

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

BID PROPOSAL NO. 1153
SECURITY CAMERA SYSTEM – BOYCE CAMPUS NORTH LOT

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, October 13, 2026.**

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 install a security camera system at Boyce Campus North Lot in accordance with specifications, drawings, terms and conditions contained herein. **THE CONTRACTOR SHOULD DEMONSTRATE EXPERIENCE WITH OVERHEAD POLE LINE WORK OUTDOORS.**

A mandatory pre-bid meeting and site visitation will be held on Thursday, October 1, 2026, at 10:00 a.m. Meet at the North Parking Lot. From 595 Beatty Road, Monroeville – pass the campus to Cooper Road, make a left onto Old Frankstown Road, then make the first left into the CCAC North Parking Lot.

Project Labor Agreement compliance is required.

For questions, contact Mike Cvetic (mccvetic@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. 1153
SECURITY CAMERA SYSTEM – BOYCE CAMPUS NORTH LOT

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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. 1153

SECURITY CAMERA SYSTEM – BOYCE CAMPUS NORTH LOT

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. 1153
SECURITY CAMERA SYSTEM – BOYCE CAMPUS NORTH LOT

BID SHEET

BASE BID

Provide all labor, material, equipment, permits, and supervision required to furnish and install a security camera system at Boyce Campus North Lot as specified herein.

Lump Sum Bid: \$ _____

Bidder's Name: _____

RETURN FORM 2.1

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

NON-COLLUSION AFFIDAVIT

Contract/Bid No. **1153**

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. 1153

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). Document your firm's good faith effort to obtain the 20% Goal:

M/W/DBE Company	M/W/D circle one	Contact Person	Phone Number	\$Amount or Objective %
_____	M W D	_____	_____	_____
_____	M W D	_____	_____	_____
_____	M W D	_____	_____	_____

_____ 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: _____

Revised: 9/14/21

RETURN FORM 4.0

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

BID PROPOSAL NO. 1153

**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. 1153

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:	Security Camera System - Boyce Campus North Lot
General Description:	Installation of several cameras in the Boyce Campus parking lot.
Project Locality	Monroeville, PA
Awarding Agency:	Community College of Allegheny County
Contract Award Date:	11/1/2026
Serial Number:	26-08423
Project Classification:	Building/Heavy/Highway
Determination Date:	9/18/2026
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: 26-08423 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	8/1/2025		\$45.10	\$30.31	\$75.41
Boilermakers	6/1/2016		\$40.90	\$27.61	\$68.51
Bricklayer	12/1/2025		\$42.00	\$26.59	\$68.59
Bricklayer	6/1/2026		\$42.65	\$26.94	\$69.59
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	6/1/2026		\$42.11	\$23.36	\$65.47
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2027		\$43.26	\$24.35	\$67.61
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2028		\$44.45	\$25.19	\$69.64
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2029		\$45.72	\$26.01	\$71.73
Cement Masons	6/1/2025		\$35.52	\$25.64	\$61.16
Cement Masons	6/1/2026		\$36.02	\$26.14	\$62.16
Drywall Finisher	6/1/2025		\$35.16	\$25.98	\$61.14
Drywall Finisher	6/1/2026		\$36.59	\$27.30	\$63.89
Electricians & Telecommunications Installation Technician	12/27/2024		\$50.86	\$32.69	\$83.55
Electricians & Telecommunications Installation Technician	12/26/2025		\$53.11	\$33.72	\$86.83
Elevator Constructor	1/1/2025		\$61.07	\$40.05	\$101.12
Elevator Constructor	1/1/2026		\$63.71	\$40.89	\$104.60
Glazier	9/1/2024		\$37.06	\$31.89	\$68.95
Glazier	9/1/2025		\$38.70	\$33.75	\$72.45
Iron Workers	6/1/2025		\$41.50	\$37.36	\$78.86
Iron Workers	6/1/2026		\$43.50	\$37.91	\$81.41
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)	1/1/2025		\$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)	1/1/2025		\$30.47	\$19.96	\$50.43
Laborers (Class 03 - See notes)	1/1/2026		\$30.97	\$20.46	\$51.43
Landscape Laborer (Skilled)	1/1/2025		\$25.79	\$18.78	\$44.57
Landscape Laborer (Skilled)	1/1/2026		\$26.79	\$19.03	\$45.82
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	1/1/2025		\$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)	6/1/2025		\$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)	6/1/2025		\$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)	6/1/2025		\$33.88	\$24.79	\$58.67

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

Project: 26-08423 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Class 03 - See notes)	6/1/2026		\$34.88	\$25.29	\$60.17
Painters Class 6 (see notes)	6/1/2025		\$34.16	\$25.81	\$59.97
Painters Class 6 (see notes)	6/1/2026		\$35.26	\$26.51	\$61.77
Piledrivers	1/1/2026		\$43.13	\$23.47	\$66.60
Plasterers	6/1/2024		\$33.14	\$21.04	\$54.18
Plasterers	6/1/2026		\$34.59	\$22.59	\$57.18
plumber	6/1/2026		\$58.05	\$25.87	\$83.92
plumber	6/1/2027		\$61.15	\$25.87	\$87.02
Pointers, Caulkers, Cleaners	12/1/2025		\$41.50	\$22.50	\$64.00
Pointers, Caulkers, Cleaners	6/1/2026		\$42.20	\$22.80	\$65.00
Roofers	12/1/2025		\$41.21	\$21.46	\$62.67
Roofers	6/1/2026		\$42.00	\$23.17	\$65.17
Sheet Metal Workers	7/1/2025		\$45.00	\$35.16	\$80.16
Sheet Metal Workers	7/1/2026		\$46.75	\$36.61	\$83.36
Sign Makers and Hangars	7/15/2025		\$33.48	\$26.41	\$59.89
Sign Makers and Hangars	7/15/2026		\$36.38	\$25.01	\$61.39
Sprinklerfitters	1/1/2026		\$46.14	\$28.30	\$74.44
Sprinklerfitters	7/1/2026		\$48.64	\$28.30	\$76.94
Steamfitters	6/1/2025		\$50.20	\$31.02	\$81.22
Steamfitters	6/1/2026		\$53.05	\$31.27	\$84.32
Stone Masons	12/1/2025		\$44.10	\$25.22	\$69.32
Stone Masons	6/1/2026		\$44.70	\$25.62	\$70.32
Terrazzo Finisher	12/1/2025		\$42.75	\$19.51	\$62.26
Terrazzo Finisher	6/1/2026		\$43.82	\$19.94	\$63.76
Terrazzo Mechanics	12/1/2025		\$42.15	\$21.76	\$63.91
Terrazzo Mechanics	6/1/2026		\$43.22	\$22.19	\$65.41
Tile Finisher	12/1/2025		\$33.99	\$18.71	\$52.70
Tile Finisher	6/1/2026		\$34.82	\$18.98	\$53.80
Tile Setter	12/1/2025		\$40.80	\$23.25	\$64.05
Tile Setter	6/1/2026		\$41.66	\$23.49	\$65.15
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)	1/1/2025		\$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: 26-08423 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter	1/1/2026		\$42.60	\$22.84	\$65.44
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	1/1/2025		\$43.38	\$22.72	\$66.10
Carpenters - Piledriver/Welder	1/1/2026		\$44.63	\$23.47	\$68.10
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	6/3/2024		\$53.97	\$31.05	\$85.02
Electric Lineman	6/2/2025		\$57.10	\$31.63	\$88.73
Electricians & Telecommunications Installation Technician	12/26/2025		\$54.16	\$32.69	\$86.85
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2025		\$41.50	\$37.36	\$78.86
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2026		\$43.50	\$37.91	\$81.41
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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$36.20	\$26.00	\$62.20
Laborers (Class 08 - See notes)	1/1/2026		\$37.20	\$27.00	\$64.20
Millwright	6/1/2025		\$49.72	\$23.72	\$73.44
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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$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)	1/1/2025		\$35.77	\$24.23	\$60.00
Operators (Class 05 - See notes)	1/1/2026		\$37.34	\$24.66	\$62.00
Operators Class 1-A	1/1/2025		\$43.39	\$24.23	\$67.62
Operators Class 1-A	1/1/2026		\$44.96	\$24.66	\$69.62

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

Project: 26-08423 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 1-B	1/1/2025		\$42.39	\$24.23	\$66.62
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)	6/1/2025		\$40.36	\$25.81	\$66.17
Painters Class 2 (see notes)	6/1/2026		\$41.66	\$26.51	\$68.17
Painters Class 3 (see notes)	6/1/2025		\$43.68	\$25.81	\$69.49
Painters Class 3 (see notes)	6/1/2026		\$45.08	\$26.51	\$71.59
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)	1/1/2025		\$62.82	\$22.72	\$85.54
Pile Driver Divers (Building, Heavy, Highway)	1/1/2026		\$64.70	\$23.47	\$88.17
Piledrivers	1/1/2025		\$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)	1/1/2026		\$37.93	\$23.71	\$61.64
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, recognition strike slowdown, sabotage, work to rule, sickout, sitdown, picketing of any type (including informational picketing), handbidding, 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.

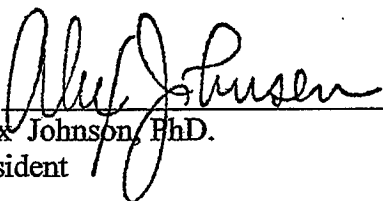
Section 2. Force of Agreement. The parties recognize the right of the CCAC to withdraw, at its absolute discretion, the utilization of this Agreement as part of any bid specification should a court of competent jurisdiction issue any order which could result, temporarily or permanently, in delay of the 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.

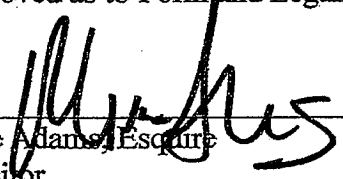
This Agreement replaces, in its entirety, that certain Labor Stabilization Agreement approved by the CCAC and the BCTC dated the 21st day of June, 1993 that covers all construction projects for which the CCAC acts as Owner.

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**

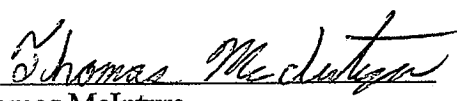
By 
Alex Johnson, PhD.
President

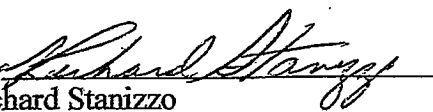
Approved as to Form and Legality:

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

SECRETARY PRESIDENT (SEAL)

Signed, Sealed and delivered in presence of

SURETY COMPANY (SEAL)

ADDRESS (SEAL)

TITLE (SEAL)

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.

Original - January 1980

MASTER SERVICES AGREEMENT

“Awardee Only”

Bid 1153

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: Cathy Jacobs

Signature: _____

Signature: _____

Title: _____

Title: Vice President of Finance and CFO

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 1153

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.

INDEX TO TECHNICAL SPECIFICATIONS FOR ELECTRICAL SERVICES

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SECTION 01000

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SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1. 01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and all other Division 1 specification sections apply to work of this section.
- B. A mandatory pre-bid meeting will be held on the construction Site. The date and time is indicated on the Invitation to Bid sheet. All prospective bidders MUST attend.

1.2 SITE

- A. The location of the Project is the Boyce Campus for Community College of Allegheny County.
- B. The College will designate an area adjacent to the building for use by the Contractor for a dumpster, a job trailer, a staging area and/or for storage. Protection and security of materials is the responsibility of the Contractor.
- C. Parking for Contractors' vehicles will be designated by the Owner in the College parking lots.

1.3 USE OF PREMISES

- A. Interior spaces will be occupied throughout the construction phase.
- B. Prior to the start of work, Contractor shall develop a phasing schedule for the implementation of the work. Owner will cooperate with the Contractor in providing access to a given area as work proceeds according to the phasing schedule.

SECTION 01000

Section 01000 - Page 01000-2

- C. Contractor shall take all necessary precautions to minimize disruptions to the Owner's on-going operations and maintain a safe environment for the Owner's employees and customers.
- D. Protect furniture, equipment and existing finishes.
- E. Remove from the building on a daily basis all demolished materials and construction debris.

Contact Persons

For IT Primary	Jason Ricci	412-237-3066
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For Facilities	Dan Devine	724-325-6765
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For H.F. Lenz Engineers	Chuck Urso	412-371-9073
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Boyce Campus Security		724-325-6653
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PART 2 PRODUCTS

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01100

Section 01100 - Page 01100-1

SUMMARY PART 1-GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Identification of the Project Owner, Engineer and the Contract Documents.
 - 2. Work covered by the contractor.
 - 3. Use of Premises.
 - 4. Owner's occupancy requirements.
 - 5. Work Restrictions.

1.3 CONTRACTS

Without force or effect on the Contract Documents, the work may generally be described as follows:

1.4 SCHEDULE AND DELIVERY OF THE WORK

The Contractor will publish a schedule as part of the bidding documents, detailing the anticipated commencement date of the Work and required date of Substantial Completion. The Contractor(s) shall schedule and coordinate activities required by the Work to align with stated delivery dates.

1.5 USE OF PREMISES

- A. Contractor(s) shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.
1. Contractor(s) shall establish an area at the work site as may be feasible for conducting their operations, as agreed upon by the Construction Manager and the Owner.
 2. The Contractor shall be responsible for determining the route that construction traffic shall use to the work areas and insuring that adjacent areas are protected against damage, dust and noise.
 3. The Contractor(s) shall be responsible for the erection of temporary barriers as required to separate areas under construction or demolition from occupied areas.
 4. The Owner, within its facilities, will furnish electricity for construction purposes free of charge to the Contractor(s). Electric shall not be used for temporary heat.
 5. The Owner will provide water for construction purposes at no cost to the Contractor(s).
 6. The Contractor(s)' working hours shall be in accordance with a schedule approved by the Construction Manager. Should evening hours or weekend work be required, this work must be fully coordinated with the Construction Manager in advance of scheduling the off-hours work.
 7. The Construction Manager is responsible for the overall coordination construction activities.
 8. The Contractor(s) will be required to use private phones or cell phones at their own cost and expense.
 9. The Contractors(s) shall not use other than approved designated work areas for storage of materials. Storage of combustibles will not be permitted within building.
 10. Use of the Owner's dumpsters for disposal of waste materials is prohibited.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

- A. Partial Occupancy: The Owner will occupy the premises during entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate the Owner's usage. Perform the work so as not to interfere with use of the premises.
 - 1. Maintain access to existing walkways, in as much as practical, and other adjacent occupied or used facilities.
 - 2. Construction access to work area shall not be routed through a finished or occupied space without authorization and appropriate protection of finishes.

1.7 Provide not less than 72 hours' notice to the Owner of activities that will affect site occupied areas or activities.

1.8 SHUTDOWN OF UTILITIES

Not applicable.

1.9 NOISE AND VIBRATION CONTROL

- A. In most instances, noise control will be a matter of prime concern. It is therefore mandatory that equipment such as compressors, generating equipment, etc. be fitted with mufflers or other noise abatement attachments.
- B. Coordinate the scheduling and use of noise/vibration-producing equipment with the Construction Manager.

1.10 OWNER OWNED EQUIPMENT

- A. The use of Owner-owned equipment is prohibited. It shall be the responsibility of Contractors performing work at the Owner to provide tools, equipment and materials necessary to perform the work.

1.11 JOB SITE SECURITY

- A. Job site security will not be provided by the Owner. The Owner assumes no responsibility for damage or loss to any Contractor's property.

1.12 PERSONNEL SAFETY AT THE SITE OF THE WORK

- A. The Construction Manager shall maintain a safe work site, free of debris, hazardous materials and monitor daily conditions of other Contractors, notifying them of any potentially dangerous or unsafe condition to both workers and the public.
- B. The Construction Manager shall furnish, supply and maintain an OSHA approved first aid station at the work site.
 - 1. Post a list of emergency responders' telephone numbers if different than "911".
 - 2. Provide a telephone line or portable telephone accessible at all times of operations within 25 feet of the emergency first aid station.
 - 3. Maintain a detailed log of all incidents, injuries and other mishaps at the work site.
 - Provide a weekly written report of such occurrences to the Owner, including the date and time, the individual involved, the nature of the incident and the action taken to render assistance.
- C. Each Contractor shall enforce prevailing laws and regulations, including, but not limited to OSHA as may be applicable to the respective trade.

1.13 PERSONNEL CONDUCT AT THE SITE OF THE WORK

A. No-Smoking Policy

The use of tobacco products, including smokeless products is prohibited.

B. Drug-Free Work Environment

1. The Owner's policy prohibiting use of illegal substances shall be strictly enforced at the jobsite. No alcoholic beverages shall be permitted at the jobsite.
2. Violation of this policy will result in immediate and permanent dismissal of the offensive individual from the jobsite.

C. Harassment of Personnel

1. The Owner's policy prohibiting harassment of personnel and other workers shall be strictly enforced at the jobsite. This includes the use of profanity, derisive or demeaning language or any other action, physical or verbal, against another individual, regardless of age, ethnicity, or sexual orientation.
2. Violation of this policy will result in immediate and permanent dismissal of the offensive individual from the jobsite.

1.14 DELIVERIES AND STORAGE

- A. Store equipment and materials delivered to the work site will at Owner approved locations.
- B. The Contractor(s) will coordinate with the Construction Manager for delivery of construction materials. The Contractor(s) will keep access to the building unobstructed at all times.

1.15 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 35-division format and CSI's "MasterFormat" numbering system.

- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words and phrases when used in particular situations.
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

END OF SECTION

SUMMARY OF PROJECT

SECTION 01010

Section 01010 - Page 01010-1

SUMMARY OF PROJECT

PART 1 GENERAL

- 1. 01 REQUIREMENTS INCLUDED
 - A. Title of Project, Type of Contracts and Work of each Separate Contract
 - B. Work by Others and Future Work
 - C. Work Sequence
 - D. Contractor use of Premises
 - E. Owner Occupancy
 - F. Owner-furnished Items
 - G. Field Engineering
 - H. Coordination
 - I. Reference Standards
 - J. Project Meetings
- 1.2 RELATED WORK
 - A. General Conditions, Special Conditions, Instructions to Bidders
 - B. Section 01041 - Project Coordination: Coordination of work of separate contracts

SUMMARY OF PROJECT

Section 01010 - Page 01010-2

1.3 CONTRACTS

- A. Perform work of a single prime contract with Owner to include the following: Electrical Construction.

1.4 ADMINISTRATIVE & PROCEDURAL SECTIONS APPLICABLE TO ALL PRIME CONTRACTS

- A. Section 01010 - Summary of Project
- B. Section 01031 - Alteration Project Procedures
- C. Section 01041 - Project Coordination
- D. Section 01045 - Cutting and Patching
- E. Section 01152 - Applications for Payment
- F. Section 01153 - Change Order Procedures
- G. Section 01200 - Project Meetings
- H. Section 01300 - Submittals
- I. Section 01500 - Construction Facilities & Temporary Controls
- J. Section 01540 - Security: Security Program
- K. Section 01600 - Material & Equipment: Storage & Protection Product Options and Substitutions
- L. Section 01670 - Systems Demonstration
- M. Section 01700 - Contract Closeout
- N. Section 01710 - Cleaning
- O. Section 01730 - Operations & Maintenance Data
- P. Section 01740 - Warranties & Bonds

1.5 TEMPORARY FACILITIES & SERVICES APPLICABLE TO PRIME CONTRACTS

- A. Section 01500 - Temporary Electricity, Temporary Lighting, Temporary Telephone, Temporary Water, Sanitation Facilities, Construction Aids and Temporary Enclosures.
- B. Section 01500 - Construction Cleaning; Cleaning of Contract Work; delivery of debris to collection receptacles.

1.6 CONTRACT FOR CONSTRUCTION

- A. Contract Drawings

1.7

WORK SEQUENCE

- A. Construct work in stages to accommodate College's intended use of the facilities. Coordinate Progress Schedule and coordinate with College during the work so there is no disruption of existing services.
 - 1. Each day all areas shall be returned to a condition that is acceptable to the College to conduct normal operations.
- B. It is the intent of the College to occupy work areas to conduct normal operations and business during the normal work day. The Contractors shall schedule work so that it does not effect the College's day-to-day operations.
- C. No disruption of existing services shall be permitted unless coordinated with the CCAC Project Manager. Contractor shall be responsible to restore services immediately to existing systems for any failure directly or indirectly due to work being performed under this Contract.

1.8

CONTRACTOR USE OF PREMISES

- A. Contractor shall limit their use of premises to construction activities in the areas indicated and allow for College occupancy and use by the public of adjacent areas as well as construction areas during College's normal business hours.
- B. Coordinate use of premises under direction of the Prime Contractor.
- C. Assume full responsibility for protection and safekeeping of products under this Contract.
- D. Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

SUMMARY OF PROJECT

Section 01010 - Page 01010-4

- E. Contractor shall maintain safe egress and ingress to all areas of the building for occupants and visitors.
- F. The use of specific existing toilets within the building by the Contractor or their personnel will be permitted. Toilet areas are to be maintained by the Contractor.
- G. Confine Operations at the site to areas permitted by Law, Ordinances, Permits, and the Contract documents
- H. Unreasonable encumbrance to the site with materials and equipment is not permitted.
- I. Loading the structure with weight that will endanger structure is not permitted.
- J. Responsibility for protection and safekeeping of products stored on the premise is the Contractor's.
- K. Stored products that interfere with operations of Owner or other contractor shall be moved.
- L. Additional storage or work areas needed for operations shall be obtained and paid by Contractor.
- M. Use of site for storage shall be limited.

1.1 0 OWNER OCCUPANCY

- A. Owner will occupy the premises during the entire period of construction for the conduct of his normal operations. Cooperate with College so as not to interfere or disrupt normal operations of the College. Any work which will require complete occupation of an area by the Contractor for accomplishment and not permit normal function of the College operations within the area will be accomplished outside of the regular College's working hours and must be scheduled not less than seventy-two (72) hours in advance.

SUMMARY OF PROJECT

Section 01010 - Page 01010-5

- B. Contractor to minimize conflict and to facilitate Owner operations. Perform the work so as not to interfere with the College's operations including operation that will produce disruptive noise levels.

1.1 1 FIELD ENGINEERING

- A. The Contractor shall obtain all required permits and submit copies of same to Project Manager.

1.12 COORDINATION N/A

1.13 REFERENCE STANDARDS

- A. For Products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, except when a specific date is specified.

- C. Obtain copies of standards when required by Contract Documents. Maintain copy at job site during progress of the specific work.

1.14 PROJECT MEETINGS

- A. Attend project meetings throughout progress of the work: Construction meetings and progress meetings as required by Owner.
- B. Suggested Agenda: Review of work progress, status of progress schedule and adjustments thereto, delivery schedules, submittals, maintenance of quality standards, pending changes and substitutions and other items affecting progress of the work.

PART 2 PRODUCTS

2.1 1 PRODUCT QUALITY

- A. All products and materials provided for this Project shall be new, of the best quality available and similar to existing items and materials except where higher quality and characteristics are required to fulfill the intent of the Project.

PART 3 EXECUTION

3.1 1 INSTALLATION

- A. All work shall be scheduled and coordinated with the Owner's Project Manager to meet the following requirements:
 - 1. Minimum practical interference with Owner's normal operations and special needs.
- B. All work shall be done using techniques that minimize dirt, disruption, noise and down time in all areas and systems.

END OF SECTION

SECTION 01031

Section 01031 - Page 01031-1

ALTERATION PROJECT PROCEDURES

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED

- A. The Prime Contractor will coordinate work of trades and schedule elements of alterations and renovation work by procedures and methods to expedite completion of the work.
- B. Patch, repair and refinish existing items to remain to the specified condition for each material with a workmanlike transition to adjacent new items of construction.
- C. No work on this project will jeopardize, reduce, eliminate or in any way effect existing warranties or guarantees now in place for this building or its building envelope or systems.

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Project
- B. Section 01045 - Cutting and Patching
- C. Section 01300 - Submittals
- D. Section 01500 - Construction Facilities & Temporary Controls
- E. Section 01540 - Security
- F. Section 01710 - Cleaning

1.3 SEQUENCE AND SCHEDULES

- A. Schedule work as specified in Section 01010.
- B. Submit separate detailed subschedule for Alterations work, coordinated with the Construction Schedules. Show:
 - 1. Each stage of work, and dates of occupancy of areas.
 - 2. Date of Substantial Completion for each area of alterations work, as appropriate.
 - 3. Trades and subcontractors employed in each stage.

- 1.4 ALTERATIONS, CUTTING AND PROTECTION
- A. Assign the work of moving, removal, cutting and patching to trades qualified to perform the work in a manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.
 - B. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work.
 - 1. Perform cutting and patching as specified in Section 01045.
 - C. Protect existing finishes, equipment and adjacent work that is scheduled to remain from damage.
 - 1. Protect existing and new work from weather and extremes of temperature.
 - a. Provide weather protection, waterproofing, heat and humidity control as needed to prevent damage to remaining existing work and to new work.
 - D. The Contractor shall provide temporary enclosures as specified in Section 01500, to separate work areas from the existing building and from areas occupied by Owner and to provide weather protection.
 - E. Discoveries of construction, having a historic or private value shall remain in the possession of Owner.
 - 1. Promptly notify Owner.
 - 2. Protect discovery from damage from elements or work.
 - 3. Contractor shall store items to be retained by Owner in a safe, dry place on site, or shall dispose of items which Owner releases.

PART 2 PRODUCTS

2.1 1 SALVAGED MATERIALS

- A. Salvage sufficient quantities of cut or removed material to replace damaged work of existing construction, when material is not readily obtainable on current market.
 - 1. Store salvaged items in a dry, secure place on site.
 - 2. Items not required for use in repair of existing work shall remain the property of Owner.
 - 3. Do not incorporate salvaged or used material in new construction except with permission of College.
 - 4. Dispose of items which are not retained or scheduled for reuse.

2.2 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING

- A. General Requirements that work be complete:
 - a. Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work. Weather dependent and temperature.
 - b. Generally Contract Documents will not define products or standards of workmanship present in existing construction; Contractor shall determine products by inspection and any necessary testing, and workmanship by use of the existing as a sample of comparison. 2. Presence of a product, finish or type of construction requires that patching, extending or matching shall be performed as necessary to make-work complete and consistent to identical standards of quality.

PART 3 EXECUTION

3.1 1 PERFORMANCE

- A. Patch and extend existing work using skilled mechanics who are capable of matching existing quality of workmanship approved by the manufacturer. Quality of patched or extended work shall be not less than that specified for new work.

3.2 ADJUSTMENTS

N/A

3.3 DAMAGED SURFACES

- A. Patch and replace any portion of an existing finished surface which is found to be damaged, lifted, discolored or show other imperfections, with matching material.
 - 1. Provide adequate support of substrate prior to patching the finish.
 - 2. Refinish patched portions or painted or coated surfaces in a manner to produce uniform color and texture over entire surface.
 - 3. When existing surface finish cannot be matched, refinish entire surface to nearest intersections.

3.4 TRANSITION FROM EXISTING TO NEW WORK

- A. When new work abuts or finishes flush with existing work, make a smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance so that the patch or transition is invisible at a distance of five (5) feet.
 - 1. When finished surfaces are cut in such a way that a smooth transition with new work is not possible, terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface.

3.5 CLEANING

- A. Perform periodic and final cleaning as specified in Section 01700.
 - 1. Clean areas daily to a degree which will permit normal continued and unimpaired building functions and operations.
- B. At completion of work of each trade, clean area and make surfaces ready for work of successive trades.
- C. At completion of alterations work in each area, provide final cleaning and return space to a condition suitable for use by Owner.

END OF SECTION

SECTION 01041

Section 01041 - Page 01041-1

PROJECT COORDINATION

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED

- A. The Prime Contractor will coordinate the work for the Project and expedite his work to assure compliance with schedules.

1.2 RELATED REQUIREMENTS

- A. Conditions of the Contract
- B. Section 01010 - Summary of Work
- C. Section 01045 - Cutting and Patching
- D. Section 01152 - Applications for Payments
- E. Section 01200 - Project Meetings
- F. Section 01300 - Submittals
- G. Section 01700 - Contract Closeout
- H. Section 01710 - Cleaning

1.3 CONSTRUCTION ORGANIZATION AND START UP

- A. Contractor shall establish on-site lines of communications:
 - 1. Obtain permits, approvals and final inspection reports:
 - a. Building permits and special permits required for work or for temporary facilities.
 - b. Verify that subcontractors have obtained inspections for work and for temporary facilities.
 - 2. Control the use of site:
 - a. Supervise field engineering and site layout.
 - b. Allocate space for each subcontractor's use for field offices, sheds and work and storage areas.
 - c. Establish access, traffic and parking allocations and regulations.
 - d. Monitor use of site during construction.

- 1.4 PRIME CONTRACTOR DUTIES
- A. Construction Schedules:
 - 1. Coordinate schedules of all subcontractors.
 - 2. Schedule and hold coordination meetings with the subcontractors to review areas of work and potential problems with work and or schedules.
 - 3. Coordinate the preparation of a detailed overall schedule of basic operations.
 - 4. Monitor schedules as work progresses:
 - a. Identify potential variances between schedules and probable completion dates for each phase of work.
 - b. Recommend to Owner adjustments in schedule to meet required completion dates.
 - c. Adjust schedules as required.
 - d. Document changes in schedule, submit to Owner and to involved subcontractors.
 - B. Prepare coordination Drawings as required to resolve conflicts and to assure coordination of the work.
 - 1. Submit to College.
 - 2. Reproduce and distribute copies to concerned parties after College review.
 - C. Monitor periodic cleaning:
 - 1. Enforce compliance with Specifications.
 - 2. Resolve any conflicts.
 - D. Maintain Reports and Records at Job Site, make available to College.
 - 1. Daily log of progress of work of each subcontractor.

2. Records:
 - a. As-built Drawings
 - b. Contracts
 - c. Purchase Orders
 - d. Materials and Equipment Records
 - e. Applicable handbooks, codes and standards.
 - f. Copies of Permits
3. Obtain information and maintain file of record documents.
4. Assemble documentation for handling of claims and disputes.

1.5 CONTRACTOR CLOSE OUT DUTIES

- A. At completion of work, conduct an inspection to assure that:
 1. Specified cleaning has been accomplished.
 2. Temporary facilities have been removed from site.
- B. Substantial completion:
 1. Conduct an inspection to confirm or supplement subcontractor's list of work to be completed or corrected.
 2. Assist College in inspection.
 3. Supervise correction and completion of work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01045

Section 01045 - Page 01045-1

CUTTING & PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements and limitations for cutting and patching of work.

1.2 RELATED SECTIONS

- A. Section 01031 - Alteration Project Procedures
- B. Section 01300 - Submittals
- C. Section 01600 - Materials & Equipment: Product Options and Substitutions.
- D. Individual Product Specification Sections:
 - 1. Cutting and patching incidental to work of the Section.
 - 2. Advance notification to other Sections of openings required to work of those Sections.
 - 3. Limitations on cutting structural support members.
 - 4. Third Floor Server Room Special Precautions All Applications.

1.3 SUBMITTALS

- A. Submit written request in advance of cutting or alteration which affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather-exposed or moisture-resistant element.
 - 3. Efficiency, maintenance or safety of any operational element.
 - 4. Visual quality of sight exposed elements.
 - 5. Work of Owner or separate Contractor.
- B. Include in request:
 - 1. Identification of Project.
 - 2. Location and description of affected work.
 - 3. Necessity for cutting or alteration.
 - 4. Description of proposed work and products to be used.
 - 5. Alternatives to cutting and patching.
 - 6. Effect on work of Owner or separate Contractor.
 - 7. Written permission of affected separate

CUTTING & PATCHING

Contractor.

8. Date and time work will be executed.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Primary Products: Those required for original installation.
- B. Product Substitution: For any proposed change in materials, submit request for substitution under provisions of Section 01600.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching.
- B. After uncovering existing work, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

- A. Provide temporary supports to ensure structural integrity of the work. Provide devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.

3.3 CUTTING AND PATCHING

- A. Execute cutting, fitting and patching including excavation and fill to complete work.
- B. Fit products together to integrate with other work.
- C. Uncover work to install ill-timed work.
- D. Remove and replace defective or nonconforming work.
- E. Remove samples of installed work for testing when requested.
- F. Provide openings in the work for penetration of electrical work.

3.4 PERFORMANCE

- A. Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
- B. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- C. Restore work with new products in accordance with requirements of Contract Documents. Fit work to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- D. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01152

Section 01152 - Page 01152-1

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Submit Applications for Payment to Owner in accord with the schedule established by Conditions of the Contract and Agreement.
- 1.2 RELATED REQUIREMENTS
 - A. Agreement between Owner and Contractor
 - B. Conditions of the Contract
 - C. Section 01153 - Change Order Procedures
 - D. Section 01300 - Submittals
 - E. Section 01700 - Contract Closeout
- 1.3 FORMAT AND DATA REQUIRED
 - A. Submit original, engineer signature, notarized and itemized applications typed on AIA Document G702, Application and Certificate for Payment, and continuation sheets G702A to:

Community College of Allegheny County
Attention Richard A. Schlegel
Facilities Management Division
800 Allegheny Avenue
Pittsburgh, PA 15233
 - B. Provide itemized data on continuation sheet:
 1. Format, schedules, line items and value; those of the Schedule of Values accepted by Owner.
- 1.4 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT
 - A. Application Form:
 1. Fill in required information, including that for approved Change Orders executed prior to date of submittal of application.
 2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
 3. Execute certification with signature of a responsible officer of Contract firm.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of Work with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or product stored.
 - a. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each approved Change Order executed prior to date of submission, at the end of the continuation sheets.
 - a. List by Change Order Number, and description, as for an original component item of work.

C. Retainage

1. The Contractor shall indicate a percentage of the completed work and stored material retained in each application for payment.
2. The retainage shall be calculated from Line Item 4 "Total Completed and Stored to Date" with the breakdown shown in Line Item 5a and 5b according to the following schedule:

<u>Contract Work Completed</u>	<u> </u>	<u>Retained Amount</u>
0 - 100%		10%

3. The Contractor may request in writing a reduction of retainage as job conditions warrant.
4. The College will reserve the right to approve or reject the reduction of retainage based upon the values shown in the Continuation Sheet G-703 which are in excess of the actual work completed or items which may effect the job progress or completion.

1.5 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

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1. Project
2. Application number and date
3. Detailed list of enclosures
4. For stored products:
 - a. Item number and identification as shown on application.
 - b. Description of specific material.
- B. Submit one copy of data and cover letter for each copy of application.

1.6 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application Form as specified for progress payments.
 1. Use continuation sheet for presenting the final statement of accounting as specified in Section 01700 - Contract Closeout.

1.7 SUBMITTAL PROCEDURE

- A. Submit AIA G702 Applications for Payment to Owner and project Engineer.
- B. Number: One (1) original, notarized Application for Payment.
- C. When Owner finds Application properly completed and correct, he will process for payment.

1.8 REFUND OF SALES TAX

- A. Access to Accounting Records - The Contractor shall check all materials, equipment and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement and the system shall be satisfactory to the Owner. The Owner, its representative or any regulatory agency shall be afforded access to all the Contractor's records, books, correspondence, instructions, Drawings, receipts, vouchers, memoranda and similar data relating to this Contract and the Contractor shall preserve all such records for a period of three years, or for such longer period as may be required by law, after the final payment.

- B. Assignment of Refund Rights - The Contractor agrees to assign and transfer to the Owner all its rights to sales and use tax which may be refunded as a result of a claim for refund for materials purchased in connection with this Contract. The Contractor further agrees that it will not file a claim for refund for any sales or use tax which is the subject of this assignment.
- C. Contracts with Subcontractors - The Contractor agrees to include the "Access to Accounting Records" and "Assignment of Refund Rights" paragraphs in full in any contracts with subcontractors.

1.9 TAXES

- A. Owner 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 successful Bidder's responsibility to pay any/all applicable taxes on nonexempt equipment, supplies and services in accordance with applicable law.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01153

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CHANGE ORDER PROCEDURES

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Promptly implement change order procedures.
 1. Provide full written data required to evaluate changes.
 1. Maintain detailed records of any work authorized to be done on a time-and-material account basis.
 2. Provide full documentation for Owner on request.
 - B. Designate in writing the member(s) of Contractor's organization.
 1. Who is authorized to accept changes in the Work.
 2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the work.
 - C. Only the Director of the Owner's Facilities Management Division or his designated representative can authorize changes to Contract.
 - D. Only fully documented, written change orders will be processed for payment. Any work performed without this approval process will be at the Contractor's expense.
- 1.2 RELATED REQUIREMENTS
 - A. Conditions of the Contract:
 1. Methods of determining cost or credit to Owner resulting from changes in Work.
 2. Contractor's claims for additional costs.
 - C. Section 01152 - Applications for Payment
 - D. Section 01300 - Submittals
 - E. Section 01600 - Materials and Equipment
 - F. Section 01700 - Contract Closeout

1.3 DEFINITIONS

- A. Change Order: Any change to the original Contract agreement.
- B. Construction Change Authorization, AIA Document G713: A written order to the Contractor, signed by Owner, which amends the Contract Documents as described, and authorized Contractor to proceed with a change which affect the Contract Sum or the Contract Time, for inclusion in a subsequent Change Order.

1.4 PRELIMINARY PROCEDURES

- A. College may initiate changes by submitting a Proposal Request to Contractor. Request will include:
 - 1. Detailed Description of the Change, Products, and location of the change in the Project.
 - 2. Supplementary or revised Drawings and Specifications.
 - 3. The projected time span for making the change and a specific statement as to whether overtime work is, or is not authorized.
 - 4. A specific period of time during which the requested price will be considered valid.
 - 5. Such request is for information only, and is not an instruction to execute the changes, nor to stop work in progress.
- B. Contractor may initiate changes by submitting a written notice to Owner containing:
 - 1. Description of the proposed changes.
 - 2. Statement of the reason for making the changes.
 - 3. Statement of the effect of the Contract Sum and the Contract Time.
 - 4. Statement of the effect on the work of separate Contractors.
 - 5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.5 CONSTRUCTION CHANGE AUTHORIZATION

- A. College may issue a construction change authorization for Contractor to proceed with a change for subsequent inclusion in a Change Order.
- B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the Change, and will designate the method of determining any change in the Contract Sum and any change in Contract Time.
- C. Owner will sign and date the Construction Change Authorization as authorization for the Contractor to proceed with the changes.
- D. Contractor may sign and date the Construction Change Authorization to indicate agreement with the terms therein.
- E. Markups on Change Order requests shall not exceed fifteen (15) percent. This applies to overhead and profit, labor, materials, equipment, etc.

1.6 DOCUMENTATION OF PROPOSAL AND CLAIMS

- A. Support each quotation for a lump sum proposal with sufficient substantiating data to allow Owner to evaluate the quotation.
- B. On request provide additional data to support time and cost computations:
 - 1. Labor required
 - 2. Equipment required
 - 3. Products required
 - a. Recommended source of purchase and unit cost
 - b. Quantities required
 - 4. Taxes, insurance and bonds
 - 5. Credit for work deleted from Contract, similarly documented
 - 6. Overhead and profit
 - 7. Justification for any change in Contract Time
- C. Document request for substitutions for Products as specified in Section 01600 - Material and Equipment.

1.7 PREPARATION OF CHANGE ORDERS

- A. Owner will prepare each change order.
- B. Form: Change Order: AIA Document G701.
- C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.8 LUMP SUM/FIXED PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
 - 1. College's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
 - 2. Contractor's Proposal for a change, as recommended by College.
- B. Owner will sign and date the Change Order as authorization for the Contractor to proceed with the Changes.
- C. Contractor may sign and date the Change Order to indicate agreement with the terms therein.

1.9 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of work, and to record the adjusted Contract Sum.
- B. Periodically revise the Construction Schedule to reflect each change in Contract Time.
 - 1. Revise subschedules to show changes for other items of work affected by the changes.
- C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

END OF SECTION

SECTION 01200

Section 01200 - Page 01200-1

PROJECT MEETINGS

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. College shall schedule and administer preconstruction meeting, periodic progress meetings and specially called meetings throughout progress of the work.
 1. Prepare agenda for meetings.
 2. Distribute written notice of each meeting.
 3. Preside at meetings.
 4. Record the Minutes: include significant proceedings and decisions.
 5. Reproduce and distribute copies of minutes after each meeting.
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meeting.
 - B. Representatives of Contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- 1.2 RELATED REQUIREMENTS
 - A. Instructions to Bidders
 - B. Section 01300 - Submittals
 - C. Section 01720 - Project Record Documents
 - D. Section 01730 - Operating and Maintenance Data
- 1.3 PRECONSTRUCTION MEETING
 - A. Schedule within 15 days after date of Notice to Proceed.
 - B. Location: Project site.
 - C. Attendance:
 1. Project Manager
 2. Physical Plant Supervisor
 3. Contractor's Superintendent
 4. Major Subcontractors as Appropriate
 5. Project Engineer
 6. Others as appropriate

D. Agenda:

1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected Construction schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project Coordination
 - a. Designation of responsible personnel.
5. Procedures and processing of:
 - a. Field Decisions
 - b. Proposal Requests
 - c. Submittals
 - d. Change Orders
 - e. Applications for Payment
6. Distribution of Contract Documents
7. Procedures for Maintaining Record Documents
8. Use of premises:
 - a. Office, Work and Storage Areas
 - b. Owner's Requirements
9. Construction Facilities, Controls and Construction Aids
10. Temporary Utilities
11. Safety and First-aid Procedures
12. Security Procedures
13. Housekeeping Procedures

1.4 PROGRESS MEETINGS

- A. Schedule regular periodic meetings, as required.
- B. Hold called meetings as required by progress of the work.
- C. Location of the meetings: Project field office.

END OF SECTION

SUBMITTALS

SECTION 01300

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SUBMITTALS

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Procedures
 - B. Construction Progress Schedules
 - C. Schedule of Values
 - D. Shop Drawings
 - E. Product Data
 - F. Samples
 - G. Manufacturer's Certificates
- 1.2 RELATED REQUIREMENTS
 - A. Section 01010 - Summary of Project
 - B. Section 01152 - Applications for Payment: Submittal of Applications
 - C. Section 01600 - Material and Equipment: Manufacturers' Instructions Substitutions and Product Options: Contractor's List of Products
 - D. Section 01700 - Contract Closeout: Closeout Submittals
- 1.3 PROCEDURES
 - A. Deliver six (6) copies of submittals to Project Manager at address listed in Section 01152, paragraph 1.03, A.
 - B. Transmit each item under AIA Form 810. Identify Project, Contractor, subcontractor, major supplier; identify pertinent Drawing sheet and detail number, and Specification section number, as appropriate. Identify deviations from Contract Documents. Provide space for Owner/Engineer review stamps.
 - C. Submit initial Project schedule, progress schedules, schedule of values, shop Drawings and product data as required no later than 15 days after award of Contract. After review by College, revise and resubmit as required. Submit revised schedules with each Application for Payment reflecting changes since previous submittal.
 - D. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

SUBMITTALS

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- E. After College review of submittal, revise and resubmit as required, identifying changes made since previous submittal.
- F. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.4 CONSTRUCTION PROGRESS SCHEDULE

- A. Submit horizontal bar chart with separate bar for each major trade or operation, identifying first work day of each week.
- B. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Show projected percentage of completion for each item of Work as of time of each progress Application for Payment.
- C. Show submittal dates required for Shop Drawings, Product Data, and Samples and Product delivery dates.
- D. Submit progress schedule in duplicate.

1.5 SCHEDULE OF VALUES

- A. Submit typed schedule of AIA Form G703, in Duplicate. Schedule of Values is to be submitted and approved by the College prior to any Application for Payment.
- B. Format: Table of Contents of the Project Manual. Identify each line item with number and title of the major Specification sections.
- C. Include in each line item a directly proportional amount of Contractor's overhead and profit.
- D. Provide a subschedule for each separate stage of Work.
- E. Revise schedule to list change orders, for each application for payment.

1.6 SHOP DRAWINGS

- A. Submit the number of opaque reproductions which Contractor requires, plus three (3) copies which will be retained by College.

SUBMITTALS

Section 01300 - Page 01300-3

1.7 PRODUCT DATA

- A. Mark each copy to identify applicable Products, models, options and other data; supplement manufacturers' standard data to provide information unique to the Work. Include manufacturers' installation instructions when required by the Specification section.
- B. Submit the number of copies which Contractor requires, plus three copies which will be retained by College.

1.8 MANUFACTURERS' CERTIFICATES

- A. Submit certificates, in duplicate.

1.9 MBE & WBE UTILIZATION

- A. Submit monthly MBE and WME reports for Contractor to the Project Manager.
- B. These are to be submitted with the Contractor's Request for Payment but no less than monthly.

1.10 EEO

- A. Submit monthly reports as required showing number of employees for Contractor and subcontractors to the Project Manager.
- B. These are to be submitted with the Contractor's request for payment but not less than monthly.

1.11 CERTIFIED PAYROLLS

- A. Contractors, subcontractors and all lower tier subcontractors shall submit weekly certified payrolls to the Project Manager.

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

SECTION 01340

Section 01340 - Page 01340-1

SHOP DRAWINGS, PRODUCT DATA & SAMPLES

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Procedures for submittals.

1.2 SHOP DRAWINGS

- A. Present in a clear and thorough manner. Title each drawing with Project name and number; identify each element of drawing by reference to sheet number and detail, schedule or room number of Contract Documents.
- B. Identify field dimensions; show relation to adjacent or critical features, work or products.

1.3 CONTRACTOR REVIEW

- A. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers and conformance of submittal with requirements of Contract Documents.
- B. Coordinate submittals with requirements of Work and of Contract Documents.
- C. Sign or initial each sheet of shop drawings and product data and each sample label to certify compliance with requirements of Contract Documents. Notify College in writing at time of submittal of any deviations from requirements of Contract Documents.
- D. Do not fabricate products or begin work which requires submittals until return of submittal with Engineer's acceptance.

1.4 SUBMITTAL REQUIREMENTS

- A. Transmit submittals in accordance with approved Progress Schedule and in such sequence to avoid delay in the Work.

- B. Coordinate submittals into logical groupings to facilitate interrelation of the several items:
 - 1. Finishes which involve College selection of colors, textures or patterns.
 - 2. Associated items which require correlation for efficient function or for installation.
- C. Submit one (1) reproducible transparency and one (1) opaque copy of shop drawings.
- D. Submit number of copies of product data and manufacturer's instructions Contractor requires, plus three (3) copies which will be retained by College.

1.5 COLLEGE REVIEW

- A. College will review shop drawings, product data and samples and return submittals within three (3) workdays.

1.6 DISTRIBUTION

- A. Duplicate and distribute reproductions of shop drawings, copies of product data and samples which bear College stamp of approval, to job site file, Record documents file, subcontractors, suppliers, other affected Contractors and other entities requiring information.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION

SECTION 01400

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QUALITY CONTROL

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. General Quality Control
 - B. Testing Laboratory Services
- 1.2 RELATED REQUIREMENTS
 - A. Section 01010 - Summary of Work
 - B. Section 01300 - Submittals: Submittal of Manufacturer's Instruction
- 1.3 QUALITY CONTROL, GENERAL
 - A. Maintain quality control over suppliers, manufacturers, products, services, site conditions and workmanship to produce work of specified quality.
- 1.4 WORKMANSHIP
 - A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
 - B. Perform work by persons qualified to produce workmanship of specified quality.
 - C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration and racking.
- 1.5 MANUFACTURERS' INSTRUCTIONS
 - A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Owner before proceeding.
- 1.6 MANUFACTURERS' CERTIFICATES
 - A. When required by individual Specifications Section, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in respective Specification Section, provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, test and to make appropriate recommendations.
- B. Representative shall submit written report to Owner listing observations and recommendations.

1.8 TESTING LABORATORY SERVICES

- A. Each Contractor shall employ and pay for services of an Independent Testing Laboratory to perform inspections, tests and other services required by individual Specification Sections, of his portion of the work.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports will be submitted to Owner in duplicate giving observations and results of test, indicating compliance or noncompliance with specified standards and with Contract documents.
- D. Contractor shall cooperate with Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
 - 1. Notify Owner and Testing laboratory 24 hours prior to expected time for operations requiring testing services.
 - 2. Make arrangements with Testing Laboratory and pay for additional samples and tests for Contractor's convenience.

PART 2 PRODUCTS
Not Used

PART 3 EXECUTION
Not Used

END OF SECTION

SECTION 01500

Section 01500 - Page 01500-1

CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Electricity and sanitary facilities.
- B. Temporary Controls: Barriers, protection of the Work and water control.
- C. Construction Facilities: Access roads, parking and progress cleaning.

1.2 RELATED SECTIONS

- A. Section 01700 - Contract Closeout: Final cleaning.

1.3 TEMPORARY ELECTRICITY

- A. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.
- B. Third Floor Server Special Precautions All Applications

1.4 TEMPORARY SANITARY FACILITIES

- A. Existing designated facilities located at campus may be used during construction operations. Maintain daily in clean and sanitary condition.

1.5 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect nonowned vehicular traffic, stored materials, site and structures from damage.

1.6 PROGRESS CLEANING
 A. Maintain areas free of waste materials debris and
 rubbish. Maintain site in a clean and orderly
 condition.

1.7 PROTECTION
 N/A

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECURITY

SECTION 01540

Section 01540 - Page 01540-1

SECURITY

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Provide a project security program to:
 1. Protect Work, stored products and construction equipment from theft and vandalism.
 2. Protect Project premises from entry by unauthorized persons.
 - B. Protect Owner's operations at site from theft, vandalism or damage from Contractor's work or employees.
 - C. The Contractors shall comply with all security regulations of the College and such regulations and/or directives issued by the College shall be absolute.
 - D. The Contractors shall not cause the security of the College's buildings, occupants and contents thereof to be jeopardized in any way and shall be responsible for any losses incurred because of such actions.
 - E. The Contractor shall secure his tools and equipment in a location mutually agreeable to himself and the College. The College shall not be responsible for its security.
 - F. All material required for the Project shall be stored as directed in an area provided at the site. The College shall not be responsible for its security.

1.2 RELATED REQUIREMENTS

- A. Section 01200 - Project Meetings
- B. Section 01600 - Storage and Protection of Products

PART 2 PRODUCTS Not Used

PART 3 EXECUTION Not Used

END OF SECTION

SECTION 01569

Section 01569 - Page 01569-1

CONSTRUCTION CLEANING

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Cleaning and disposal of waste materials, debris and rubbish during construction.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 CLEANING

- A. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from grounds and/or remote spaces prior to leaving the site.
- C. Clean interior areas daily to provide suitable conditions for Owner-occupied areas.
- D. Areas are to be kept free of debris of any type. Contractor is to ensure no damage to the system nor in any way jeopardize the warranty.

3.2 DISPOSAL

- A. Remove waste materials, debris and rubbish from worksite in Contractor-supplied container(s).

END OF SECTION

SECTION 01600

Section 01600 - Page 01600-1

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED

- A. Products
- B. Workmanship
- C. Manufacturers' Instructions
- D. Transportation and Handling
- E. Storage and Protection
- F. Substitutions and Product Options

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Project
- B. Section 01300 - Submittals: Submittal of Manufacturers' Certificates
- C. Section 01700 - Contract Closeout: Operation and Maintenance Data & Warranties.

1.3 PRODUCTS

- A. Products include all material, equipment and systems.
- B. Comply with Specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a Specification section shall be the same and shall be interchangeable.
- D. Do not use materials and equipment removed from existing structure, except as specifically required or allowed by Contract Documents.

1.4 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.5 MANUFACTURERS' INSTRUCTIONS

- A. When work is specified to comply with manufacturers' instruction, submit copies as specified in Section 01300, distribute copies to persons involved and maintain one set in field office.
- B. Perform work in accordance with details of instruction and specified requirements. Should a conflict exist between Specifications and instructions, consult with Owner.

1.6 TRANSPORTATION AND HANDLING

- A. Transport Products by methods to avoid Product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.
- B. Provide equipment and personnel to handle Products by methods to prevent damage.
- C. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct and Products are undamaged.

1.7 STORAGE AND PROTECTION

- A. Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight enclosures.
- B. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.
- C. After installation, each Contractor shall provide coverings to protect all installed products from damage due to traffic and construction operations, remove when no longer needed. ALL damaged products shall be replaced at no cost to the College.

1.8 PRODUCT OPTIONS

- A. Within fifteen (15) days after date of award of Contract, submit complete list of major Products and equipment proposed, with name of manufacturer, trade name and model.

B. Options:

1. Products specified only by reference standard: Any Product meeting that standard.
2. Products specified by naming several manufacturers: Products of any named manufacturer meeting Specifications.
3. Products specified by naming one or more manufacturers and "or equal": Submit a request for substitution for any manufacturer not specifically named.
4. Products specified by naming only one manufacturer: No option, product substitution will not be considered.

1.9

SUBSTITUTIONS

- A. Where drawings and specifications call for materials of certain manufacturers, the contract shall be based on materials specified. If the Contractor wishes to offer substitutions for consideration, he must request approval ten (10) days prior to bid opening and abide by Section 15500, paragraph 1.07. Any substitutions made after the bid is received will not be accepted. A bidder intending to furnish an alternate in place of the item or equipment specified is required to submit a written request to the College along with the following items no less than ten (10) business days prior to bid opening date.
1. Provide all current published specification data sheets on all components highlighting the comparable specifications to the specified items.
 2. Provide third party testing data that shows physical and performance attributes of the proposed equipment with those of the specified product.

Section 01600 - Page 01600-4

3. Provide a copy of the specified warranty: Sample copy of manufactures warranty that meets all requirements stated in this specification. Furnish manufacture's affidavit that project warranty requirements shall be enforced. Standard manufacturer's warranty that does not meet requirements specific to this project will be rejected.
 4. Any equipment submitted as an equal to specified standard must also submit a list of three (3) jobs where the proposed equipment has been used in similar applications as that which is specified, and within a one hundred (100) mile radius from the location of the specified job. In addition the three (3) jobs must be at least two (2) years old and be available for the engineer, Owner or Owner's representative to inspect.
 5. Any deficiencies in performance, warranty terms or improper submittal procedure shall constitute grounds for immediate rejection. Equipment submitted as possible equals to the specified standard system must meet or exceed all criteria specified. Manufacture's standard procedures, warranties, etc. that do not meet criteria of the specification will constitute grounds for immediate rejection.
 6. Consideration will be given to only those equipment's that have approval prior to the scheduled bid opening date. The College reserves the right to be the final authority on the acceptance or rejection of any proposed alternate materials or equipment.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. Request constitutes a representation that Contractor:
1. Has investigated proposed Product and determined that it meets or exceeds in all respects, specified Product.

2. Will provide the same warranty for substitution as for specified Product.
 3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
 4. Waives claims for additional costs which may subsequently become apparent.
- D. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request, or when acceptance will require substantial revision or Contract Documents.
- E. Owner will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable time.
- F. Substitutions made without Owner's authorization will be removed and replaced to the original specifications at the Contractor's expense.

PART 2 PRODUCTS

2.1 PENNSYLVANIA STEEL PRODUCTS PROCUREMENT ACT

- A. 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.

END OF SECTION

SECTION 01670

Section 01670 - Page 01670-1

SYSTEMS DEMONSTRATION

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED

- A. Procedures for demonstration of equipment operation and instruction of Owner's personnel.

1.2 RELATED REQUIREMENTS

- A. Section 01010 - Summary of Project: Work Sequence.
- B. Section 01700 - Contract Closeout: Operation and Maintenance Data and Section 01730 - Operating and Maintenance Data
- C. Individual Sections: Specific requirements for demonstrating systems and equipment.

1.3 QUALITY ASSURANCE

- A. Manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel and provide written report that demonstrations and instructions have been completed.
- B. Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.4 SUBMITTALS

- A. Submit preliminary schedule for Owner's approval, listing times and dates for demonstration of each item of equipment and each system, two (2) weeks prior to proposed dates.
- B. Submit reports within one (1) week after completion of demonstrations, that demonstrations and instructions have been satisfactorily completed. Give time and date of each demonstration, and hours devoted to demonstration, with a list of persons present.

PART 2 PRODUCTS

Not Used

END OF SECTION

CONTRACT CLOSEOUT

SECTION 01700

Section 01700 - Page 01700-1

CONTRACT CLOSEOUT

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED

- A. Closeout Procedures
- B. Final Cleaning
- C. Project Record Documents
- D. Operation and Maintenance Data
- E. Systems Demonstration
- F. Warranties

1.2 RELATED REQUIREMENTS

- A. Conditions of the Contract: Fiscal provisions, legal submittals and other administrative requirements.
- B. Section 01010 - Summary of Project

1.3 CLOSEOUT PROCEDURES

- A. Comply with procedures stated in General Conditions of the Contract for issuance of Certificate of Substantial Completion.
- B. Owner will occupy designated portion of Project for the purpose of conduct of business under provision stated in Certificate of Substantial Completion.
- C. When Contractor considers Work has reached final completion, submit written certification that Contract Documents have been reviewed, work has been inspected and that work is completed in accordance with Contract Documents and ready for Owner's inspection.
- D. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments and sum remaining due.

1.4 FINAL CLEANING

- A. Execute prior to final inspection.
- B. Remove waste and surplus materials rubbish and construction facilities from the Project and from the site.

1.5 PROJECT RECORD DOCUMENTS

- A. Store documents separate from those used for construction.
- B. Keep documents current; do not permanently conceal any work until required information has been recorded.
- C. At Contract Closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents and signature of Contractor.

1.6 OPERATION AND MAINTENANCE DATA

- A. Provide data for all material and equipment used or installed.
- B. Submit two (2) sets of O&M manuals to Project Manager within thirty (30) days of award of Contract. Upon completion of Contract work, submit three (3) additional sets of O&M manuals to Owner prior to final inspection which includes names, addresses and telephone numbers of subcontractors and suppliers.
List:

- 1. Appropriate design criteria
- 2. List of equipment
- 3. Parts list
- 4. Operating instructions
- 5. Maintenance instructions, equipment
- 6. Maintenance instructions, finishes
- 7. Shop Drawings and Product Data
- 8. Warranties

1.7 WARRANTIES

- A. Provide triplicate copies. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.
- B. Submit material prior to final application for payment. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01710

Section 01710 - Page 01710-1

CLEANING

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED

- A. Execute cleaning, during progress of the Work and at completion of the Work.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract
- B. Each Specification Section: Cleaning for specific Products of work.
- C. Section 01010 - Summary of Project.

1.3 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations and antipollution laws.

PART 2 PRODUCTS

2.1 1 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces. Submit MSDA sheets in advance.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 1 DURING CONSTRUCTION

- A. Execute cleaning to keep the Work site and adjacent properties free from accumulations of waste materials, rubbish and debris, resulting from construction operations.
- B. Use on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site and dispose of in legal disposal units at the site.

END OF SECTION

SECTION 01720

Section 01720 - Page 01720-1

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Each Contractor shall maintain at the site for the Owner one record copy of:
 1. Drawings
 2. Specifications
 3. Addenda
 4. Change Orders and other Modifications to the Contract
 5. Approved Shop Drawings, Product Data and Samples
 - B. At the completion of the work, the Contractor shall deliver to the Engineer the complete set of documents, including changes made to that date on which he shall have recorded as required by the General Conditions, changes or discrepancies between the Drawings and the actual locations or dimensions of member, materials or equipment in the buildings whether architectural, mechanical or electrical.
- 1.2 RELATED REQUIREMENTS
 - A. Section 01300 - Submittals
 - B. Section 01730 - Operating & Maintenance Data
 - C. Section 01740 - Warranties
- 1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES
 - A. Store documents and samples in locked cabinet and secure storage space apart from documents used for construction.
 - B. File documents and samples in accordance with CSI 16 Division format.
 - C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
 - D. Make documents and samples available at all times for inspection by Owner.

1.4 RECORDING

- A. Label each document "Project Record" in neat large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
- C. Drawings, legibly mark drawing in red or various colors to record actual construction:
 - 1. Location of exterior and internal communication construction, referenced to visible and accessible features of the structure.
 - 2. Changes made by Field Order or by Change Order.
 - 3. Details not on original Contract Drawings.
- D. Specifications and Agenda: Legibly mark each Section to record:
 - 1. Manufacturer, trade name, catalog number, and Supplier of each Product and item of equipment actually installed.
 - 2. Changes made by Field Order or by Change Order.

1.5 SUBMITTALS

- A. At Contract close-out, deliver Record Documents to the Owner.
- B. Accompany submittals with transmittal letter in duplicate, containing:
 - 1. Date
 - 2. Project title and number
 - 3. Contractor's name and address
 - 4. Title and number of each Record Document
 - 5. Signature of Contractor or his authorized representative.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01730

Section 01730 - Page 01730-1

OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.
 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of the Specifications.
 - B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.
- 1.2 RELATED REQUIREMENTS
 - A. Section 01010 - Summary of Project
 - B. Section 01300 - Submittals
 - C. Section 01700 - Contract Closeout
 - D. Section 01720 - Project Record Documents
 - E. Section 01740 - Warranties
- 1.3 FORM OF SUBMITTALS
 - A. Prepare three (3) copies in the form of an instructional manual for use by Owner's personnel.
 - B. Format:
 1. Size: 8-1/2" x 11"
 2. Text: Manufacturer's printed data, or neatly typewritten.
 3. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Fold large Drawings to size of text pages.
 4. Provide fly-leaf for each separate product, or each piece of equipment.
 - a. Provide type description of product, and major component parts of equipment.
 - b. Provide indexed tabs.

5. Cover: Identify each volume with type or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".
List:
 - a. Project # and Project Title
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in the manual.
- C. Binders:
 1. Commercial quality three-ring binders with durable and cleanable plastic covers.
 2. Minimum ring size: One inch.
 3. If multiple binders are necessary to encompass scope of Project, correlate the data into related consistent groupings.
- D. Copy contents of each complete manual on disk or flashdrive and submit with written documentation.

1.4

CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arrange in systematic order.
 1. Contractor, name or responsible principle, address and telephone number.
 2. A list of each product required to be included, indexed to content of the volume.
 3. List, with each product, name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. Maintenance Contractor, as appropriate.
 - c. Identify area of responsibility of each.
 - d. Local source of supply for parts and replacement.
 4. Identify each product by name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
 1. Include only those sheets which are pertinent to the specific product.

2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.
- C. Drawings:
 1. Supplement product data with Drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 2. Coordinate Drawings with information in Project Record Documents to assure correct illustration of completed installation.
 3. Do not use Project Record Documents as maintenance Drawings.
- D. Written text, as required to supplement product data for the particular installation:
 1. Organize in consistent format under separate headings for different procedures.
 2. Provide logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond and service contract issued.
 1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in event of failure.
 - b. Instances which might affect validity of warranties.

END OF SECTION

SECTION 01740

Section 01740 - Page 01740-1

WARRANTIES

PART 1 GENERAL

1. 01 REQUIREMENTS INCLUDED
 - A. Compile warranties.
 - B. Review submittals and verify compliance with Contract Documents.
- 1.2 RELATED REQUIREMENTS
 - A. Project Contract Articles
 - B. Conditions of the Contract
 - C. Section 01700 - Contract Closeout
 - D. Section 01730 - Operating & Maintenance Data
- 1.3 SUBMITTAL REQUIREMENTS
 - A. The Prime Contractor shall assemble all warranties, service and maintenance contracts, executed by each manufacturers, suppliers and subcontractors.
 - B. Number of original signed copies required: Three (3) each.
 - C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item:
 1. Product or work item
 2. Firm, with name of principle, address and telephone number
 3. Scope
 4. Date of beginning of warranty, service and maintenance contract and expiration date
 5. Duration of warranty or service maintenance contract shall not be less than one year from data of Owner's acceptance.
 6. Provide information for Owner's personnel:
 - a. Proper procedure in case of failure
 - b. Instances which might affect the validity of warranty or bond.
 7. Contractor, name of responsible principle, address and telephone number.

1.4 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
 - 1. Size 8-1/2" x 11", punch sheets for standard three-ring binder.
 - a. Fold larger sheets to fit into binders.
 - 2. Cover: Identify each packet with types or printed title "Warranties". List:
 - a. Title of Project
 - b. Name of Contractor
- C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.5 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put in to service during progress of construction:
 - 1. Submit documents within 10 days after inspection and acceptance.
- B. Otherwise make submittals within 10 days after Date of Substantial Completion, prior to final request for payment.
- C. For items of work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittals within 10 days after acceptance, listing date of acceptance as start of warranty period.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

BASIC ELECTRICAL MATERIALS AND METHODS

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.
- B. Any reference in the Electrical Specifications to "this Contractor," is intended as indication of the work to be furnished and installed by the Electrical Contractor. Where work is indicated on the electrical drawings or specified in the electrical specification without reference or mention as to the Contractor, it is understood such work is to be provided by the Electrical Contractor.
- C. Wherever the work "provide" appears in these specifications or on the accompanying drawings, it means "furnish and install, with all associated wiring, raceways, supports and appurtenances, final connections, and place same in proper electrical operating condition." Where equipment is listed but the words "provide" or "furnish and install" are not mentioned, it is understood that such material and/or work is the responsibility of this Contractor.
- D. Wherever the word "equipment" appears in these specifications or on the accompanying drawings, it means "all wiring, raceways, fixtures, supports, panels, boxes, switches, devices, and appurtenances." Where the word "work" appears in these specifications or on the accompanying drawings, it means "to include all equipment, all labor, rigging, scaffolding, tools, and appurtenances of an auxiliary nature."

- E. Perform the work under this Contract in accordance with the Contract Documents. The work includes the furnishing and installing of all materials, equipment, appurtenances, and other necessary work required for proper completion, operation and use of the electrical facilities, and includes the furnishing of all tools, equipment, labor, transportation, supervision, and other such items incidental to the execution of the work, all as intended or reasonably implied by the Contract Documents.

1.2 SCOPE OF WORK

Without limiting or restricting the volume of work and solely for the convenience of this Contractor, the work to be performed is, in general, to be comprised of the following:

- A. Obtain and pay for all permits and inspections required by any and all lawful authorities. The building permit shall be secured and paid for by the Contractor.
- B. Type confirmed Panel Directories, engrave identification nameplates, provide operation and maintenance instructions, record drawings, and clean premises of debris resulting from this Contractor's work.
- C. The Electrical Contractor shall coordinate their work with Mr. Richard Schlegel, attending a pre-construction meeting prior to be scheduled by the Facilities Management Division.

1.3 REQUIREMENTS

- A. Examination of Contract Documents: Carefully examine the electrical drawings and these specifications. If any discrepancies occur between the drawings or between the drawings and the specifications, report such discrepancies to the Engineer in writing and obtain written instructions as to the manner in which to proceed. No departures from the contract drawings or specifications shall be made without prior written approval of the Engineer.
- B. Any discrepancies shall be reported at least 10 days prior to submission of bid.
In the event that such discrepancies are not reported in this manner, the Contractor shall accept the Engineer's interpretation and/or clarification.
- C. Examination of the Site: Visit and examine the site of the work and become acquainted with existing conditions before submitting proposal. This Contractor will be held responsible for the installation of all work complete in every detail. Verify and secure all measurements at the site.
- D. Standards of Material and Workmanship: All work shall be executed by persons skilled in the work to which they are assigned. All materials and equipment furnished for the project shall be new and of first quality, produced by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than twenty years.
- E. Where there is more than one item of similar equipment required under this Contract, all such similar equipment shall be the product of one manufacturer.
- F. All materials furnished under this contract shall be determined safe by a Nationally Recognized Testing Laboratory, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corporation, and all material shall be labeled, certified or listed by such testing facility.

- G. With respect to custom-made equipment or related installations which are constructed specially for this project, the manufacturer shall certify the safety of it on the basis of test data or by providing a certification by a Nationally Recognized Testing Laboratory. Furnish copies of such certifications to the Owner or signify by the presence of the certification on the equipment furnished.
- H. Standards, Specifications and Codes: Where Electrical Standards, Federal Specifications, and Electrical Codes are referred to herein, it shall be understood that such reference is to the issue in effect at the date of the proposal, including all revisions and addenda, if any.
- I. Laws, Regulations, Permits and Certificates: Procure all necessary permits, paying all associated charges, and furnish the Engineer with evidence of the permits before commencing the Contract Work. Furnish Notify the inspection agency in sufficient time prior to concealment of work so that a complete rough-in inspection may be made. The material, equipment and installation shall conform to all applicable regulations and codes, a partial list being as follows:
1. The National Electrical Code, NFPA 70.
 2. Pennsylvania Uniform Construction Code (UCC) - and any local amendments.
 3. The Occupational Health and Safety Act (OSHA).
 4. Americans with Disability Act (ADA).
 5. American National Standards Institute.
 6. Institute of Electrical and Electronic Engineers.
 7. Standards of the National Electric Manufacturer's Association.
 8. The National Fire Protection Association.

9. All health and safety regulations or codes, which pertain to the installation of equipment furnished under this Contract or the subsequent use of the equipment by the Owner.

- J. Nothing contained in these specifications or shown on the drawings shall be so construed as to conflict with any national, state, municipal, or local laws or regulations governing the installation of work specified herein, and all such acts, ordinances and regulations, including the National Electrical Code, are hereby incorporated and made a part of these specifications. All such requirements shall be satisfied by this Contractor and at no additional expense to the Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Attachments and Supports

Attachments and Supports: Provide adequate support for all installed equipment. Methods of support shall be subject to approval.

1. All fastenings, supports, hangers, clamps, and anchors shall be of the type made for the specific purpose for which they are to be used. Provide toggle bolts or machine bolt fastenings for hollow tile, terra-cotta or lath construction. Use machine screws for structural steel fastening, lead expansion shields and machine screws for solid masonry fastening, and lag screws or bolts for wood fastening. Install all conduit rigidly and firmly to prevent swaying, vibration or sagging, using malleable or wrought steel hangers of standard design, pipe clamps, or fabricated steel supports of approved design. Hangers for horizontal conduit runs shall be adjustable clevis type. Perforated strap iron hangers are not permitted.
2. Fastenings and attachments such as screws, bolts and nuts, shall be made with nonferrous metals, or galvanized or cadmium plated steel. All fastenings and attachments shall be made with such materials or so protected that they will offer the maximum protection against deterioration from age, weather and dampness.
3. Masonry anchors installed in reinforced concrete shall support ACI 318 Appendix D Strength Design with an ICC ES report.

- B. Singular Number: All references made to any particular item in the singular number shall apply equally to as many identical items that the completed electrical system may require.

- C. Material Selection: The Electrical Contractor shall review all drawings related to the project to assure proper materials are being installed for the environmental conditions of the space. Any questions shall be directed to the Engineer for clarification prior to the bid date.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Location

1. Carefully investigate the structural and finish conditions affecting the work and arrange all work accordingly, furnishing necessary parts and equipment to meet the various conditions.
2. Coordinate the plan locations and mounting heights of equipment with the location of existing equipment.

B. Critical Circuits

C. Identification Nameplates

D. Coordination With Others

This Contractor shall cooperate with the Owner in the scheduling of his work so that he does not delay or interfere with facility operations, and shall also check the location of his equipment with others to avoid space conflicts.

E. Protection of Work

This Contractor shall be held responsible for the protection of and damage to his work prior to the final acceptance of same, and shall repair or replace all damaged work at his own expense.

F. Storage of Materials and Equipment

1. Store material and equipment in a location that will not interfere with the operations of other Contractors or the Owner, and in a manner that will afford them maximum protection.

G. Cutting and Patching

1. Where openings are required in work already in place, all cutting and patching shall be done by or at the expense of this Contractor.
2. This Contractor shall consult with the Engineer before cutting any openings, and shall cut such openings in an approved manner so that they will not weaken or damage any structural part of the building.

H. Painting

1. Remove rust, clean and paint all auxiliary steel members and parts installed by this Contractor for the support of his work, using one coat of a rust inhibiting primer before erection. After the steel members are in place, paint with one coat of light grey oil paint.

I. Shop Drawings and Samples

1. Submit shop drawings for all items of material and equipment as herein and after specified. Review the shop drawings prior to submission and verify that they are complete, including the following minimum information: complete construction details including dimensions, materials, and finishes; diagrams or illustration showing physical characteristics; performance data; description of operation; name of laboratory by which item will be labeled, certified, or listed; and where applicable, wiring diagrams showing the connections of all components of related equipment.

2. Submit shop drawings promptly so that no delay will result in this Contractor's work, or the work of others.
3. Submit samples for approval of all items that are of a different make or catalog number than those named in the Contract Documents. Supply samples for all other items upon request.
4. No items requiring shop drawings or samples shall be purchased until after approval of it, except that orders may be placed subject to the approval of drawings or samples.

J. Operation and Maintenance Data

Collect two sets of complete instructions for operation and maintenance of all equipment, spare parts lists for all pieces of equipment furnished under his Contract. Bind the data in a notebook, suitably indexed. Upon conclusion of the work, deliver two sets of notebooks to the Owner's representative.

K. Instructions

After all tests and adjustments have been made, fully instruct the Owner's representatives regarding all details of operation and maintenance of equipment installed under this Contract.

L. Record Drawings

1. Retain a separate clean and legible "Record" set of prints of the Contract Drawings on the job. Neatly mark on the "Record" set any and all installation changes. Keep this "Record" set up to date through the conclusion of the Contract.
2. The marking of this "Record" set shall show all changes, as well as the actual plan location and elevation of all underground and concealed conduit. Deliver to the Owner before application for final payment.

M. Guarantee

1. This Contractor and his surety shall guarantee in writing for a period of one year from the date of final acceptance that all materials, equipment and labor furnished by him are free from defects. This Contractor shall further guarantee that if any piece of material or equipment is found to be defective within the guarantee period because of faulty manufacture or faulty installation, in the opinion of the Engineer, he will replace and install such material or equipment without any further expense to the Owner.
2. Furnish three copies of all guarantees and certificates that are required.

N. Selective Demolition - Removal of Existing Wiring, Devices, Equipment, Etc.

O. Cleanup of Premises and Equipment

1. Weekly cleanup of the construction areas shall be observed by the Electrical Contractor. He shall clean any of his debris that the Owner or construction manager deems necessary to maintain a safe environment for the work site.
2. Upon completion of this Contract and after final approval of completion is given, remove all tools, benches, and other workmen's appurtenances from the premises. Clean the premises of all remaining debris and leave the entire installation clean and in first-class operating condition.

END OF SECTION

SECTION 01760

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SPLICES AND TERMINATIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

Splices and terminations shall be made using splicing devices and lugs that are the most appropriate type and size for the particular splice.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All materials and devices used for making joints and splices shall be approved by sample, catalog designation or shop drawings.
- B. All materials and devices used for making joints and splices shall be installed according to the manufacturer's instructions and as stipulated in their listing by a Nationally Recognized Testing Laboratory.

END OF SECTION

Community College of Allegheny County

Boyce Campus North Lot Security Camera System

2026-1166.01
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Prepared by:

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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 01 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 and finishing for electrical construction.
 - 4. Touch-up Painting.
 - 5. Access panels.
 - 6. Excavation and Backfill.
 - 7. Electrical and communications equipment.

1.3 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 chargers 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. 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.
- D. 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, excavation, service charges, etc.

1.4 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 (i.e. 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.

1.5 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.
 - 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. Access panels and doors.
 - 2. Fiber optic cable.
 - 3. Poles
 - 4. Lighting fixtures
 - 5. Splice enclosures
 - 6. Conduit
 - 7. Wiring
 - 8. Hoffman cabinet with all accessories
 - 9. Outdoor CAT 6 cable - Gamechanger product

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10. Boxes
 11. Panelboards
 12. Brackets
 13. Handholes
 14. J-hooks
 15. Disconnect switches
- 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.

1.6 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.

1.7 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.
 - 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.
 - 5. National Electrical Safety Code - ANSI C2.
 - 6. Owner's insuring agency.
 - 7. International Building Code (IBC)
- 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.

1.8 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.

1.9 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.

1.10 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.

1.11 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.

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- 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, i.e. fire alarm, signal/communication, intrusion detection, 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 circuit directories of panelboards, including the following:
 - 1) Electric service.
 - 2) Controls.
 - 3) Communication.

1.12 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, 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. 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.
- D. 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.
- E. 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.

1.13 CONTINUITY OF SERVICE

- A. The Contractor shall maintain electrical service to the Existing Buildings including remote trailer at North Lot 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.

1.14 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 4-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.
- H. All training defined herein shall be video-taped by the contractor, and a DVD (or a recording in a media as directed by the owner) of said training sessions turned over to the owner at the completion of the training.

1.15 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.

1.16 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.

1.17 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.
- D. Arrange selective demolition so as not to interfere with Owner's on site operations.
- E. Coordinate electrical equipment installation with other building components.
- F. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations.
- G. 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.
- H. Coordinate connecting electrical service to components furnished under other Sections.
- I. Coordinate connecting electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- J. Notify the owner at least 5 days prior to commencing demolition operations.

PART 2 - PRODUCTS

2.1 CONCRETE BASES

- A. Concrete Forms and Reinforcement Materials: As specified in Division 3 Section "Cast-in-Place Concrete."
- B. Concrete: 4000-psi, 28-day compressive strength as specified in Division 3 Section "Cast-in-Place Concrete."

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 ACCESS DOORS

- A. Steel Access Doors and Frames: Factory-fabricated and assembled units, complete with attachment devices and fasteners ready for installation. Joints and seams shall be continuously welded steel, with welds ground smooth and flush with adjacent surfaces.
- B. Size: Install access panels not smaller than 12" by 6" for access to concealed pull boxes, junction boxes or similar items where no other means of access is provided.
- C. Fire Rating: All access panels and doors in walls and in ceilings shall be "1 ½ hour fire rated" and must bear the Underwriters' Laboratory 1 ½ hour B label.
- D. Frames: 16-gage steel, with a 1-inch-wide exposed perimeter flange for units installed in unit masonry, pre-cast, or cast-in-place concrete, ceramic tile, or wood paneling.
 - 1. For installation in masonry, concrete, ceramic tile, or wood paneling: 1 inch-wide-exposed perimeter flange and adjustable metal masonry anchors.
 - 2. For gypsum wallboard or plaster: perforated flanges with wallboard bead.
 - 3. For full-bed plaster applications: galvanized expanded metal lath and exposed casing bead, welded to perimeter of frame.
- E. Flush Panel Doors: 14-gage sheet steel, with concealed spring hinges or concealed continuous piano hinge set to open 175 degrees; factory-applied prime paint.
 - 1. Fire-Rated Units: Insulated flush panel doors, with continuous piano hinge and self-closing mechanism.
- F. Locking Devices: Flush, screwdriver-operated cam locks.
- G. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:
 - 1. Bar-Co., Inc.
 - 2. J.L. Industries.
 - 3. Karp Associates, Inc.
 - 4. Milcor Div. Inryco, Inc.
 - 5. Nystrom, Inc.

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 EXCAVATION AND BACKFILL

- A. The Contractor shall do all excavating required for the installation of underground conduits and wiring, exterior lighting circuits, and for other work included under this Contract.

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- B. Prior to submitting his bid price and prior to any work, the Electrical Contractor shall familiarize himself with local ordinances and amendments, and shall contact local authorities to obtain all regulations and requirements which must be followed. The Contractor shall secure all necessary permits before the start of any work.
- C. The Contractor shall conform with Act No. 187 of 1996 (formerly Act No. 287) of the General Assembly of the Commonwealth of Pennsylvania which was enacted to protect public health and safety.
- D. Exterior underground conduits shall be installed with top not less than 2'-6" below finished grade line. Conduits shall be installed at depth required to properly enter building. Cable shall be installed not less than 2'-6" below finished grade and in strict accordance with the cable manufacturer's recommendations. Furnish and install plastic warning sheets above all underground electrical installations as hereinafter specified. Excavation and backfill for the Power Company's primary service shall be in strict accordance with the Power Company's requirements.
- E. The bottoms of all excavations shall be properly leveled off and concrete placed on undisturbed soil. All loose materials shall be removed and the excavations shall be brought into approved condition to receive concrete or other material. No earth filling will be allowed under bases or slabs. All excavation shall be carried down to firm formation. However, if additional depths are required to reach firm earth, the extra excavation and materials required to perform the work shall be done at no extra cost to the Owner. If, through an error on the part of the Contractor, any part of the excavation is carried below the depth indicated or required for the work, the Contractor shall maintain the excavation and shall start concrete from the excavated level, and no extra compensation will be considered. Excavate and pour concrete only on the basis of approved shop drawings. Excavation below footings shall be filled with concrete as directed by the Architect.
- F. The Contractor shall notify the Construction Architect as soon as excavations are completed, in order that the bearing quality of the bottoms may be inspected before concrete is poured, or before formwork is erected. Concrete shall be poured as soon as weather conditions permit after excavation is completed and inspected. In case bottoms of excavations become wet and soft, all soft material shall be removed and the concrete poured to the required extra depth, at no extra cost to the Owner.
- G. The excavation shall be kept safe at all times. Shoring and sheathing shall be used when necessary or required by applicable regulating agencies. The excavation shall be kept free of water at all times. Additional shoring and sheathing shall be provided at any time to safeguard the work. Shoring and sheathing shall be provided in strict accordance with all applicable Federal, State, county and local ordinances and regulations. Existing structures shall be shored and underpinned where necessary and as directed by the Architect.
- H. After the underground conduits and cable, etc. are installed and tested, the Contractor shall back-fill all excavations with selected earth placed in layers not exceeding 6" in thickness with each layer thoroughly compacted. All backfill shall be clean and free of rocks, stones or other debris.

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- I. Adequate protection shall be provided for all existing or new structures, services, or utilities encountered in the excavation. The protection shall include bracing, sheathing, shoring, supports, etc., as required to maintain grade and alignment and to provide proper mechanical strength. Any structures, services, or utilities damaged by the work of the Contractor shall be promptly repaired and placed in same condition as they originally were prior to such damage. Adequate barricades, guards, signs, red lanterns, audible signals, etc., shall be placed and maintained to protect persons from injury. Rules and regulations of federal, state and local authorities respecting safety provisions shall be observed.
- J. The proposal shall be for unclassified excavation and shall include all excavation that may be necessary to complete the Project, including any rock or other debris that may be encountered.
- K. All excess excavated materials shall be disposed of as directed by the Architect. The number of points at which the Contractor will be permitted to work and length of open trenches that will be permitted will be governed by the Architect. All excavated debris shall be immediately removed from the site.
- L. Excavation shall be conducted in a manner to cause the least interruption of traffic. Where traffic must cross open trenches, the Contractor shall provide bridges suitable for the traffic involved in accordance with local, State and Federal Regulations.
- M. No conduit or masonry shall be laid in water and new laid masonry or conduit shall be protected, in a manner satisfactory to the Architect, so that no flood or surface water may enter same. The Contract shall include any required pumping, bailing or drainage of water that may have accumulated or be found in excavations.
- N. As the work progresses, the Contractor shall record on the drawings all changes and deviations from the Contract Drawings. Measurements shall include elevations and sufficient offset measurements from building to definitely locate all equipment and underground lines. Two prints of marked drawings shall be delivered to the Architect before final acceptance.
- O. All surfaces shall be restored to their original condition, including paved or unpaved areas, streets, roadways and turf to the satisfaction of the Architect. Final grading, finishing, paving and seeding of all excavated areas shall be included under this Contract, except where new surfaces are being provided as a part of the site work under the General Contract.
- P. Any settling, deterioration or washing out of earth or repaired surfaces after the initial installation shall be corrected by this Contractor.
- Q. All backfill in areas shall be clean earth fill compacted in 6" layers to a 95% compaction proctor test.
- R. All backfill in paved parking areas shall be #2b, or approved equal, clean, crushed stone brought up to the paving base mutual elevation.

- S. Restore the surface of all excavations performed under this Contract to their original condition. This shall include paved or unpaved streets, sidewalks, curbs, steps, roadways, avenues, drive-ways, parking areas, or turf. Include all necessary raking, fertilizing, seeding, rough and finish grading. Restore all surfaces to the satisfaction of the Architect. Coordinate all of the restoration work with the extent of work included under the General Contract. Existing trees, shrubs, or turf damaged under this Contract shall be replaced to the satisfaction of the Construction Manager.

3.3 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.

3.4 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. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 - 8. 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.
 - 9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 10. 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.
 - 11. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "ACCESS DOORS".

12. 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 auxiliary systems specified herein including the emergency lighting system, fire alarm system, intercommunication system, telephone distribution system, MATV system, or other similar systems shall be furnished by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than five (5) years. This Contractor shall deliver to the Architect, prior to final payment, a statement from the manufacturer or his authorized representative, certifying that the equipment has been inspected by him and found to be properly installed and functioning satisfactorily. Installation, final connections and testing of such systems shall be performed under the direct supervision of competent authorized service engineers who shall be in the employ of the respective equipment manufacturer. Any and all expenses incurred by these equipment manufacturer's representatives shall be borne by the Contractor.
4. All details of the installation of all equipment shall be electrically and mechanically correct. All equipment shall operate without objectionable 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.

3.5 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 according to requirements of Division 3 Section "Cast-in-Place Concrete" and as indicated.
- 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.
 - 3. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 5. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
- 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 are specified in Division 7.

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 no 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 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Metal-clad cable, Type MC.
3. Connectors and splices.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 271513 "Communications Copper Horizontal Cabling" for twisted pair cabling used for data circuits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Alpha Wire Company.
 2. Belden Inc.
 3. Cerro Wire LLC.
 4. General Cable; Prysmian Group North America.
 5. Okonite Company (The).
 6. Service Wire Co.
 7. Southwire Company, LLC.

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C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Conductor Insulation:

1. Type RHH and Type RHW-2: Comply with UL 44.
2. Type TC-ER: Comply with NEMA WC 70/ICEA S-95-658 and UL 1277.
3. Type THHN and Type THWN-2: Comply with UL 83.
4. Type XHHW-2: Comply with UL 44.

F. Shield

2.2 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems; Atkore International.
2. Alpha Wire Company.
3. Belden Inc.
4. Encore Wire Corporation.
5. General Cable; Prysmian Group North America.
6. Okonite Company (The).
7. Southwire Company, LLC.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:

1. Single circuit with color-coded conductors.

E. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

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- F. Ground Conductor: Insulated.
- G. Conductor Insulation:
 - 1. Type THHN/THWN-2: Comply with UL 83.
- H. Armor: Steel, interlocked.
- I. Jacket: PVC applied over armor.

2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. 3M Electrical Products.
 - 2. AFC Cable Systems; Atkore International.
 - 3. Gardner Bender.
 - 4. Hubbell Utility Solutions; Hubbell Incorporated.
 - 5. Ideal Industries, Inc.
 - 6. ILSCO.
 - 7. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - 8. TE Connectivity Ltd.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 - 1. Material: Copper or Bronze.
 - 2. Type: Two hole with long barrels.
 - 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders:
 - 1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits:
 - 1. Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.2 INSTALLATION, GENERAL

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. 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.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
- G. Complete cable tray systems installation according to Section 260536 "Cable Trays for Electrical Systems" prior to installing conductors and cables.

3.3 CONNECTIONS

- A. 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-486B.
- B. Make splices, terminations, 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, termination, and tap for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch (150 mm) of slack.
- D. Comply with requirements in Section 284621.11 "Addressable Fire-Alarm Systems" for connecting, terminating, and identifying wires and cables.

3.4 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. After installing conductors and cables and before electrical circuitry has been energized, test conductors feeding the following critical equipment and services for compliance with requirements:
 - a. Circuit breakers.
3. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.

- B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Related Requirements:
 - 1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 260010 "Supplemental Requirements for Electrical," include the following:
 - a. Plans showing as-built, locations of system described in "Field Quality Control" Article, including the following:
 - 1) Telecommunications grounding.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 2. ERICO; brand of nVent Electrical plc.
 3. Harger Lightning & Grounding; business of Harger, Inc.
 4. ILSCO.
 5. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
1. Bonding Cable Conductor: No. 4 or No. 6 AWG, stranded conductor.
 2. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch wide and 1/16 inch thick.
 3. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch wide and 1/16 inch thick.
- B. Grounding Bus/Telecommunications Ground Bar: Predrilled rectangular bars of annealed copper, 1/4 by 4 inch in cross section, with 9/32 inch holes spaced 1-1/8 inch apart. Stand-off insulators for mounting must comply with UL 891 for use in switchboards, 600 V and must be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Compression-Type Bus-Bar Connectors: Copper or copper alloy, with two wire terminals.
- D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- F. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- G. Conduit Hubs: Mechanical type, terminal with threaded hub.
- H. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.

- I. Straps: Solid copper, cast-bronze clamp. Rated for 600 A.
- J. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Grounding Conductors: Green-colored insulation with continuous yellow stripe.
- C. Telecommunications Groundbar: As indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inch minimum from wall, 6 inch 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, and down; connect to horizontal bus.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Receptacle circuits.
 - 3. Flexible raceway runs.
 - 4. Armored and metal-clad cable runs.

3.3 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 bonding so vibration is not transmitted to rigidly mounted equipment.

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- B. Report measured ground resistances that exceed the following values:
 - 1. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer 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 SUMMARY

A. Section Includes:

1. Support, anchorage, and attachment components.
2. Fabricated metal equipment support assemblies.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
2. Include rated capacities and furnished specialties and accessories.

B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch diameter holes at a maximum of 8 inch on center in at least one surface.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. CADDY; brand of nVent Electrical plc.
 - c. Cooper B-line; brand of Eaton, Electrical Sector.
 - d. Flex-Strut Inc.
 - e. G-Strut.
 - f. Rocket Rack; Robroy Industries.
 - g. Unistrut; Atkore International.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 - 4. Channel Width: 1-5/8 inch.
 - 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
- B. 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 must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.
- C. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: **NOT PERMITTED.**
 - 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 where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-line; brand of Eaton, Electrical Sector.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti, Inc.
 - 4) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
6. Toggle Bolts: Stainless steel springhead type.
7. Hanger Rods: Threaded steel.
8. Hilti Hit System for attaching to NATCO Tile.

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.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 SELECTION

- A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 1. NECA NEIS 101
 2. NECA NEIS 105.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, as required by NFPA 70. Minimum rod size must be 5/8-inch in diameter.
- E. 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.
 1. Secure raceways and cables to these supports with single-bolt conduit clamps.

3.2 INSTALLATION OF SUPPORTS

- A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.

- B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT may be supported by openings through structure members, in accordance with NFPA 70.
- C. 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 must be weight of supported components plus 200 lb.
- D. 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. To NATCO Tile - Hilti Hit System
 - 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 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.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 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. Submit welding certificates.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inch larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000 psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup:

1. Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - a. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type EMT raceways and elbows.
2. Type LFMC raceways.
3. Type PVC raceways and fittings.
4. Fittings for conduit, tubing, and cable.
5. Threaded metal joint compound.
6. Solvent cements.
7. Surface metal raceways and fittings.
8. Strut-type channel raceways and fittings.
9. Wireways and auxiliary gutters.
10. Metallic outlet boxes, device boxes, rings, and covers.
11. Termination boxes.
12. Cabinets, cutout boxes, junction boxes, pull boxes, and miscellaneous enclosures.
13. Cover plates for device boxes.
14. Hoods for outlet boxes.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wireways and auxiliary gutters.
2. Surface metal raceways.
3. Cabinets, cutout boxes, and miscellaneous enclosures.
4. Raceways.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 TYPE EMT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 797A and UL Category Control Number FJMX.

2.2 TYPE EMT RACEWAYS AND ELBOWS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 797 and UL Category Control Number FJMX.

B. Steel Electrical Metal Tubing (EMT) and Elbows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
 - c. Wheatland Tube; Zekelman Industries.
2. Material: Steel.
3. Options: As indicated on drawings.
 - a. Exterior Coating: Zinc.
 - b. Interior Coating: Zinc.
 - c. Minimum Trade Size: Trade size 3/4.
 - d. Colors: As indicated on Drawings. Zinc color if no other indicated.

2.3 TYPE RMC RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 6 and UL Category Control Number DYIX.

B. Galvanized-Steel Electrical Rigid Metal Conduit (RMC), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. Wheatland Tube; Zekelman Industries.
2. Exterior Coating: Zinc.
3. Options:
 - a. Interior Coating: Zinc.
 - b. Minimum Trade Size: Trade size 3/4.
 - c. Colors: As indicated on Drawings.

C. PVC-Coated-Steel Electrical Rigid Metal Conduit RMC-PVC, Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Bluesteel Services LLC.
 - b. Calbond; Atkore International.
 - c. Plasti-Bond; Robroy Industries.
2. Additional Characteristics:
 - a. Fittings for PVC-Coated Conduit:
 - 1) Minimum coating thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
 - 2) Conduit bodies must be Form 8 with an effective seal and a positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours must be available. Conduit bodies must be supplied with plastic-encapsulated stainless steel cover screws.
 - 3) Form 2 inch long or one pipe diameter long, whichever is less, PVC sleeve at openings of female fittings, except unions. Inside sleeve diameter must be matched to outside diameter of metal conduit.
 - 4) PVC coating on the outside of conduit couplings must be protected from tool damage during installation.
 - 5) Female threads on fittings and couplings must be protected by urethane coating.
 - 6) Fittings must be from same manufacturer as conduit.
 - 7) Beam clamps and U bolts must be formed and sized to fit outside diameter of coated conduit. Plastic-encapsulated nuts must cover the exposed portions of threads.
3. Options:
 - a. Exterior Coating: PVC complying with NEMA RN 1.
 - b. Interior Coating: Zinc.
 - c. Minimum Trade Size: Trade size 3/4.
 - d. Colors: As indicated on Drawings.
 - e. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
 - f. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

2.4 TYPE FMC-S RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1 and UL Category Control Number DXUZ.

2.5 TYPE LFMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 360 and UL Category Control Number DXHR.

B. Steel Liquidtight Flexible Metal Conduit (LFMC):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anaconda Sealtite; Anamet Electrical, Inc.
 - b. Electri-Flex Company.
 - c. International Metal Hose Co.
2. Material: Steel.
3. Options:
 - a. Minimum Trade Size: Trade size 3/4.
 - b. Colors: As indicated on Drawings.

2.6 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL Category Control Number DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Calconduit; Atkore International.
 - b. JM Eagle; J-M Manufacturing Co., Inc.
 - c. NAPCO; Westlake Chemical Corp.
 - d. Topaz Lighting & Electric.
2. Dimensional Specifications: Schedule 40.
3. Options:
 - a. Minimum Trade Size: Trade size 3/4.
 - b. Markings: For use with maximum 90 deg C wire.
 - c. Elbows shall be PVC coated RGS.

C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Calconduit; Atkore International.
 - b. Opti-Com Manufacturing Network, Inc (OMNI).
 - c. Topaz Lighting & Electric.
2. Dimensional Specifications: Schedule 80.
3. Options:
 - a. Minimum Trade Size: Trade size 3/4.
 - b. Markings: For use with maximum 90 deg C wire.
 - c. Elbows shall be PVC coated RGS.

2.7 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Fittings for Type RMC, Type IMC, and Type PVC Raceway S:

1. Fittings from conduit manufacturer.
2. General Characteristics: UL 514B and UL Category Control Number DWTT.
3. Options:
 - a. Material: Steel.
 - b. Coupling Method: Raintight compression coupling with distinctive color gland nut.
 - c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
 - d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type EMT Raceways:

1. Fittings from conduit manufacturer.
2. General Characteristics: UL 514B and UL Category Control Number FKAV.
3. Options:
 - a. Material: Steel.
 - b. Coupling Method: Compression coupling.
 - c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
 - d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

D. Fittings for Type FMC Raceways:

1. Fittings from conduit manufacturer.
2. General Characteristics: UL 514B and UL Category Control Number ILNR.

E. Fittings for Type LFMC and Type LFNC Raceways:

1. Fittings from conduit manufacturer
2. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.8 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR
THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

B. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. ABB, Electrification Business.

2.9 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.

B. Solvent Cements for Type PVC Raceways and Fittings:

1. As approved by raceway manufacturer.

2.10 SURFACE METAL RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 5 and UL Category Control Number RJBT.

B. Surface Metal Raceways and Fittings with Metal Covers:

1. Wiremold; Legrand.
2. Options:
 - a. Galvanized steel base with snap-on covers.
 - b. Manufacturer's standard enamel finish in color selected by Engineer.
 - c. Wiring Channels: Dual. Multiple channels must be capable of housing a standard 20 to 30 A NEMA device flush within the raceway.

2.11 WIREWAYS AND AUXILIARY GUTTERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 870 and UL Category Control Number ZOYX.

B. Metal Wireways and Auxiliary Gutters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Hoffman; brand of nVent Electrical plc.
 - c. MonoSystems, Inc.
 - d. Square D; Schneider Electric USA.
 - e. Wiegmann; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
2. Additional Characteristics:
 - a. Fittings and Accessories: Include covers, 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.
 - b. Finish: Manufacturer's standard enamel finish.
3. Options:
 - a. Degree of Protection: Type 1, unless otherwise indicated.
 - b. Wireway Covers: Hinged type unless otherwise indicated.

2.12 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514A and UL Category Control Number QCIT.

B. Metallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crouse-Hinds; brand of Eaton, Electrical Sector.

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- b. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. MonoSystems, Inc.
 - e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
- 3. Options:
 - a. Material: Sheet steel.
 - b. Sheet Metal Depth: Minimum 3.5 inch.
 - c. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb and marked with maximum allowable weight.

C. Metallic Conduit Bodies:

- 1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - b. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - d. Pass & Seymour; Legrand North America, LLC.

D. Metallic Device Boxes:

- 1. Description: Box with provisions for mounting wiring device directly to box.
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - b. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - e. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
- 3. Options:
 - a. Material: Cast metal.
 - b. Sheet Metal Depth: Minimum 3.5 inch.

- c. Cast-Metal Depth: Minimum 2.4 inch.

E. Metallic Extension Rings:

- 1. Description: Ring intended to extend sides of outlet box or device box to increase box depth, volume, or both.
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. Pass & Seymour; Legrand North America, LLC.
 - e. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2.13 CABINETS, CUTOUT BOXES, JUNCTION BOXES, PULL BOXES, AND MISCELLANEOUS ENCLOSURES

A. Performance Criteria:

- 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
- 2. General Characteristics:
 - a. Non-Environmental Characteristics: UL 50.
 - b. Environmental Characteristics: UL 50E.

B. Indoor Sheet Metal Cabinets:

- 1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adalet.
 - b. Cooper B-line; brand of Eaton, Electrical Sector.
 - c. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - d. Hoffman; brand of nVent Electrical plc.
 - e. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - f. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - g. Robroy Enclosures; Robroy Industries.
- 3. Additional Characteristics: UL Category Control Number CYIV.
- 4. Options:
 - a. Degree of Protection: Indoor Type 1; Outdoor Type 4.

C. Indoor Sheet Metal Cutout Boxes:

1. Description: Enclosure that has swinging doors or covers secured directly to and telescoping with walls of enclosure.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Hoffman; brand of nVent Electrical plc.
 - d. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - e. Robroy Enclosures; Robroy Industries.
3. Additional Characteristics: UL Category Control Number CYIV.
4. Options:
 - a. Degree of Protection: Type 1.

D. Indoor Sheet Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Hoffman; brand of nVent Electrical plc.
 - c. Hubbell Industrial Controls; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - e. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
3. Additional Characteristics: UL Category Control Number BGUZ.
4. Options:
 - a. Degree of Protection: Type 1.

E. Indoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Adalet.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.

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- d. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - 3. Additional Characteristics: UL Category Control Number BGUZ.
 - 4. Options:
 - a. Degree of Protection: Type 1.
- F. Indoor Polymeric Junction and Pull Boxes:
 - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Robroy Enclosures; Robroy Industries.
 - d. Topaz Lighting & Electric.
 - 3. Additional Characteristics: UL Category Control Number BGUZ.
 - 4. Options:
 - a. Degree of Protection: Type 1.
- G. Indoor Sheet Metal Miscellaneous Enclosures:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Erickson Electrical Equipment Company.
 - c. Hoffman; brand of nVent Electrical plc.
 - d. Milbank Manufacturing Co.
 - e. Square D; Schneider Electric USA.
 - 2. Additional Characteristics: UL 1773 and UL Category Control Number XCKT.
 - 3. Options:
 - a. Degree of Protection: Type 1.
- H. Outdoor Sheet Metal Cabinets:
 - 1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.

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- b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Erickson Electrical Equipment Company.
 - d. Hoffman; brand of nVent Electrical plc.
 - e. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - f. Milbank Manufacturing Co.
 - g. Robroy Enclosures; Robroy Industries.
 - 3. Additional Characteristics: UL Category Control Number CYIV.
 - 4. Options:
 - a. Degree of Protection: Type 4.
- I. Outdoor Sheet Metal Cutout Boxes:
 - 1. Description: Enclosure that has swinging doors or covers secured directly to and telescoping with walls of enclosure.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Hoffman; brand of nVent Electrical plc.
 - d. Killark; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - e. Milbank Manufacturing Co.
 - f. Robroy Enclosures; Robroy Industries.
 - 3. Additional Characteristics: UL Category Control Number CYIV.
 - 4. Options:
 - a. Degree of Protection: Type 4.
- J. Outdoor Sheet Metal Junction and Pull Boxes:
 - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Milbank Manufacturing Co.
 - c. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - d. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - 3. Additional Characteristics: UL Category Control Number BGUZ.
 - 4. Options:
 - a. Degree of Protection: Type 4.

K. Outdoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - b. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
 - c. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
3. Additional Characteristics: UL Category Control Number BGUZ.
4. Options:
 - a. Degree of Protection: Type 4.

L. Outdoor Sheet Metal Miscellaneous Enclosures:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Hoffman; brand of nVent Electrical plc.
 - c. Milbank Manufacturing Co.
 - d. Square D; Schneider Electric USA.
2. Additional Characteristics: UL 1773 and UL Category Control Number XCKT.
3. Options:
 - a. Degree of Protection: Type 4.

2.14 COVER PLATES FOR DEVICES BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
 - a. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.
 - b. Wallplate-Securing Screws: Metal with head color to match wallplate finish.

B. Metallic Cover Plates for Device Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - b. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - e. Pass & Seymour; Legrand North America, LLC.
2. Options:
 - a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
 - b. Wallplate Material: Galvanized steel. If metal plate indicated: Cast aluminum.

C. Nonmetallic Cover Plates for Device Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Leviton Manufacturing Co., Inc.
 - d. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 - e. Panduit Corp.
 - f. Pass & Seymour; Legrand North America, LLC.
2. Options:
 - a. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
 - b. Wallplate Material: 0.060-inch thick high-impact thermoplastic (nylon) with smooth finish and color matching wiring device.
 - c. Color: Ivory or as indicated on Drawings.

2.15 HOODS FOR OUTLET BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

2. General Characteristics:

a. Reference Standards:

- 1) UL 514D and UL Category Control Numbers QCIT and QCMZ.
- 2) Receptacle, hood, cover plate, gaskets, and seals comply with UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.

b. Mounts to box using fasteners different from wiring device.

B. Retractable or Reattachable Hoods for Outlet Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. ABB, Electrification Business.
- b. Raco Taymac Bell; brand of Hubbell Electrical Solutions; Hubbell Incorporated.

2. Options:

- a. Provides clear, weatherproof, "while-in-use" cover.

PART 3 - EXECUTION

3.1 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Engineer for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Severe Physical Damage: RMC.
2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Exposed and Subject to Severe Physical Damage: RMC. Subject to severe physical damage includes the following locations:
 - a. Loading docks.
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - c. Mechanical rooms.
2. Exposed and Not Subject to Physical Damage: EMT.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Damp or Wet Locations: RMC.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. RMC and IMC: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Engineer for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:
 - a. Type 4 unless otherwise indicated.
 - b. Locations Exposed to Hosedown: Type 4.
2. Indoors:
 - a. Type 1 unless otherwise indicated.

3.3 INSTALLATION OF RACEWAYS

A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Engineer for resolution of conflicting requirements.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
4. Comply with NECA NEIS 101 for installation of steel raceways.
5. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
6. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
7. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts.
8. Raceway Terminations at Locations Subject to Moisture or Vibration:
 - a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft above finished floor.
3. Install no more than equivalent of three 90-degree bends in conduit run. Support within 12 inch of changes in direction.
4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inch of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:
 - a. Conduit extending from interior to exterior of building.
 - b. Where otherwise required by NFPA 70.
9. Do not install conduits within 2 inch of the bottom side of a metal deck roof.
10. Keep raceways at least 6 inch away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
11. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
12. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb tensile strength. Leave at least 12 inch of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types RMC and IMC:
 - a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
2. Types FMC, LFMC, and LFNC:
 - a. Comply with NEMA RV 3. Provide a maximum of 36 inch of flexible conduit for recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

D. Stub-ups to Above Recessed Ceilings:

1. Provide EMT, IMC, or RMC for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

E. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. EMT: Provide compression fittings. Comply with NEMA FB 2.10.
2. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

F. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F and that have straight-run length that exceeds 25 ft. Install in runs of aboveground RMC and EMT conduit that are located where environmental temperature change may exceed 100 deg F and that have straight-run length that exceeds 100 ft.
2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
3. 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 for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

G. Raceways Penetrating Rooms or Walls:

1. Seal raceway openings on both sides of rooms/walls with fire rated putty/firestopping.

3.4 INSTALLATION OF SURFACE RACEWAYS

- A. Install surface raceways only where indicated on Drawings.
- B. Install surface raceway with a minimum 2 inch radius control at bend points.

- C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

3.5 INSTALLATION OF BOXES AND ENCLOSURES

- A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
- B. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- C. 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. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.
- D. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- E. Locate boxes so that cover or plate will not span different building finishes.
- F. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.
- G. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.
- H. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
- I. Set metal floor boxes level and flush with finished floor surface.
- J. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- K. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.
- L. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:
 - 1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
 - 2. Provide gaskets for wallplates and covers.

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of all floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.8 CLEANING

- A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type PVC raceways and fittings.
2. Fittings for conduit, tubing, and cable.
3. Threaded metal joint compound.
4. Solvent cements.
5. Duct accessories.
6. Handholes and boxes for exterior underground wiring.
7. Duct sealing.

1.2 DEFINITIONS

- A. Duct: A single raceway or multiple raceways, installed singly or as components of a duct bank.
- B. Duct Bank: Two or more ducts installed in parallel, direct buried or with additional casing materials such as concrete.
- C. Handhole: An underground chamber containing electrical cables, sized such that personnel are not required to enter in order to access the cables.
- D. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Duct-bank materials, including spacers and miscellaneous components.
2. Ducts, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Accessories for handholes and boxes.
4. Underground-line warning tape.

B. Shop Drawings:

1. Duct Banks:
 - a. Include plans, elevations, sections, and details, including attachments to other Work.
 - b. Indicate locations of private property boundaries and utility easements.

2. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:

- a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
- b. Include duct entry provisions, including locations and duct sizes, and methods and materials for waterproofing duct entry locations.
- c. Include cover design.
- d. Include grounding details.
- e. Include dimensioned locations of cable rack inserts, pulling-in and lifting irons, and other accessories.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:

1. All products to be installed under this contract.

B. Source Quality-Control Submittals:

1. Source quality-control reports.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts: Furnish to Owner spare parts necessary for repairing or adding more cables to manholes or handholes that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651A and UL CCN EAZX.

B. Schedule 40 Electrical HDPE Underground Conduit (PVC-40):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blue Diamond Industries, LLC.
 - b. Prysmian Cables and Systems; Prysmian Group North America.
 - c. Southwire Company, LLC.
2. Dimensional Specifications: Schedule 40.

C. Schedule 80 Electrical HDPE Underground Conduit (PVC-80):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Blue Diamond Industries, LLC.
 - b. Prysmian Cables and Systems; Prysmian Group North America.
 - c. Southwire Company, LLC.
2. Dimensional Specifications: Schedule 80.

2.2 TYPE ERM-C-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. PVC-Coated-Steel Electrical Rigid Metal Conduit (ERM-C-S-PVC), Elbows, Couplings, and Nipples:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Calbond; Atkore International.
 - b. KorKap; Robroy Industries.
 - c. Perma-Cote; Robroy Industries.
 - d. Plasti-Bond; Robroy Industries.
2. Additional Characteristics:
3. Fittings for PVC-Coated Conduit:
 - a. Minimum coating thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
 - b. Conduit bodies must be Form 8 with effective seal and positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 inch Hg (vacuum) for 72 hours must be available. Conduit bodies must be supplied with plastic-encapsulated stainless steel cover screws.
 - c. Form 2 inch long or one pipe diameter long, whichever is less, PVC sleeve at openings of female fittings, except unions. Inside sleeve diameter must be matched to outside diameter of metal conduit.
 - d. PVC coating on outside of conduit couplings must be protected from tool damage during installation.

- e. Female threads on fittings and couplings must be protected by urethane coating.
- f. Fittings must be from same manufacturer as conduit.
- g. Beam clamps and U bolts must be formed and sized to fit outside diameter of coated conduit. Plastic-encapsulated nuts must cover exposed portions of threads.

4. Options:

- a. Exterior Coating: PVC complying with NEMA RN 1.
- b. Interior Coating: Zinc.
- c. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

2.3 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

- 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
- 2. General Characteristics: UL 651 and UL CCN DZYR.

B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Business.
 - b. Calconduit; Atkore International.
 - c. JM Eagle.
- 2. Dimensional Specifications: Schedule 40.

C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Business.
 - b. Calconduit; Atkore International.
 - c. Opti-Com Manufacturing Network, Inc (OMNI).
- 2. Dimensional Specifications: Schedule 80.

2.4 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

- 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Metallic Fittings for Type ERM, Type IMC, Type PVC, Type EPEC, and Type RTRC Raceways:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Appleton; Emerson Electric Co., Automation Solutions.
 - b. Crouse-Hinds; brand of Eaton, Electrical Sector.
 - c. Penn Aluminum Conduit & EMT; Penn Aluminum International LLC; Berkshire Hathaway.
 - d. Southwire Company, LLC.
2. General Characteristics: UL 514B and UL CCN DWTT.
3. Options:
 - a. Material: Die cast.
 - b. Coupling Method: Raintight compression coupling with distinctive color gland nut.
 - c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
 - d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

2.5 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL Subject 2419 and UL CCN FOIZ.

B. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. ABB, Electrification Business.
2. Approved equal.

2.6 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
- B. Underground-Line Warning Tape: In accordance with Section 260553 "Identification for Electrical Systems."

2.7 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
 - a. ASTM C858 for design and manufacturing processes.
 - b. SCTE 77.

B. Source Quality Control:

1. Precast Concrete Utility Structures: Test and inspect in accordance with ASTM C1037.
2. Polymer Concrete and Nonconcrete Handhole and Pull-Box Prototypes: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests must be for specified tier ratings of products supplied. Testing machine pressure gages must have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.
 - a. Tests of materials must be performed by independent testing agency.
 - b. Strength tests of complete boxes and covers must be by independent testing agency or manufacturer. Qualified registered professional engineer must certify tests by manufacturer.

C. Precast Concrete Handholes and Boxes:

1. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover must form top of enclosure and must have load rating consistent with that of handhole or box.
2. Hubbell or approved equal.
3. Configuration: Units must be designed for flush burial and have open bottom unless otherwise indicated.
 - a. Cover Finish: Nonskid finish must have minimum coefficient of friction of 0.50.
 - b. Cover Legend: Molded lettering, **"TELE-COM"**.
4. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
 - a. Type and size: Match fittings to duct to be terminated.
 - b. Fittings must align with elevations of approaching duct and be located near interior corners of handholes to facilitate racking of cable.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in field. Notify Architect if there is conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.
- C. Clear and grub vegetation to be removed, and protect vegetation to remain. Remove and stockpile topsoil for reapplication.

3.2 SELECTION OF UNDERGROUND DUCTS

- A. Duct for Electrical Branch Circuits: PVC-40, direct buried unless otherwise indicated.
- B. Underground Ducts Crossing Paved Paths Walks and Driveways: PVC-40 encased in reinforced concrete.
- C. Underground Ducts Crossing Roadways: PVC-40, encased in reinforced concrete.
- D. Stub-ups: Concrete encased, PVC-40.

3.3 SELECTION OF UNDERGROUND ENCLOSURES

- A. Handholes and Boxes:
 - 1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete, AASHTO HB 17, H-20 structural load rating.
 - 2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.

3.4 EARTHWORK

- A. Restoration: Restore area after construction vehicle traffic in immediate area is complete.
- B. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary top soiling, fertilizing, liming, seeding, sodding, sprigging, and mulching.
- D. Cut and patch existing pavement in path of underground duct, duct bank, and underground structures.

3.5 INSTALLATION OF DUCTS AND DUCT BANKS

A. Reference Standards:

- 1. Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NEMA TCB 2 for installation of underground ducts and duct banks.
- 2. Consult Architect for resolution of conflicting requirements.

B. Special Techniques:

- 1. Where indicated on Drawings, install duct, spacers, and accessories into duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- 2. Steel raceway, bends, and fittings in single duct run or duct bank on Project must be of same type.
- 3. Slope: Pitch duct minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from high point between two manholes to drain in both directions.
- 4. Joints: Use solvent-cemented joints in nonmetallic duct and fittings and make watertight in accordance with manufacturer's published instructions. Stagger couplings so those of adjacent duct do not lie in same plane. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with minimum 3 inch (75 mm) of concrete for minimum of 12 inch (300 mm) on each side of coupling.
 - a. Install insulated grounding bushings on steel raceway terminations that are less than 12 inch (300 mm) below grade or floor level and do not terminate in hubs.
- 5. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing duct will not be subject to environmental temperatures above 104 deg F (40 deg C). Where environmental temperatures are calculated to rise above 104 deg F (40 deg C), and anywhere duct crosses above underground steam line, install insulation blankets listed for direct burial to isolate duct bank from steam line to maintain maximum environmental temperature of 104 deg F (40 deg C).
- 6. Concrete-Encased Ducts and Duct Bank:
 - a. Excavate trench bottom to provide firm and uniform support for duct.
 - b. Width: Excavate trench 3 inch (75 mm) wider than duct on each side.
 - c. Depth: Install so top of duct envelope is at least 24 inch (600 mm) below finished grade in areas not subject to deliberate traffic, and at least 30 inch (750 mm) below finished grade in deliberate traffic paths for vehicles unless otherwise indicated. Install so top of duct envelope is below local frost line.

- d. Support duct on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 - e. Elbows:
 - 1) Use manufactured duct elbows for stub-ups and at changes of direction in duct unless otherwise indicated. Extend encasement throughout length of elbow.
 - 2) Use manufactured steel elbows for stub-ups, at building entrances, and at changes of direction in duct run.
 - f. Stub-ups to Outdoor Equipment: Extend concrete-encased steel raceway horizontally minimum of 60 inch (1500 mm) from edge of equipment base.
 - 1) Stub-ups to Outdoor Equipment: Extend concrete-encased steel raceway horizontally minimum of 60 inch (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.
 - a) Stub-ups must be minimum 4 inch (100 mm) above finished base and minimum 3 inch (75 mm) from conduit side to edge of base.
 - 2) Stub-ups to Indoor Equipment: Extend concrete-encased steel raceway horizontally on exterior of wall minimum of 60 inch (1500 mm) from edge of wall. Install insulated grounding bushings on terminations at equipment.
 - 3) Stub-ups through interior floors must be minimum 4 inch (100 mm) above finished floor and no less than 3 inch (75 mm) from conduit side to edge of equipment pad or floor slab.
 - g. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inch (100 mm) over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction.
7. Underground-Line Warning Tape: Bury conducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inch (300 mm) above concrete-encased duct and duct banks and approximately 12 inch (300 mm) below grade. Align tape parallel to and within 3 inch (75 mm) of centerline of duct bank. Provide additional warning tape for each 12 inch (300 mm) increment of duct-bank width over nominal 18 inch (450 mm). Space additional tapes 12 inch (300 mm) apart, horizontally across width of ducts.
8. Ground ducts and duct banks in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

3.6 INSTALLATION OF CONCRETE HANDHOLES AND BOXES

A. Reference Standards:

1. Precast Concrete Handholes: Comply with ASTM C891 unless otherwise indicated.
2. Consult Architect for resolution of conflicting requirements.

B. Special Techniques:

1. Precast Concrete Handholes and Manholes:
 - a. Install units level and plumb and with orientation and depth coordinated with connecting duct to minimize bends and deflections required for proper entrances.
 - b. Unless otherwise indicated, support units on level bed of crushed stone or gravel graded from 1 inch (25 mm) sieve to No. 4 (4.75 mm) sieve and compacted to same density as adjacent undisturbed earth.
 - c. Field-cut openings for conduits in accordance with enclosure manufacturer's published instructions. Cut wall of enclosure with tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.7 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Special Techniques:

1. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.
2. Unless otherwise indicated, support units on level bed of crushed stone or gravel, graded from 1/2 inch (12.5 mm) sieve to No. 4 (4.75 mm) sieve and compacted to same density as adjacent undisturbed earth.
3. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.

END OF SECTION 260543

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Labels.
2. Bands and tubes.
3. Tapes and stencils.
4. Tags.
5. Signs.
6. Cable ties.
7. Miscellaneous identification products.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.

C. Identification Schedule: For each piece of electrical equipment and electrical system components to be index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with ASME A13.1 and IEEE C2.

- B. Comply with 29 CFR 1910.144 for color identification of hazards; 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs and tags; and the following:
 - 1. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft (2.3 m) above finished floor.
- C. Signs, labels, and tags required for personnel safety must comply with the following standards:
 - 1. Safety Colors: NEMA Z535.1.
 - 2. Facility Safety Signs: NEMA Z535.2.
 - 3. Safety Symbols: NEMA Z535.3.
 - 4. Product Safety Signs and Labels: NEMA Z535.4.
 - 5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.
- D. Comply with NFPA 70E and Section 260573.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, must comply with UL 969.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 1000 V or Less:
 - 1. White engraved circular plate 2"-dia. With 1/16" stainless steel around conduit showing source and load I.D. Match existing product.
 - 2. Black letters on white field.
 - 3. Legend: Indicate voltage and system.
- B. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - 1. Color must be factory applied or field applied for sizes larger than 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208Y/120 V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Color for Neutral: White.
 - 4. Color for Equipment Grounds: Green.

C. Warning Label Colors:

1. Identify system voltage with black letters on orange background.

D. Warning labels and signs must include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 3 FEET MINIMUM."

E. Equipment Identification Labels:

1. Black letters on white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. HellermannTyton.
 - c. Panduit Corp.
 - d. Seton Identification Products; a Brady Corporation company.

B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. HellermannTyton.
 - c. Panduit Corp.
 - d. Seton Identification Products; a Brady Corporation company.

C. Self-Adhesive Wraparound Labels: Preprinted, 3 mil (0.08 mm) thick, polyester flexible label with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brother International Corporation.
 - c. Ideal Industries, Inc.

- d. Panduit Corp.
 - e. Seton Identification Products; a Brady Corporation company.
- 2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over legend. Labels sized such that clear shield overlaps entire printed legend.
 - 3. Marker for Labels:
 - a. Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - b. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
 - 4. Minimum Nominal Size:
 - a. 1-1/2 by 6 inch (37 by 150 mm) for raceway and conductors.
 - b. 3-1/2 by 5 inch (76 by 127 mm) for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inch (50 mm) long, with diameters sized to suit diameters and that stay in place by gripping action.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. HellermannTyton.
 - c. Panduit Corp.
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 deg F (93 deg C). Comply with UL 224.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Panduit Corp.

2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Champion America.
 - b. HellermannTyton.

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- c. Ideal Industries, Inc.
 - d. Panduit Corp.
- B. Tape and Stencil: 4 inch (100 mm) wide black stripes on 10 inch (250 mm) centers placed diagonally over orange background and are 12 inches (300 mm) wide. Stop stripes at legends.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. HellermannTyton.
 - b. LEM Products Inc.
 - c. Seton Identification Products; a Brady Corporation company.

2.6 TAGS

- A. Metal Tags for use on ground wires at ground bars only: Brass, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking cable tie fastener.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. Marking Services, Inc.
 - d. Seton Identification Products; a Brady Corporation company.

2.7 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. Marking Services, Inc.
 - d. Seton Identification Products; a Brady Corporation company.
 - 2. Engraved legend.
 - 3. Thickness:
 - a. For signs up to 20 sq. inch (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
 - b. For signs larger than 20 sq. inch (129 sq. cm), 1/8 inch (3.2 mm) thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4 inch (6.4 mm) grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.8 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. HellermannTyton.
 - 2. Ideal Industries, Inc.
 - 3. Marking Services, Inc.
 - 4. Panduit Corp.
- B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black, except where used for color-coding.
- C. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black.
- D. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 7000 psi (48.2 MPa).
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - 5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain 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.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 1000 V: Identification must completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Emergency Operating Instruction Signs: Install instruction signs with white legend on red background with minimum 3/8 inch (10 mm) high letters for emergency instructions at equipment used for power transfer.
- J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.
- K. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:
 - 1. System (A or B)
 - 2. "POWER."
 - 3. "TELECOMMUNICATIONS."

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- L. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.
- M. Snap-Around Labels: Secure tight to surface at location with high visibility and accessibility.
- N. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.
- O. Snap-Around Color-Coding Bands: Secure tight to surface at location with high visibility and accessibility.
- P. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.
- Q. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- R. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- S. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's instructions.
- T. Metal Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using stainless steel cable ties.
- U. Nonmetallic Preprinted Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using stainless steel cable ties.
- V. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
 - 2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high sign; where two lines of text are required, use labels 2 inch (50 mm) high.
- W. Cable Ties: General purpose, for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 1000 V or Less, for Feeder, and Branch Circuits, engraved plate fastened with steel cable.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify cover of junction and pull box of the following systems with self-adhesive labels containing wiring system legend and system voltage. System legends must be as follows:
 - 1. "SYSTEM A OR B POWER."
 - 2. "POWER."
 - 3. "FIBER OPTICS."
- E. Power-Circuit Conductor Identification, 1000 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use snap-around labels to identify phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes with conductor designation.
- H. Conductors to Be Extended in Future: Attach marker tape to conductors and list source.
- I. Workspace Indication: Apply tape and stencil to finished surfaces. Show working clearances in direction of access to live parts. Workspace must comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- J. Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.

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- K. Warning Labels for Indoor Cabinets, Boxes, and Enclosures: Screw fastened baked enamel.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. 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.
- L. Arc Flash Warning Labeling: Self-adhesive labels.
- M. Operating Instruction Signs: Baked-enamel warning signs.
- N. Emergency Operating Instruction Signs: Baked-enamel warning signs with white legend on red background with minimum 3/8 inch (10 mm) high letters for emergency instructions at equipment used for power transfer.
- O. Equipment Identification Labels:
 - 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign.
 - 3. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in location provided by panelboard manufacturer. Panelboard identification must be in form of engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Emergency system boxes and enclosures.
 - e. Enclosed switches.
 - f. Enclosed circuit breakers.
 - g. Enclosed controllers.
 - h. Push-button stations.
 - i. Telecommunications enclosures and raceways.

END OF SECTION 260553

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General-use switches.
2. General-grade single straight-blade receptacles.
3. General-grade duplex straight-blade receptacles.
4. Receptacles with arc-fault and ground-fault protective devices.
5. Locking receptacles.
6. Special-purpose power outlet assemblies.
7. Connectors, cords, and plugs.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Toggle switches.
2. Maintained-contact switches.
3. Momentary-contact switches.
4. Single straight-blade receptacles
5. Duplex straight-blade receptacles.
6. Receptacles with GFCI device.
7. Locking receptacles.
8. Cord connectors.

B. Shop Drawings:

1. Wiring diagrams for duplex straight-blade receptacles with integral switching means.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturers' Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:
 - 1. Single straight-blade receptacles.
 - 2. Duplex straight-blade receptacles.
 - 3. Receptacles with GFCI device.
 - 4. Locking receptacles.
 - 5. Pin-and-sleeve receptacles.
- B. Sample warranties.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Special Tools:
 - 1. Proprietary equipment and software required to maintain, repair, adjust, or implement future changes to controlled receptacles.
 - 2. Proprietary equipment required to maintain, repair, adjust, or implement future changes to cord connectors.

1.5 WARRANTY FOR DEVICES

- A. Special Manufacturer Extended Warranty: Manufacturer warrants that devices perform in accordance with specified requirements and agrees to provide repair or replacement of devices that fail to perform as specified within extended warranty period.
 - 1. Extended Warranty Period: Three years from date of Substantial Completion; full coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 GENERAL-USE SWITCHES

- A. Toggle Switch:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.

2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN WMUZ and UL 20.
4. Options:
 - a. Device Color: Ivory.
 - b. Configuration:
 - 1) General-duty, 120-277 V, 20 A, single pole.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.2 GENERAL-GRADE SINGLE STRAIGHT-BLADE RECEPTACLES

A. Single Straight-Blade Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
4. Options:
 - a. Device Color: Ivory.

b. Configuration:

- 1) Heavy-duty, NEMA 5-20R.
- 2) General-duty, NEMA 6-20R and NEMA 6-30R.
- 3) Heavy-duty, smooth face, NEMA 6-20R.

5. Accessories:

- a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
- b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.3 GENERAL-GRADE DUPLEX STRAIGHT-BLADE RECEPTACLES

A. Duplex Straight-Blade Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
4. Options:
 - a. Device Color: Ivory.
 - b. Configuration:
 - 1) General-duty, NEMA 5-20R.
 - 2) General-duty, NEMA 6-20R.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.

- b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.4 LOCKING RECEPTACLES

A. NEMA, 125 V, Locking Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

B. NEMA, 250 V, Locking Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour; Legrand North America, LLC.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
4. Options:
 - a. Device Color: Black with blue voltage indication on face.
 - b. Configuration:
 - 1) 4 pole, 5 wire, grounding, NEMA L21-30R.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receptacles:

1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

3.2 INSTALLATION OF SWITCHES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Consult Engineer for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black-filled lettering, and provide durable wire markers or tags inside device box or outlet box.

3.3 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Engineer for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black-filled lettering, and provide durable wire markers or tags inside device box or outlet box.

3.4 INSTALLATION OF LOCKING RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Engineer for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black-filled lettering, and provide durable wire markers or tags inside device box or outlet box.

3.5 FIELD QUALITY CONTROL OF SWITCHES

A. Testing Preparation:

B. Field tests and inspections must be witnessed by Engineer.

C. Tests and Inspections:

1. Perform tests and inspections in accordance with manufacturers' instructions.

D. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Assemble and submit test and inspection reports.

3.6 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

- A. Testing Preparation:
- B. Field tests and inspections must be witnessed by Engineer.
- C. Tests and Inspections:
 - 1. Insert and remove test plug to verify that device is securely mounted.
 - 2. Verify polarity of hot and neutral pins.
 - 3. Measure line voltage.
 - 4. Measure percent voltage drop.
 - 5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
- D. Nonconforming Work:
 - 1. Device will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- E. Assemble and submit test and inspection reports.

3.7 FIELD QUALITY CONTROL OF LOCKING RECEPTACLES

- A. Testing Preparation:
- B. Field tests and inspections must be witnessed by Engineer.
- C. Tests and Inspections:
 - 1. Insert and remove test plug to verify that device is securely mounted.
 - 2. Verify polarity of hot and neutral pins.
 - 3. Measure line voltage.
 - 4. Measure percent voltage drop.
 - 5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
 - 6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.
- D. Nonconforming Work:
 - 1. Device will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- E. Assemble and submit test and inspection reports.

3.8 FIELD QUALITY CONTROL OF CONNECTORS, CORDS, AND PLUGS

- A. Testing Preparation:
- B. Field tests and inspections must be witnessed by Engineer.

C. Tests and Inspections:

1. Perform tests and inspections indicated in manufacturer's instructions.

D. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Assemble and submit test and inspection reports.

3.9 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.
2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

B. Connectors, Cords, and Plugs:

1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262726

SECTION 262813 - FUSES

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. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Control circuits.
 - b. Enclosed controllers.
 - c. Enclosed switches.
2. Spare-fuse cabinets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
 2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 3. Current-limitation curves for fuses with current-limiting characteristics.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.
 1. Current-limitation curves for fuses with current-limiting characteristics.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 5 percent of quantity installed for each size and type, but no fewer than one of each size and type.

1.6 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bussmann; Eaton, Electrical Sector.
 - 2. Littelfuse, Inc.
 - 3. Mersen USA.
- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
 - 1. Type RK-1: 50-V, zero- to 600-A rating, 200 kAIC.
 - 2. Type RK-5: 250-V, zero- to 600-A rating, 200 kAIC.
 - 3. Type J: 600-V, zero- to 600-A rating, 200 kAIC.
 - 4. Type L: 600-V, 601- to 6000-A rating, 200 kAIC.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.3 SPARE-FUSE CABINET

- A. Use existing spare fuse cabinet located in power room 009.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 - 1. Feeders: Class RK5, fast acting.
 - 2. Motor Branch Circuits: Class RK5.
 - 3. Power Electronics Circuits: Class J, high speed.
 - 4. Other Branch Circuits: Class RK1, time delay.
 - 5. Control Transformer Circuits: Class CC, time delay, control transformer duty.
 - 6. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 270500 - COMMON WORK RESULTS FOR COMMUNICATIONS

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. Communications equipment coordination and installation.
 - 2. Sleeves for pathways and cables.
 - 3. Sleeve seals.
 - 4. Grout.
 - 5. Common communications installation requirements.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of communications 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 pathways, 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.

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- C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- E. The actual runs and locations of all cabling and cable tray systems shall be determined on the site and shall be installed to meet the various conditions at the building, and any changes necessary to conceal pipes or clear pipes or equipment of other trades shall be made without additional compensation.
- F. Where this Contractor elects to substitute materials or equipment approved for those specified, this Contractor will be held responsible for all structural, mechanical, and electrical changes required for the installation of substituted materials at no additional compensation. When the Contractor proposes to use an item or equipment other than that specified or detailed on the drawings, that is approved by the Engineer and that requires re-design of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, then such re-design, new drawings, and detailing required for it shall be prepared by the Contractor without additional compensation.
- G. Lay out work from dimensions of field investigation and actual dimensions of equipment being installed. Layouts in congested areas shall not be scaled from the Mechanical, Electrical and Telecommunications Drawings. Clearances shall be provided on all sides of equipment for proper maintenance purposes as required by the equipment manufacturer and as required by the Department of Labor and Industry. All equipment, apparatus, and accessories requiring normal servicing, operation, or maintenance shall be made easily accessible.
- H. All equipment shall operate without objectionable noise or vibration and within Noise Criteria or Vibration Tables as determined by authorized representatives of the Architect from Sound and Vibration Control listed in the latest Edition of the ASHRAE Handbook of Fundamentals. If such objectionable noise or vibration shall be produced and transmitted to occupied portions of the building by apparatus, piping, or other parts of this work, any necessary changes, as approved, shall be made by the Contractor without cost to the owner.
- I. The Contractor shall be responsible for providing all necessary fire-resistant materials and covers where fire-rated construction is penetrated under this Contract. Materials shall be furnished by the Contractor as required to maintain the fire rating of the walls, partitions, ceilings, and floors in accordance with the requirements of NFPA, *the Pennsylvania Department of Labor and Industry*, International Building Code (IBC) 2021, and all other applicable codes.
- J. This Contractor shall disconnect and remove all telecommunications cabling and other associated telecommunications equipment in conjunction with removed cameras and other miscellaneous equipment. Relocated equipment shall be reconnected to telecommunication systems at their new locations.
- K. Where present piping or equipment is removed and unused openings remain in walls, floors, ceilings, partitions, and similar locations, the openings shall be properly patched by this Contractor in a manner satisfactory to the Architect.

- L. Cutting of the construction excessively or carelessly done shall be repaired to match the original work by this Contractor and to the satisfaction of the Architect who will make the final decision with respect to excessive or careless cutting work.
- M. The submissions are the Contractor's documents and the Architect's and Engineer's approval constitutes an acknowledgment that the documents have been submitted and nothing more. It is the Contractor's responsibility to check his own submissions for compliance with the Contract Documents and job conditions.

1.6 GENERAL PROJECT REQUIREMENTS

- A. This Contractor shall include all inspection fees as required by the local municipality, along with coordinating inspector visits in a timely manner.
- B. Provide protection of all existing structures, flooring, equipment, finishes, landscaping, insulation, etc. from damage resulting from the work of this Contract. Repair any damage promptly to the satisfaction of the Architect and Owner.
- C. Provide painting for "touch up" that will be required to restore "factory finished" equipment and material to its original condition in the event of damage.
- D. Provide any housekeeping and equipment pads required for equipment (interior or exterior) that are required for the work of this Contract.
- E. Perform the necessary on-site discovery process in order to understand all existing systems currently in use.
- F. Assist in resolving and scheduling any power outages. A two (2) week notice shall be given in the event an outage must occur. All outages shall be kept to a minimum and shall be approved by the Owner.

PART 2 - PRODUCTS

2.1 SLEEVES FOR PATHWAYS AND 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.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.

- b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Calpico, Inc.
 - b. Metraflex Co.
 - c. Pipeline Seal and Insulator, Inc.
 - d. Thunder Line/Link-Seal.
 - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
 - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

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.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

- A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or other wall assemblies.
- B. Concrete Slabs and All Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and pathway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.

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- B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

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

END OF SECTION 270500

SECTION 270529 - HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

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. Steel slotted support systems for communication raceways.
 - 2. Nonmetallic slotted support systems for communication raceways.
 - 3. Conduit and cable support devices.
 - 4. Support for conductors in vertical conduit.
 - 5. Structural steel for fabricated supports and restraints.
 - 6. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 7. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

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

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
 - 2. Include rated capacities and furnished specialties and accessories.

- B. Shop Drawings: For fabrication and installation details for communications hangers and support systems.
 - 1. Trapeze hangers. Include product data for components.
 - 2. Aluminum slotted-channel systems.
 - 3. Nonmetallic slotted-channel systems.
 - 4. Equipment supports.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M.
 - 2. AWS D1.2/D1.2M.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch- (10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
 - 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 2. Material for Channel, Fittings, and Accessories (Indoor): Galvanized steel.
 - 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 - 7. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with minimum 13/32-inch- (10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c., in at least one surface.
 - 1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 2. Channel Width: Selected for applicable load criteria.
 - 3. Fittings and Accessories: Products provided by channel and angle manufacturer and designed for use with those items.

4. Fitting and Accessory Materials: Same as those for channels and angles, except metal items may be stainless steel.
 5. Rated Strength: Selected to suit applicable load criteria.
 6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Conduit and Cable Support Devices: Steel clamps, hangers, 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 communications 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 made of malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M 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: **NOT PERMITTED.**
 2. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 3. Toggle Bolts: All-steel springhead type.
 4. Hanger Rods: 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 the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
1. NECA 1.
 2. NECA/BICSI 568.
 3. TIA-569-D.
 4. NECA 101.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

- C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 5 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with single-bolt conduit clamps, using spring friction action for retention in support channel.
- E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, according to NFPA 70.
- 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 (90 kg).
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten communications 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: Use approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Use 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 (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 - 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 - 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.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

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

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 270529

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 6 - Gamechanger direct bury sunlight resistant shielded twisted pair OSP AWM aluminum interlocked armor 600V. PN 258880845.
 2. Jacks: Hubbell Ascent Series Jacks Cat 6 (568B) (Blue for Data and White for Voice). 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 6 (Blue data; White for voice, lack for cameras)

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. Hand written 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 try. 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 6

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

SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE 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. Type OFNP optical fiber cable.
 - 2. Type OFCP optical fiber cable.
 - 3. Optical fiber cable hardware.
 - 4. Outdoor OS2 optical fiber cable.

1.3 DEFINITIONS

- A. Conductive Cable: Cable containing non-current-carrying electrically-conductive members such as metallic strength members and metallic vapor barriers.
- B. Cross-Connect: A facility enabling termination of cable elements and their interconnection or cross-connection.
- C. Type OFCP: Conductive cable for use in plenums, ducts, and other spaces used for environmental air.
- D. Type OFCR: Conductive cable for use as riser in vertical shafts or from floor to floor.
- E. Type OFNP: Nonconductive cable for use in plenums, ducts, and other spaces used for environmental air.
- F. Type OFNR: Nonconductive cable for use as riser in vertical shafts or from floor to floor.
- G. Types OFC and OFCG: Conductive cable for general purpose use.
- H. Types OFN and OFNG: Nonconductive cable for general purpose use.

1.4 COORDINATION

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

1.5 ACTION SUBMITTALS

A. Product Data:

1. Type OFCR optical fiber cable.
2. Type OFCP optical fiber cable.
3. Optical fiber cable hardware.
4. Outdoor OS2 optical fiber cable.
5. Outdoor support hardware.

B. Shop Drawings:

1. System Labeling Schedules:
 - a. Electronic copy of labeling schedules, in software and format selected by Owner.
2. Cabling administration drawings and printouts.
3. Wiring diagrams showing typical schematic arrangement, including the following:
 - a. Telecommunications rooms plans and elevations.
 - b. Telecommunications pathways.
 - c. Telecommunications system access points.
 - d. Telecommunications grounding system.

C. Certificates: For each type of product.

D. Field Quality-Control Reports: Optical fiber cable testing plan.

1.6 INFORMATIONAL SUBMITTALS

A. Source quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Contracts:

1. Software service agreement.

B. Maintenance Data: For optical fiber cable, splices, and connectors.

1.8 DELIVERY, STORAGE, AND HANDLING

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

- B. Test cables upon receipt at Project site.
 - 1. Test optical fiber cable to determine continuity of strand end to end. Use optical loss test set.
 - 2. Test optical fiber cable while on reels. Use optical time domain reflectometer to verify cable length and locate cable defects, splices, and connector, including loss value of each. Retain test data and include record in maintenance data.

PART 2 - PRODUCTS

- A. Type OFNP, Designation OS2, Inside-Outside Plant, Single-Mode Optical Fiber Cable :
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Corning ALTOS figure 8.
 - b. Prysmian General Cable
 - c. Superior Essex Inc.; subsidiary of LS Corp.
 - 2. Source Limitations: Obtain products from single manufacturer.
 - 3. Additional Characteristics:
 - a. Construction: TIA-492CAAB; 9 μm core diameter, 125 μm cladding diameter, with low water peak.
 - b. Minimum Overfilled Modal Bandwidth-Length Product: 500 MHz-km at 850 nm wavelength; 500 MHz-km at 1300 nm wavelength.
 - 4. Options:
 - a. Configuration:
 - 1) See drawings for count - loose tube, optical fiber cable.
 - b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
 - c. Jacket Color: Black.

2.2 TYPE OFCP OPTICAL FIBER CABLE

- A. Type OFCP Optical Fiber Cable: This category covers jacketed optical fiber cable for use in vertical runs in plenums, ducts, or other spaces used for environmental air within buildings in accordance with Article 770 of NFPA 70 containing noncurrent-carrying electrically conductive materials.

B. Type OFCP, Designation OS1, Inside Plant, Single-Mode Optical Fiber Cable :

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. General Cable; Prysmian Group North America
 - b. Superior Essex Inc.; subsidiary of LS Corp.
 - c. Corning
2. Source Limitations: Obtain products from single manufacturer.
3. Additional Characteristics:
 - a. Construction: TIA-492CAAA; 9 μ m core diameter, 125 μ m cladding diameter.
 - b. Minimum Overfilled Modal Bandwidth-Length Product: 500 MHz-km at 850 nm wavelength; 500 MHz-km at 1300 nm wavelength.
4. Options:
 - a. Configuration: fiber count see drawings, tight buffered, optical fiber cable.
 - b. Maximum Attenuation: 1.0 dB/km at 1310 nm wavelength; 1.0 dB/km at 1550 nm wavelength.
 - c. Jacket Color: Yellow.
 - d. Armor: Aluminum.

2.3 OPTICAL FIBER CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Corning Optical Communications; Corning Incorporated
 2. Hubbell Premise Wiring; brand of Hubbell Electrical Solutions; Hubbell Incorporated
 3. Molex Premise Networks
 4. Optical Cable Corporation (OCC)
 5. Siemon Co. (The)
- B. Performance Criteria:
1. Fiber Optic Connector Intermateability Standard (FOCIS) specifications of TIA-604 series.
 2. TIA-568.3.
- C. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.
1. Number of Connectors per Field: [One]<Insert number> for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.
- D. Patch Cords: Factory-made, dual-fiber cables in 36 inch (900 mm) lengths.

- E. Connector Type MT-RJ complying with TIA-604-12 connectors. VERIFY WITH OWNER PRIOR TO SUBMITTING.
- F. Plugs and Plug Assemblies:
 - 1. Male; color-coded modular telecommunications connector designed for termination of single optical fiber cable.
 - 2. Insertion loss not more than 0.25 Db.
- G. Jacks and Jack Assemblies:
 - 1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of single optical fiber cable.
 - 2. Insertion loss not more than 0.25 dB.
 - 3. Designed to snap-in to patch panel or faceplate.

2.4 SOURCE QUALITY CONTROL

- A. Testing Administrant: Engage qualified testing agency to evaluate cables.
- B. Factory Tests and Inspections:
 - 1. Test and inspect optical fiber cables, by, or under supervision of, qualified electrical testing laboratory recognized by authorities having jurisdiction, in accordance with TIA-526-14 and TIA-568.3 before delivering to site. Affix label with name and date of manufacturer's certification of system compliance.
- C. Nonconforming Work:
 - 1. Cables that do not pass tests and inspections will be considered defective.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 SELECTION OF OPTICAL FIBER TYPE

- A. Installed in Vertical Shaft or Floor-to-Floor Riser:
 - 1. Conductive:
 - a. Type OFCP in listed plenum communications raceway.
- B. Installed in Plenum, Duct, or Other Space Handling Environmental Air:
 - 1. Nonconductive:
 - a. Type OFCP in listed plenum communications raceway Conductive:

C. Installed in Location Other Than Riser or Plenum:

1. Type OFCP in listed plenum communications raceway.

3.2 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

- A. Optical fiber backbone cabling system must provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
- B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters may not be used as part of backbone cabling.
- C. Comply with BICSI N1, NECA NEIS 1, and NECA NEIS 301.
- D. Backbone cabling system must comply with transmission standards in TIA-568.1.
- E. Telecommunications Pathways and Spaces: Comply with TIA-569.
- F. Wiring Methods:
1. Not in Raceway: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
 2. In Raceway: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
 - a. Install plenum cable in environmental airspaces, including plenum ceilings.
 - b. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."
 3. In Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- G. Optical Fiber Cabling Installation:
1. Comply with TIA-568.1 and TIA-568.3.
 2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
 3. Terminate all cables; no cable may contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inch (760 mm) and not more than 6 inch (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.

6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps may not be used for heating.
9. In communications equipment room, provide 10 ft (3 m) long service loop on each end of cable.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

H. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Cable may not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

I. Group connecting hardware for cables into separate logical fields.

3.3 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569, Annex A, "Firestopping."
- C. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.4 GROUNDING

- A. Install grounding in accordance with BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.
- B. Comply with TIA-607 and NECA/BICSI-607.
- C. Locate grounding bus bar to minimize length of bonding conductors. Fasten to wall allowing at least 2 inch (50 mm) clearance behind grounding bus bar. Connect grounding bus bar with minimum 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to grounding bus bar, using not smaller than 6 AWG equipment grounding conductor.

3.5 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA-606. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
 - 1. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.
- B. Comply with requirements in Section 271523 "Communications Optical Fiber Horizontal Cabling" for cable and asset management software.
- C. Cable Schedule: Install in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish electronic copy of final comprehensive schedules for Project.
- D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.
- E. Cable and Wire Identification:
 - 1. Label each cable within 4 inch (100 mm) of each termination and tap, where it is accessible in cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
 - 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 ft (4.5 m).
 - 4. Label each unit and field within distribution racks and frames.
 - 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use different color for jacks and plugs of each service.
- F. Labels must be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606, for the following:
 - 1. Flexible vinyl or polyester that flexes as cables are bent.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect optical fiber jacket materials for qualified electrical testing laboratory certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Optical Fiber Cable Tests:
 - a. Test instruments must meet or exceed applicable requirements in TIA-568.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Link End-to-End Attenuation Tests:
 - 1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in one direction in accordance with TIA-526-14, Method B, One Reference Jumper.
 - 2) Attenuation test results for backbone links must be less than 2.0 dB. Attenuation test results must be less than those calculated in accordance with equation in TIA-568.1.

B. Nonconforming Work:

1. Cables will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective cables and retest.

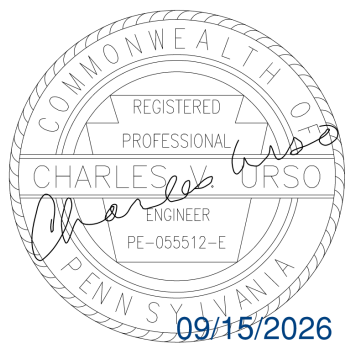
C. Collect, assemble, and submit test and inspection reports.

1. Data for each measurement must be documented.
2. Data for field quality-control report submittals must be printed in summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from instrument to computer, saved as text files, and printed and submitted.
3. Engage factory-authorized service representative to supervise field tests and inspections.

END OF SECTION 271323

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS
SECURITY CAMERAS
OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

COVER SHEET

Project Number: 2026-1166.01

Drawn By: AJP

Checked By: CVU

Date: 09/15/26

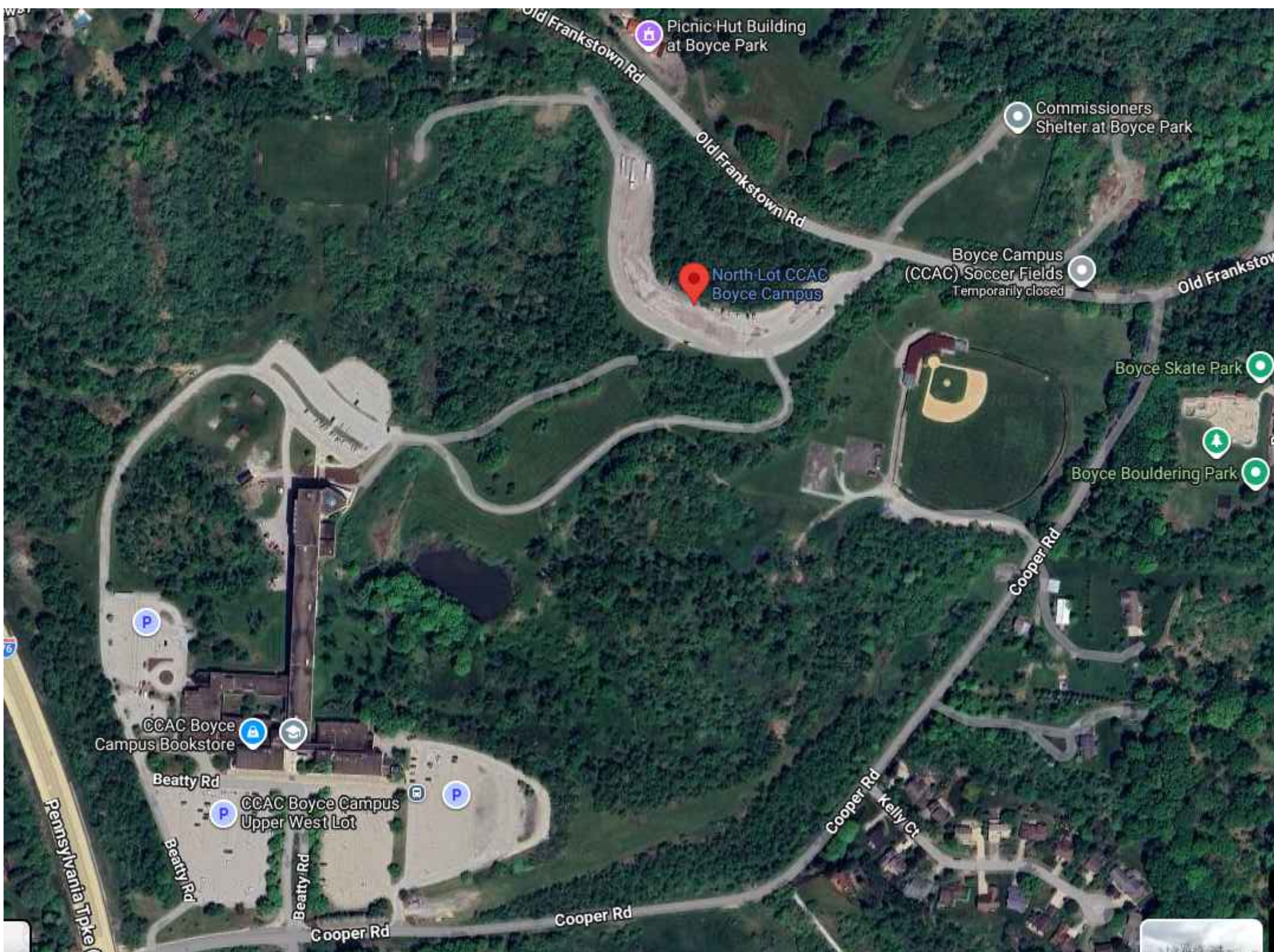
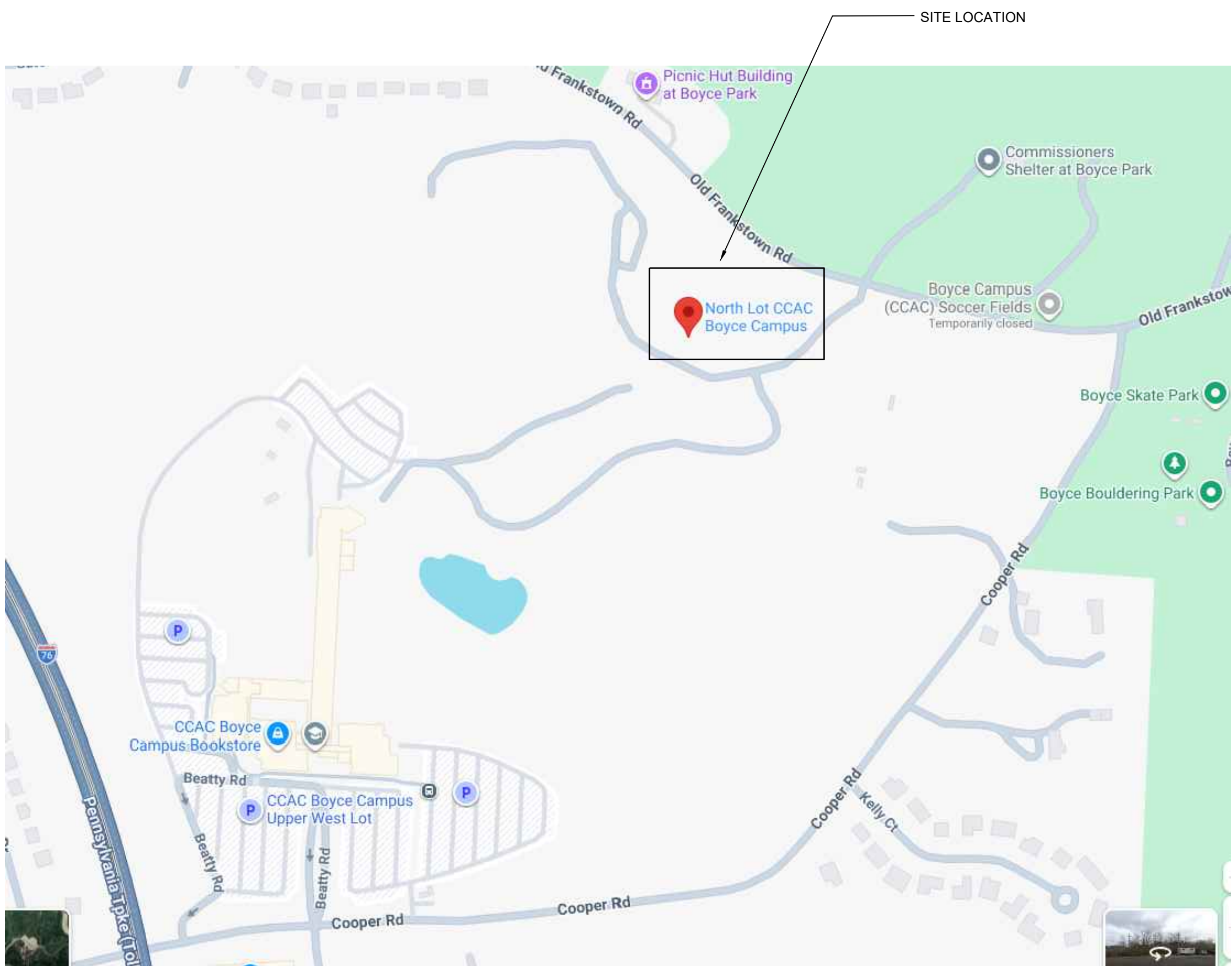
Drawing Number

CS001

Sheet 00 of 00



CCAC BOYCE CAMPUS N LOT SECURITY CAMERAS
506 BEATTY ROAD, MONROEVILLE, PA 15146
OLD FRANKSTOWN ROAD, MONROEVILLE, PA 15146



SHEET NUMBER	SHEET NAME	PERMIT SET - SEP. 15, 2026
CS001	COVER SHEET	X
E001	ELECTRICAL SYMBOLS, NOTES, & ABBREVIATIONS	X
E100	ELECTRICAL SITE PLAN	X
E101	ELECTRICAL NORTH LOT PLAN	X
E102	FIRST FLOOR NORTH WING PLAN	X
E103	SECOND FLOOR NORTH WING PLAN	X
E104	PARTIAL NORTH WING PLANS	X
E105	PARTIAL FIFTH FLOOR NORTH WING PLAN	X
E106	PARTIAL FIFTH FLOOR NORTH/SOUTH WING PLAN	X
E107	PARTIAL SIXTH FLOOR SOUTH WING PLAN	X
E601	ELECTRICAL DETAILS	X
E602	ELECTRICAL DETAILS	X
E603	ELECTRICAL DETAILS	X
E701	ELECTRICAL SCHEDULES	X
E702	ELECTRICAL SCHEDULES	X
E703	ELECTRICAL CAMERA LAYOUTS	X
E704	ELECTRICAL CAMERA LAYOUTS	X
E801	ELECTRICAL RISERS	X

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SYMBOL & ABBREVIATION SCHEDULE

THIS SCHEDULE IS A STANDARD SCHEDULE. CERTAIN SYMBOLS & ABBREVIATIONS INDICATED ON THIS SCHEDULE MAY NOT APPEAR ON THE DRAWINGS.
EQUIPMENT SYMBOLS SHOWN DASHED ON THE DRAWINGS INDICATE EXISTING EQUIPMENT TO BE REMOVED.
CERTAIN MOUNTING HEIGHTS INDICATED ON THIS DRAWING ARE TO BE USED AS A GUIDE ONLY AND MAY HAVE TO BE CHANGED TO COMPLY WITH REGULATIONS GOVERNING MOUNTING HEIGHTS
OF EQUIPMENT FOR USE BY THE PHYSICALLY HANDICAPPED. CONSULT WITH THE AUTHORITY HAVING JURISDICTION BEFORE EQUIPMENT INSTALLATION AND INSTALL ACCORDINGLY.

MISCELLANEOUS ELECTRICAL LEGEND

	ELECTRICAL PANEL BOARD - SURFACE MOUNTED
	ELECTRICAL PANEL BOARD - RECESSED
	MULTI-OUTLET ASSEMBLY (RATING AS NOTED)
	INDICATES NOTES ELSEWHERE
	PHASE
	BUSWAY
	SWITCH LEG
	BRANCH CIRCUIT
	SWITCHED CIRCUIT
	HOMERUN TO PANEL BOARD - 3 #12-3/4\"/>
	CROSS HATCHING INDICATES EQUIPMENT AND/OR WIRING TO BE RENDERED DEAD AND REMOVED BY EC.
	ELECTRIC VEHICLE CHARGER
	FINAL CONNECTION BY EC TO EQUIPMENT
	POWER ENCLOSED CIRCUIT BREAKER
	FUSED DISCONNECT SWITCH
	UNFUSED DISCONNECT SWITCH
	JUNCTION BOX
	SPECIAL PURPOSE OUTLET
	HANDHOLE
	TELEPHONE POLE
	TELEPHONE / LIGHT POLE WITH LIGHT FIXTURE
	SECURITY CAMERA

ABBREVIATIONS

A	AMPERE	FCU	FAN COIL UNIT
AB	ABOVE COUNTER	GC	GENERAL CONTRACTOR
ABBREV	ABBREVIATIONS	GEN	GENERATOR
ADA	AMERICANS W/DISABILITIES ACT	GFI	GROUND FAULT INTERRUPTER
AF	AMP FRAME, AMP FUSE	GRD	GROUND
AFF	ABOVE FINISHED FLOOR	HP	HORSEPOWER
AFG	ABOVE FINISHED GRADE	HZ	FREQUENCY IN CYCLES PER SECOND
AHU	AIR HANDLING UNIT	JB	JUNCTION BOX
APPROX	APPROXIMATELY	KCMIL	THOUSAND CIRCULAR MILS
AS	AMP SWITCH OR AMMETER SWITCH	KV	KILOVOLT
AT	AMP TRIP OR AMP TAP	KVA	KILOVOLT AMPERES
@	AT	KVAR	KILOVAR
ATC	AUTOMATIC TEMPERATURE CONTROL	KW	KILOWATT
ATS	AUTOMATIC TRANSFER SWITCH	KWH	KILOWATT HOURS
AWG	AMERICAN WIRE GAGE	LAN	LOCAL AREA NETWORK
BFC	BELOW FINISHED CEILING	MATV	MASTER ANTENNA TELEVISION
BFG	BELOW FINISHED GRADE	MAX	MAXIMUM
C	CONDUIT	MCA	MINIMUM CIRCUIT AMPACITY
CATV	COMMUNITY ANTENNA TELEVISION	MCB	MAIN CIRCUIT BREAKER
CB	CIRCUIT BREAKER	MDP	MAIN DISTRIBUTION PANEL
CCTV	CLOSED CIRCUIT TV	MDS	MAIN DISTRIBUTION SWITCHBOARD
CL	CENTERLINE	MCC	MOTOR CONTROL CENTER
CLG	CEILING	MH	MANHOLE OR METAL HALIDE
CUH	CABINET UNIT HEATER	MIN	MINIMUM
DWG	DRAWING	MISC	MISCELLANEOUS
DWN	DOWN	MLO	MAIN LUGS ONLY
EA	EACH	NC	NORMALLY CLOSED
EC	ELECTRICAL CONTRACTOR OR EMERGENCY CRITICAL	NE	NORMAL EMERGENCY
EE	EMERGENCY EQUIPMENT	NEC	NATIONAL ELECTRICAL CODE
EF	EXHAUST FAN	NF	NON FUSED
ELR	END OF LINE RESISTOR	NFS	NON FUSED SWITCH
EM OR EMER	EMERGENCY	NO	NORMALLY OPEN
EMT	ELECTRICAL METALLIC TUBING	NTS	NOT TO SCALE
ETR	EXISTING TO REMAIN	OCP	OVERCURRENT PROTECTIVE DEVICE
EX	EXISTING (EXIST)	OHD	OVERHEAD DOOR
EWC	ELECTRIC WATER COOLER	P	POLE(S) OR PILOT
FA	FIRE ALARM / FEEDER AMPLIFIER	PF	POWER FACTOR
		PIV	POST INDICATOR VALVE
		PL	PILOT LIGHT

GENERAL NOTES - ELECTRICAL

- THE CONTRACTOR SHALL DISCONNECT, REMOVE, RELOCATE, AND RECONNECT AS NECESSARY ALL EXISTING ELECTRICAL EQUIPMENT CIRCUITS AND CONDUCTORS THAT INTERFERE WITH THE INSTALLATION OF THE NEW EQUIPMENT BEING INSTALLED. WORK RELATED TO MODIFICATIONS TO ANY EXISTING ELECTRICAL SYSTEM SHALL BE COORDINATED WITH THE ENGINEER.
- ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 2017 NATIONAL ELECTRICAL CODE AND ALL APPLICABLE FEDERAL, STATE, AND PITTSBURGH CODES.
- ALL WIRE, CONDUIT, CONNECTORS, OUTLETS BOXES, ETC. NECESSARY TO ACHIEVE A COMPLETE ELECTRICAL INSTALLATION WHERE AN ELECTRICAL DEVICE IS REQUIRED BY CODE BUT NOT SHOWN SHALL BE FURNISHED AND INSTALLED AS THOUGH FULLY SHOWN AND SPECIFIED.
- ALL EXISTING AREAS WHICH ARE DAMAGED BECAUSE OF THE ELECTRICAL WORK UNDER THIS CONTRACT SHALL BE REPAIRED AND/OR REFINISHED. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CUTTING, PATCHING AND PAINTING.
- ALL ELECTRICAL WORK, WIRING, CONNECTIONS AND ASSOCIATED EQUIPMENT WITHIN THE AREA OF WORK SHALL BE AS PER APPLICABLE ARTICLES OF THE NATIONAL ELECTRICAL CODE.
- THE ENTIRE INSTALLATION MUST BE GROUNDED IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE.
- CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID AND FULLY INFORM HIMSELF OF ANYTHING WHICH MAY AFFECT HIS WORK. CONTRACTOR SHALL INFORM ARCHITECT/ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS WORK. FAILURE TO VISIT SITE AND FULLY INFORM HIMSELF OF ANY ALL CONDITIONS AND FAILURE TO INFORM ARCHITECT/ENGINEER IN WRITING PRIOR TO SUBMITTING BID DOES NOT EXCUSE CONTRACTOR FROM COMPLETING THE WORK.
- THE CONTRACTOR SHALL CONTACT PA ONE-CALL AND OBTAIN EXISTING UTILITY INFORMATION PRIOR TO BEGINNING WORK. HAND DIG ANY AREA WHICH MAY HAVE UTILITIES.

VOLTAGE DROP NOTE:
THE FOLLOWING LIST APPLIES TO ALL NEW BRANCH WIRING PROVIDED UNDER THIS CONTRACT. LISTS INDICATE THE NECESSARY GAUGE OF CONDUCTORS NECESSARY FOR BRANCH CIRCUITS ONE WAY FROM PANEL TO LAST OUTLET OR LIGHTING FIXTURE ON THE CIRCUIT.

120/240V CIRCUITS	WIRE SIZE
0 - 100 FEET	No. 12 AWG
101 - 250 FEET	No. 10 AWG
250 - 400 FEET	No. 8 AWG

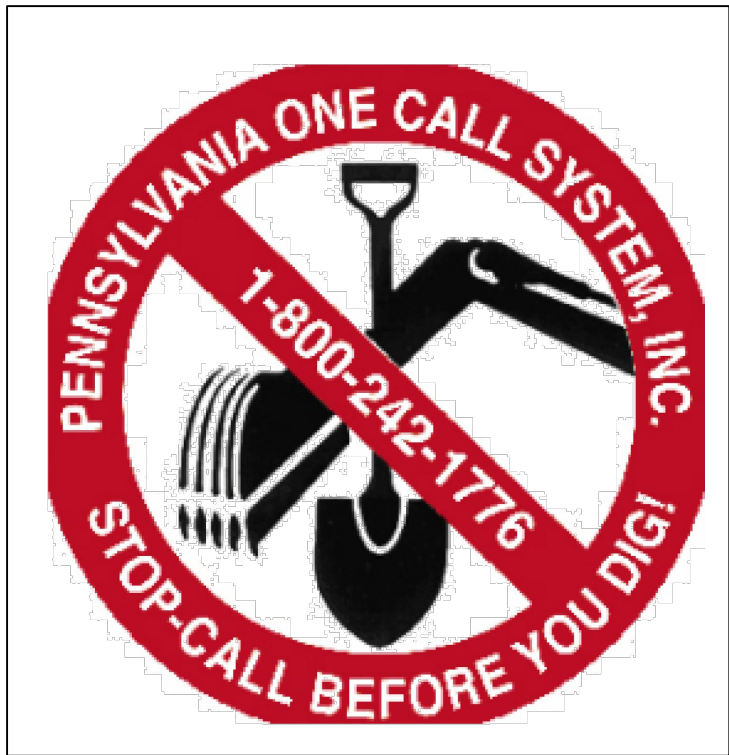
OWNER PROVIDED EQUIPMENT:

	OWNER PROVIDED	COMMENTS
CAMERAS	YES	RESERVED
CAMERA MOUNTING BRACKETS	YES	RESERVED
CAMERA SD CARD	YES	RESERVED
CAMERA SOFTWARE	YES	RESERVED
CAMERA HOUSING	YES	RESERVED
POE SWITCH	YES	RESERVED
OUTDOOR WIFI	YES	RESERVED

NOTE: OWNER PROVIDED - CONTRACTOR INSTALLED.

- NOTES:
- VERIFY MANUFACTURERS MODEL NUMBERS.
 - OWNER PROVIDES UNITY LICENSE, DUAL SD CARDS AND IR RINGS.

CONTRACTOR SHALL SURVEY CCAC
NOTIFY PA ONE CALL AND
COORDINATE WITH CCAC.



PERMIT SET- SEPTEMBER 15, 2026

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Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**
SECURITY CAMERAS
**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**ELECTRICAL SYMBOLS,
NOTES, &
ABBREVIATIONS**

Project Number: 2026-1166.01

Drawn By: AJP

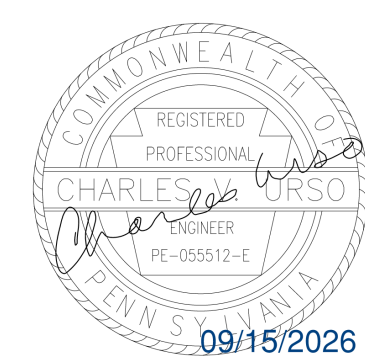
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**NORTH LOT CCAC
BOYCE CAMPUS
SECURITY CAMERAS
OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ELECTRICAL SITE PLAN

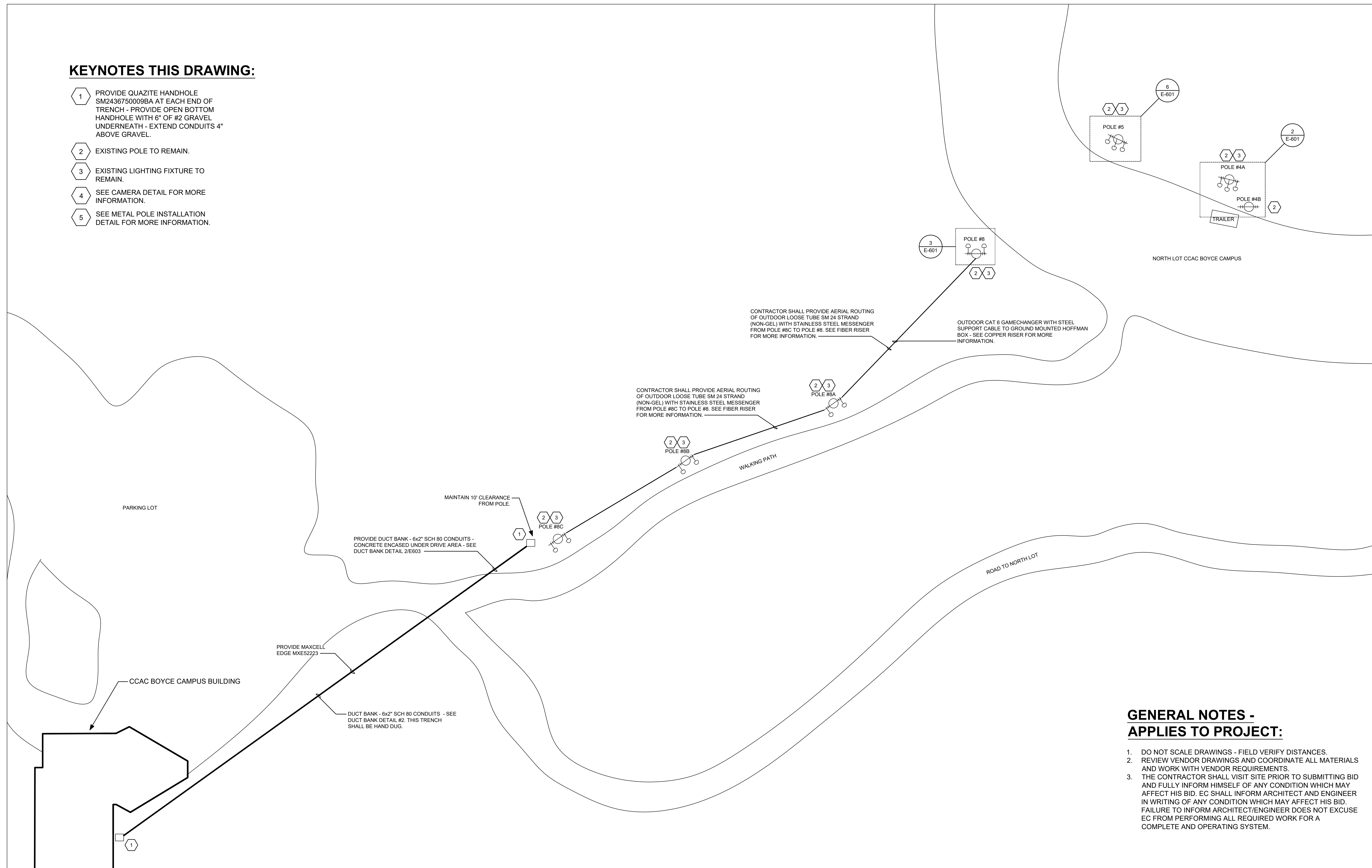
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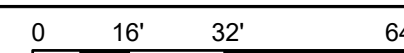
Sheet 00 of 00

- 1 PROVIDE QUANTITY HANDLEHOLE SM2436750098A AT EACH END OF TRENCH - PROVIDE OPEN BOTTOM HANDLEHOLE WITH 6" OF #2 GRAVEL UNDERNEATH - EXTEND CONDUITS 4" ABOVE GRAVEL.
- 2 EXISTING POLE TO REMAIN.
- 3 EXISTING LIGHTING FIXTURE TO REMAIN.
- 4 SEE CAMERA DETAIL FOR MORE INFORMATION.
- 5 SEE METAL POLE INSTALLATION DETAIL FOR MORE INFORMATION.

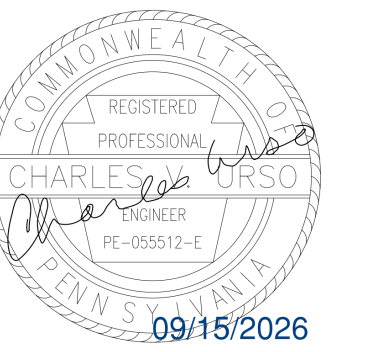


1. DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
2. REVIEW VENDOR DRAWINGS AND COORDINATE ALL MATERIALS AND WORK WITH VENDOR REQUIREMENTS.
3. THE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID AND FULLY INFORM HIMSELF OF ANY CONDITION WHICH MAY AFFECT HIS BID. EC SHALL INFORM ARCHITECT AND ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS BID. FAILURE TO INFORM ARCHITECT/ENGINEER DOES NOT EXCUSE EC FROM PERFORMING ALL REQUIRED WORK FOR A COMPLETE AND OPERATING SYSTEM.

Scale: 1/32" = 1'-0"



Seal:



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Charles V Urso
BICSI ID # 121387
EXPIRES 12-31-26
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**NORTH LOT CCAC
BOYCE CAMPUS**

SECURITY CAMERAS

**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ELECTRICAL NORTH LOT PLAN

Date: 09/15/26

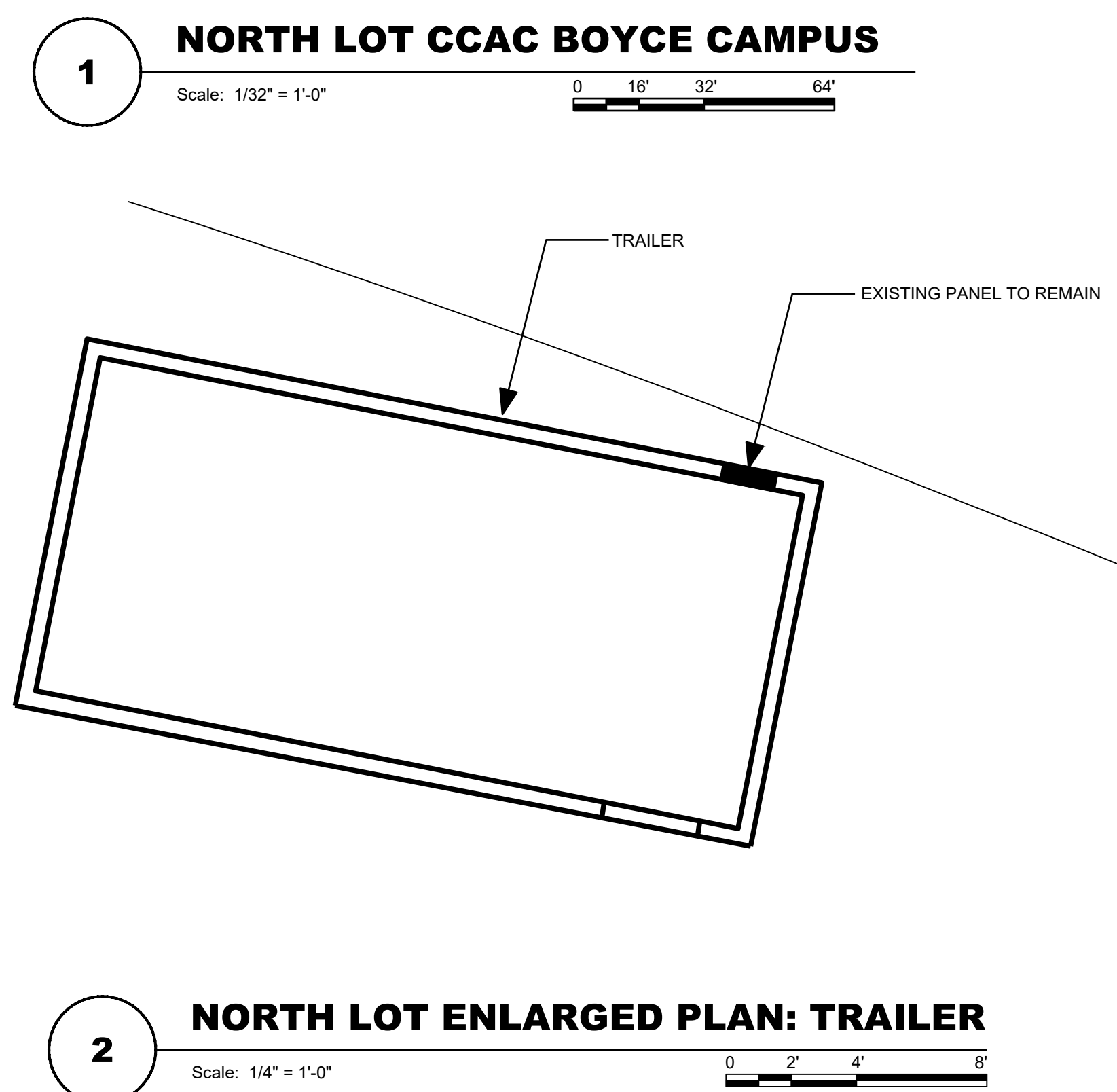
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Sheet 00 of 00

- 1 SEE CAMERA DETAIL FOR MORE INFORMATION.
- 2 PROVIDE LSI ZONE SPORTS FLOOD LED - FIELD VERIFY. PROVIDE 2 #12, 1 #12 GND, 3/4"C TO CONTROL CABINET PANEL - FIELD VERIFY. SEE PANEL SCHEDULE FOR MORE INFORMATION. EXTEND FROM EXISTING HANDHOLE (4) 2" PVC CONDUITS ROUTED TO BASE OF EXISTING WOODEN POLE. EXTEND UP POLE 48" CAP ALL CONDUITS. PROVIDE A 6"x6" NEMA 4 J-BOX ON ONE CONDUIT. ROUTE THE 2 #12, #12 GND IN 3/4" LFMC TO THE J-BOX. TRANSITION TO THWN WIRING. ROUTE TO POWER PANEL ACROSS THE PARKING LOT VIA EXISTING CONDUIT DUCT. EXTEND (3) 2" CONDUITS FROM NORTH HANDHOLE TO EXISTING PAD MOUNTED ENCLOSURE. CIRCUIT POWER WIRING TO SPARE BREAKER.
- 3 SEE CONTROL CABINET DETAIL AND PANEL SCHEDULES FOR MORE INFORMATION.
- 4 SEE METAL POLE INSTALLATION DETAIL FOR MORE INFORMATION
- 5 CLEAN BOTTOM OF CABINET - TURN OVER SPARE PARTS TO OWNER
- 6 ROUTE 2 #12, 1 #12 GND CIRCUIT TO POLE #8 THROUGH EXISTING DUCT BANK - USE EXISTING SPARE CONDUIT
- 7 PROVIDE HOFFMAN ENCLOSURE - SEE DETAILS
- 8 SEE 2/E601 FOR MORE INFORMATION
- 9 EXISTING POLE TO REMAIN.
- 10 EXISTING LIGHTING FIXTURE TO REMAIN.
- 11 SEE BOLLARD DETAIL FOR MORE INFORMATION.

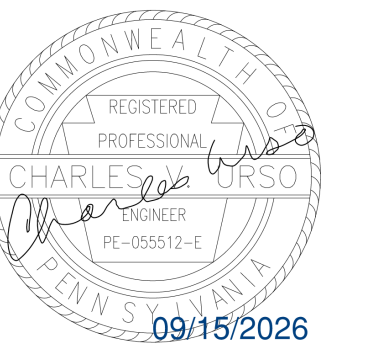
1. DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
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1. THE CATALOG OR SERIES NUMBER INDICATES THE GENERAL LINE OF FIXTURES TO BE SUPPLIED AND MAY NOT NECESSARILY INCLUDE ALL PREFIXES AND SUFFIXES FOR OPTIONS OR ACCESSORIES REQUIRED. WHERE A CONFLICT EXISTS BETWEEN THE DESCRIPTION AND THE NUMBER, THE DESCRIPTION SHALL TAKE PRECEDENCE INCLUDING THE COLOR, FINISH, LAMP, AND VOLTAGE COLUMNS.
2. 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 THE CEILINGS FURNISHED.
3. FIXTURES SHALL BE DESIGNED, ARRANGED, FURNISHED AND INSTALLED COMPLETE WITH ALL ACCESSORIES FOR MOUNTING IN OR ON PLASTER, GYPSUM, TILE OR CONCRETE, T-BAR TYPE CONSTRUCTION, AND OTHER TYPES OF CEILINGS SHOWN ON THE ARCHITECTURAL DRAWINGS.
4. THE CONTRACTOR SHALL CHECK CAREFULLY WITH THE FINAL CEILING FINISH SCHEDULE OF ROOMS BEFORE ORDERING THE FIXTURES. SINCE THE CONTRACTOR IS RESPONSIBLE FOR A COMPLETE/COMPATIBLE INSTALLATION.
5. ALL WORK SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR, INCLUDING ALL DIMENSIONS.
6. LIGHTING FIXTURES SHALL BE FURNISHED FOR THE BRANCH CIRCUIT VOLTAGE INDICATED ON THE CONTRACT DOCUMENTS.
7. COLOR AND FINISH OF ALL LIGHTING FIXTURES AND COMPONENTS SHALL BE SELECTED BY ARCHITECT.



1. DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
2. REVIEW VENDOR DRAWINGS AND COORDINATE ALL MATERIALS AND WORK WITH VENDOR REQUIREMENTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING BID AND FULLY INFORM HIMSELF OF ANY CONDITION WHICH MAY AFFECT HIS BID. EC SHALL INFORM ARCHITECT AND ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS BID. FAILURE TO INFORM ARCHITECT AND ENGINEER DOES NOT EXCUSE EC FROM PERFORMING ALL REQUIRED WORK FOR A COMPLETE AND OPERATING SYSTEM.
4. FIELD COORDINATE ALL ROUTING.
5. XRAY ALL FLOOR PENETRATIONS.
6. TRANSITION FIBER TO INDOOR PLENUM RATED FIBER INSTALLED INSIDE OF INNER DUCT SUPPORTED BY CONTRACTOR PROVIDED J-HOOKS FOR USE WITH PLENUM RATED INDOOR FIBER - AFTER TERMINATING AT DATA CLOSET. CONDUIT BODIES NOT PERMITTED FOR FIBER USE LONG SWEET ELBOWS.

Seal:



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BICSI ID # 121387
EXPIRES 12-31-26
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**NORTH LOT CCAC
BOYCE CAMPUS
SECURITY CAMERAS
OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

FIRST FLOOR NORTH WING PLAN

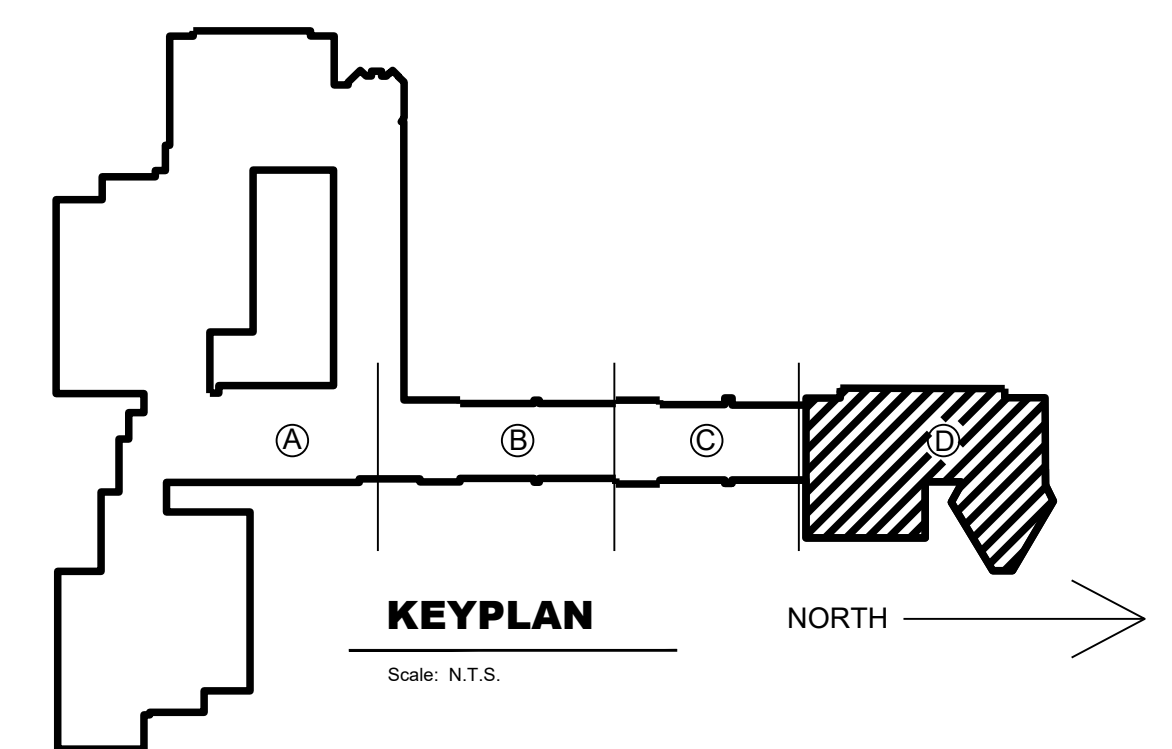
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— SEE E100 FOR MORE INFORMATION

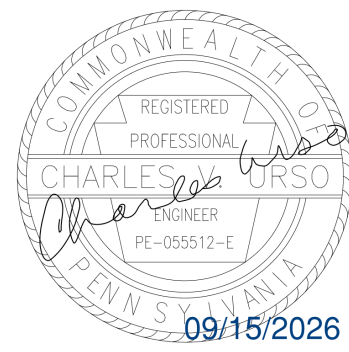


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Consultants:

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Key Plan:



Project Identification:

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15146-1348**

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Sheet Title:

**SECOND FLOOR
NORTH WING PLAN**

Project Number: 2026-1166.01

Drawn By: AJP

Checked By: CVU

Date: 09/15/26

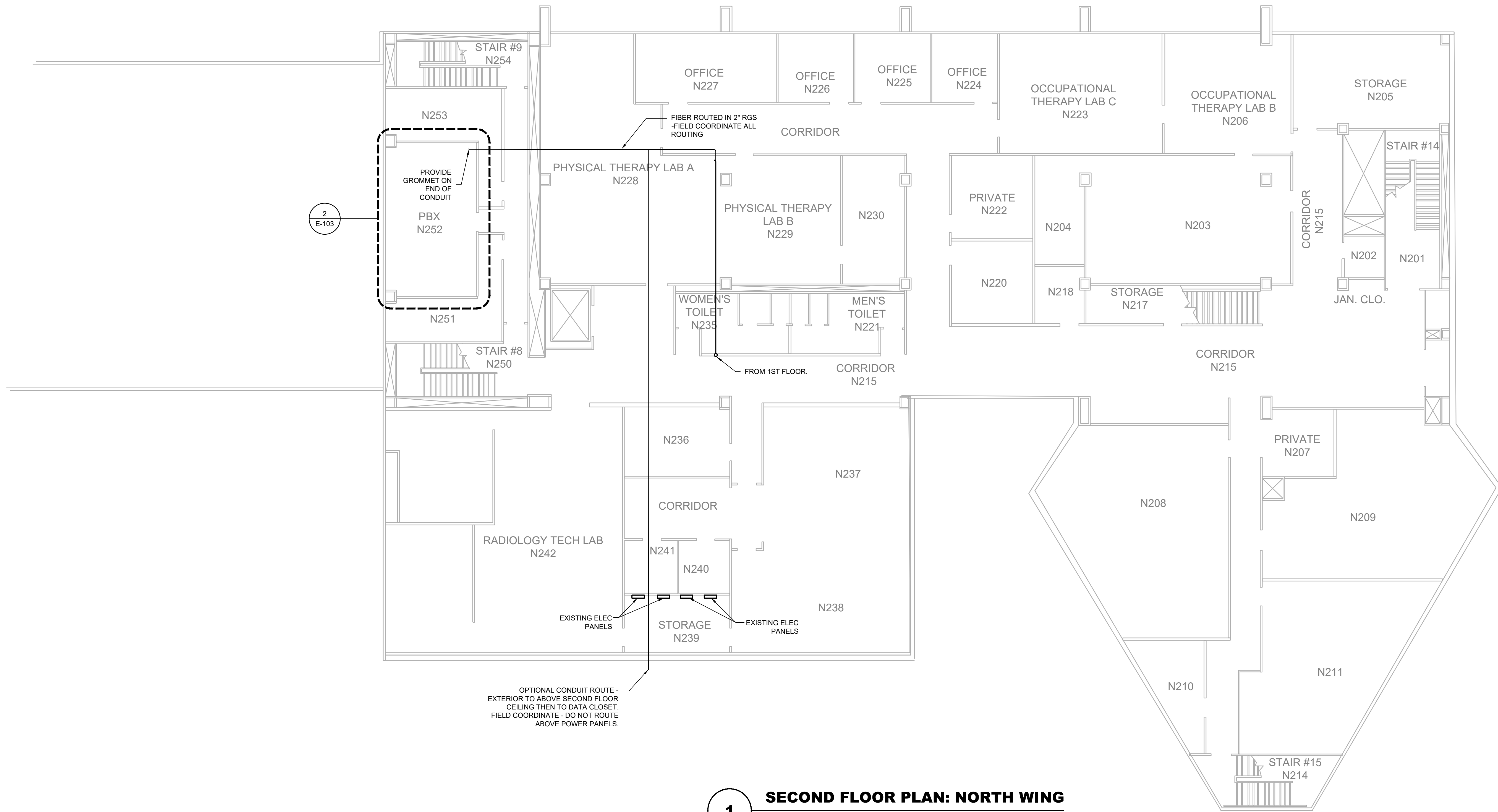
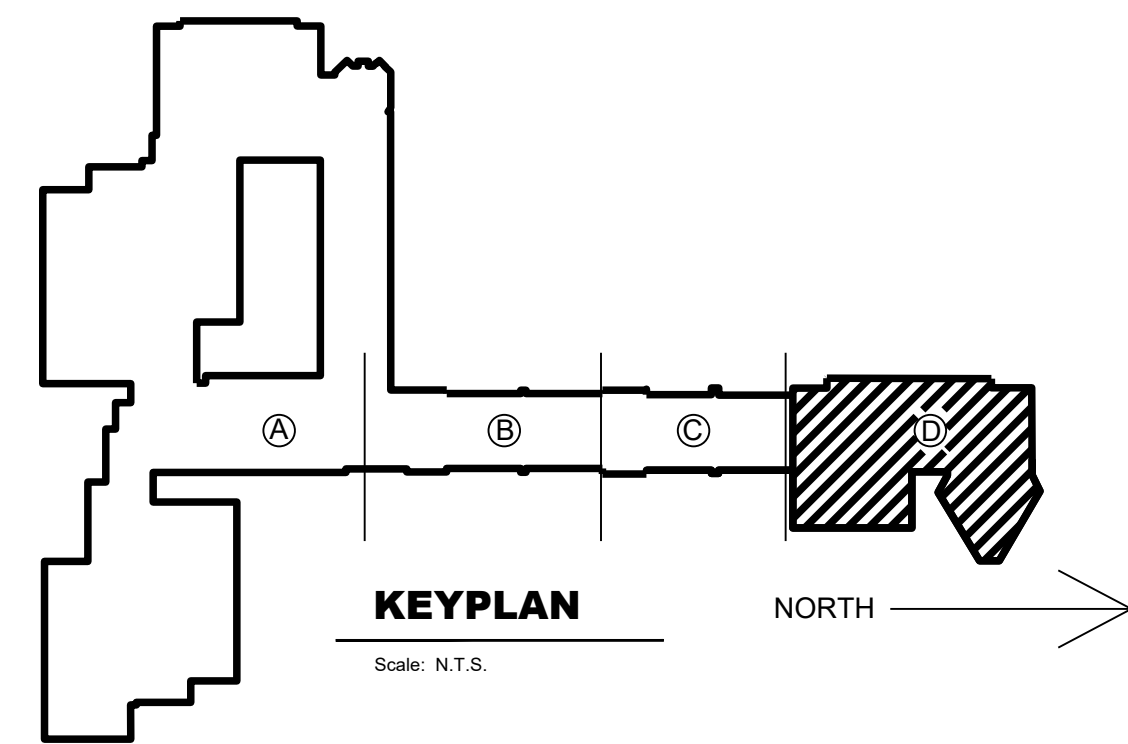
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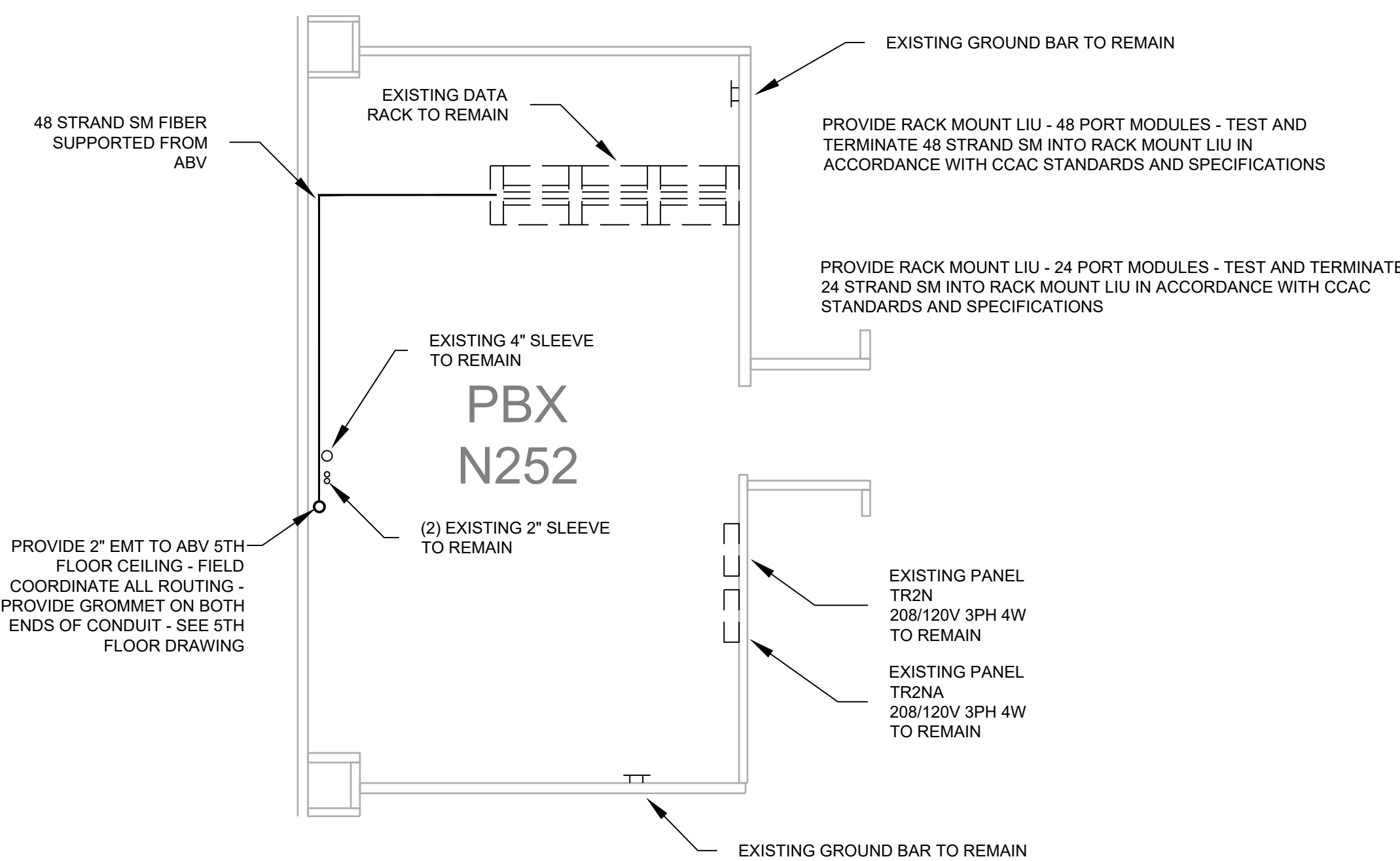
Sheet 00 of 00

**GENERAL NOTES -
APPLIES TO PROJECT:**

- DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
- REVIEW VENDOR DRAWINGS AND COORDINATE ALL MATERIALS AND WORK WITH VENDOR REQUIREMENTS.
- THE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID AND FULLY INFORM HIMSELF OF ANY CONDITION WHICH MAY AFFECT HIS BID. EC SHALL INFORM ARCHITECT AND ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS BID. FAILURE TO INFORM ARCHITECT/ENGINEER DOES NOT EXCUSE EC FROM PERFORMING ALL REQUIRED WORK FOR A COMPLETE AND OPERATING SYSTEM.
- FIELD COORDINATE ALL ROUTING.
- XRAY ALL FLOOR PENETRATIONS.
- TRANSITION FIBER TO INDOOR PLENUM RATED FIBER INSTALLED INSIDE OF INNER DUCT SUPPORTED BY CONTRACTOR PROVIDED J-HOOKS FOR USE WITH PLENUM RATED INDOOR FIBER - AFTER TERMINATING AT DATA CLOSET. CONDUIT BODIES NOT PERMITTED FOR FIBER USE LONG SWEEP ELBOWS.
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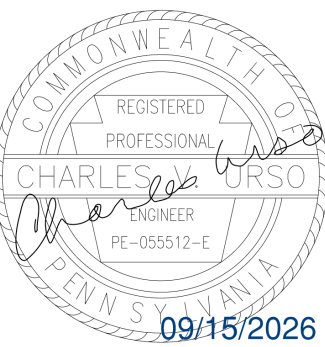


1 SECOND FLOOR PLAN: NORTH WING
Scale: 1/8" = 1'-0"



2 ENLARGED TELECOM ROOM PLAN
Scale: 1/4" = 1'-0"

Seal:



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15146-1348

PARTIAL NORTH WING PLANS

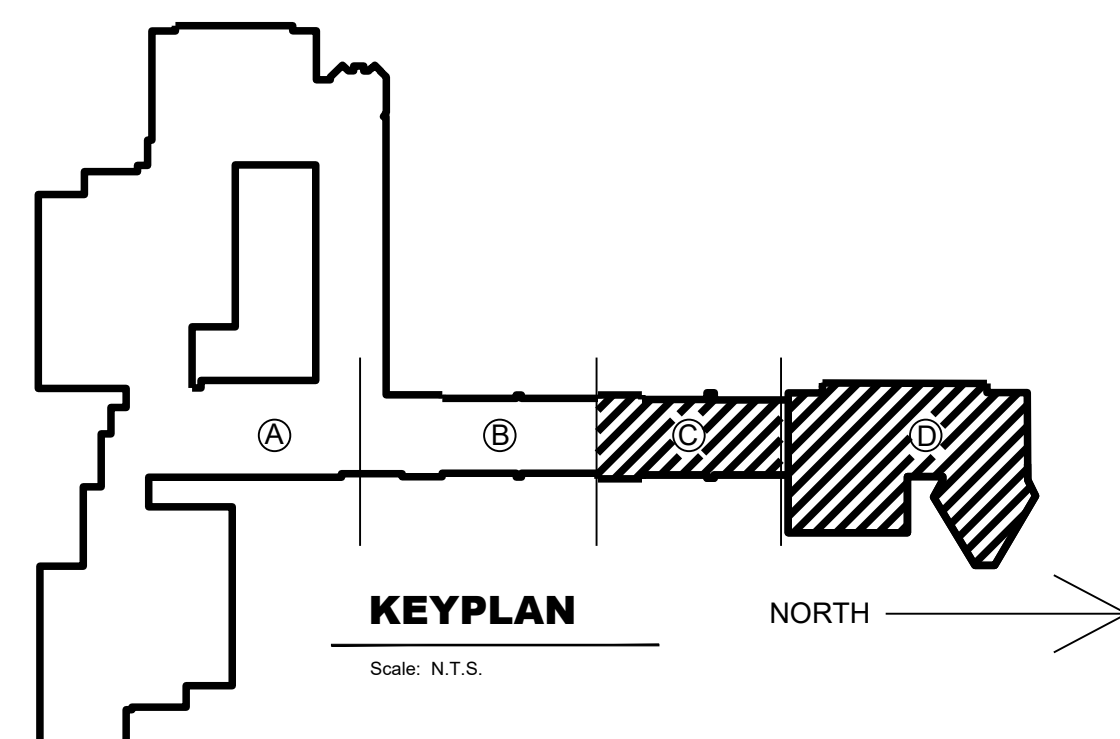
Drawing Number

E104

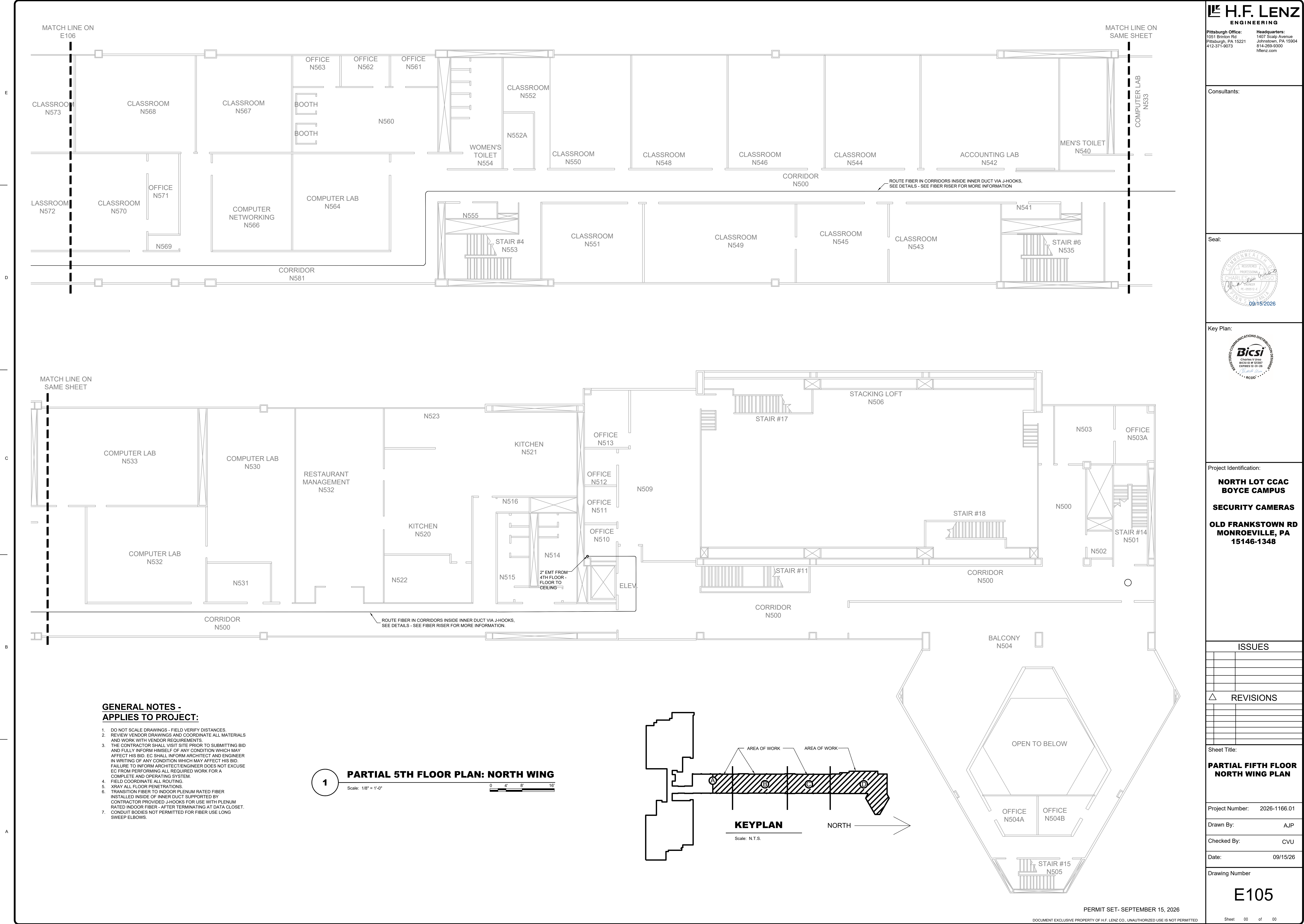
Sheet 00 of 00



1. DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
2. REVIEW VENDOR DRAWINGS AND COORDINATE ALL MATERIALS AND WORK WITH VENDOR REQUIREMENTS.
3. CONTRACTOR TO VISIT SITE PRIOR TO SUBMITTING BID AND FULLY INFORM HIS/HERS OF ANY CONDITION WHICH MAY AFFECT HIS BID. EC SHALL INFORM ARCHITECT AND ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS BID. FAILURE TO INFORM ARCHITECT/ENGINEER DOES NOT EXCUSE CONTRACTOR FROM PERFORMING THE REQUIRED WORK FOR A COMPLETE AND OPERATING SYSTEM.
4. FIELD COORDINATE ALL ROUTING.
5. XRAY ALL FLOOR PENETRATIONS.
6. TRANSITION FIBER TO PLENUM RIGID FIBER INSTALLED INSIDE OF INNER DUCT SUPPORTED BY CONTRACTOR PROVIDED J-HOOKS FOR USE WITH PLENUM RIGID INDOOR FIBER - AFTER TERMINATING AT DATA CLOSET. CONDUIT/POIES NOT PERMITTED FOR FIBER USE LONG SWEEP ELBOWS.



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curso



H.F. LENZ
ENGINEERING

Pittsburgh Office:
1051 Brinton Rd
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412-371-9073

Headquarters:
1407 Scalp Avenue
Johnstown, PA 15004
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Consultants:

Seal:

Key Plan:

Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**
SECURITY CAMERAS
**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**PARTIAL FIFTH FLOOR
NORTH WING PLAN**

Project Number:

2026-1166.01

Drawn By:

AJP

Checked By:

CVU

Date:

09/15/26

Drawing Number

E105

Sheet 00 of 00

Seal:



Bicsi
Charles V Urso
BICSID ID # 121387
EXPIRES 12-31-26
RCDD

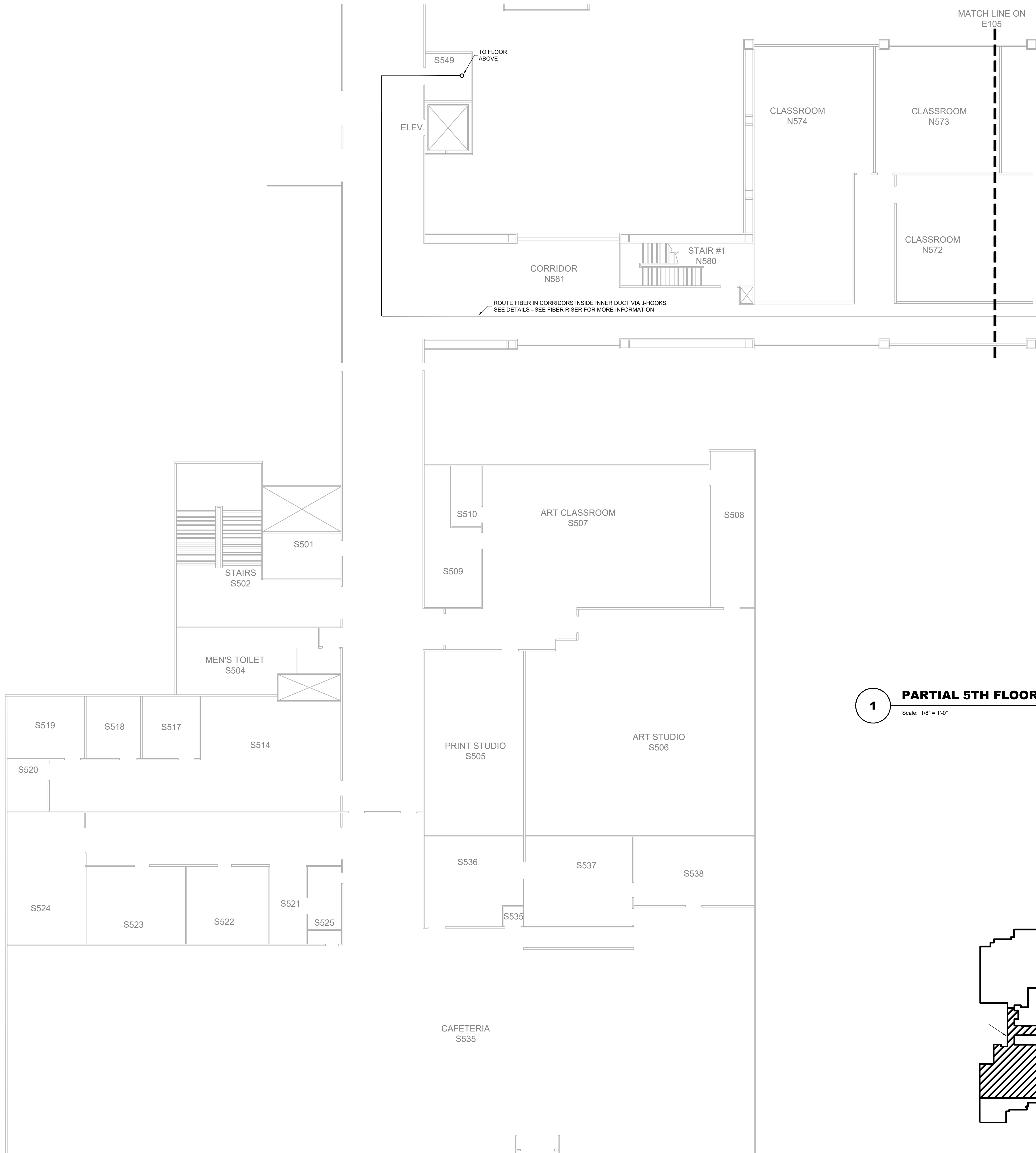
**NORTH LOT CCAC
BOYCE CAMPUS
SECURITY CAMERAS
OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

**PARTIAL FIFTH FLOOR
NORTH/SOUTH WING
PLAN**

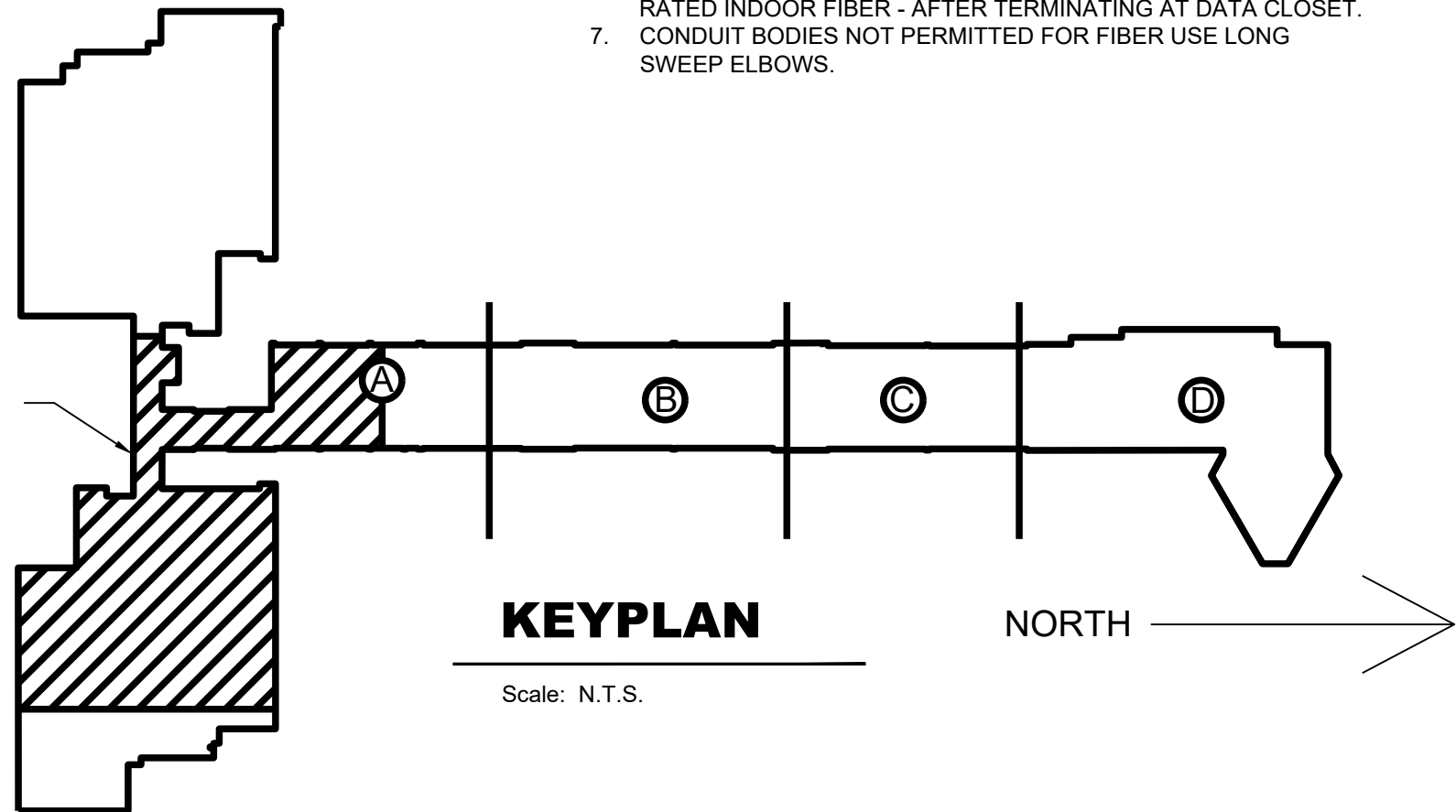
Date: 09/15/26

E106

Sheet 00 of 00

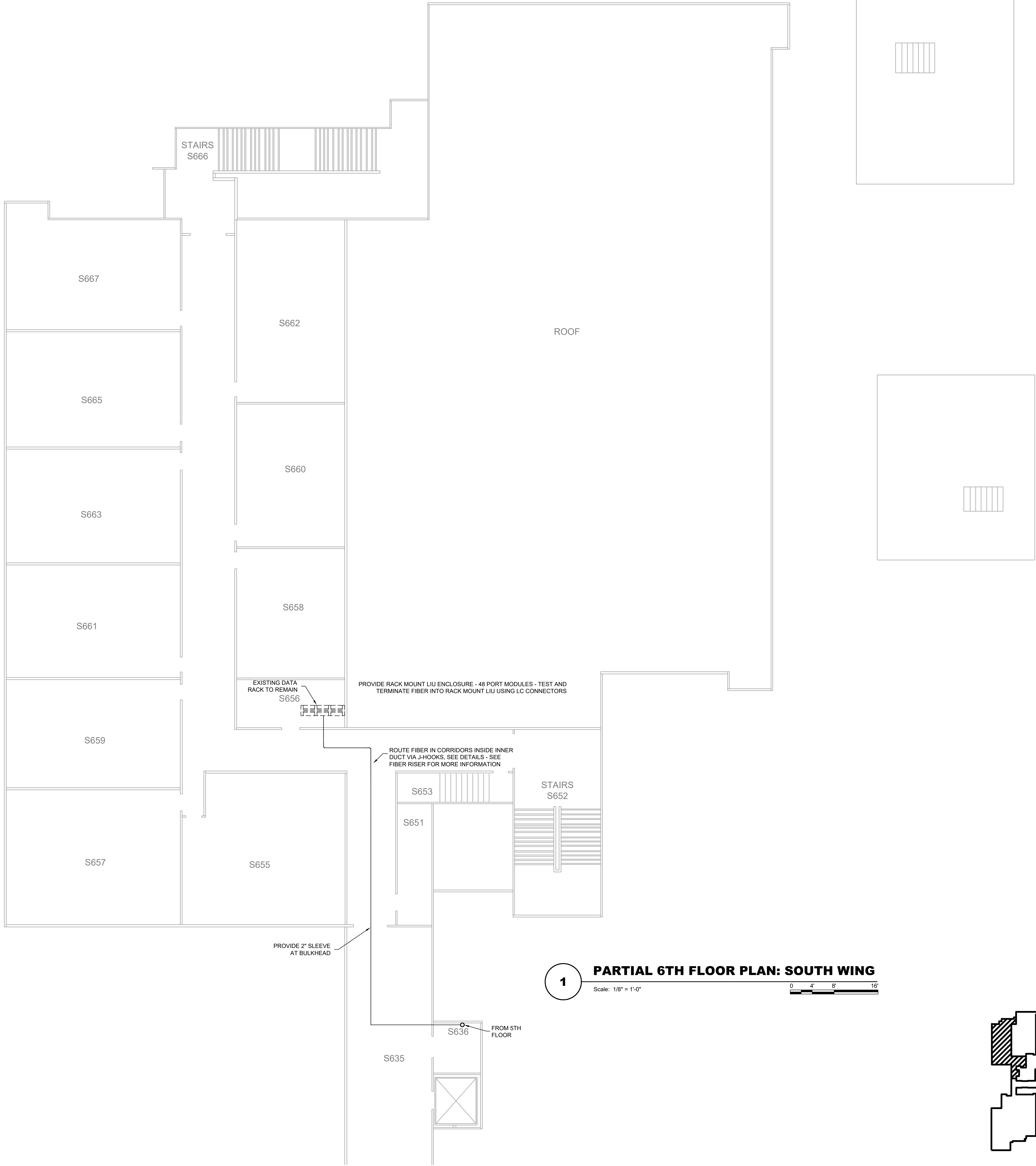


1. DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
2. REVIEW VENDOR DRAWINGS AND COORDINATE ALL MATERIALS AND WORK WITH VENDOR REQUIREMENTS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING BID AND FULLY INFORM HIMSELF OF ANY CONDITION WHICH MAY AFFECT HIS BID. EC SHALL INFORM ARCHITECT AND ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS BID.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOT EXCLUDING EC FROM PERFORMING ALL REQUIRED WORK FOR A COMPLETE AND OPERATING SYSTEM.
5. FIELD COORDINATE ALL ROUTING.
6. XRAY ALL FLOOR PENETRATIONS.
7. TRANSITION FIBER TO INDOOR PLENUM RATED FIBER INSTALLED INSIDE OF INNER DUCT SUPPORTED BY CONTRACTOR PROVIDED 4-HOOKS FOR USE WITH PLENUM RATED INDOOR FIBER - AFTER TERMINATING AT DATA CLOSET.
8. CONTRACTOR NOT PERMITTED FOR FIBER USE LONG SWEEP ELBOWS.



PERMIT SET- SEPTEMBER 15, 2026

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**GENERAL NOTES -
APPLIES TO PROJECT:**

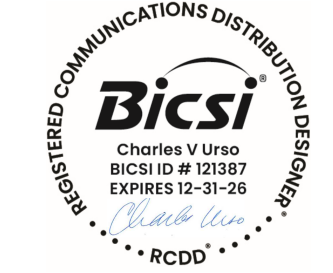
1. DO NOT SCALE DRAWINGS - FIELD VERIFY DISTANCES.
2. REVIEW VENDOR DRAWINGS AND COORDINATE ALL MATERIALS AND WORK WITH VENDOR REQUIREMENTS.
3. THE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING BID AND FULLY INFORM HIMSELF OF ANY CONDITION WHICH MAY AFFECT HIS BID. EC SHALL INFORM ARCHITECT AND ENGINEER IN WRITING OF ANY CONDITION WHICH MAY AFFECT HIS BID. FAILURE TO INFORM ARCHITECT/ENGINEER DOES NOT EXCUSE EC FROM PERFORMING ALL REQUIRED WORK FOR A COMPLETE AND OPERATING SYSTEM.
4. FIELD COORDINATE ALL ROUTING.
5. XRAY ALL FLOOR PENETRATIONS.
6. TRANSITION FIBER TO INDOOR PLENUM RATED FIBER INSTALLED INSIDE OF INNER DUCT SUPPORTED BY CONTRACTOR PROVIDED J-HOOKS FOR USE WITH PLENUM RATED INDOOR FIBER - AFTER TERMINATING AT DATA CLOSET.
7. CONDUIT BODIES NOT PERMITTED FOR FIBER USE LONG SWEEP ELBOWS.

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**

SECURITY CAMERAS

**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**PARTIAL SIXTH FLOOR
SOUTH WING PLAN**

Project Number: 2026-1166.01

Drawn By: AJP

Checked By: CVU

Date: 09/15/26

Drawing Number

E107

Sheet 00 of 00

PERMIT SET- SEPTEMBER 15, 2026

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NOTES TO OUTDOOR INSTALLATION:

THIS PARTIAL LIST/EXAMPLE IS NOT INTENDED FOR ALL TYPES OF FIBER NOR IS THIS A COMPREHENSIVE LIST. CONTRACTOR VERIFY THAT ALL MANUFACTURERS PRODUCT INFORMATION AND INSTALLATION INFORMATION HAS BEEN OBTAINED AND COMPLIED WITH.

ALL OUTDOOR WORK SHALL COMPLY WITH APPLICABLE CODES - INCLUDING BUT NOT LIMITED TO: NESC; NFPA; OSHA; OWNERS AND CONTRACTORS INSURANCE PROVIDERS.

- THE BASIS OF DESIGN IS THE ALTOS CORNING FIGURE 8 SINGLE MODE OUTDOOR FIBER.
- CORNING ALTOS® FIGURE-8 SINGLE-MODE CABLES.
- PROVIDE A 0.25" MINIMUM GALVANIZED STEEL MESSENGER WIRE (OR) PROVIDE SELF-SUPPORTING AERIAL GLAVINIZED (SUCH AS THE ALTOS FIGURE 8).

TECHNICAL SPECIFICATIONS

- FIBER TYPE: SINGLE-MODE (OS2)
- FIBER COUNT: AS NOTED ON DRAWINGS
- WATER BLOCKING: GEL-FREE WATER-SWELLABLE TAPE FOR OVERHEAD, GEL-FILLED FOR UNDERGROUND
- CABLE TYPE: LOOSE TUBE
- RODENT PROTECTION: YES
- STANDARDS: ANSI/ICEA S-87-640

PARTIAL LIST OF HARDWARE:

THIS PARTIAL EXAMPLE IS NOT INTENDED FOR ALL TYPES OF FIBER PRODUCTS NOR IS THIS LIST A COMPREHENSIVE LIST. CONTRACTOR VERIFY THAT ALL MANUFACTURERS PRODUCT INFORMATION AND INSTALLATION INFORMATION HAS BEEN OBTAINED AND COMPLIED WITH.

ALL OUTDOOR WORK SHALL COMPLY WITH APPLICABLE CODES - INCLUDING BUT NOT LIMITED TO NESC; NFPA; OSHA; OWNERS AND CONTRACTORS INSURANCE PROVIDERS.

- TANGENT SUPPORT (STRAIGHT RUNS)
USED FOR POLES WHERE THE CABLE PASSES THROUGH IN A STRAIGHT LINE OR AT A SLIGHT ANGLE (UP TO 30 DEGREES CABLE ANGLE).
- TANGENT SUPPORT CLAMPS: 3 BOLT SUSPENSION CLAMPS - PROVIDE 5/8" GALVANIZED STEEL BOLT - INSTALLED THROUGH POLES (ALL THE WAY TO THE OPPOSITE SIDE OF POLE) WITH APPROVED LOCK WASHER AND NUT - SECURE THE MESSENGER WIRE DIRECTLY TO THE POLE.
- MACHINE BOLTS: A 5/8" INCH MACHINE BOLT FOR SECURING THE CLAMP TO THE WOODEN POLE. THE BOLT LENGTH MUST BE SELECTED BASED ON THE POLE'S DIAMETER. FIELD VERIFY POLE DIAMETER AT MOUNTING HEIGHT.
- WASHERS: TWO SQUARE OR ROUND WASHERS ARE USED WITH THE MACHINE BOLT TO PREVENT THE HARDWARE FROM SINKING INTO THE WOOD.
- DEAD-END AND CORNER HARDWARE
USED AT THE START OR END OF A RUN, OR WHERE THE CABLE MAKES A SHARP TURN THAT CREATES SIGNIFICANT TENSION.
- DEAD-END GRIPS (GUY-GRIPS): ONE-PIECE GALVANIZED STEEL GRIPS (LIKE THOSE FROM NEW TECH INDUSTRIES) WRAP AROUND THE MESSENGER TO PROVIDE HIGH HOLDING STRENGTH WITHOUT BOLTS.
- ANCHOR/TENSION CLAMPS: WEDGE-STYLE CLAMPS (E.G. LIGHTOPTICS ANCHOR CLAMPS) WITH STAINLESS STEEL BAIL THAT ATTACHES TO A POLE BRACKET OR HOOK.
- CORNER SUSPENSION CLAMPS: HEAVY-DUTY CLAMPS DESIGNED FOR ANGULAR RUNS WHERE STANDARD TANGENT CLAMPS MIGHT FAIL.
- ADDITIONAL ACCESSORIES
MESSENGER SEPARATION: SEPARATE THE MESSENGER FROM THE FIBER TUBE FOR ABOUT 20 INCHES AT THE HANGER TO PREVENT DAMAGE FROM VIBRATIONS.
- SLACK STORAGE BRACKETS: USED TO STORE EXCESS FIBER FOR FUTURE REPAIRS. THESE ARE MOUNTED DIRECTLY TO THE POLE OR THE MESSENGER WIRE.

SEE SPECIFICATIONS FOR ACCEPTABLE PRODUCT INFORMATION. ALL OVERHEAD FIBER PRODUCTS SHALL BE SECURED TO A MESSENGER WIRE. PROVIDE A 0.25" MINIMUM GALVANIZED STEEL MESSENGER WIRE - ATTACH CABLE TO MESSENGER WITH APPROVED AND CONTINUOUS METHOD. PROVIDE HIGH-TENSILE STAINLESS STEEL WIRE WRAPPING HELICALLY AROUND BOTH THE MESSENGER WIRE AND THE COMMUNICATIONS CABLE. WRAPPING METHOD SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

PARTIAL LIST OF HARDWARE FOR COPPER CABLES:

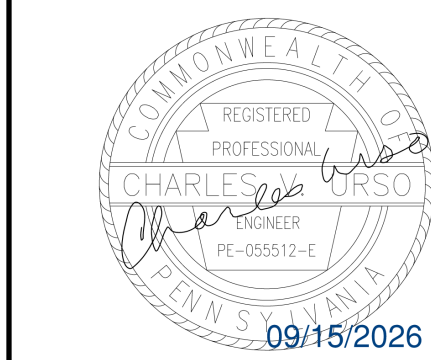
THIS PRODUCT EXAMPLE IS NOT INTENDED FOR ALL TYPES OF FIBER PRODUCTS NOR IS THIS A COMPREHENSIVE LIST. CONTRACTOR VERIFY THAT ALL MANUFACTURERS PRODUCT INFORMATION AND INSTALLATION INFORMATION HAS BEEN OBTAINED AND COMPLIED WITH.

ALL OUTDOOR WORK SHALL COMPLY WITH APPLICABLE CODES - INCLUDING BUT NOT LIMITED TO NESC; NFPA; OSHA; OWNERS AND CONTRACTORS INSURANCE PROVIDERS.

- PROVIDE A 0.25" MINIMUM GALVANIZED STEEL MESSENGER WIRE - ATTACHED SIGNAL CABLE TO MESSENGER WITH APPROVED AND CONTINUOUS METHOD. PROVIDE HIGH-TENSILE STAINLESS STEEL WIRE WRAPPING HELICALLY AROUND BOTH THE MESSENGER WIRE AND THE COMMUNICATIONS CABLE.
- ALLOW FOUR CAT 6 CABLES PER MESSENGER WIRE.
- FIBER CABLE MESSENGER WIRE IS DEDICATED TO FIBER CABLE. DO NOT COMBINE ANY CABLES WITH FIBER CABLES ON MESSENGER SPANS.

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**
SECURITY CAMERAS
**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

ELECTRICAL DETAILS

Project Number: 2026-1166.01

Drawn By: AJP

Checked By: CVU

Date: 09/15/26

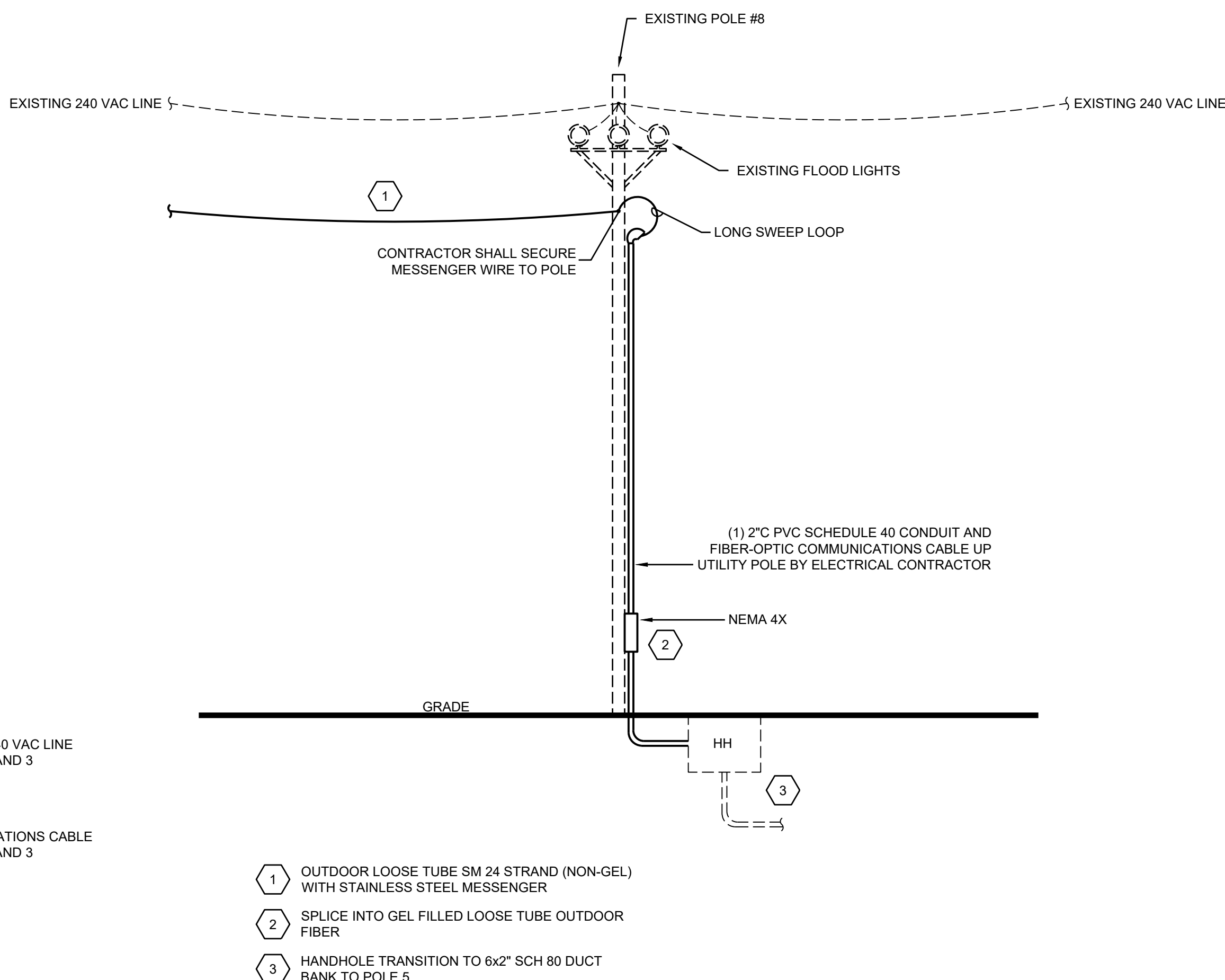
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E601

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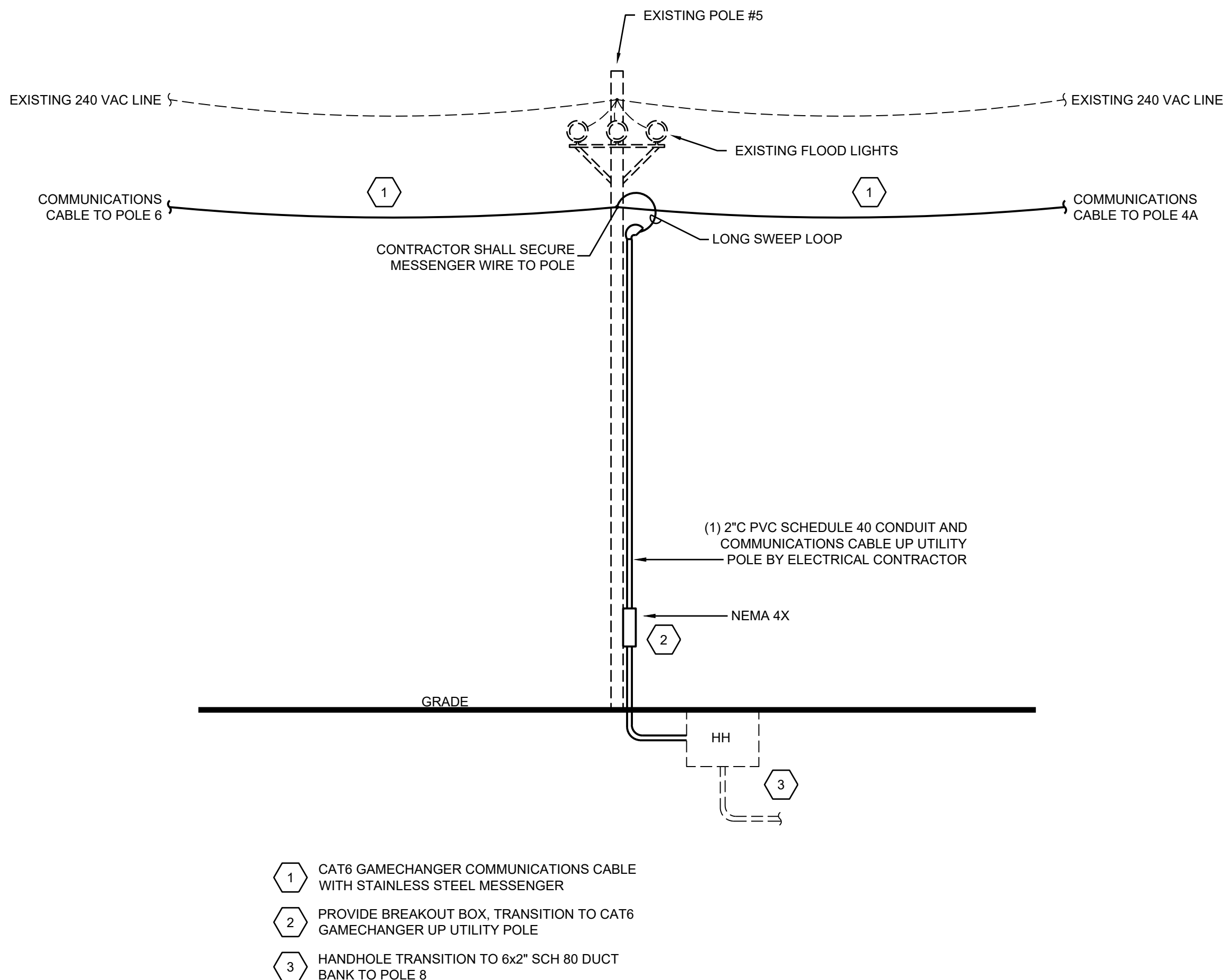
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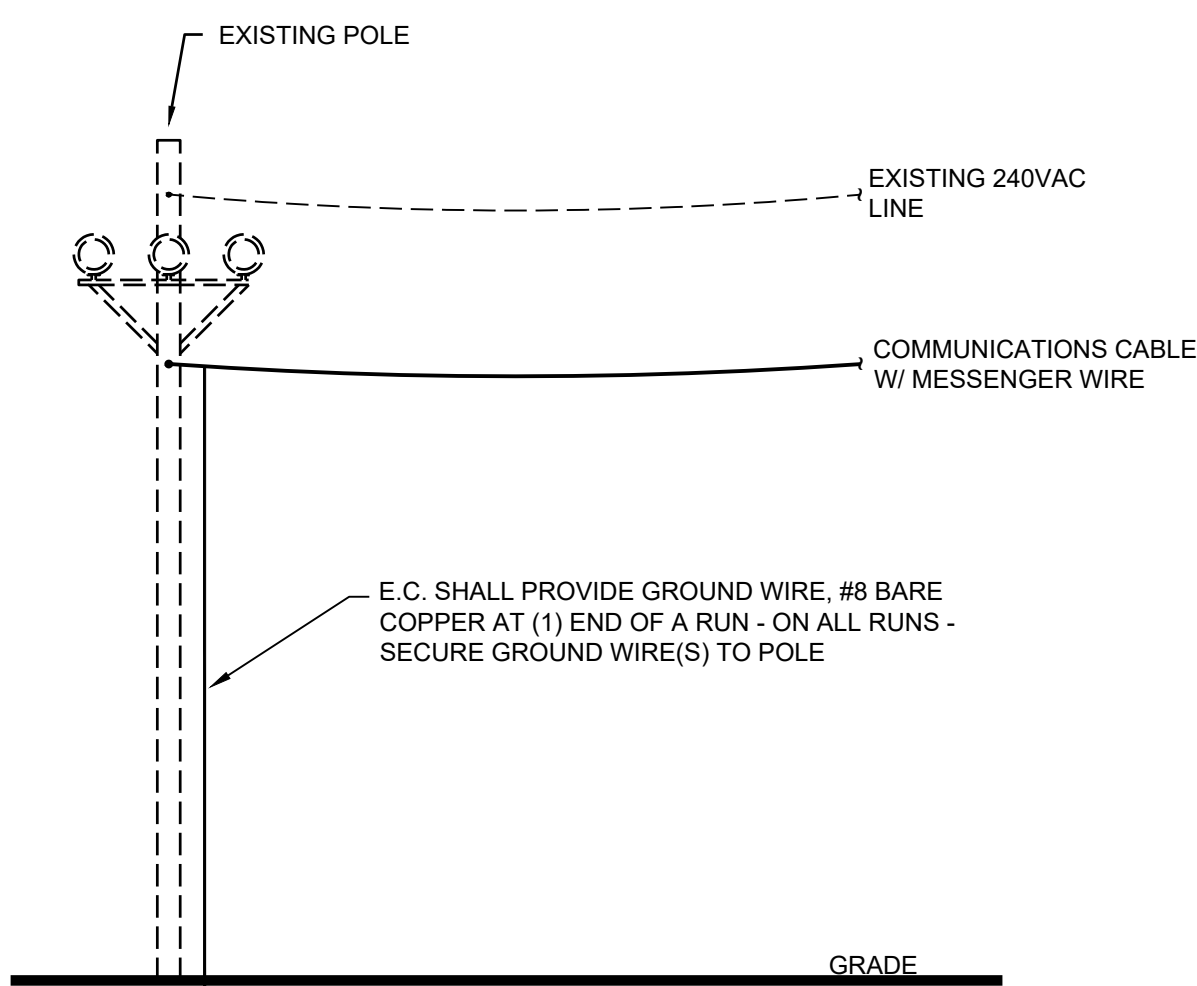
ELECTRICAL CABLE AND CONDUIT DETAIL (POLE 8)

NOT TO SCALE



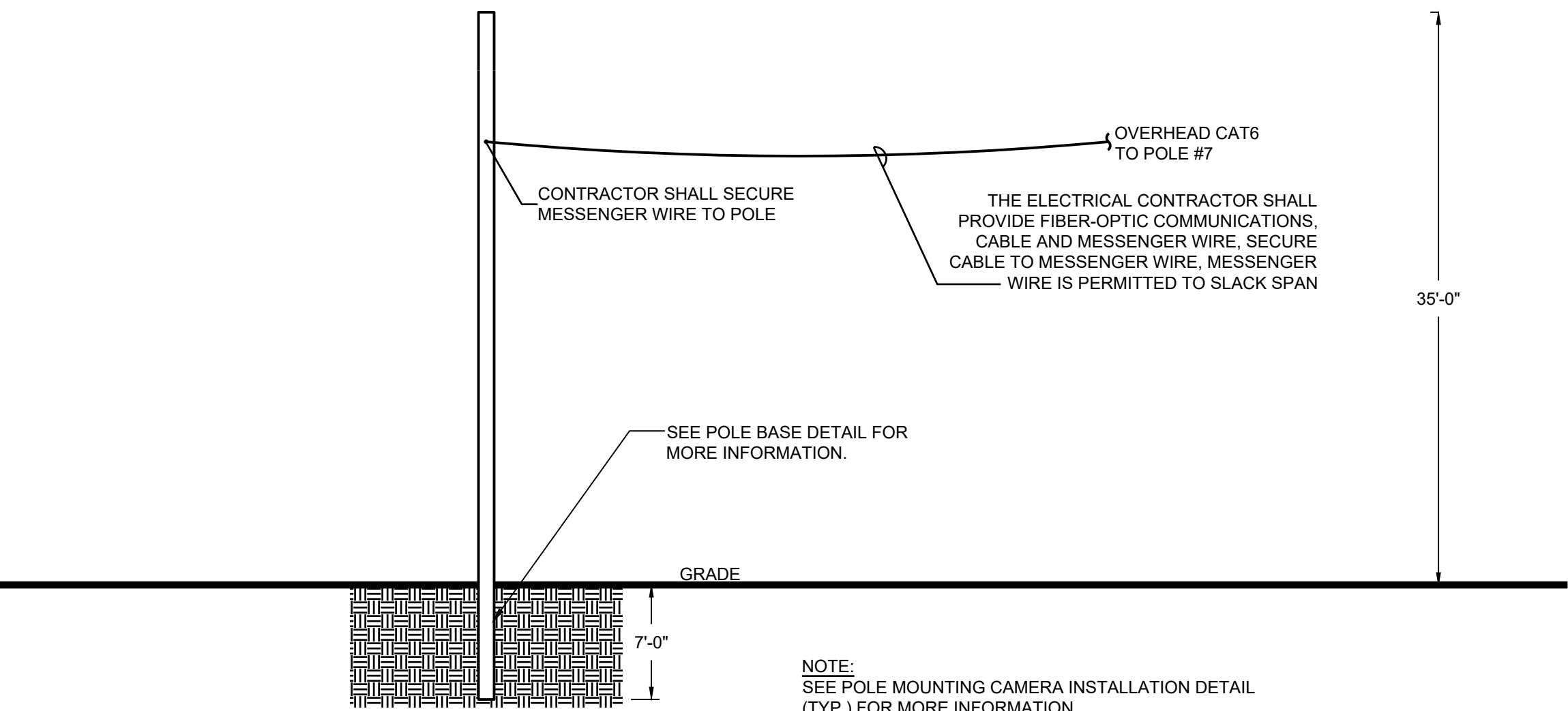
ELECTRICAL CABLE AND CONDUIT DETAIL (POLE 5)

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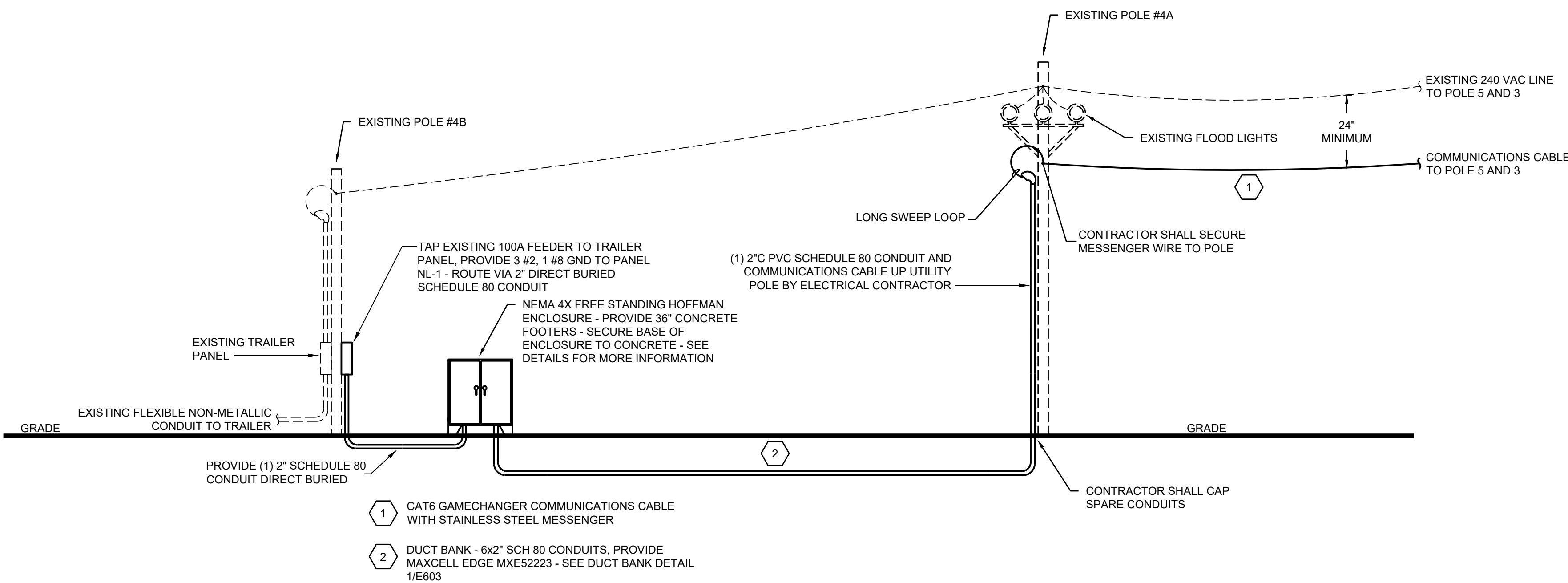
MESSENGER WIRE GROUNDING DETAIL

NOT TO SCALE



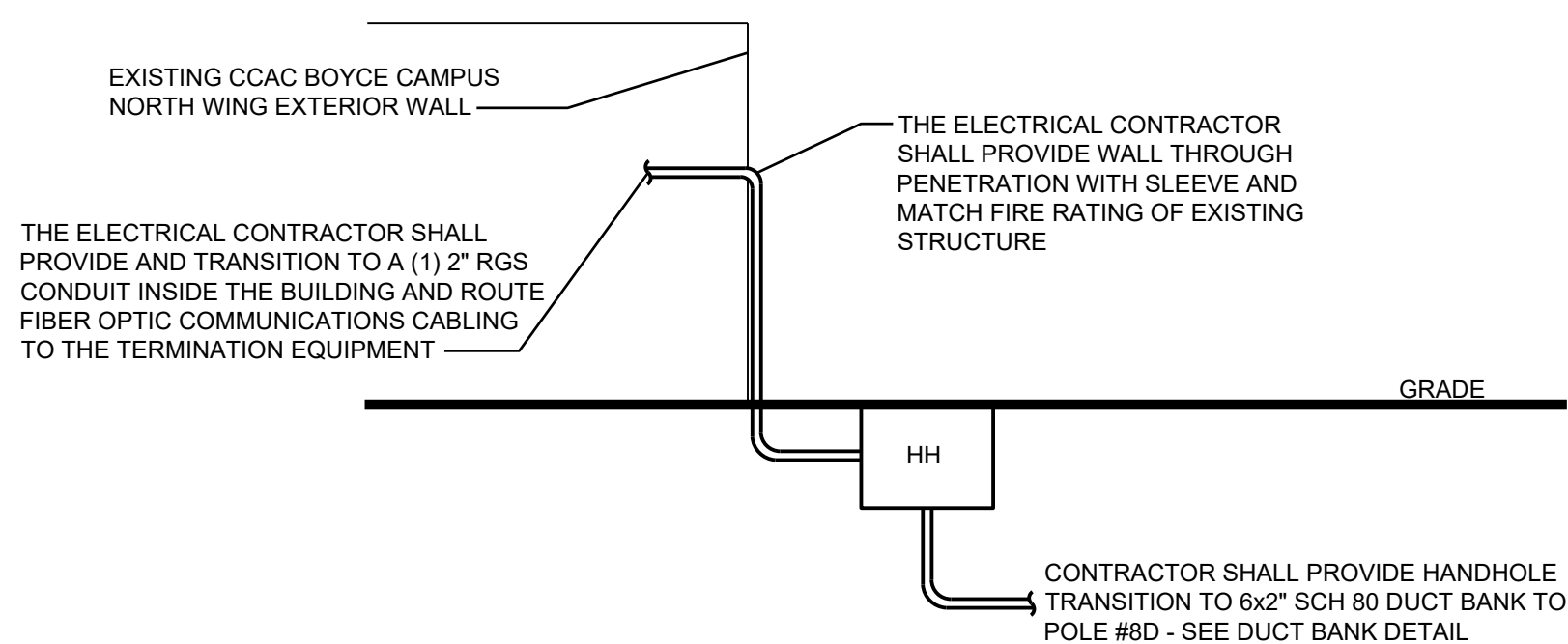
METAL POLE INSTALLATION

NOT TO SCALE



ELECTRICAL CABLE AND CONDUIT DETAIL (POLE 4A & 4B)

NOT TO SCALE



ELECTRICAL CABLE AND CONDUIT DETAIL

NOT TO SCALE

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**

SECURITY CAMERAS

**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

ELECTRICAL DETAILS

Project Number: 2026-1166.01

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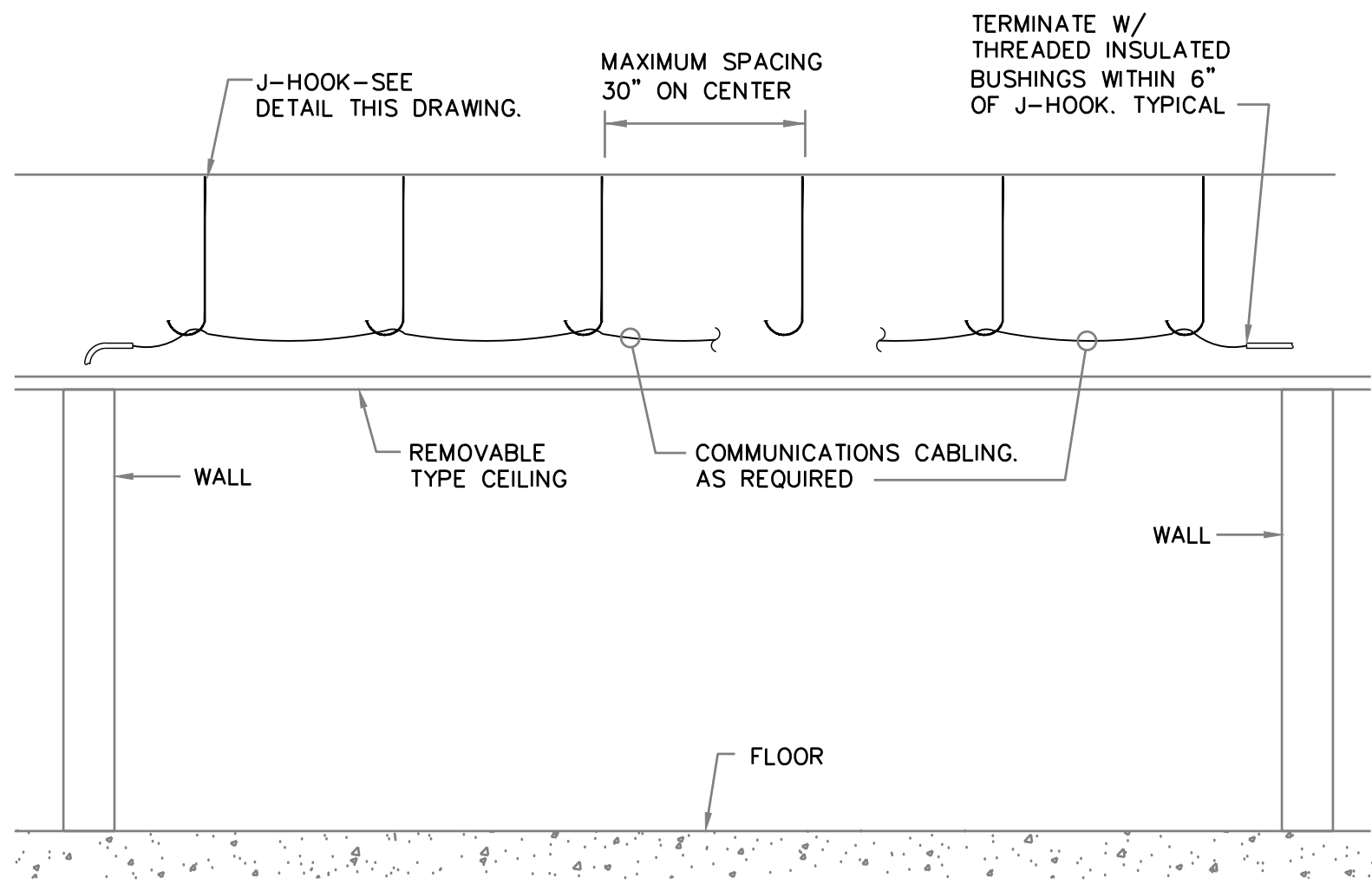
Checked By: CVU

Date: 09/15/26

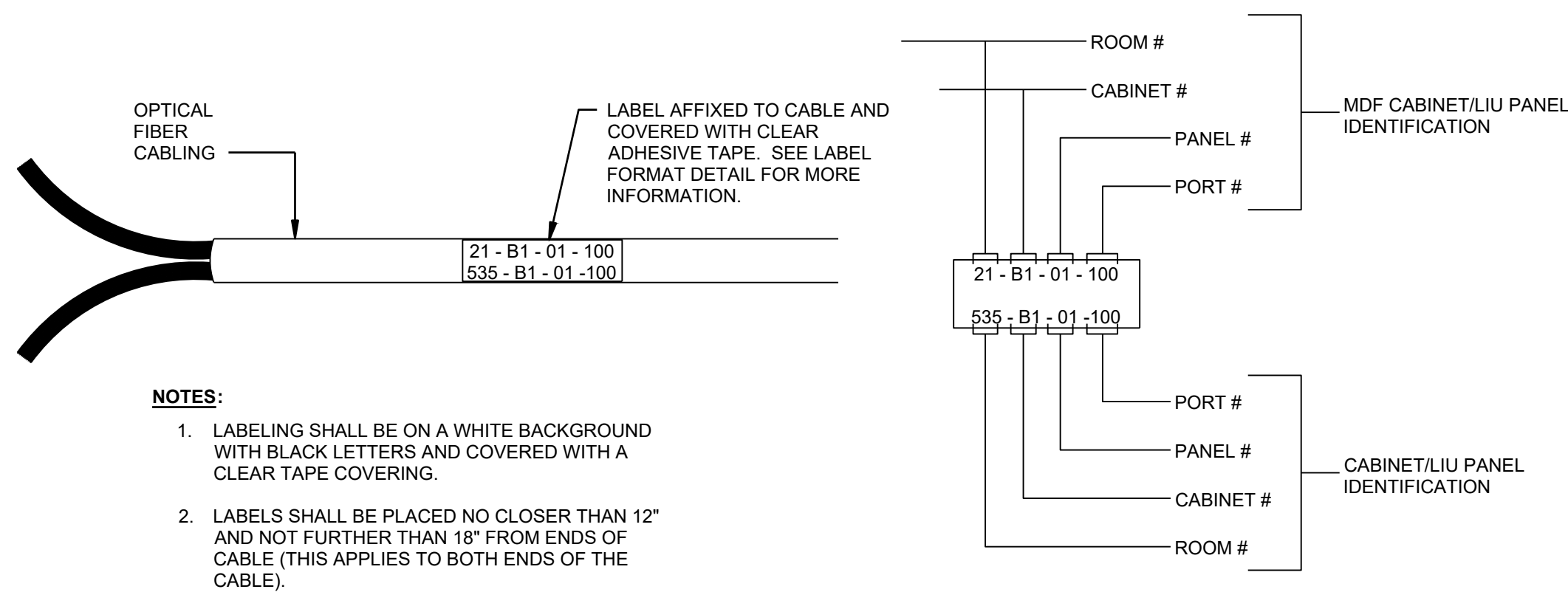
Drawing Number

E602

Sheet 00 of 00



1 J-HOOK DETAIL
NOT TO SCALE

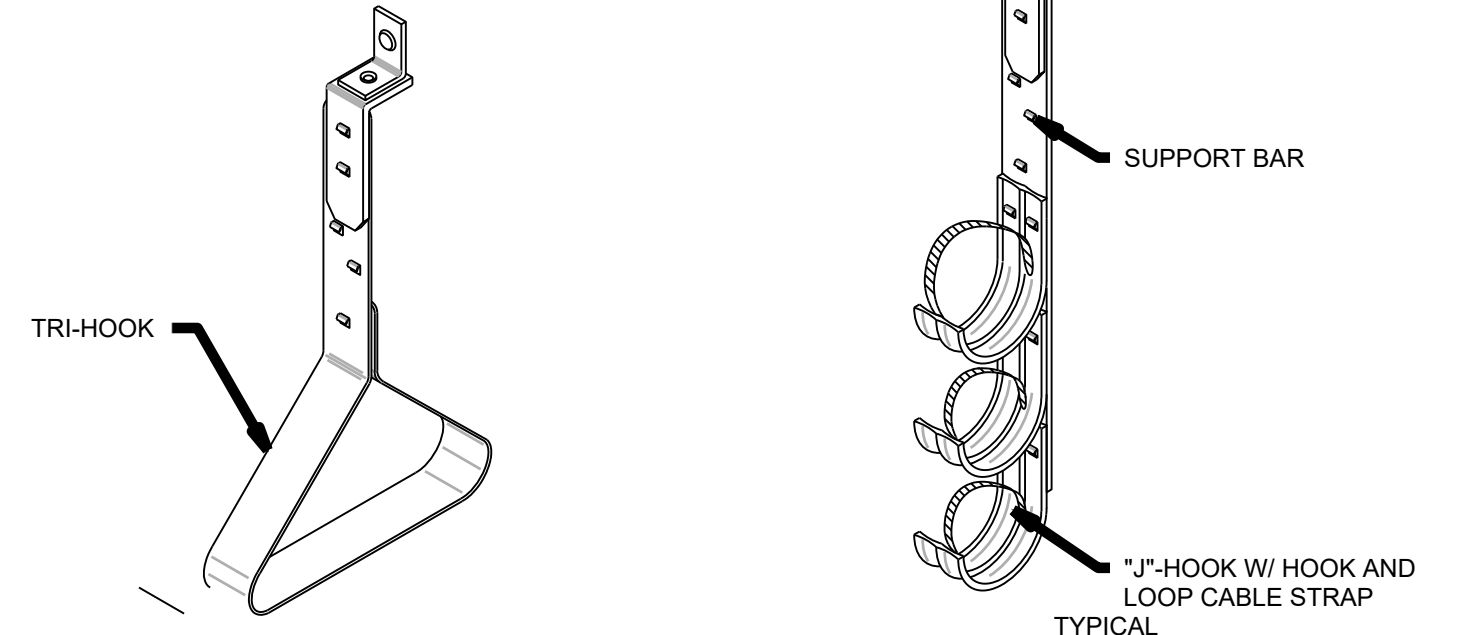


LABEL LOCATION AND APPLICATION

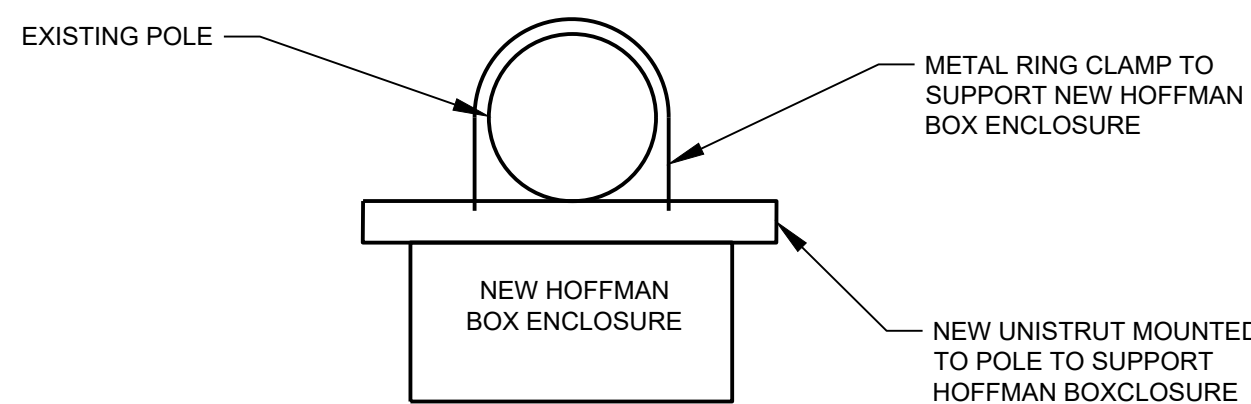
LABEL FORMAT DETAIL

3 TYPICAL OPTICAL FIBER CABLE LABELING SCHEME DETAIL
NOT TO SCALE

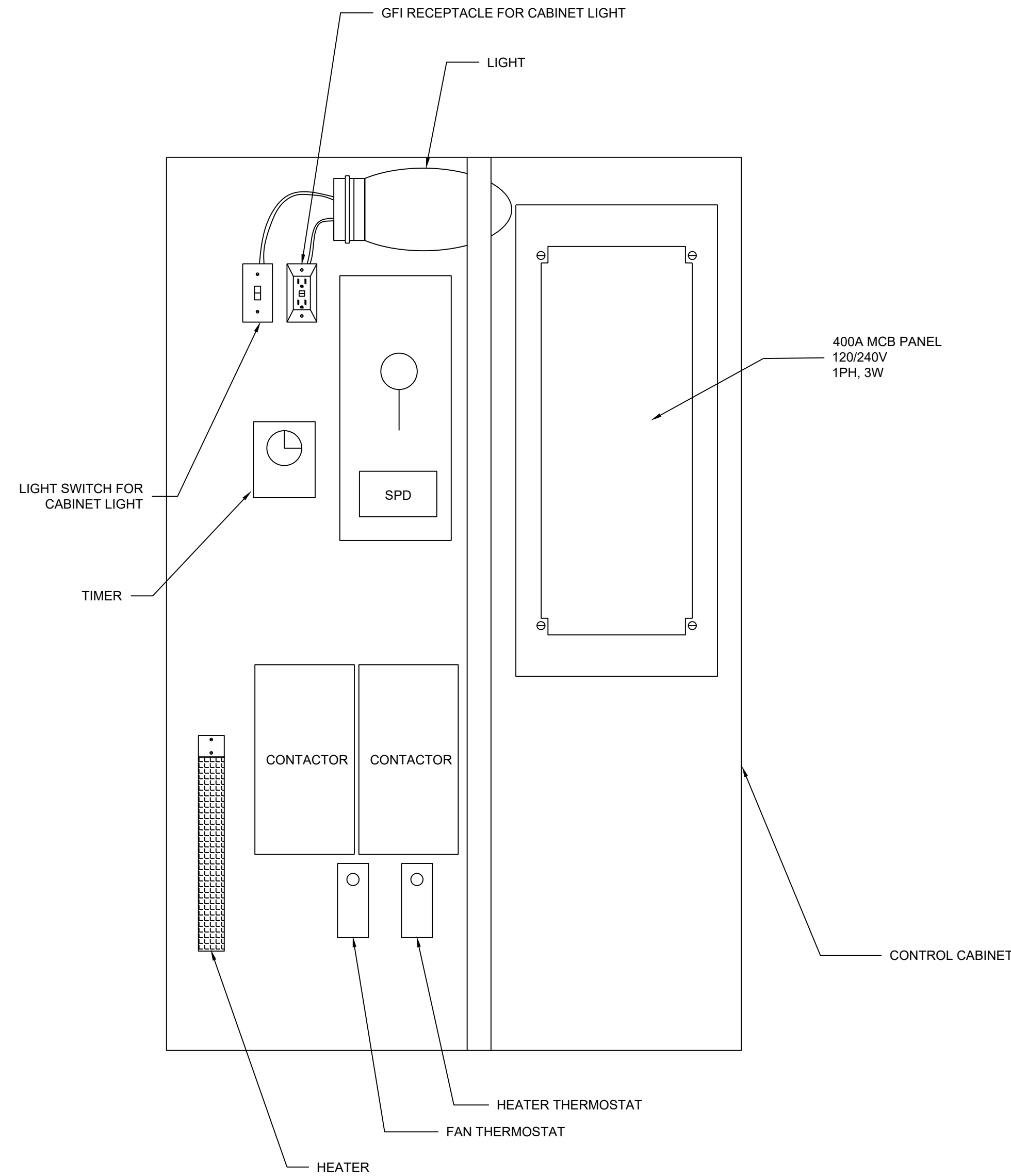
- NOTES:
1. SECONDARY PATHWAY CABLE SUPPORTS ARE TO BE USED AS NECESSARY FOR CABLES TO COMPLY WITH EIA/TIA REQUIREMENTS FOR CABLE SUPPORT. OTHER ALTERNATIVES MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
 2. ALL SUPPORTS SHALL BE SPACED ON 5'-0" MAX CENTERS. REFER TO MANUFACTURE'S RECOMMENDATIONS FOR MAX LOADING, APPLICATION REQUIREMENTS, AND SECURING TO CABLES.
 3. ALL CABLE SUPPORTS SHALL BE SPECIFICALLY MANUFACTURED TO SUPPORT HIGH SPEED COMMUNICATIONS STRUCTURE.
 4. ROUTE CABLES VIA SECONDARY PATHWAY FROM PRIMARY PATHWAY (WERE BASKET IN CORRIDOR) DIRECTLY TO ROOM BEING FED. DO NOT ROUTE CABLES THROUGH ANY ROOM OTHER THAN THE ROOM BEING FED.



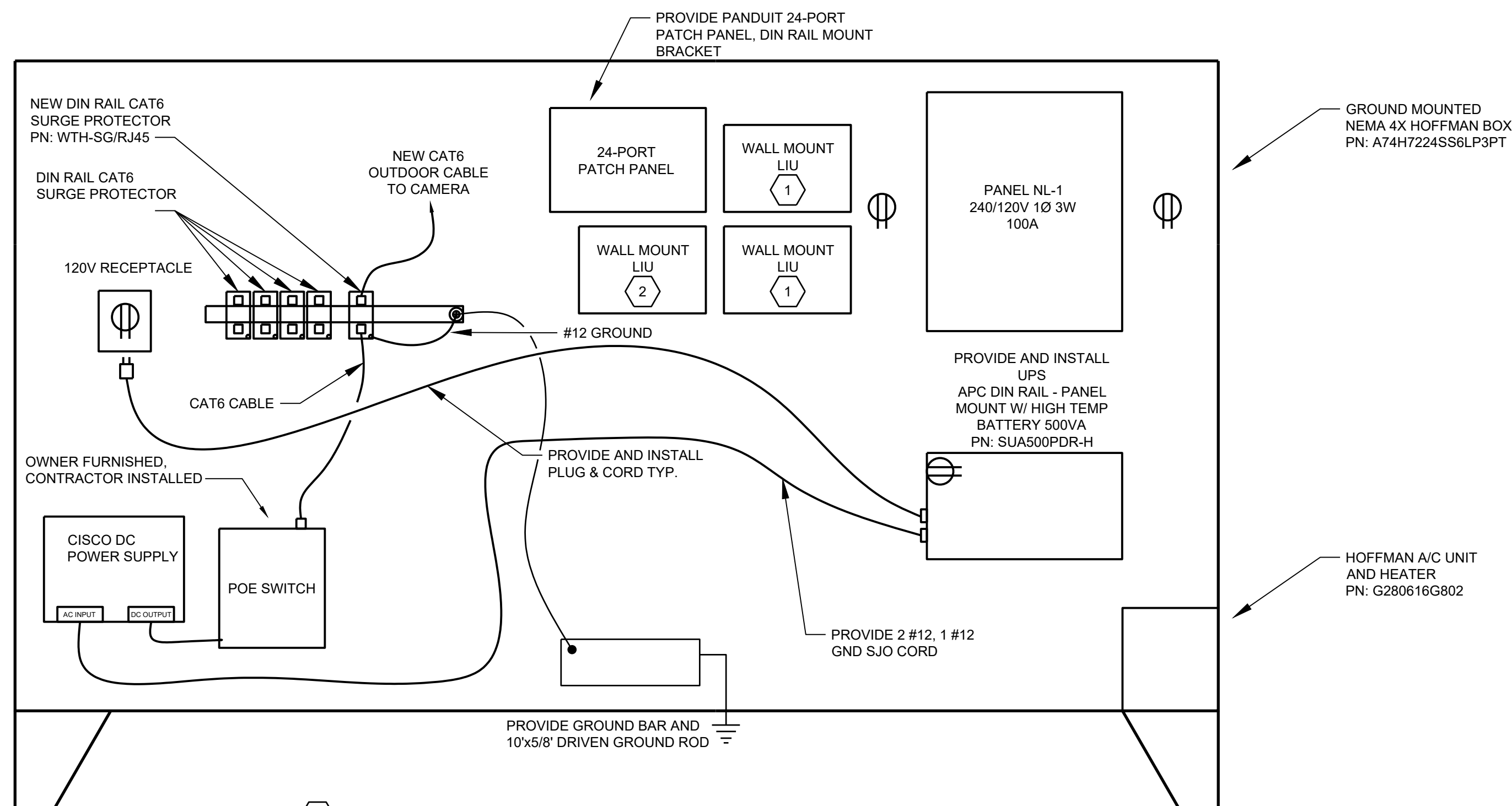
2 SECONDARY PATHWAY SUPPORTS
NOT TO SCALE



4 OVERHEAD POLE/ENCLOSURE MOUNTING VIEW FOR REFERENCE
NOT TO SCALE

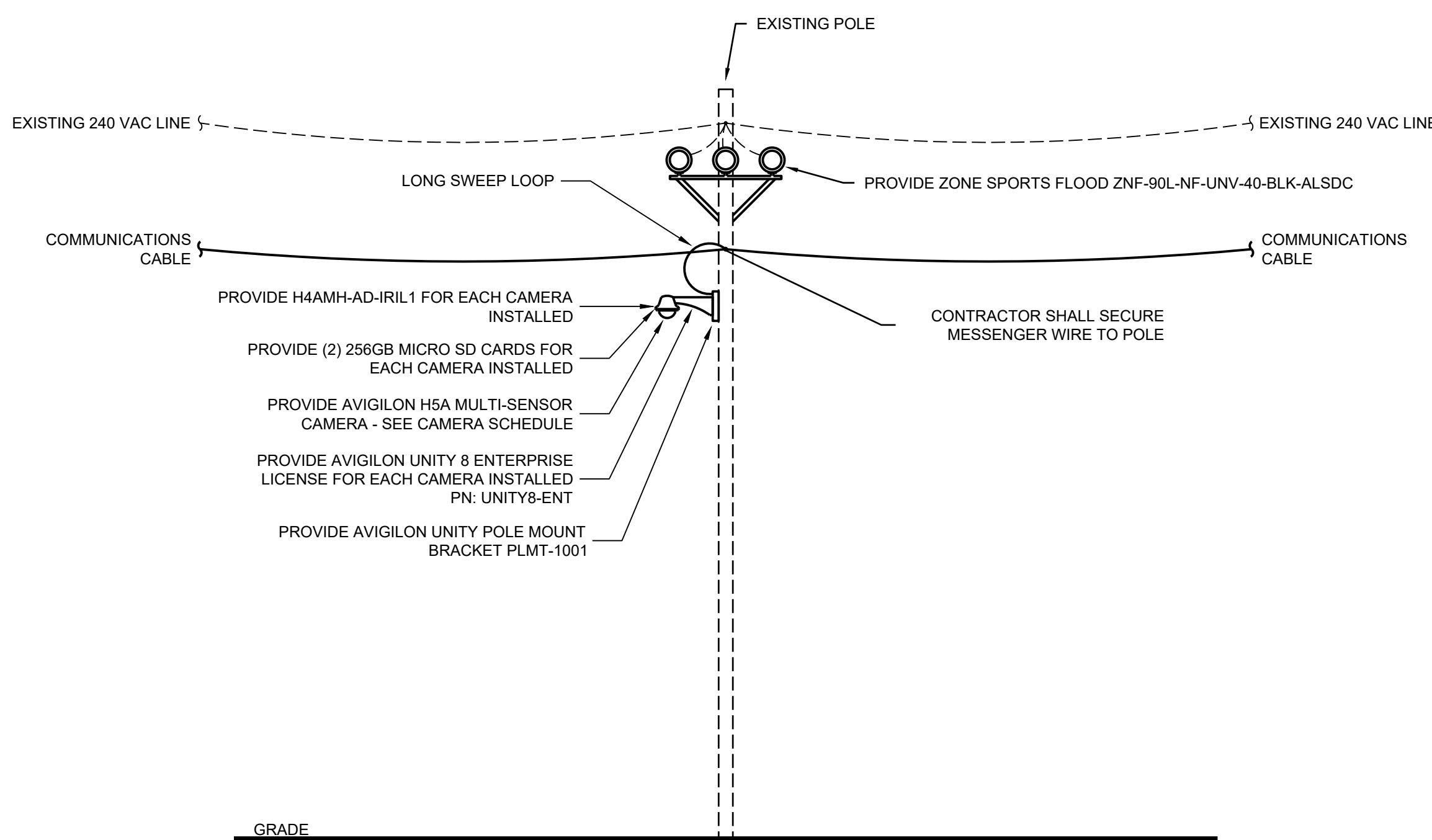


5 CONTROL CABINET DETAIL (ETR)
NOT TO SCALE



1. PROVIDE WALL MOUNT LIU ENCLOSURE - 12 PORT MODULES - TEST AND TERMINATE 12 STRAND SM IN WALL MOUNT ENCLOSURE IN ACCORDANCE WITH CCAC STANDARDS AND SPECIFICATIONS
2. PROVIDE WALL MOUNT LIU ENCLOSURE - 24 PORT MODULES - TEST AND TERMINATE 24 STRAND SM IN WALL MOUNT ENCLOSURE IN ACCORDANCE WITH CCAC STANDARDS AND SPECIFICATIONS

6 GROUND MOUNTED HOFFMAN BOX
NOT TO SCALE



1 POLE MOUNTING CAMERA INSTALLATION DETAIL (TYP.)
NOT TO SCALE

Seal:



SECURITY CAMERAS

ISSUES

△ REVISIONS

Sheet Title:

ELECTRICAL DETAILS

Project Number:	2026-1166.01
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Drawn By: AJP

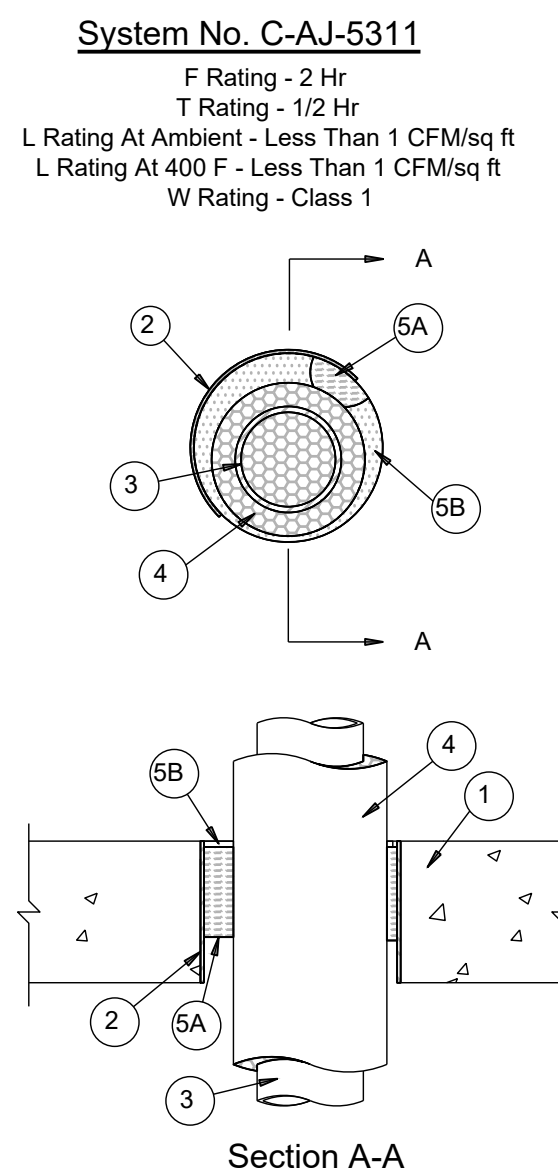
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Date: 09/15/26

Drawing Number

E603

Sheet 00 of 00



THROUGH PENETRATION - CONCRETE FLOOR/WALL METALLIC CONDUIT



NOTES:

- NOTES:

- Floor or Wall Assembly - Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 or for 1600-2400 kpsi) concrete. Wall may also be constructed of any U.L. Classified Concrete Blocks. Max. max opening of 6 in. (203 mm)
- See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. 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.
3. Through Penetrant - One metallic pipe or tube to be installed either concentrically or eccentrically within the firestop 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:
- A. Steel Pipe - Nom 2 in. (51 mm) diam. (or smaller) Schedule 5 (or heavier) steel pipe.
 - B. Iron Pipe - Nom 2 in. (51 mm) diam. (or smaller) cast or ductile iron pipe.
 - C. Copper Tubing - Nom 2 in. (51 mm) diam. (or smaller) Type L (or heavier) copper tube.
 - D. Copper Pipe - Nom 2 in. (51 mm) diam. (or smaller) Regular (or heavier) copper pipe.
- Tube Insulation - Plastics*** - Nom 3/4 in. (19 mm) thick acrylonitrile butadiene/polyvinyl chloride (ABP/VC) flexible foam units in form of tubing. The annular space between the insulated pipe or tube and the edge of the opening shall be min 3/4 in. (19 mm) to max 1.508 in. (41 mm).
- See Plastics (QMF22) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recommended Component tube material meeting the above specifications and having a U.L. 94 Flammability Classification of 94-5VA may be used.
5. Firestop System - The details of the firestop system shall be as follows:
- A. 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.
 - B. 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 with both surfaces of wall. A min 1/16 in. (1.6 mm) thick film of sealant shall be applied to contact of steel sleeve and wall. Min 1/2 in. (13 mm) annular perimeter of opening.
- ***SPECIFIED TECHNOLOGIES Inc. - Penstul 300 Sealant/Special Sealant, Penstul Sealant/Special Sealant for floors and walls and Penstul 300 SL Sealant or Special Sealant SL300SL Sealant for floors only.
- *Bearing the U.L. Classification Mark

NOTES:

- Fire Assembly - Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m³) concrete. Min thickness of concrete shall be 6-1/2 in. (165 mm). Wall may also be constructed of any UL Classified Max. demand of opening is 10 in. (254 mm).**
- Steel Pipe Penetrants - Penetrants shall be UL Classified (C-27) Fire Resistance Directory for names of manufacturers.**
- Steel Sleeve - (Optional) - Nom 4 in. (102 mm) diameter (or smaller) Schedule 10 (or heavier) steel sleeve cast into assembly. As an alternate, nom 10 in. (254 mm) diameter (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick gage steel with fire stop material applied to the sleeve.**
- Through Penetrant - One metallic pipe or tubing to be installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of floor. The following types and sizes of metallic pipe or tube may be used:**
- A. **Steel Pipe - Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.**
 - B. **Iron Pipe - Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.**
 - C. **Steel Tubing - Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) copper tubing.**
 - D. **Copper Pipe - Nom 4 in. (102 mm) diam (or smaller) Regular (or heavier) copper pipe.**
- All pipe coverings - Max 2 in. (51 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an aluminum jacket. Longitudinal joints shall be staggered. The units shall be applied with self-sealing lap tape. Transverse joints secured with min 5 fasteners or with butt strip tape supplied with the material. The annular surface of the pipe covering and the edge of the opening shall be min 1/4 in. (6 mm) to max 1-5/8 in. (41 mm).**
- See Pipe and Equipment Covering - Materials (BRU) category in Building Materials Directory for names of manufacturers. Any other materials meeting the above specifications and having a UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.**
- PVC Jacketing - (Not Shown) - An additional PVC jacket, supplied in sheet form, shall be tightly wrapped around the all pipe coverings. The PVC jacket shall be applied to the pipe covering with the adhesive supplied. The longitudinal seam of the PVC jacket shall be continuously sealed using the adhesive supplied with the jacket. The jacket is to be nom 48 in. (1.22 m) wide by nom 20 to 30 mil (0.5 or 0.8 mm) thick. The PVC jacket shall be positioned with its top edge located 37 in. (40 mm) below the top of the surface of the floor assembly and shall extend downward into and/or through the floor opening.**
- See Plastics (CMF22) category in the Plastics Recognized Component Directory for names of manufacturers. Any Recognized Component material meeting the above specifications and having a UL 94 Flammability Classification of 94-V5A may be used.**
- Fireproof System - The details of the fireproof system shall be as follows:**
- A. **Packing Material - Min 2-1/2 in. (64 mm) thickness (firmly packed mineral wool batt insulation used as a preferred form. Packing material to be recessed to a depth of one inch or more from both top and bottom to accommodate the required thickness of fill material (Item 11).**
 - B. **Fill, Void or Cavity Material - Sealant - Min 2 in. (51 mm) thickness of fill material applied in annular space flanking top surface of floor opening.**
- SPECIFIED TECHNOLOGIES INC. - Pencil 300 Sealant / Seal Spec/Seal Series SIL30 Sealant for floors and walls and Pencil 300 SIL Sealant / Seal Spec/Seal Series SIL300S/Seal Spec/Seal Series for floors only.**
- Specifying the UL Classification Mark**
- Bearing the UL Recognized Component Marking

THROUGH PENETRATION - CONCRETE FLOOR/WALL METALLIC CONDUIT

SEE SCHEDULE

HANDHOLE
SEE MFG'S TEMPLATE
FOR DIMENSIONS OF
BASE PLATE.

1 1/2" CHAMFER

3-#3 TIES WITHIN FIRST 5' OF BASE

3/4" DIA X 30" ANCHOR BOLTS

FINISHED GRADE

CONCRETE BASE

9'5"

2'6"

1'5"

1'5"

3" CLEAR ALL SIDES

C

SECTION

#4 BARE COPPER
GROUND 20'FT
COILED BELOW BASE.

DETAIL A: SECURITY DEVICE PROVISION DETAIL

GENERAL NOTES:

1. POLE MANUFACTURER TO PROVIDE PULL STRING IN POLE TO FACILITATE INSTALLATION OF FLEX CONDUIT.
2. ALL CONDUIT INTO POLE BASE PROVIDED BY CONTRACTOR.

ELECTRICAL NOTES:

1. ALL CONDUCTORS FOR POST LIGHTS SHALL BE INSTALLED IN PVC CONDUIT.
2. FIXTURE BASES SHALL BE LOCATED 5'-0" FROM OUTSIDE CURB EDGE OF PAVED VEHICULAR SURFACE, SEE NOTE 3.
3. DIMENSION SHALL INCREASE BY 18" WITHIN PAVED VEHICULAR SURFACE AREAS.

POLE SIZE	A	B	C
< 15'	5'-0"	3'-0"	1'-6"
15' > 35'	9'-6"	6'-0"	2'-6"

POUR-IN-PLACE LIGHT POLE BASE DETAIL - SECURITY

NOT TO SCALE

FIRESTOP GENERAL NOTES

1. Any pipe or conduit with a diameter smaller than the listed value may be used.
2. Any pipe or conduit with a wall thickness heavier than the listed value may be used.
3. A rated freestop system ("T" rating may be applied to a wall or floor of equal or lesser "T" rating, the system then is rated at the lesser "T" rating of floor or ceiling.)
4. Stencil UL number on both sides of wall above ceiling and on pipe in ceiling
5. Stencil UL number on pipe/pipe insulation for vertical penetration. Stencil on both sides of wall above ceiling
6. Provide STI detail on both sides of penetration (wall or floor). Include STI detail number, wall/floor/pipe, date installed, and installing contractor.
7. UL system number to be verified in field for appropriate wall/floor system.
8. Seal unrated walls similar to freestop details
9. Seal existing thru floor penetrations if wall is not sealed, for bedding purposes, seal 10 pipe penetrations assuming 4" diameter pipes, (both insulated and uninsulated)
10. Fire stop material shall be as follows. Drywall penetrations shall be later based on the type of wall.
11. Seal existing thru floor, concrete, and exterior penetrations shall be grey in color and silicon based. Deviations shall be submitted to the engineer for review.
12. All firestop shall be products as manufactured by STI.

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LINE #	# OF DATA CABLES	CABLE TYPE	CABLE COLOR	BLDG	FLOOR	ROOM NAME	DEVICE TYPE	DEVICE MOUNTING	ROOM PLATE NO.	PORT POSITION	DATA CLOSET	RACK #	PATCH PANEL #	CBL POSITION ON P.P.	CABLE LABEL	FACEPLATE LABEL	PATCH PANEL LABEL
1	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	1	EXT-1-1-BLK-N252-1-1	TBD	TBD
2	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	2	EXT-1-1-BLK-N252-1-2	TBD	TBD
3	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	3	EXT-1-1-BLK-N252-1-3	TBD	TBD
4	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	4	EXT-1-1-BLK-N252-1-4	TBD	TBD
5	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	5	EXT-1-1-BLK-N252-1-5	TBD	TBD
6	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	6	EXT-1-1-BLK-N252-1-6	TBD	TBD
7	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	7	EXT-1-1-BLK-N252-1-7	TBD	TBD
8	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	8	EXT-1-1-BLK-N252-1-8	TBD	TBD
9	1	CAT 6 OSP	BLK	BOYCE CAMPUS	EXTERIOR	NORTH LOT	SECURITY	POLE	1	1	N252	1	1	9	EXT-1-1-BLK-N252-1-9	TBD	TBD
10	1	CAT 6 OSP	BLUE	BOYCE CAMPUS	EXTERIOR	NORTH LOT	WAP	POLE	1	1	N252	1	1	10	EXT-1-1-BLUE-N252-1-10	TBD	TBD
11	1	CAT 6 OSP	BLUE	BOYCE CAMPUS	EXTERIOR	NORTH LOT	WAP	POLE	1	1	N252	1	1	11	EXT-1-1-BLUE-N252-1-11	TBD	TBD
12	1	CAT 6 OSP	BLUE	BOYCE CAMPUS	EXTERIOR	NORTH LOT	WAP	POLE	1	1	N252	1	1	12	EXT-1-1-BLUE-N252-1-12	TBD	TBD

NOTES:

1. VERIFY ALL LABELING WITH CCAC IT PRIOR TO PRODUCING LABELS

EXAMPLE OF CABLE LABEL SCHEME:

EXT	-	11	-	1	-	BLK	-	316	-	14	-	33
ROOM NUMBER												
PLATE NUMBER												
POSITION ON PLATE												
CABLE COLOR												
DATA CLOSET NUMBER												
PATCH PANEL NUMBER												

SECURITY CAMERA CABLE ID SCHEDULE

NOT TO SCALE

SECURITY NOTES:

FOR EACH CAMERA INSTALLED UNDER THIS PROJECT PROVIDE:

- IR RING PN: HAAMH-AD-IRIL1
- 256GB MICRO SD CARDS - COORDINATE WITH IT DEPARTMENT
- AVIGILON UNITY 8 ENTERPRISE LICENSE PN: UNITY8-ENT
- POLE MOUNT BRACKET PN: PLMT-1001

LIGHTING FIXTURE SCHEDULE											
TYPE	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	MOUNTING	INITIAL COLOR TEMPERATOR	VOLTAGE	LAMPS	WATTAGE	COMMENTS		
P1	LSI ZONE SPORTS FLOOD LED, 80CRI, AIRLINK SYNAPSE INTEGRAL CONTROLLER, NARROW FLOOD, 90,000 LUMENS, UNIVERSAL VOLTAGE	LSI	ZNF-90L-NF-UNV-46-BLK-ALSDC	MOUNTED ON POLE	4000K	UNIVERSAL	LED	532W			
POLE	METAL POLE, DARK BRONZE FINISH	LYTE POLE	101-60-7-30-AB-D1-XX-CMB-VD	ANCHOR BASE	NA	NA	NA	NA			

GENERAL LIGHTING NOTES:

- THE CATALOG OR SERIES NUMBER INDICATES THE GENERAL LINE OF FIXTURES TO BE SUPPLIED AND MAY NOT NECESSARILY INCLUDE ALL PREFIXES AND SUFFIXES FOR OPTIONS OR ACCESSORIES REQUIRED. WHERE A CONFLICT EXISTS BETWEEN THE DESCRIPTION AND THE NUMBER, THE DESCRIPTION SHALL TAKE PRECEDENCE INCLUDING THE COLOR, FINISH, LAMP, AND VOLTAGE COLUMNS.
- 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 THE 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 AND OR COMPONENTS SHOWN ON THE ARCHITECTURAL DRAWINGS.
- THE CONTRACTOR IS RESPONSIBLE FOR A COMPLETE / COMPATIBLE INSTALLATION.
- ALL WORK SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR, INCLUDING ALL DIMENSIONS.
- LIGHTING FIXTURES SHALL BE FURNISHED FOR THE BRANCH CIRCUIT VOLTAGE INDICATED ON THE CONTRACT DOCUMENTS.
- COLOR AND FINISH OF ALL LIGHTING FIXTURES AND COMPONENTS SHALL BE SELECTED BY OWNER / ARCHITECT.
- ALL FIXTURES SHALL BE PAINTED AFTER FABRICATION.
- NOT USED.

NL-1							
	MAIN	60	MCB	VOLTAGE	120 /240V	MOUNTING SURFACE	
	BUSING	100	AMPS		1-Ph 3-W		
	SCR	22K	AIC				
NO	DESCRIPTION			CB/P	CB/P	DESCRIPTION	NO
1	POLE #8			20/1	20/1	PELTIER COOLER	2
3	UPS RECEPT.			20/1	20/1	SPARE	4
5	SPARE			20/1	20/1	SPARE	6
7	SPARE			20/1	20/1	SPARE	8
9	SPARE			20/1	20/1	SPARE	10
11	SPARE			20/1	20/1	SPARE	12
13	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	14
15	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	16
17	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	18
19	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	20
21	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	22
23	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	24

EXISTING PANEL CONTROL CABINET							
	MAIN	400	MCB	VOLTAGE	120 /240V	MOUNTING SURFACE	
	BUSING	400	AMPS		1-Ph 3-W		
	SCR	EXISTING	AIC				
NO	DESCRIPTION			CB/P	CB/P	DESCRIPTION	NO
1	TWIST OUT			---	---	TWIST OUT	2
3	TWIST OUT			---	---	TWIST OUT	4
5	TWIST OUT			---	---	TWIST OUT	6
7	LIGHTS			30/2	20/1	SPARE	8
9					20/1	SPARE	10
11	LIGHTS						12
13				60/2	60/2	BASEBALL FIELD LIGHTS	14
15	LIGHTS				20/1	SPARE	16
17				60/2	20/1	SPARE	18
19	SPARE			20/1	20/1	SPARE	20
21	SPARE			20/1			22
23	SPARE			20/1	100/2	CDL TRAILER PANEL	24
25	SPARE			20/1			26
27	TIMER			20/1	100/2	OFF	28
29	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	30

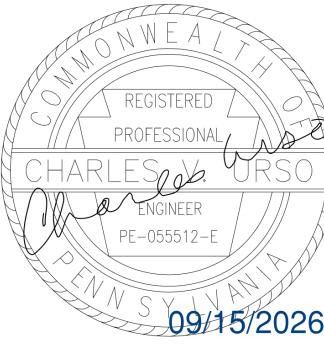
REVISED PANEL CONTROL CABINET							
	MAIN	400	MCB	VOLTAGE	120 /240V	MOUNTING SURFACE	
	BUSING	400	AMPS		1-Ph 3-W		
	SCR	EXISTING	AIC				
NO	DESCRIPTION			CB/P	CB/P	DESCRIPTION	NO
1	TWIST OUT			---	---	TWIST OUT	2
3	TWIST OUT			---	---	TWIST OUT	4
5	TWIST OUT			---	---	TWIST OUT	6
7	LIGHTS			30/2	20/1	SPARE	8
9					20/1	SPARE	10
11	LIGHTS						12
13				60/2	60/2	BASEBALL FIELD LIGHTS	14
15	LIGHTS				20/1	SPARE	16
17				60/2	20/1	SPARE	18
19	SPARE			20/1	20/1	SPARE	20
21	SPARE			20/1			22
23	SPARE			20/1	100/2	CDL TRAILER PANEL	24
25	SPARE			20/1			26
27	TIMER			20/1	100/2	OFF	28
29	PROVISIONAL SPACE			---	---	PROVISIONAL SPACE	30
	*NEW BREAKER						
	*NOTE: CONTRACTOR TO RECONFIGURE PANEL ACCORDINGLY						

PERMIT SET- SEPTEMBER 15, 2026

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Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**

SECURITY CAMERAS

**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**ELECTRICAL
SCHEDULES**

Project Number: 2026-1166.01

Drawn By: AJP

Checked By: CVU

Date: 09/15/26

Drawing Number

E701



Bicsi
Charles V Uroo
BICSI ID # 121367
EXPIRES 12-31-26
RCDD

**OLD FRANKSTOWN RI
MONROEVILLE, PA
15146-1348**

ELECTRICAL SCHEDULES

Date: 09/15/26

E702

Sheet 00 of 00

Sheet 00 of 00

Pole 6	General	Accessories	Camera Settings	Scene Settings
Quantity: 1	24C-H5A-3MH-B H5A Multisensor 3x8MP HFOV 270° 3.3-5.7mm F1.5 Next-Generation Analytics		Operation mode: Full feature Wide Dynamic Range: On	Mounting height: 4.50 m

Quantity: 1	24C-H5A-3MH-B H5A Multisensor 8xMP HFOV 72° 3.3-5.7mm F1.5 Next Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 15 Mbps Average bandwidth: 11 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8.0MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 24 Keyframe interval: 30	Mounting height: 4.50 m Target height: 1.83 m Target distance: 30.10 m Scene width: 31.98 m Pixel density at target: 120 ppm Camera rotation: None Mounting angle: 67.61°
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Quantity: 1	24C H5A-3MH-H H5A Multisensor 8x8MP HFOV 720° 3.3-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 13 Mbps Average bandwidth: 11 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8.0MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 24 Keyframe interval: 30	Mounting height: 4.50 m Target height: 1.83 m Target distance: 28.69 m Scene width: 30.50 m Pixel density at target: 126 ppm Camera rotation: None Mounting angle: 67.37°
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Quantity: 1	2x HSA 3x8MB HSA Multisensor 3x8MP HFOV 270° 3.3-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 15 Mbps Average bandwidth: 11 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8.0MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 24 Keyframe interval: 30	Mounting height: 4.30 m Target height: 1.83 m Target distance: 28.67 m Scene width: 30.47 m Pixel density at target: 126 ppm Camera rotation: None Nemra notation: 67.35°
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Pole 7A	General	Accessories	Camera Settings	Scene Settings
Quantity: 1	24C-HiSA-3MH-B H5A Multisensor 3x8MP HiFOV 270° 3.3-5.7mm F1.5 Next-Generation Analytics	-	Operation mode: Full feature Wide Dynamic Range: On	Mounting height: 4.50 m

Quantity: 1	24C H5A 3MH-B H5A Multisensor 3x8MP HFOV 720° 3.3-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 13 Mbps Average bandwidth: 11 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8.0MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 24 Keyframe interval: 30	Mounting height: 4.50 m Target height: 1.83 m Target distance: 21.31 m Scene width: 22.73 m Pixel density at target: 169 ppm Camera rotation: None Mounting angle: 65.54°
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Quantity: 1	24C H5A 3MH-B H5A Multisensor 3x8MP HFOV 720° 3.3-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 13 Mbps Average bandwidth: 11 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8.0MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 24 Keyframe interval: 30	Mounting height: 4.50 m Target height: 1.83 m Target distance: 26.14 m Scene width: 27.81 m Pixel density at target: 138 ppm Camera rotation: None Mounting angle: 66.8°
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Quantity 1	24C-H5A-3MH-H H5A Multisensor 3x8MP HFOV 720° 3.3-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 13 Mbps Average bandwidth: 13 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8 MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 24 Keyframe interval: 30	Mounting height: 4.50 m Target height: 1.83 m Target distance: 26.12 m Pixel density: 27.79 m Scene width at target: 138 ppm Camera rotation: None Mounting angle: 66.85°
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FOR REFERENCE ONLY

Pole 8	General	Accessories	Camera Settings	Scene Settings
Quantity: 1	32C-HSA-4MH-B HSA Multisensor 4x8MP HFOV 360° 3.3-5.7mm F1.5 Next-Generation Analytics	-	Operation mode: Full feature Wide Dynamic Range: On	Mounting height: 4.50 m

Quantity: 1	52C45A4MH-B H54 Multisensor 4x8MP HFOV 360° 3.5-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 10 Mbps Average bandwidth: 8 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 80MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 17 Keypress interval: 30	Mounting height: 4.30 m Target height: 1.83 m Target distance: 21.49 m Scene width: 22.91 m Pixel density at target: 168 ppm Camera rotation: None Mounting angle: 65.60°
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Quantity: 1	32L HSA-4MBH HSA Multisensor 48MP HFOV 360° 3.3-5.7mm F1.5 Next-Generation Analytics	Bandwidth calculation: Auto Maximum bandwidth: 10 Mbps Average bandwidth: 8 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 80MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 17 Keyframe interval: 30	Mounting height: 4.30 m Target height: 1.93 m Target distance: 17.25 m Scene width: 18.48 m Pixel density at target: 208 ppm Camera rotation: None Mounting angle: 63.89°
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Quantity: 1		H54 Multisensor 4x8MP H54V 360° 3.3-5.7mm F1.5 Next-Generation Analytics	Maximum bandwidth: 10 Mbps Average bandwidth: 8 Mbps Max record time: Daily recording cycle: 12 hours	Wide Dynamic Range: On Format: H.265 Resolution: 80MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 17 Keyframe interval: 30	Target height: 1.83 m Target distance: 22.29 m Scene width: 23.76 m Pixel density at target: 162 ppm Camera rotation: None Mounting angle: 65.85°
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Pole 8 (Head 4)	General	Accessories	Bandwidth & Storage	Camera Settings	Scene Settings
Quantity: 1	32C-H54-4MH-B H54 Multisensor 4x8MP HFOV 360° 3.3-5.7mm F1.5 Next-Generation Analytics		Bandwidth calculation: Auto Maximum bandwidth: 10 Mbps Average bandwidth: 8 Mbps Max record time: Daily recording cycle: 12 hours	Operation mode: Full feature Wide Dynamic Range: On Format: H.265 Resolution: 8:0MP Scene type: Low detail, low motion Image quality: 6 Flicker control: 60Hz Image rate: 17 Keyframe interval: 30	Mounting height: 4.50 m Target height: 1.83 m Target distance: 21.51 m Scene width: 22.94 m Pixel density at target: 167 ppm Camera rotation: None Mounting angle: 65.61°

FOR REFERENCE ONLY

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**
SECURITY CAMERAS
**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**ELECTRICAL CAMERA
LAYOUTS**

Project Number: 2026-1166.01

Drawn By: AJP

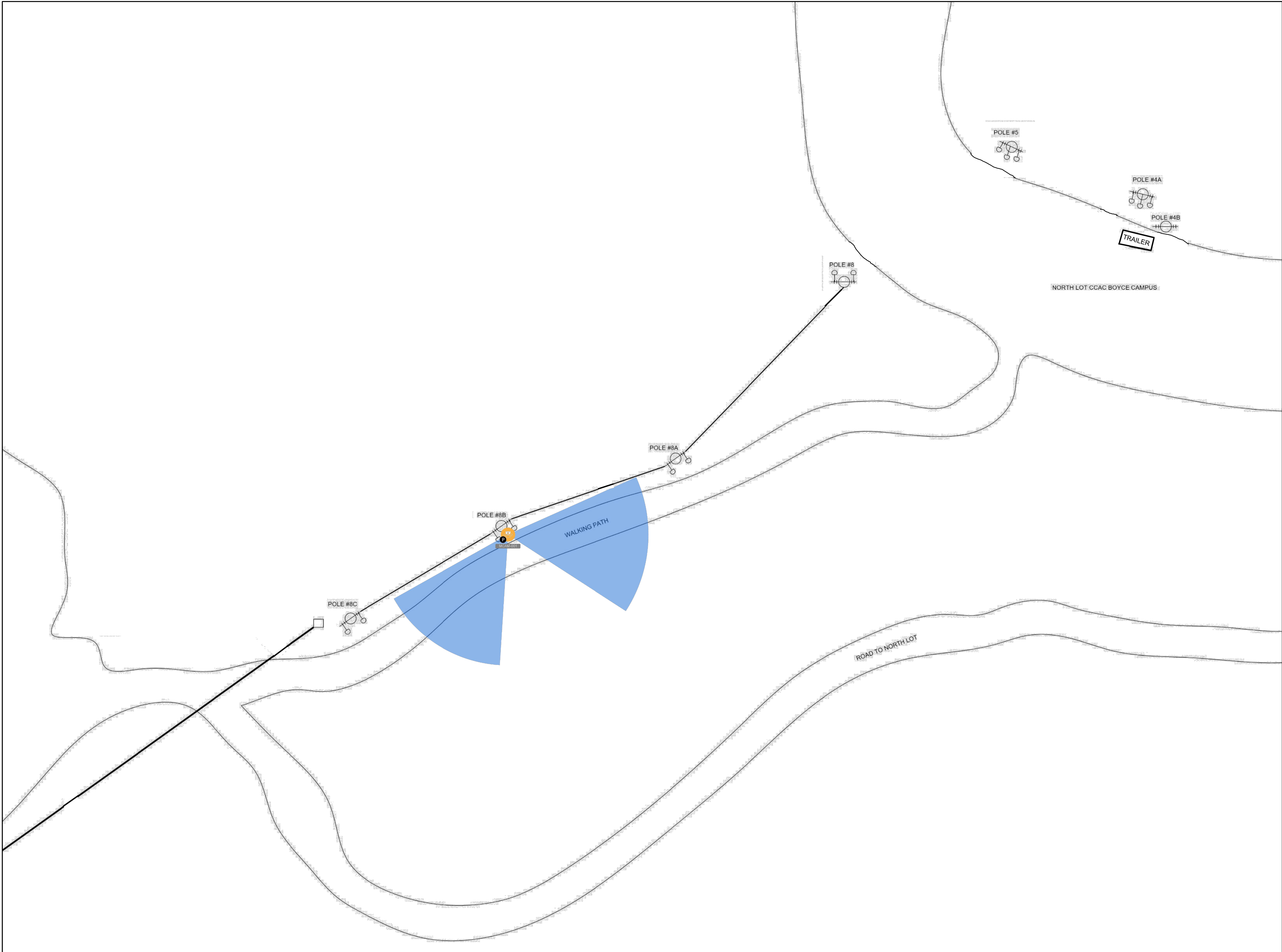
Checked By: CVU

Date: 09/15/26

Drawing Number

E703

Sheet 00 of 00



1

CAMERA LAYOUT WALKING PATH

Scale: NOT TO SCALE
*DRAWING FOR REFERENCE ONLY

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS
SECURITY CAMERAS
OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**ELECTRICAL CAMERA
LAYOUTS**

Project Number: 2026-1166.01

Drawn By: AJP

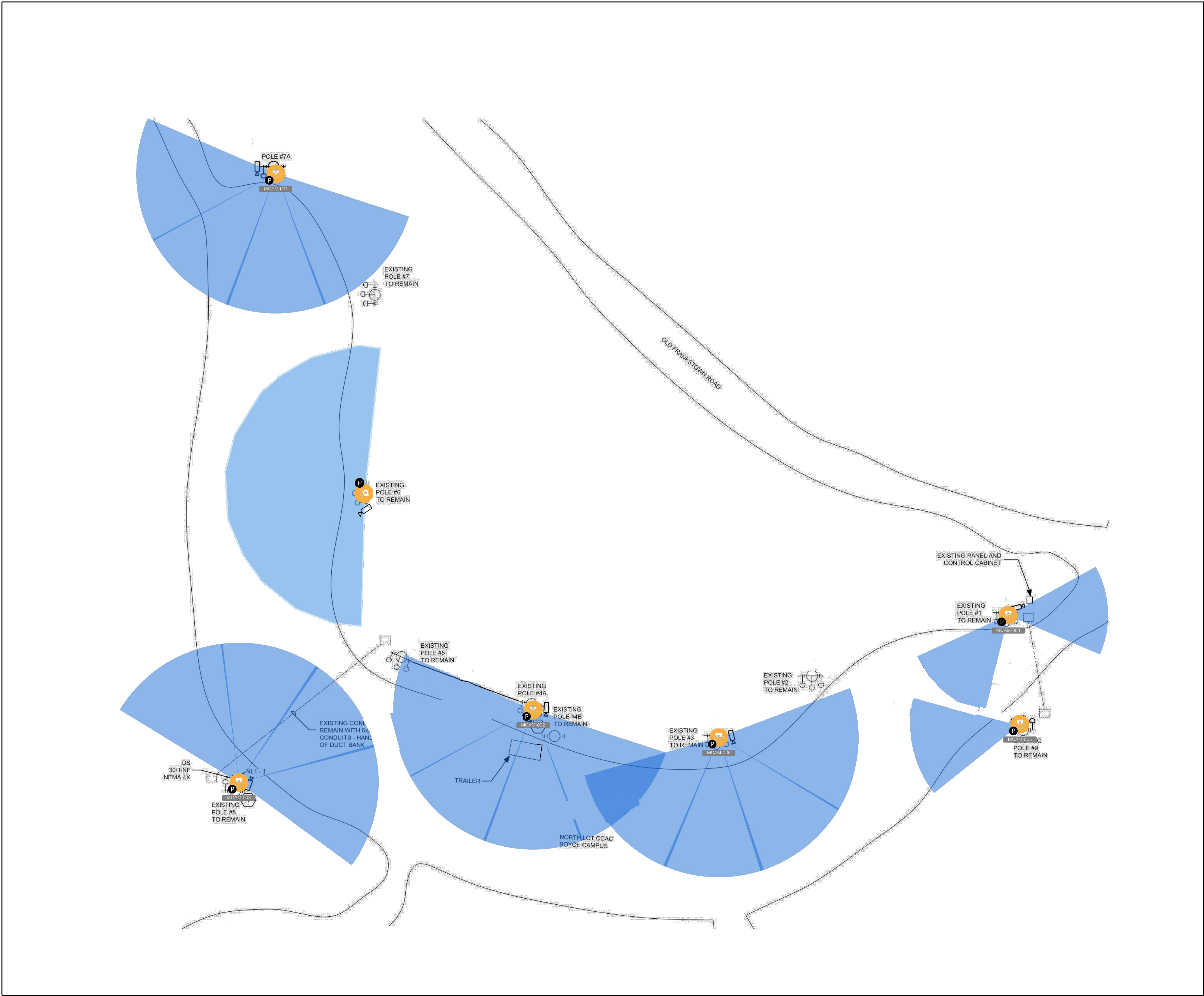
Checked By: CVU

Date: 09/15/26

Drawing Number

E704

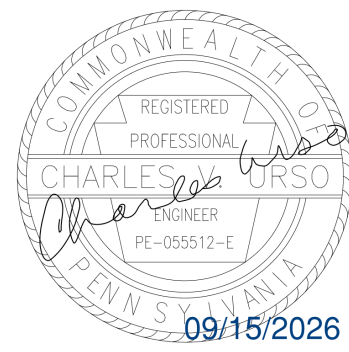
Sheet 00 of 00



1 CAMERA LAYOUT NORTH PARKING LOT
Scale: NOT TO SCALE
*DRAWING FOR REFERENCE ONLY

Consultants:

Seal:



Key Plan:



Project Identification:

**NORTH LOT CCAC
BOYCE CAMPUS**

SECURITY CAMERAS

**OLD FRANKSTOWN RD
MONROEVILLE, PA
15146-1348**

ISSUES

REVISIONS

Sheet Title:

**ELECTRICAL
RISERS**

Project Number: 2026-1166.01

Drawn By: AJP

Checked By: CVU

Date: 09/15/26

Drawing Number

E801

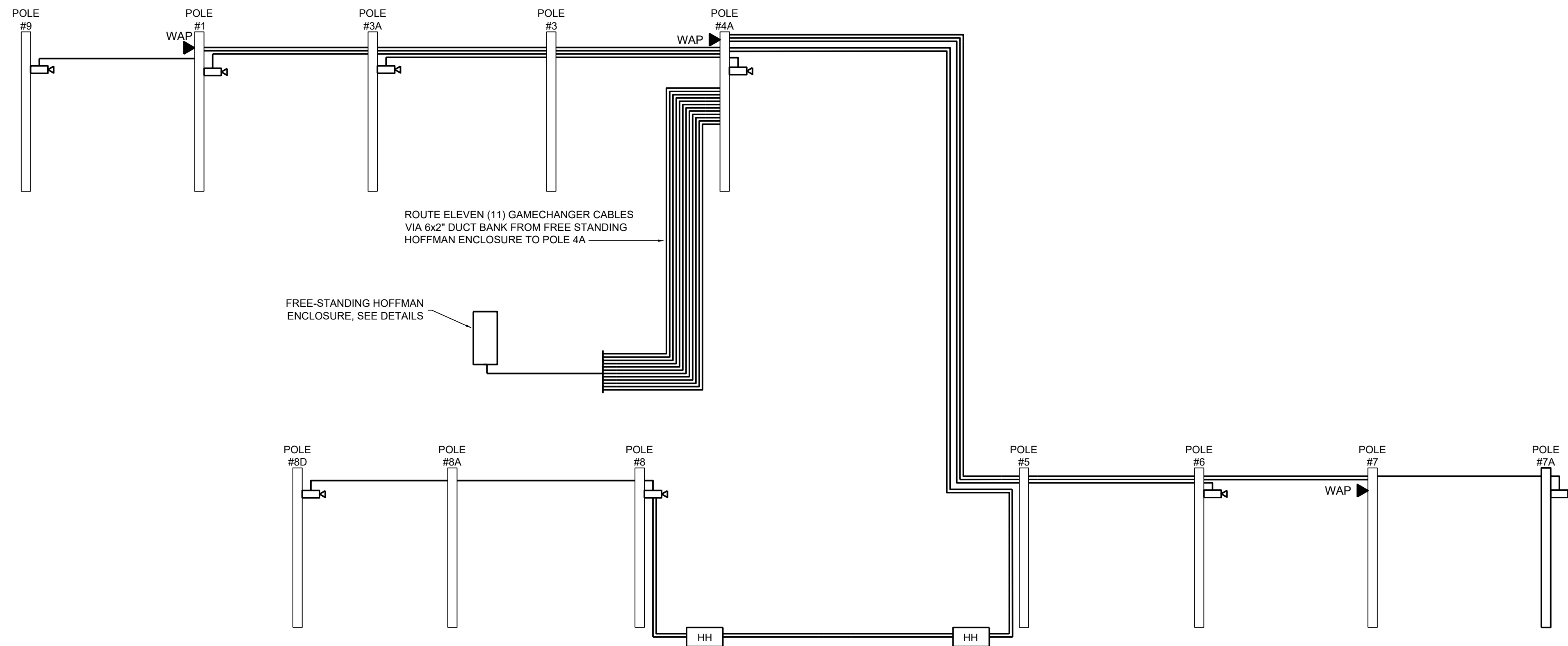
Sheet 00 of 00

NOTES TO COPPER RISER:

1. BASIS OF DESIGN COPPER CABLE IS THE GAMECHANGER SHIELDED TWISTED PAIR, OSP DIRECT BURIAL, ALUMINUM ARMOR SUNLIGHT RESISTANT CABLE.
2. PROTECT ALL CABLES ROUTED VERTICALLY WITH SCHEDULE 80 CONDUIT ATTACHED TO POLES - PROVIDE WEATHER HEADS AND DRIP LOOPS.
3. SEE SPECIFICATIONS AND DRAWING E601 FOR ADDITIONAL INFORMATION.

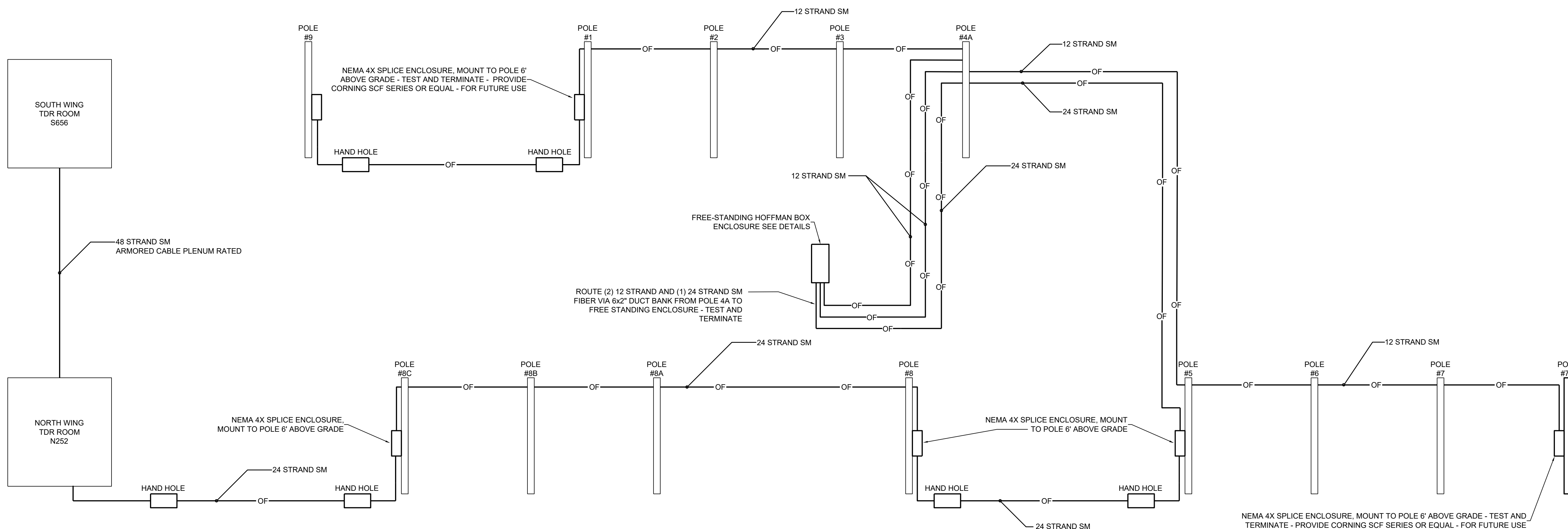
NOTES TO FIBER RISER:

1. BASIS OF DESIGN FOR OUTDOOR FIBER CABLE IS THE ALTOS CORNING FIGURE 8 SINGLEMODE OUTDOOR, SUNLIGHT RESISTANT CABLE.
2. BASIS OF DESIGN FOR INDOOR FIBER CABLE IS THE CORNING UNITIZED TIGHT BUFFERED INTERLOCKING ARMORED CABLE, PLENUM RATED SINGLE MODE.
3. PROTECT ALL OUTDOOR CABLES ROUTED VERTICALLY WITH SCHEDULE 80 CONDUIT ATTACHED TO POLES - PROVIDE WEATHER HEADS AND DRIP LOOPS.
4. PROTECT ALL INDOOR CABLES ROUTED VERTICALLY WITH EMT CONDUIT - FLOOR TO CEILING IN MECHANICAL SPACES AND OFFICE ENVIRONMENTS - FLOOR SLEEVE IN ELECTRICAL CLOSETS.
5. SEE SPECIFICATIONS AND DRAWING E601 FOR ADDITIONAL INFORMATION.



1 NORTH LOT COPPER RISER

NOT TO SCALE



1 NORTH LOT FIBER RISER

NOT TO SCALE