

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

BID PROPOSAL NO. 1062
CABLE RELOCATION PROJECT – ALLEGHENY CAMPUS

Sealed proposals will be received and publicly opened by a Purchasing Agent of the Community College of Allegheny County.

**Proposals must be received by the Purchasing Department, 800 Allegheny Avenue,
Pittsburgh, Pennsylvania 15233**

on or before 2:00 PM, on Thursday, February 20, 2020.

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 relocate data and voice cables at Allegheny Campus in accordance with specification, terms and conditions contained herein.

A MANDATORY pre-bid meeting and site-visitation will be held at 9:00 a.m. on Tuesday, February 11, 2020. The assembly point will be the OCS Lobby, 800 Allegheny Ave., Pittsburgh, PA 15233. Park in the lot directly across from Wendy’s (buzz in at the gate).

For technical questions contact Rich Schlegel (rschlegel@ccac.edu), Project Manager, at 412.237.3180.
For procedural questions, contact Mike Cvetic (mcvetic@ccac.edu), Director of Purchasing, at 412.237.3146

BID REQUIREMENTS (where checked)

 X Bid Bond. 10% of total base bid amount (Submit with Bid)

 X Performance Bond. 100% of total contract amount (Awardee Only)

 X Payment Bond. 100% of total contract amount (Awardee Only)

 X Master Services Agreement (Awardee Only)

 X No Lien Agreement (Awardee Only)

 X 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

INDEX TO SPECIFICATIONS
FOR

BID PROPOSAL NO. 1062
CABLE RELOCATION PROJECT – ALLEGHENY CAMPUS

INVITATION TO BID	Cover Sheet
INDEX TO SPECIFICATIONS	
INSTRUCTIONS TO BIDDERS	2 Pages
RETURN BID PROPOSAL FORMS:	
BIDDER SIGNATURE FORM	Return Form 1.0
PRICE FORM	Return Form 2.0
NON-COLLUSION AFFIDAVIT	Return Form 3.0
& INSTRUCTIONS	1 Page
MINORITY PARTICIPATION GOALS	Return Form 4.0
EXTENSION OF CONTRACT EXECUTION REQUIREMENTS	Return Form 5.0
LETTER OF ASSENT	Return Form 6.0
GENERAL CONDITIONS	7 Pages
PREVAILING MINIMUM WAGE DETERMINATION	Allegheny County Rates
PROJECT LABOR AGREEMENT	
DOCUMENTS REQUIRED BY AWARDEE ONLY:	
PERFORMANCE BOND	Copy Attached
PAYMENT BOND	Copy Attached
MASTER SERVICES AGREEMENT	Copy Attached
NO-LIEN AGREEMENT	Copy Attached
INSURANCE REQUIREMENTS	Form B
SPECIFICATIONS	1000-1760
TECHNICAL SPECIFICATIONS	260501-260543

DRAWINGS: TC-000, TC-001, TS-101, TS-102, TS-103, TS-201, TS- 202, TS-203, TC-301, TC-302, TC-303, TC-304, TC-305, TC-501, TC-502, TC-701, TC-702

The CCAC Purchasing Department is now publishing all bids via the CCAC website at https://www.ccac.edu/Bid-RFP_Opportunities.aspx. 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. 1062
CABLE RELOCATION PROJECT – ALLEGHENY CAMPUS**

Complete this form and submit with your bid.

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

Submitted by:

Company Name Bidding
(Please print)

Contact Person at Company
(Please print)

Signature Title
(Handwritten signature must appear here in ink.)

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.

Rev: 1/01

RETURN FORM 1.0

BID PROPOSAL NO. 1062
CABLE RELOCATION PROJECT – ALLEGHENY CAMPUS

BID SHEET

NOTE: 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.

BASE BID – The total lump sum for performing all construction as specified herein:

\$ _____

BIDDER'S NAME (please print)_____

RETURN FORM 2.0

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

NON-COLLUSION AFFIDAVIT

Contract/Bid No. **1062**

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 15%. 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. 1062

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 **15%** M/W/DBE work participation is established. Document your firm's good faith effort to obtain the **15%** Goal:

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

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

Total: _____

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

Bidding Company's Name: _____

Signature: _____

Title: _____

Date: _____

Revised: 04/30/08

RETURN FORM 4.0

COMMUNITY COLLEGE OF ALLEGHENY COUNTY

BID PROPOSAL NO. 1062

**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. 1062

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 **15%** combined MBE/WBE/DBE (Minority-owned Business enterprise/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 15% 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:	Cable Relocation Project
Awarding Agency:	Community College of Allegheny County
Contract Award Date:	3/1/2020
Serial Number:	20-00814
Project Classification:	Building/Heavy/Highway
Determination Date:	1/30/2020
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: 20-00814 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	8/1/2017		\$36.66	\$24.25	\$60.91
Asbestos & Insulation Workers	8/1/2018		\$37.11	\$24.80	\$61.91
Asbestos & Insulation Workers	8/1/2019		\$38.16	\$25.75	\$63.91
Boilermakers	6/1/2016		\$40.90	\$27.61	\$68.51
Bricklayer	12/1/2017		\$31.69	\$22.15	\$53.84
Bricklayer	12/1/2018		\$32.35	\$22.49	\$54.84
Bricklayer	6/1/2019		\$32.75	\$22.79	\$55.54
Bricklayer	12/1/2019		\$33.25	\$22.99	\$56.24
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2017		\$33.01	\$16.63	\$49.64
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2018	5/31/2019	\$33.75	\$17.34	\$51.09
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2019	5/31/2020	\$34.72	\$17.82	\$52.54
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2020	5/31/2021	\$35.48	\$18.56	\$54.04
Carpenters, Drywall Hangers, Framers, Instrument Men, Lathers, Soft Floor Layers	6/1/2021		\$36.23	\$19.31	\$55.54
Cement Mason/Concrete Finisher	6/1/2017	5/31/2018	\$29.52	\$18.39	\$47.91
Cement Mason/Concrete Finisher	6/1/2018	5/31/2019	\$30.27	\$18.99	\$49.26
Cement Mason/Concrete Finisher	6/1/2019		\$31.27	\$19.39	\$50.66
Drywall Finisher	6/1/2017		\$27.80	\$19.14	\$46.94
Drywall Finisher	6/1/2018		\$28.10	\$19.99	\$48.09
Drywall Finisher	6/1/2019	5/31/2020	\$29.10	\$20.49	\$49.59
Drywall Finisher	6/1/2020	5/31/2021	\$30.10	\$20.89	\$50.99
Drywall Finisher	6/1/2021	5/31/2022	\$31.00	\$21.39	\$52.39
Drywall Finisher	6/1/2022		\$32.00	\$21.89	\$53.89
Electricians & Telecommunications Installation Technician	12/23/2017		\$39.76	\$26.44	\$66.20
Electricians & Telecommunications Installation Technician	12/22/2018		\$41.74	\$26.44	\$68.18
Electricians & Telecommunications Installation Technician	12/22/2019		\$44.46	\$26.44	\$70.90
Elevator Constructor	1/1/2018		\$47.22	\$33.00	\$80.22
Glazier	9/1/2017		\$28.00	\$22.60	\$50.60
Glazier	9/1/2018		\$28.62	\$23.23	\$51.85
Glazier	9/1/2019		\$30.50	\$24.40	\$54.90
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2017		\$33.54	\$30.24	\$63.78
Iron Workers	6/1/2018		\$34.49	\$31.17	\$65.66
Iron Workers	6/1/2019		\$35.49	\$32.30	\$67.79
Laborers (Class 01 - See notes)	1/1/2018		\$22.32	\$16.67	\$38.99
Laborers (Class 01 - See notes)	1/1/2019		\$22.37	\$17.67	\$40.04
Laborers (Class 01 - See notes)	1/1/2020		\$26.42	\$14.67	\$41.09
Laborers (Class 01 - See notes)	1/1/2021		\$27.47	\$14.67	\$42.14
Laborers (Class 02 - See notes)	1/1/2018		\$22.47	\$16.67	\$39.14
Laborers (Class 02 - See notes)	1/1/2019		\$22.52	\$17.67	\$40.19

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 20-00814 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 02 - See notes)	1/1/2020		\$26.57	\$14.67	\$41.24
Laborers (Class 02 - See notes)	1/1/2021		\$27.62	\$14.67	\$42.29
Laborers (Class 03 - See notes)	1/1/2018		\$22.60	\$16.67	\$39.27
Laborers (Class 03 - See notes)	1/1/2019		\$22.65	\$17.67	\$40.32
Laborers (Class 03 - See notes)	1/1/2020		\$26.70	\$14.67	\$41.37
Laborers (Class 03 - See notes)	1/1/2021		\$27.75	\$14.67	\$42.42
Laborers (Class 04 - See notes)	1/1/2018		\$23.07	\$16.67	\$39.74
Laborers (Class 04 - See notes)	1/1/2019		\$23.12	\$17.67	\$40.79
Laborers (Class 04 - See notes)	1/1/2020		\$27.17	\$14.67	\$41.84
Laborers (Class 04 - See notes)	1/1/2021		\$28.22	\$14.67	\$42.89
Landscape Laborer (Skilled)	1/1/2018		\$21.01	\$15.31	\$36.32
Landscape Laborer (Skilled)	1/1/2019		\$21.44	\$16.08	\$37.52
Landscape Laborer (Skilled)	1/1/2020		\$21.64	\$16.98	\$38.62
Landscape Laborer (Tractor Operator)	1/1/2018		\$21.31	\$15.31	\$36.62
Landscape Laborer (Tractor Operator)	1/1/2019		\$21.74	\$16.08	\$37.82
Landscape Laborer (Tractor Operator)	1/1/2020		\$21.94	\$16.98	\$38.92
Landscape Laborer	1/1/2018		\$20.59	\$15.31	\$35.90
Landscape Laborer	1/1/2019		\$21.02	\$16.08	\$37.10
Landscape Laborer	1/1/2020		\$21.22	\$16.98	\$38.20
Millwright	6/1/2017		\$39.83	\$18.57	\$58.40
Operators (Class 01 - see notes)	6/12/2017		\$34.49	\$20.15	\$54.64
Operators (Class 01 - see notes)	6/1/2018		\$35.09	\$20.95	\$56.04
Operators (Class 01 - see notes)	6/1/2019		\$35.69	\$21.75	\$57.44
Operators (Class 01 - see notes)	6/1/2020		\$36.39	\$22.55	\$58.94
Operators (Class 01 - see notes)	6/1/2021		\$37.09	\$23.35	\$60.44
Operators (Class 02 -see notes)	6/12/2017		\$29.58	\$20.15	\$49.73
Operators (Class 02 -see notes)	6/1/2018		\$29.90	\$20.95	\$50.85
Operators (Class 02 -see notes)	6/1/2019		\$30.22	\$21.75	\$51.97
Operators (Class 02 -see notes)	6/1/2020		\$30.62	\$22.55	\$53.17
Operators (Class 02 -see notes)	6/1/2021		\$31.02	\$23.35	\$54.37
Operators (Class 03 - See notes)	6/12/2017		\$28.25	\$20.15	\$48.40
Operators (Class 03 - See notes)	6/1/2018		\$28.46	\$20.95	\$49.41
Operators (Class 03 - See notes)	6/1/2019		\$28.67	\$21.75	\$50.42
Operators (Class 03 - See notes)	6/1/2020		\$28.95	\$22.55	\$51.50
Operators (Class 03 - See notes)	6/1/2021		\$29.23	\$23.35	\$52.58
Painters Class 6 (see notes)	6/1/2017		\$27.50	\$18.66	\$46.16
Painters Class 6 (see notes)	6/1/2018		\$28.00	\$19.36	\$47.36
Painters Class 6 (see notes)	6/1/2019		\$28.50	\$20.06	\$48.56
Pile Driver Divers (Building, Heavy, Highway)	1/1/2018		\$50.33	\$18.55	\$68.88
Pile Driver Divers (Building, Heavy, Highway)	1/1/2019		\$51.45	\$19.30	\$70.75
Pile Driver Divers (Building, Heavy, Highway)	1/1/2020		\$53.10	\$19.70	\$72.80
Pile Driver Divers (Building, Heavy, Highway)	1/1/2021		\$54.75	\$20.10	\$74.85
Pile Driver Divers (Building, Heavy, Highway)	1/1/2022		\$56.40	\$20.50	\$76.90
Piledrivers	1/1/2018		\$33.55	\$18.55	\$52.10

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

Project: 20-00814 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Piledrivers	1/1/2019		\$34.30	\$19.30	\$53.60
Piledrivers	1/1/2020		\$35.40	\$19.70	\$55.10
Piledrivers	1/1/2021		\$36.50	\$20.10	\$56.60
Piledrivers	1/1/2022		\$37.60	\$20.50	\$58.10
Plasterers	6/1/2017		\$28.79	\$15.79	\$44.58
Plasterers	6/1/2017		\$28.79	\$15.79	\$44.58
Plasterers	6/1/2018		\$28.74	\$16.84	\$45.58
Plasterers	6/1/2019		\$29.78	\$17.20	\$46.98
plumber	6/1/2018		\$40.85	\$21.77	\$62.62
plumber	6/1/2019		\$43.00	\$21.77	\$64.77
plumber	6/1/2020		\$45.15	\$21.77	\$66.92
plumber	6/1/2021		\$47.25	\$21.77	\$69.02
plumber	6/1/2022		\$49.35	\$21.77	\$71.12
Plumbers	6/1/2017		\$39.20	\$21.27	\$60.47
Pointers, Caulkers, Cleaners	12/1/2017		\$29.88	\$18.73	\$48.61
Pointers, Caulkers, Cleaners	6/1/2019		\$31.38	\$19.44	\$50.82
Pointers, Caulkers, Cleaners	12/1/2019		\$31.93	\$19.64	\$51.57
Roofers	6/1/2017		\$31.00	\$15.17	\$46.17
Roofers	6/1/2018		\$31.00	\$16.42	\$47.42
Roofers	6/1/2019		\$34.83	\$13.84	\$48.67
Roofers	6/1/2020		\$36.08	\$13.84	\$49.92
Sheet Metal Workers	7/1/2017		\$33.70	\$27.74	\$61.44
Sheet Metal Workers	7/1/2018		\$34.47	\$28.08	\$62.55
Sprinklerfitters	1/1/2017		\$35.42	\$20.52	\$55.94
Sprinklerfitters	7/1/2017		\$36.42	\$20.52	\$56.94
Steamfitters	6/1/2017		\$41.71	\$19.01	\$60.72
Steamfitters	6/1/2018		\$40.55	\$22.67	\$63.22
Stone Masons	12/1/2017		\$32.66	\$21.41	\$54.07
Stone Masons	6/1/2019		\$33.72	\$22.05	\$55.77
Stone Masons	12/1/2019		\$34.22	\$22.25	\$56.47
Terrazzo Finisher	12/1/2017		\$31.08	\$15.85	\$46.93
Terrazzo Finisher	6/1/2019		\$32.01	\$16.52	\$48.53
Terrazzo Finisher	12/1/2019		\$32.37	\$16.74	\$49.11
Terrazzo Mechanics	12/1/2017		\$30.57	\$17.91	\$48.48
Terrazzo Mechanics	6/1/2019		\$31.31	\$18.67	\$49.98
Terrazzo Mechanics	12/1/2019		\$31.79	\$18.92	\$50.71
Tile Finisher	12/1/2017		\$25.16	\$14.90	\$40.06
Tile Finisher	6/1/2019		\$25.69	\$15.65	\$41.34
Tile Finisher	12/1/2019		\$26.00	\$15.86	\$41.86
Tile Setter	12/1/2017		\$30.75	\$19.05	\$49.80
Tile Setter	6/1/2019		\$31.47	\$20.03	\$51.50
Tile Setter	12/1/2019		\$31.91	\$20.24	\$52.15
Truckdriver class 1(see notes)	1/1/2016		\$27.62	\$16.60	\$44.22
Truckdriver class 2 (see notes)	1/1/2016		\$27.75	\$16.69	\$44.44

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

Project: 20-00814 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Truckdriver class 3 (see notes)	1/1/2016		\$28.23	\$16.98	\$45.21
Window Film / Tint Installer	10/1/2019		\$25.00	\$2.63	\$27.63

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

Project: 20-00814 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter	1/1/2018	12/31/2018	\$33.17	\$17.77	\$50.94
Carpenter	1/1/2019		\$34.02	\$18.42	\$52.44
Carpenter Welder	1/1/2018	12/31/2018	\$34.12	\$17.77	\$51.89
Carpenter Welder	1/1/2019		\$34.97	\$18.42	\$53.39
Cement Finishers	1/1/2018		\$31.04	\$19.90	\$50.94
Cement Finishers	1/1/2019		\$31.94	\$20.50	\$52.44
Electric Lineman	5/29/2017		\$45.24	\$24.23	\$69.47
Electric Lineman	5/28/2018		\$46.29	\$25.26	\$71.55
Electric Lineman	5/27/2019		\$47.38	\$26.30	\$73.68
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	6/1/2017		\$33.54	\$30.24	\$63.78
Laborers (Class 01 - See notes)	1/1/2018		\$24.85	\$22.35	\$47.20
Laborers (Class 01 - See notes)	1/1/2019		\$24.85	\$23.85	\$48.70
Laborers (Class 02 - See notes)	1/1/2018		\$25.01	\$22.35	\$47.36
Laborers (Class 02 - See notes)	1/1/2019		\$25.01	\$23.85	\$48.86
Laborers (Class 03 - See notes)	1/1/2018		\$25.40	\$22.35	\$47.75
Laborers (Class 03 - See notes)	1/1/2019		\$25.40	\$23.85	\$49.25
Laborers (Class 04 - See notes)	1/1/2018		\$25.85	\$22.35	\$48.20
Laborers (Class 04 - See notes)	1/1/2019		\$25.85	\$23.85	\$49.70
Laborers (Class 05 - See notes)	1/1/2018		\$26.26	\$22.35	\$48.61
Laborers (Class 05 - See notes)	1/1/2019		\$26.26	\$23.85	\$50.11
Laborers (Class 06 - See notes)	1/1/2018		\$23.10	\$22.35	\$45.45
Laborers (Class 06 - See notes)	1/1/2019		\$23.10	\$23.85	\$46.95
Laborers (Class 07 - See notes)	1/1/2018		\$25.85	\$22.35	\$48.20
Laborers (Class 07 - See notes)	1/1/2019		\$25.85	\$23.85	\$49.70
Laborers (Class 08 - See notes)	1/1/2018		\$27.35	\$22.35	\$49.70
Laborers (Class 08 - See notes)	1/1/2019		\$27.35	\$23.85	\$51.20
Operators (Class 01 - see notes)	1/1/2018		\$31.29	\$20.78	\$52.07
Operators (Class 01 - see notes)	1/1/2019		\$31.89	\$21.68	\$53.57
Operators (Class 02 -see notes)	1/1/2018		\$31.03	\$20.78	\$51.81
Operators (Class 02 -see notes)	1/1/2019		\$31.63	\$21.68	\$53.31
Operators (Class 03 - See notes)	1/1/2018		\$27.38	\$20.78	\$48.16
Operators (Class 03 - See notes)	1/1/2019		\$27.98	\$21.68	\$49.66
Operators (Class 04 - See notes)	1/1/2018		\$26.92	\$20.78	\$47.70
Operators (Class 04 - See notes)	1/1/2019		\$27.52	\$21.68	\$49.20
Operators (Class 05 - See notes)	1/1/2018		\$26.67	\$20.78	\$47.45
Operators (Class 05 - See notes)	1/1/2019		\$27.27	\$21.68	\$48.95
Painters Class 1 (see notes)	6/1/2017		\$31.85	\$18.66	\$50.51
Painters Class 1 (see notes)	6/1/2017		\$31.98	\$18.43	\$50.41
Painters Class 1 (see notes)	6/1/2018		\$32.50	\$19.36	\$51.86
Painters Class 1 (see notes)	6/1/2019		\$33.15	\$20.06	\$53.21
Painters Class 2 (see notes)	6/1/2017		\$33.95	\$18.66	\$52.61
Painters Class 2 (see notes)	6/1/2018		\$34.60	\$19.36	\$53.96
Painters Class 2 (see notes)	6/1/2019		\$35.25	\$20.06	\$55.31
Painters Class 3 (see notes)	6/1/2017		\$33.95	\$18.66	\$52.61

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 20-00814 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Painters Class 3 (see notes)	6/1/2017		\$27.58	\$18.48	\$46.06
Painters Class 3 (see notes)	6/1/2018		\$34.60	\$19.36	\$53.96
Painters Class 3 (see notes)	6/1/2019		\$35.25	\$20.06	\$55.31
Painters Class 4 (see notes)	6/1/2017		\$27.16	\$18.66	\$45.82
Painters Class 4 (see notes)	6/1/2018		\$27.68	\$19.36	\$47.04
Painters Class 4 (see notes)	6/1/2019		\$28.20	\$20.06	\$48.26
Painters Class 5 (see notes)	6/1/2017		\$22.07	\$18.66	\$40.73
Painters Class 5 (see notes)	6/1/2018		\$22.49	\$19.36	\$41.85
Painters Class 5 (see notes)	6/1/2019		\$22.91	\$20.06	\$42.97
Pile Driver Divers (Building, Heavy, Highway)	1/1/2018		\$50.33	\$18.55	\$68.88
Pile Driver Divers (Building, Heavy, Highway)	1/1/2019		\$51.45	\$19.30	\$70.75
Pile Driver Divers (Building, Heavy, Highway)	1/1/2020		\$53.10	\$19.70	\$72.80
Pile Driver Divers (Building, Heavy, Highway)	1/1/2021		\$54.75	\$20.10	\$74.85
Pile Driver Divers (Building, Heavy, Highway)	1/1/2022		\$56.40	\$20.50	\$76.90
Piledrivers	1/1/2018		\$33.55	\$18.55	\$52.10
Piledrivers	1/1/2019		\$34.30	\$19.30	\$53.60
Piledrivers	1/1/2020		\$35.40	\$19.70	\$55.10
Piledrivers	1/1/2021		\$36.50	\$20.10	\$56.60
Piledrivers	1/1/2022		\$37.60	\$20.50	\$58.10
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2017		\$40.98	\$32.53	\$73.51
Truckdriver class 1(see notes)	1/1/2018		\$28.52	\$18.40	\$46.92
Truckdriver class 1(see notes)	1/1/2019		\$28.99	\$19.43	\$48.42
Truckdriver class 2 (see notes)	1/1/2018		\$28.66	\$18.48	\$47.14
Truckdriver class 2 (see notes)	1/1/2019		\$29.13	\$19.51	\$48.64
Truckdriver class 3 (see notes)	1/1/2018		\$29.13	\$18.78	\$47.91
Truckdriver class 3 (see notes)	1/1/2019		\$29.59	\$19.82	\$49.41

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.

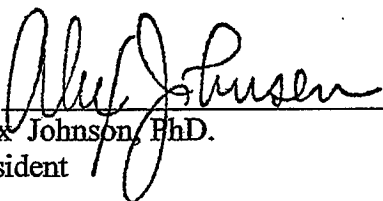
Section 2. Force of Agreement. The parties recognize the right of the CCAC to withdraw, at its absolute discretion, the utilization of this Agreement as part of any bid specification should a court of competent jurisdiction issue any order which could result, temporarily or permanently, in delay of the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

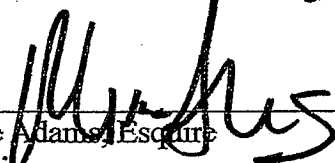
This Agreement replaces, in its entirety, that certain Labor Stabilization Agreement approved by the CCAC and the BCTC dated the 21st day of June, 1993 that covers all construction projects for which the CCAC acts as Owner.

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**

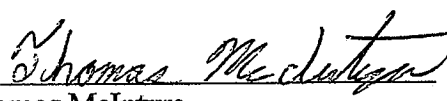
By 
Alex Johnson, PhD.
President

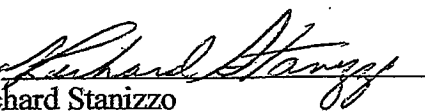
Approved as to Form and Legality:

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

_____ (SEAL)

SECRETARY

PRESIDENT

Signed, Sealed and delivered in presence of

_____ (SEAL)

SURETY COMPANY

_____ (SEAL)

ADDRESS

_____ (SEAL)

TITLE

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

LABOR AND MATERIAL
P A Y M E N T B O N D

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____

Witness _____ (Seal) Principal

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 1062

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://www.ccac.edu/client/twocolumn.aspx?pageid=28676>. 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: Joyce Breckenridge

Signature: _____

Signature: _____

Title: _____

Title: Vice President for Finance

Date: _____

Date: _____

Revised 3/3/15

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

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

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

NO-LIEN AGREEMENT

"TO BE COMPLETED ONLY BY AWARDEE"

Bid 1062

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/
V-D SUPPORTIVE WFT&DC RE-ROUTE**

DIVISION 1	GENERAL REQUIREMENTS	
Section 01000	Special Project Procedures	01000:1-2
Section 01100	Summary	01100:1-6
Section 01010	Summary of Project	01010:1-6
Section 01031	Alteration Project Procedures	01031:1-5
Section 01041	Project Coordination	01041:1-3
Section 01045	Cutting & Patching	01045:1-3
Section 01152	Applications for Payment	01152:1-4
Section 01153	Change Order Procedures	01153:1-4
Section 01200	Project Meetings	01200:1-2
Section 01300	Submittals	01300:1-3
Section 01340	Shop Drawings, Product Data & Samples	01340:1-2
Section 01400	Quality Control	01400:1-2
Section 01500	Construction Facilities & Temporary Controls	01500:1-2
Section 01540	Security	01540:1
Section 01569	Construction Cleaning	01569:1
Section 01600	Material and Equipment	01600:1-5
Section 01670	Systems Demonstration	01670:1-1
Section 01700	Contract Closeout	01700:1-3
Section 01710	Cleaning	01710:1-2
Section 01720	Project Record Documents	01720:1-2
Section 01730	Operating and Maintenance Data	01730:1-3
Section 01740	Warranties	01740:1-2
Section 01750	Basic Electrical Materials and Methods	01750:1-10
Section 01760	Splices and Terminations	01760:1

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 Allegheny 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.

1.4 CONTACT PERSON

- A. For CCAC: Richard A. Schlegel (412-237-3180)
- B. For Engineer: Zach Zanke (814-269-9300)

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. Owners 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 and pedestrian 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.
 - 4. All MH (manholes) will be under "CONFINED SPACE" Regulations
- 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.

SUMMARY

Section 01100 - Page 01100-6

- 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

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.

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 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>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:

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

Section 01153 - Page 01153-1

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

Section 01300 - Page 01300-1

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

Section 01300 - Page 01300-2

- 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. 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.
- B. Show submittal dates required for Shop Drawings, Product Data, and Samples and Product delivery dates.
- C. 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

Section 01400 - Page 01400-1

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.

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

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. List:
 - 1. Appropriate design criteria
 - 2. List of equipment
 - 3. Parts list
 - 4. Maintenance instructions, equipment
 - 5. Shop Drawings and Product Data
 - 6. 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" and "CABLE TEST RESULTS"
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

Section 01760 - Page 01760-1

SPLICES AND TERMINATIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

Splices and terminations shall be made using splicing devices that are the most appropriate type 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

SPECIFICATIONS

FOR

COMMUNITY COLLEGE OF ALLEGHENY COUNTY (CCAC)
WFD&TC CABLE RELOCATION PROJECT
PITTSBURGH, PENNSYLVANIA

REVISED PATHWAYS SUBMISSION



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PROJECT TABLE OF CONTENTS

	PAGES
DIVISION 27 -- COMMUNICATIONS	
270500 COMMUNICATIONS-GENERAL -----	1 - 18
271350 VOICE AND DATA COMMUNICATIONS CABLING AND ASSOCIATED HARDWARE -----	1 - 32
-- End of Project Table of Contents --	

SECTION 270500 - COMMUNICATIONS-GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

- A. The extent of telecommunications systems work covered by this Section is specified in all other sections of Division 27, the drawings, schedules, and by requirements of this Section.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: For all cabling installation and termination activities under this contract, the contractor's/installer's foreman on the site shall be a BICSI Registered Cabling Installer. The contractor/installer shall also employ a BICSI Registered Communication Distribution Designer (RCDD) on staff assigned to this project.
- B. Comply with NFPA 70.
- C. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
- D. Work Coordination: Coordinate Work of this Section with Owner and existing conditions
 - 1. Meet jointly with representatives of the above organizations, Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 2. Record agreements reached in meetings and distribute record to other participants.
- E. Source Limitations: Obtain each type of component through one source from a single manufacturer.

1.4 GENERAL STIPULATIONS

- A. The Contractor shall furnish all labor, materials, tools, scaffolding and other equipment necessary to provide the complete telecommunication systems in accordance with the accompanying drawings and these specifications. The Contractor will be responsible for the

completion of all work included under this Contract and shall employ skilled and qualified tradesmen as necessary to satisfy all work and trades.

- B. In all cases where equipment and materials are specified in the singular or plural number, it is intended that such reference shall apply to as many such items as are required to complete the installation.
- C. Except as otherwise defined hereinafter, the term "furnish" is used to mean supply and deliver to the project site and readied for installation. Except as otherwise defined hereinafter, the term "install" is used to describe furnishing and manufacturing and operations at the project site, including furnishing, unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance. Except as otherwise defined hereinafter, the term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
- D. The terms "The Contractor", "This Contractor", "TC", or "The Telecommunications Contractor" mentioned in these specifications refers to the Communications Contractor responsible for the work and equipment included in these specifications.
- E. The Contractor shall carefully examine the general building drawings, all mechanical and electrical drawings, and carry on his work so as not to delay or interfere with the work of other trades. He shall obtain in writing from the other contractors such data as necessary to coordinate his work with other branches.
- F. The Contractor shall submit samples as may be required by the Owner or Engineer of any article or materials to be used under this Contract, which samples, if approved, may be used on the work after serving their purpose as samples. A complete list of materials proposed for installation shall be submitted to the Engineer for approval before delivery to the site. Shop drawings, manufacturers' descriptions, and cuts of fixtures and other equipment shall be submitted to the Engineer for approval before such fixtures or equipment are installed and before any item is roughed-in for same.
- G. Equipment of similar types shall be of the same manufacturer except where specifically indicated otherwise.
- H. Nothing contained in these specifications or shown on the drawings shall be so construed as to conflict with any local, county, municipal, federal, or state laws or regulations governing the installation of electric or other work specified herein, and all such ordinances and regulations, including the National Electrical Code, Institute of Electrical and Electronic Engineers, Inc. and ANSI/EIA/TIA are hereby incorporated and made a part of these specifications All such requirements shall be satisfied by the Contractor and at no additional expense to the Owner. In addition to compliance to the above regulations and requirements, the following standards, regulations and requirement shall be met:
 - 1. National Fire Protection Association
 - 2. ANSI/TIA/EIA-568-B, Commercial Building Telecommunications Cabling Standard
 - a. ANSI/TIA/EIA-568-D.1, General Cabling System Requirements.
 - b. ANSI/TIA/EIA-568-D.2, Balanced Twisted Pair Copper Cabling Systems.

c. ANSI/TIA/EIA-568-D.3, Optical Fiber Cabling Components.

3. ANSI/TIA/EIA-569-B, Commercial Building Standard for Telecommunications Pathways and Spaces
 4. ANSI/TIA/EIA-606-C, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 5. ANSI/TIA/EIA-J-STD-607-D, Commercial Building Grounding and Bonding Requirements for Telecommunications
 6. ANSI/TIA/EIA-455-C-2014, Standard Test Procedures for Fiber Optic Fibers, Cables and Transducers, Sensors, Connecting and Terminating Devices, and other Fiber Optic Components.
 7. ANSI/ICEA S-80-576-1988, Communications Wire and Cable for Wiring Premises.
 8. ANSI/ICEA S-83-596-1994, Fiber Optic Premises Distribution Cable.
 9. ANSI/ICEA S-87-640-1997, Fiber Optic Outside Plant Communications Cable.
 10. ANSI/TIA/EIA-492AAAB -1998, Detail Specification for 50 μ m Core Diameter/125 μ m Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers.
 11. ANSI/TIA/EIA-526-14-C, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant OFSTP-14A.
 12. ANSI/TIA/EIA-598-D, Optical Fiber Cable Color Coding.
 13. ANSI Z136.2, 1997, American Standard for the Safe Operation of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources.
 14. ICEA - Insulated Cable Engineers Association
 15. NEMA - National Electrical Manufacturers Association
 16. ASTM - American Society for Testing and Materials
 17. ISO - International Standards Organization
 18. FCC - Federal Communication Commission
 19. UL - Underwriters Laboratories
 20. ANSI/TIA-942 –REV a 2014 Telecommunications infrastructure Standard for Data Centers.
 21. ANSI/BICSI 002-2014 Data Center Design and Implementation Best Practices
- I. The Site Development Contractor shall do all necessary excavating to perform the work under this Contract. All surfaces shall be restored to their original condition. All work shall conform to local, county, state and federal safety regulations and requirements.
- J. The system shall be effectively grounded, and the insulation shall be made sufficiently perfect so that there will be an insulation resistance between all conductors and the ground of not less than required by the rules of the National Electrical Code.
- K. Equipment, wire, cables, conduit not remaining as part of the system and all remaining waste materials and rubbish resulting from the Contract work shall become the property of the Contractor and shall be immediately removed from the building and premises by the Contractor. Existing unused wiring shall be removed and discarded.
- L. 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 Owner 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.

- M. All of the testing work shall be done when and as directed by the Owner before the system is accepted. All testing and retesting shall be done at the Contractor's expense.
- N. Telecommunication test documentation shall be provided in a three-ring binder(s) and on CD at completion of the project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by major heading tabs. Each major heading shall be further sectioned by test type. Within the sections, scanner test results (Category 6A), OTDR traces, and green light test results shall be segregated by tab. The test equipment by name, manufacturer, model number and last calibration date will also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test.
- O. Scanner tests shall be printed on 8-1/2 x 11 inch paper. Attenuation and green light result reports shall be machine generated. OTDR test results shall be printed or attached and copied on 8-1/2 x 11 inch paper for inclusion in the test documentation binder. Hand written reports are unacceptable. Test report identification shall be directly correlated to cable and port identifiers.
- P. Upon receipt of the test documentation, the Owner reserves the right to perform spot testing of a representative sample of the cabling system to validate test results provided in the test document. Owner testing will use the same method employed by the contractor, and minor variations will be allowed to account for differences in test equipment. If significant discrepancies are found, the Contractor will be notified for resolution.
- Q. Contractor to provide both hard and soft copies of all test results. Soft copies shall be provided with all software necessary to read and utilize the test files.
- R. Due to the small scale of the drawings, it is not possible to indicate all conduits, conductors, fittings, boxes, switches, and similar parts, which may be required. The drawings are generally indicative of the work to be installed. The Contractor shall investigate the structural and finish conditions affecting the work and arrange all work accordingly, furnishing such parts and equipment as may be required to meet building conditions.
- S. Contractor shall layout his work from existing conditions and actual dimensions of equipment being installed. Do not scale from Drawings.
- T. The right is reserved to make any reasonable change in the locations of conduits, outlets and equipment prior to roughing-in, without involving additional expense to the Owner.
- U. Make final connections to equipment furnished under other Divisions of work except where specifically indicated otherwise.

- V. Where the building insulation or vapor retarder, or spray on fire proofing is broken due to the installation of hangers, conduits, boxes or other equipment, properly repair to maintain original insulation integrity.
- W. 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. Care shall be taken to keep all open ends of conduit and optical fiber protected 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 Owner.
- X. Furnish all labor, material, tools, and equipment necessary for and incidental to the installation and test of information and communications cabling as described herein and/or depicted on accompanying plans. All equipment shall be listed by Underwriters Laboratories for particular use and/or power supply requirements.
- Y. This specification describes a telecommunications cabling system, including pathways and spaces, and cabling for the building that will support a multi-product, multi-vendor environment.
- Z. This specification establishes performance and technical criteria for various cabling system configurations for interfacing and connecting their respective elements.
- AA. This specification establishes minimum requirements for telecommunications backbone cabling within the building

1.5 DEFINITIONS, ACRONYMS & ABBREVIATIONS

- A. General: This section contains the definitions of terms, acronyms, and abbreviations that have special technical meaning or that are unique to the technical content of this document. Special definitions that are appropriate to individual technical sections are included.
- B. Definitions

ADAPTER - a device that enables any or all of the following:

1. different sizes or types of plugs to mate with one another or to fit into a information outlet/connector,
2. the rearrangement of leads,
3. large cables with numerous wires to fan out into smaller groups of wires
4. interconnection between cables.

ADMINISTRATION - The method for labeling, identification, documentation and usage needed to implement moves, additions and changes of the telecommunications infrastructure.

BACKBONE - a facility (e.g. pathway, cable or conductors) between telecommunications rooms, or floor distribution terminals, the entrance facilities, and the equipment rooms within or between buildings.

BACKBONE CABLE - see backbone.

BONDING - the permanent joining of metallic parts to form an electrically conductive path that will assure electrical continuity and the capacity to conduct safely any current likely to be imposed on it.

BRIDGED TAP - the multiple appearances of the same cable pair at several distribution points.

CABLE - an assembly of one or more conductors or optical fibers within an enveloping sheath, constructed so as to permit use of the conductors singly or in groups.

CABLE SHEATH - a covering over the conductor assembly that may include one or more metallic members, strength members, or jackets.

CABLING - a combination of all cables, wire, cords, and connecting hardware.

CAMPUS - the buildings and grounds of a complex; e.g. a university, college, industrial park or military establishment.

CHANNEL - the end-to-end transmission path between two points at which application-specific equipment is connected.

CLOSET, TELECOMMUNICATIONS - an enclosed space for housing telecommunications equipment, cable terminations, and cross-connect cabling. The closet is the recognized location of the cross-connect between the backbone and horizontal facilities.

CONDUIT - a raceway of circular cross-section of the type permitted under the appropriate electrical code.

COMMUNICATIONS EQUIPMENT ROOM - the centralized location at each remote facility for the Owner's telecommunications equipment. This space contains the secondary video head-end equipment, the Owner's remote telephone switches, and network electronics.

CONNECTING HARDWARE - a device providing mechanical cable terminations.

CROSS-CONNECT - a facility enabling the termination of cable elements and their interconnection, and/or cross-connection, primarily by means of a patch cord or jumper.

CROSS-CONNECTION - a connection scheme between cabling runs, subsystems, and equipment using patch cords or jumpers that attach to connecting hardware on each end.

CUSTOMER PREMISES - building(s) with grounds and appurtenances (belongings) under the control of the customer.

DEMARCATIION POINT - a point where the operational control or ownership changes.

DISTRIBUTION FRAME - a structure with terminations for connecting the permanent cabling of a facility in such a manner that inter-connection or cross-connections may be readily made.

DUCT -

1. a single enclosed raceway for wires or cables. See also conduit, see also raceway;
2. a single enclosed raceway for wires or cables usually used in soil or concrete;
3. an enclosure in which air is moved. Generally part of the HVAC system of a building.

EMT - Electrical Metallic Tubing (conduit)

ENTRANCE FACILITY, TELECOMMUNICATIONS - an entrance to a building for both public and private network service cables (including antennae) including the entrance point at the building wall and continuing to the entrance room or space.

ENTRANCE POINT, TELECOMMUNICATIONS - the point of emergence of telecommunications conductors through an exterior wall, a concrete floor slab, or from a rigid metal conduit or intermediate metal conduit.

ENTRANCE ROOM OR SPACE, TELECOMMUNICATIONS - a space in which the joining of inter- or intra-building telecommunications backbone facilities takes place. An entrance room may also serve as an equipment room.

EQUIPMENT ROOM, TELECOMMUNICATIONS - a centralized space for telecommunications equipment that serves the occupants of the building. An equipment room is considered distinct from a telecommunications closet because of the nature or complexity of the equipment.

GROUND - a conducting connection, whether intentional or accidental, between an electrical circuit (e.g. telecommunications) or equipment and the earth, or to some conducting body that serves in place of the earth.

HIGH PAIR COUNT CABLE – A cable containing more than 25 pairs of copper under a single overall jacket.

HORIZONTAL CABLING - the cabling between and including the information outlet/connector and the horizontal cross-connect.

HORIZONTAL CROSS-CONNECT - a cross-connect of horizontal cabling to other cabling, e.g. horizontal, backbone, or equipment.

HYBRID CABLE - an assembly of 2 or more cables (of the same or different types or categories) covered by one overall sheath.

INFORMATION OUTLET/CONNECTOR - see outlet/connector, information.

INFRASTRUCTURE, TELECOMMUNICATIONS - a collection of those telecommunications components, excluding equipment, that together provide the basic support for the distribution of all information within a building or campus.

INTERCONNECTION - a connection scheme that provides for the direct connection of a cable to another cable or to an equipment cable without a patch cord or jumper.

INTERMEDIATE CROSS-CONNECT - a cross-connect between first level and second level backbone cabling.

JUMPER - an assembly of twisted pairs without connectors, used to join telecommunications circuits/links at the cross-connect.

LC - (1) strand small form factor optical fiber connector.

LINK - a transmission path between two points, not including terminal equipment, work area cables, and equipment cables.

LISTED - equipment included in a list published by an organization, acceptable to the authority having jurisdiction, that maintains periodic inspection of production of listed equipment, and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

MAIN CROSS-CONNECT - a cross-connect for, first level backbone cables, entrance cables, and equipment cables.

MAIN EQUIPMENT ROOM - the centralized location at each remote facility for the Owner's telecommunications equipment. This space contains the secondary video head-end equipment, the Owner's remote telephone switches, and network electronics.

MEDIA, TELECOMMUNICATIONS - wire, cable, or conductors used for telecommunications.

MODULAR JACK - a telecommunications female connector. A modular jack may be keyed or unkeyed and may have six or eight contact positions, but not all the positions need be equipped with jack contacts.

MODULAR PLUG - a telecommunications male connector for wire or cords. A modular plug may be keyed or unkeyed and may have six or eight contact positions, but not all the positions need be equipped with contacts.

MULTIMODE OPTICAL FIBER - an optical fiber that will allow many bound modes to propagate. The fiber may be either a graded-index or step-index fiber. See also: optical fiber cable.

OPTICAL FIBER CABLE - an assembly consisting of one or more optical fibers.

OUTLET BOX, INFORMATION - a metallic or nonmetallic box mounted within a wall, floor, or ceiling and used to hold information outlet/connectors or transition devices.

PATHWAY - a facility for the placement of telecommunications cable.

PULL STRENGTH - see pull tension.

PULL TENSION - the pulling force that can be applied to a cable without effecting specified characteristics for the cable.

PVC - Poly-vinyl-chloride. Usually used in reference to schedule 40 PVC conduit.

RACEWAY - any channel designed for holding wires or cables, e.g. conduit, electrical metallic tubing, sleeves, slots, underfloor raceways, cellular floors, surface raceways, lighting fixture raceways, wireways, cable troughs, busways, auxiliary gutters, and ventilated flexible cableways.

RMC - Rigid metallic conduit.

RNC - Rigid non-metallic conduit.

ROOM, TELECOMMUNICATIONS - an enclosed space for housing telecommunications equipment, cable terminations, and cross-connect cabling. The closet is the recognized location of the cross-connect between the backbone and horizontal facilities. The terms telecommunications room and telecommunications closet are used interchangeably.

SHEATH - see cable sheath.

SHIELD (SCREEN) - a metallic layer placed around a conductor or group of conductors.

NOTE - The shield may be the metallic sheath of the cable or the metallic layer inside a nonmetallic sheath.

SINGLE-MODE OPTICAL FIBER - an optical fiber that will allow only one mode to propagate; this fiber is typically a step index fiber.

SPLICE - a joining of conductors generally from separate sheaths.

SPLICE CLOSURE - a device used to protect a cable or wire splice.

SC - (1) strand optical fiber connector.

TELECOMMUNICATIONS - any transmission, emission, or reception of signs, signals, writings, images, and sounds, that is information of any nature by cable, radio, optical, or other electromagnetic systems.

TELECOMMUNICATIONS ENTRANCE ROOM OR SPACE - see entrance room or space, telecommunications.

TELECOMMUNICATIONS GROUNDING BUSBAR - a common point of connection for telecommunications system and bonding to ground, and located in the telecommunications closet or equipment room.

TELECOMMUNICATIONS INFRASTRUCTURE - see infrastructure, telecommunications.

TELECOMMUNICATIONS ROOM - see closet, telecommunications.

TERMINAL -

1. a point at which information may enter or leave a communications network; or
2. the input-output associated equipment; or
3. a device by means of which wires may be connected to each other.

TERMINATION HARDWARE - see Connecting Hardware.

TRANSFER IMPEDANCE - the ratio of the induced voltage of the conductors enclosed by the shield to the shield of the cable, connector, or cable assembly.

OWNER MAIN EQUIPMENT ROOM - the centralized location for the Owner's telecommunications equipment. This space contains the primary video head-end equipment, the Owner's PBX, network electronics, servers, and system management consoles.

C. Acronyms & Abbreviations

ACR	Attenuation-to-Crosstalk Ratio
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
BER	Bit Error Rate
BICSI	Building Industry Consulting Service International
CP	Consolidation Point
CSA	Canadian Standards Association
dB	decibel
dc	direct current
DMER	Owner main equipment room
EIA	Electronic Industries Association
EMI	electromagnetic interference
EP	entrance point
ER	equipment room
FCC	Federal Communications Commission
ft	foot
Ga	abbreviation for wire gauge
HC	horizontal cross-connect
HVAC	heating, ventilation, and air conditioning

Hz	hertz
IC	intermediate cross-connect
ICEA	Insulated Cable Engineers Association
IDC	insulation displacement connector
IDF	Intermediate Distribution Frame
IEC	International Electrotechnical Commission
IEEE	The Institute of Electrical and Electronics Engineers
in	inch
IO	Information Outlet
ISDN	integrated services digital network
ISO	International Organization for Standardization
ITU-T	International Telecommunications Union-Telecommunications Standardization Section
J	joule
kHz	kilohertz
km	kilometer
kV	kilovolt
LAN	local area network
lbf	pound force
m	meter
Mb/s	Megabits per second
MC	main cross-connect
MDF	main distribution frame
MER	Main equipment room
MHz	megahertz
mm	millimeter
N	Newton
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEXT	near end crosstalk
NIR	Near-end Crosstalk-to-Insertion Loss Ratio
nF	nanofarad
nm	nanometer
PE	polyethylene
pF	picofarad
PVC	polyvinyl chloride
SRL	structural return loss
STP	shielded twisted-pair
TR	telecommunications closet or telecommunications room
TGB	telecommunications grounding busbar
TMGB	telecommunications main grounding busbar
TIA	Telecommunications Industry Association

UL	Underwriters Laboratories
UTP	unshielded twisted-pair
X	cross-connect

1.6 SUBMITTALS

- A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit two copies of evidence of Installer's qualifications.
- B. Contract Documents Examination Report: Submitted with Bid, submit two copies of the Contract Documents review report as follows:
 - 1. Examine contract documents to become familiar with project requirements and to discover conditions in systems design that may preclude proper testing or conflict with warranty requirements.
 - a. Contract documents are defined in the General and Supplementary Conditions to the Contract.
 - 2. Examine all aspects of the specifications and drawings and identify any and all issues for inclusion in the contract documents examination report.
- C. Strategies and Procedures Plan: Within 60 days from the Contractor's Notice to Proceed, submit two copies of the testing, step-by-step procedures as specified in sections elsewhere in Division 27. Include a complete set of report forms intended for use on this Project.
- D. Warranty: Within 60 days from Contractor's Notice to Proceed, submit two copies of special warranty specified in the "Warranty" Article in sections elsewhere in Division 27.
- E. Identification and Administration Plan: Within 60 days from Contractor's Notice to Proceed, submit two copies of an identification and administration plan verifying "Voice and Data Communications Cabling" Section requirements. Include all submittals required in "Voice and Data Communications Cabling" Section with this plan.
- F. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
 - 1. Provide manufacturer's certification that Contractor is qualified and authorized to provide the warranted structured cabling plant described in this specification.
 - 3. Polarity management scheme for optical fiber cabling systems shall match the existing installation

1.7 SUBSTITUTIONS

- A. Materials are specified by manufacturer's names, and catalog numbers in order to establish standards of quality and performance and not for the purpose of limiting competition

- B. When the Contractor submits equipment or materials of the manufacturers specified, verification specifications must be submitted at the request of the Engineer.
- C. The Contractor is responsible for confirming that all specified products will be available in a timely manner to meet the contract schedule. Should the delivery time schedule of any specified product be an issue that could adversely affect the project schedule, the Contractor shall notify the Engineer, in writing, within 14 days following the award of the Contract. Documentation as to when specified products were ordered and anticipated delivery dates will be required to be submitted to the Engineer at this time. Failing to comply with this paragraph will prohibit the Contractor from substituting a specified product based on delivery time issues.

1.8 CLOSEOUT SUBMITTALS

A. Record Drawings shall comply with the following:

1. Submit copies of Record Drawings as follows:

a. Initial Submittal

- 1) Submit one paper copy set of marked-up record prints.
- 2) Submit PDF electronic files of scanned record prints and one set of file prints.
- 3) Owner and Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal

- 1) Submit one paper copy set of marked-up record prints.
- 2) Submit PDF electronic files of scanned record prints and one set of file prints.
- 3) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications

- 1. Submit annotated PDF electronic files and one paper copy of the Project's specifications, including addenda and Contract modifications.

C. Record Product Data

- 1. Submit annotated PDF electronic files and directories and one paper copy of each submittal.

1.9 RECORD DRAWINGS

A. Record Prints

1. Contractor shall maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
2. Where installation varies from that shown originally, Contractor shall mark record prints to show the actual installation. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
3. Types of items requiring marking include, but are not limited to the following:
 - a. Revisions to details shown on drawings.
 - b. Locations and depths of underground utilities.
 - c. Revisions to routing of piping and conduits.
 - d. Revisions to copper and/or optical fiber cabling.
 - e. Actual equipment locations.
 - f. Duct size and routing.
 - g. Changes made by Change Order or Work Change Directive.
 - h. Details not on the original Contract Drawings.
 - i. Field records for variable and concealed conditions.
 - j. Record information on the Work that is shown only schematically.
4. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
5. Mark record prints with an erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the work at the same location.
6. Mark important additional information that was either shown schematically or omitted from original drawings.
7. Update manhole foldout drawings showing existing cabling that was removed and new cabling that was added under this project.
8. Provide manhole foldout drawings for the new manhole locations indicating conduit arrangement in each and cabling installed.
9. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files

1. Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints, with Owner and Engineer.
2. When authorized, prepare a full set of corrected digital data files of the Contract Drawings as follows:
 - a. Provide AutoCAD DWG file format drawing files prepared with AutoCAD 2018 version and Microsoft Windows operating system.
 - b. Provide electronic PDF files of the corrected drawing files.
 - c. Incorporate changes and additional information previously marked on record prints. Delete, redraw and add details and notations where applicable.
 - d. Refer instances of uncertainty to Owner and Engineer for resolution.
 - e. Owner and Engineer will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.

1.10 WARRANTY

- A. Contractor shall warrant that the materials and workmanship used in the erection of this installation are as herein specified, and he shall provide all material and labor required to make good any defects due to faulty materials or workmanship which become apparent within a one year period.
- B. Where specifically mentioned in the specifications, equipment shall be guaranteed for longer than one year.
- C. The equipment and materials manufacturers are expected to recognize that they are responsible for the failure of their products to perform in accordance with data furnished by them or their authorized representatives, as well as misrepresentations of such data. When the products have been installed in accordance to the manufacturer's published or written instructions and recommendations, and such products fail, then the Contractor and the manufacturers are responsible for replacement of the products and all associated work and materials without additional cost to the Owner. This warranty applies to all items supplied on the equipment and not just those that are the product of the manufacturer.

1.11 CLEAN-UP

- A. Daily, and when directed by the Owner, this Contractor shall remove all waste and debris resulting from his work.
- B. The Contractor shall remove all dirt, foreign materials, stains and fingerprints from all equipment, fixtures, trim, 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. Refer to Division 1 for additional information

1.12 EQUIPMENT IDENTIFICATION

- A. All telecommunication equipment, such as racks, patch panels, and similar items shall be identified by name, function and/or control, consistent with the existing, and as directed by Owner.
- B. Identification labels shall not be less than 3" in length and 1" in height. Black letters shall be 1/2" high on white background. Labels shall be manufactured of engraved Micarta or Bakelite with pressure-sensitive backing and shall be nonabsorbent, nonporous and colorfast. Adhesive backing shall be chemically compounded to hold tight and fast at wide temperature extremes. Labels shall be as manufactured by Seton Name Plate Company, Brady Co., Kimball Systems, or approved equal. Labels shall be additionally secured with screws or rivets. For additional telecommunication labels, see "Communications Cabling" elsewhere in Division 27 of these specifications. Flexible plastic punched tapes will not be acceptable.
- C. A typewritten list of the above nameplates shall be submitted to the Owner for approval before ordering same.
- D. The major equipment, telecommunication equipment, and electrical equipment installations will not be considered acceptable unless identification plates and nameplates are attached.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall be totally responsible for delivery, storage and handling, of material and products to be delivered to the project site.
- B. Storage: Materials stored at the project site which become soiled with construction dirt, concrete or earthwork shall be washed, cleaned and dried or removed from the project site and replaced with new. Do not install soiled material.
- C. Cleaning: Clean and wipe the interior of conduit, pullboxes and panelboard backboxes, soiled by masonry trades, before proceeding with wiring.
- D. Generally, do not install damaged, broken or marred material or products, replace with new. On long delivery items which are damaged in shipping or storage, field repair may be authorized instead of replacement. Repair authorization shall be written.

1.14 SIZING

- A. Capacity: Provide equipment and material of sizes, capacities, ratings and dimensions indicated on the drawings, in the schedules and as specified.
- B. Fit and Clearance: All clearances shall comply with the requirements of the latest edition of the National Electrical Code and Local Codes.

1.15 COORDINATION

- A. Coordinate telecommunications work with that of other trades so that:

1. Interference between general construction, telecommunications, mechanical, electrical, structural and other specialty trades is to be avoided.
2. Maintain clearances and advise other trades of clearance requirements for operation, repair, removal and testing of telecommunication equipment.
3. Indicate aisleways and accessways required on coordinated shop drawings for computer rooms.
4. Provide shop drawings, drawn to a scale of 1/4 inch to the foot, showing all telecommunication equipment intended to be furnished. Any equipment conflicting with other equipment or space constrictions shall be indicated at the submittal stage.
5. Furnish and install all offsets, fittings and similar items necessary to accomplish the requirements of coordination, without additional expense.

1.16 MINOR CHANGES IN WORK

- A. The Owner will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be affected by written order and shall be binding on the Contractor. The Contractor shall carry out such written orders promptly.

1.17 EQUIPMENT CLEARANCES

- A. All finished field installations shall reflect clearances which in the opinion of the Engineer and/or applicable regulatory authorities are adequate for:
 1. Latest edition of the National Electrical Code.
 2. Life safety codes (local and state).
 3. Preventative maintenance.
 4. Routine maintenance.
 5. Breakdown repair.
 6. Parts removal and entrance.

1.18 CLOSING OF OPENINGS

- A. Unused slots, sleeves and other penetrations in floors, walls or other general construction shall be closed and sealed with an approved firestopping material.
 1. Firestopping material shall be UL listed.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

- A. Material: Cold-formed steel, with corrosion-resistant, painted or galvanized coating acceptable to the Engineer / Owner, based on location.

- B. Metal Items for Use in Damp Locations: Hot-dip galvanized steel.
- C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- (14-mm-) diameter slotted holes at a maximum of 2 inches (50 mm) o.c., in webs.
 - 1. Channel Thickness: Selected to suit structural loading.
 - 2. Fittings and Accessories: Products of the same manufacturer as channel supports.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- B. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- C. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 SUPPORTING DEVICE APPLICATION

- A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.
- B. Dry Locations: Steel materials.
- C. Selection of Supports: Comply with manufacturer's written instructions.
- D. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb (90-kg) design load.

END OF SECTION 270500

SECTION 271350 - VOICE AND DATA COMMUNICATIONS CABLING AND ASSOCIATED HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Sections include the following:
 - 1. Division 27 Section "Communications General"

1.2 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specifications Section, and Division 26.
- B. Coordination drawings, including floor plans and sections drawn to accurate scale. Submit with shop drawings. Show communications equipment layout and relationships between components and adjacent structural, mechanical, or electrical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.

1.3 MANUFACTURERS

- A. The Contractor shall submit all products per drawings and specifications for review by the Owner prior to installation. Subject to compliance with specific design and specification requirements.

PART 2 - PRODUCTS

2.1 CABLE PULLING LUBRICATION AND LUBRICANT

- 1. The cable jacket and/or conduit innerduct walls shall be completely lubricated when cable is pulled into conduit. The lubricant shall be applied immediately before or during the pull.
- 2. The cable lubricant shall meet the following performance specifications:
 - a. The lubricant shall be UL or CSA listed.
 - b. The lubricant shall produce no deleterious effects on physical or electrical properties of cable jackets.
 - c. The lubricant shall produce no stress cracking on LDPE cable jackets when tested per IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.
 - d. Cable jacket materials LLDPE, XLPE, CPE, and PVC heat aged in lubricant shall pass tensile and elongation compatibility requirements from IEEE Standard 1210,

Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.

- e. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes.
- f. The lubricant shall not phase-out after five freeze/thaw cycles or 5-day exposure at 140 degrees F.
- g. A 6.5 oz. sample of the lubricant, when placed in a one-foot, split metal conduit and fully dried for 24 hours at 221 degrees F., shall not ignite with a pilot flame and continuously burn for more than one minute at a continued heat flux of 40 kW/m². Total time of test shall be one-half hour.
- h. A 6.5 oz. sample of the lubricant, when placed in a one-foot, split metal conduit and fully dried for 24 hours at 221 degrees F., shall not spread a flame more than three inches beyond a point of ignition at a continued heat flux of 40 kW/ m². Total time of test shall be one-half hour.

2.2 ENTRANCE CABLE RACKS, CLOSURES AND TERMINATION COMPONENTS

A. Heavy Duty Metallic Cable Rack:

- 1. Cable rack shall consist of stanchions and arms.
- 2. Stanchions: Shall be hot rolled, hot dip galvanized, T section steel, nominal 2-1/4 inch punched with 1/2 inch holes on 1-1/2 inch centers for cable arm attachment. The stanchion shall be 36 inches long.
- 3. Holes or slots shall be provided in the arms for cable wire ties.
- 4. Cable Arms: Shall be 3/16 inch thick hot rolled, hot dip galvanized, sheet steel pressed to channel shape, nominal 7-1/2 inches long.
- 5. The cable racks shall meet or exceed the load capacities shown in Table 2.3.A.5.

Table 2.3.A.5: CABLE RACK ARM CAPACITIES***

Length (inches)	8	14	20
Rated Working Load (lbs.)*	450	350	250
Deflection at Rated Working Load (inches)**	.25	.37	.37
Ultimate Load (lbs.)* (Short Term)	1000	900	1000

* Load concentrated 1 inch from outer end of arm.

** Deflection is measured at outer end of arm.

*** Arm and stanchion are to be conditioned at 50% relative humidity prior to test.

B. Twisted Pair Copper Splice Closure:

- 1. The splice closure housing shall be non-metallic. It shall be resistant to solvents, stress cracking, and creep. The housing materials shall also be compatible with chemicals and other materials to which they might be exposed in normal applications.
- 2. The closure shall be capable of accepting any cable used in interoffice, outside plant, and building entrance facilities.

3. The closure shall be available in distinct sizes to accommodate a variety of cable entries as specified in the table below:

Table 2.3.B.3: Twisted Pair Copper Splice Closure Cable Capacity

MAXIMUM CABLE CAPACITY (INCHES)					
Splice Case Dimension	Single Sheath				Maximum Cable Opening
	1 Cable	2 Cables	3 Cables	4 Cables	
4.0 x 25.8	2.2	1.95	1.7	1.45	16.5
6.5 x 22.0	4.1	3.85	3.6	3.35	12
6.5 x 28.4	4.1	3.85	3.6	3.35	19
8.0 x 25.4	5.6	5.35	5.1	4.85	19
9.5 x 28.4	7.1	6.85	6.6	6.35	18
12.5 x 28.4	*	*	*	*	18
6.5 x 38.4	4.1	3.85	3.6	3.35	29
8.0 x 38.4	5.6	5.35	5.1	4.85	29
9.5 x 38.4	7.1	6.85	6.6	6.35	28
12.5 x 38.4	*	*	*	*	28
8.0 x 45.2	5.6	5.35	5.1	4.85	36
9.5 x 45.2	7.1	6.85	6.6	6.35	35
12.5 x 45.2	*	*	*	*	35

* Three Section End Plates

4. The sealing mechanism shall not utilize heat shrinks nor require electrical power to attain a seal. The sealing mechanism used for the drop ports shall be of a mechanical type incorporating reusable compression fittings. Mastic sealing tape shall be used to install cables along the end cap seam. Encapsulation shall not be required to resist water penetration.
5. The splice closure shall be re-enterable. The closure end cap shall be capable of accepting additional cables without removal of the sheath retention or strength member clamping hardware on previously installed cables or disturbing existing splices. The splice closure shall provide a clamping mechanism to prevent cable sheath slip or pullout.
6. The splice closure shall have appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the armored cable sheath. The cable bonding hardware shall be able to accommodate a copper conductor equal to or larger than a #6 AWG.
7. The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by installation crews.
8. Performance Requirements as Follows:
 - a. A bond clamp shall remain firmly attached to the cable armor sheath while under a tensile load of 20 lbf. Following removal of the load, there shall be no evidence of clamp loosening or damage to the cable sheath, armor, or clamp that would reduce its current carrying capacity as required by the AC fault test.

- b. The electrically conductive path used for continuity and grounding of the splice closure metallic components shall be capable of withstanding an AC current of 1000 amperes for 20 seconds.
- c. The cable clamping and sealing hardware used to terminate optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at 1550 nm ± 20 nm.
- d. An axial load of 100 lbf, individually applied to each cable, shall not cause mechanical damage to the cable or clamping hardware.
- e. The diameter of the splice closure shall not permanently deform more than 10%, nor temporarily deform more than 20%, when it is compressed by a uniformly distributed load of 300 lbf. Additionally, the compressive load shall cause no mechanical damage to the closure or its contents.
- f. The closure shall not exhibit any mechanical damage after being subjected to mechanical impact of 85 lbf at temperatures of 0 ± 3.6 degrees F and 104 ± 3.6 degrees F.
- g. The closure shall be capable of being safe and proper assembly at temperatures of 32 ± 3.6 degrees F and 104 ± 3.6 degrees F using materials and procedures specified by the manufacturer.
- h. The splice closure shall show no evidence of water penetration following exposure to a 20 ft waterhead for a period of 7 days.
- i. A closure shall show no evidence of corrosion following exposure to salt-fog for a period of 90 days.
- j. Samples of polymeric closure materials shall not support fungus growth when tested per ASTM G 21. A rating of 0 is required.
- k. Subjecting the closure/cable interface to 10 cycles of Torsional loading at ambient temperatures of 0 ± 3.6 degrees F and 104 ± 3.6 degrees F shall not cause any mechanical damage to the cable or clamping hardware.
- l. Subjecting the closure/cable interface to 90 degrees flexing for 8 cycles at ambient temperatures of 0 ± 3.6 degrees F and 104 ± 3.6 degrees F shall not cause any mechanical damage to the cable or clamping hardware.
- m. Sealing components (gaskets, grommets, O-rings) used in a closure, shall not permit the entry of water into the closure after thermal aging at 194 ± 1.8 degrees F for 720 hours.

C. Optical Fiber Splice Closure:

- 1. The splice closure housing shall be non-metallic. It shall be resistant to solvents, stress cracking, and creep. The housing materials shall also be compatible with chemicals and other materials to which they might be exposed in normal applications.
- 2. The optical fiber closure shall be capable of accepting any optical fiber cable used in interoffice, outside plant, and building entrance facilities.
- 3. The optical fiber closure shall be available in distinct sizes to accommodate a variety of cable entries as specified in the table below:

Table 2.3.C.3: Optical Fiber Splice Closure Cable Capacity

Cable Capacity	Canister (Butt) Configuration		Branch (In-Line) Configuration	
	Express Entries/ Max. Cable Diameter (mm)	Drop Port Entries/ Max. Cable Diameter (mm)	Express Entries/ Max. Cable Diameter (mm)	Drop Port Entries/ Max. Cable Diameter (mm)
Large	2/32	6/25	4/32	12/25
Medium	2/25	4/18	4/25	8/18
Small	2/20	3/15	4/20	6/15

4. As an option, the ability to double the cable capacity of an installed canister splice closure by use of a kit shall be available. Such a conversion shall not disturb existing cables or splices.
5. The sealing mechanism shall not utilize heat shrinks nor require electrical power to attain a seal. The sealing mechanism used for the drop ports shall be of a mechanical type incorporating reusable compression fittings. Mastic sealing tape shall be used to install cables along the end cap seam. Encapsulation shall not be required to resist water penetration.
6. The splice closure shall be re-enterable. The closure end cap shall be capable of accepting additional cables without removal of the sheath retention or strength member clamping hardware on previously installed cables or disturbing existing splices. The optical fiber splice closure shall provide a clamping mechanism to prevent pistoning of the central member or strength members and to prevent cable sheath slip or pullout.
7. The splice closure shall have appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the armored cable sheath. The cable bonding hardware shall be able to accommodate a copper conductor equal to or larger than a #6 AWG.
8. The closure shall accommodate splice trays suitable for single fiber, single fiber heat shrink, mechanical, or ribbon heat shrink splices.
9. The small splice closure shall accommodate up to 48 single fiber splices.
10. Spliced fibers shall not be subjected to a bend radius smaller than 30 mm (1.2 inches). Buffer tubes shall not be subjected to a bend radius smaller than 38 mm (1.5 inches).
11. The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by installation crews.
12. Performance Requirements as Follows:

NOTE: The test procedures for evaluating these requirements are detailed in EIA/TIA/IS-66, August 1991, section 4.0.

- a. A bond clamp shall remain firmly attached to the cable armor sheath while under a tensile load of 9-kg (20 lbf). Following removal of the load, there shall be no evidence of clamp loosening or damage to the cable sheath, armor, or clamp that would reduce its current carrying capacity as required by the AC fault test.

- b. The electrically conductive path used for continuity and grounding of the splice closure metallic components shall be capable of withstanding an AC current of 1000 Amperes for 20 seconds.
- c. The cable clamping and sealing hardware used to terminate optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at $1550 \text{ nm} \pm 20 \text{ nm}$.
- d. An axial load of 100 lbf, individually applied to each cable, shall not cause mechanical damage to the cable or clamping hardware. The load to the optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at $1550 \pm 20 \text{ nm}$.
- e. The diameter of the optical fiber splice closure shall not permanently deform more than 10%, nor temporarily deform more than 20%, when it is compressed by a uniformly distributed load of 300 lbf. Additionally, the compressive load shall cause no mechanical damage to the closure or its contents.
- f. The closure shall not exhibit any mechanical damage after being subjected to mechanical impact of 85 lbf (115 Nm) at temperatures of $-18 \pm 2^\circ\text{C}$ ($0 \pm 3.6^\circ\text{F}$) and $40 \pm 2^\circ\text{C}$ ($104 \pm 3.6^\circ\text{F}$).
- g. The closure shall be capable of being safely and properly assembled at temperatures of $0 \pm 2^\circ\text{C}$ ($32 \pm 3.6^\circ\text{F}$) and $40 \pm 2^\circ\text{C}$ ($104 \pm 3.6^\circ\text{F}$) using materials and procedures specified by the manufacturer.
- h. The splice closure shall show no evidence of water penetration following exposure to a 20-foot waterhead for a period of 7 days.
- i. A closure shall show no evidence of corrosion following exposure to salt-fog for a period of 90 days.
- j. Samples of polymeric closure materials shall not support fungus growth when tested per ASTM G 21. A rating of 0 is required.

NOTE: The test procedures for evaluating the following requirements are detailed in GR-771-CORE, Issue 1, July 1994, section 6.

- k. Subjecting the closure/cable interface to 10 cycles of torsional loading at ambient temperatures of $\pm 2^\circ\text{C}$ ($0 \pm 3.6^\circ\text{F}$) and $40 \pm 2^\circ\text{C}$ ($104 \pm 3.6^\circ\text{F}$) shall not cause any mechanical damage to the cable or clamping hardware. In addition, torsional loading of the optical fiber cable shall not exceed allowable attenuation changes.
- l. Subjecting the closure/cable interface to 90° flexing for 8 cycles at ambient temperatures of $-18 \pm 2^\circ\text{C}$ ($0 \pm 3.6^\circ\text{F}$) and $40 \pm 2^\circ\text{C}$ ($104 \pm 3.6^\circ\text{F}$) shall not cause any mechanical damage to the cable or clamping hardware. In addition, flexing of the optical fiber cable shall not cause an attenuation change greater than ± 0.05 dB per fiber, when tested with a source operating at $1550 \pm 20 \text{ nm}$.
- m. The closure central member clamp shall prevent movement (e.g. bowing, pistoning, or breaking) of the cable central member (CM) when the CM exerts a force of 100 lbf on the clamp.
- n. Sealing components (gaskets, grommets, O-rings) used in a closure, shall not permit the entry of water into the closure after thermal aging at $90 \pm 1^\circ\text{C}$ ($194 \pm 1.8^\circ\text{F}$) for 720 hours (30 days).

D. Outside Plant Rated Recloseable Storage Ring

- 1. Basis of Design:
 - a. Leviton 24-Inch Recloseable Storage Ring (Product #: 48900-OFR).

2. Storage ring shall provide mechanical support, protection, and management of optical fiber service loops.
3. Storage ring shall have a 24-Inch diameter.
4. Storage ring shall have Velcro brand loops to contain and secure cable.
5. Storage ring shall be anchored and secured to wall or structural member in manhole.

E. Flexible Innerduct for Optical Fiber Cabling

1. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Alpha Wire Company.
 - b. Thomas and Betts Corporation.- Carlon Electrical Products
 - c. Endot Industries Inc.
 - d. IPEX.
 - e. Dura-Line
2. Description: Comply with UL 2024; flexible-type pathway, approved for outside plant installation.
3. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Comply with TIA-569-B.

F. Innerduct and Conduit Duct Plugs

1. Acceptable Manufacturers:
 - a. Jack Moon, AMP, Carlon, or approved equal.
2. Provide blank duct plugs, fiber optic simplex plugs, bplex seal-in system, triplex duct plugs, quadplex duct plugs, custom duct plugs, as required.
3. Duct plugs shall be furnished and installed in all entry conduits, and innerduct within conduits, in all communications and electrical rooms, manholes, and handholes under this contract.
4. Conduit Duct Plugs:
 - a. Duct plugs shall be manufactured from high impact plastic components and shall be corrosion proof.
 - b. Duct plugs shall contain a durable elastic compressible gasket which will make it effective as a long term or temporary seal. They shall be removable and reusable.
 - c. They shall meet or exceed the following mechanical requirements:
 - 1) Air Pressure 7.5 psi
 - 2) Water Head 15 ft.
 - 3) Pull Out 100 Kgf
5. Duct plugs shall be equipped with a rope tie device on the back compression plate to allow the securing of a pull rope. This will allow excess rope slack to be stored within the conduit.

G. Building Entrance Terminals:

1. Acceptable Manufacturers:
 - a. Circa Telecom.
2. Metallic enclosure shall be 19" rack mountable as indicated on contract drawings.
3. Enclosure shall be manufactured of 16 AWG steel construction and shall have a powder coat finish for durability.

4. The building entrance terminal shall be rated for indoor use and be designed for terminating outside plant cables of up to 200 cable/pairs.
5. The building entrance terminal shall be configured with a double cross-connect field with a 110-style termination block for incoming OSP cabling and a 110-style termination block for internal distribution cabling.
6. The wiring block shall accommodate pair quantities as indicated on contract drawings and shall be fire retardant. Mold plastic consisting of horizontal strips for terminating cable/pairs. The strips shall be marked with industry standard color coding on the high teeth to differentiate between tip and ring of each cable pair, to establish pair termination location.
7. The terminal shall have a built in 26 Gauge fuse link to mitigate effects of potential overcurrent conditions.
8. Enclosure shall accommodate industry standard 5 pin protector modules.
9. The building entrance terminal shall provide ground lug attachments for connection of the terminal to the switch room ground network and for bonding of the incoming and outgoing cabling sheaths.

H. Solid State Protector Modules:

1. The module shall be five pin configuration.
2. The modules shall respond in less than 5 nanoseconds and have an integral fail safe mechanism that permanently shorts the module to ground in the presence of a sustained surge condition.
3. Modules shall be equipped with a heat coil for sneak current protection.
4. The protector module shall be UL listed.
5. Solid State Protector Modules Specifications

Test Parameters

DC Breakdown	265-345V	2Kv/Sec
Surge Breakdown	265-360V	100V/Micro Sec
Insulation Resistance		100 MegΩ Typical
DC Holdover		150V Typical (140mA)
Capacitance		<100 pF
Operating Temperature		-13 to 149 degrees F.
Sneak Current Operation (Heat Coils @ 68 degrees F)		1A: < 15 Sec 540 mA: <210 Sec

6. Provide continuity only modules for all high pair count cables not requiring protection.
7. Provide red low voltage data protector modules to identify special circuits.

2.3 MISCELLANEOUS BACKBONE CABLING COMPONENTS

- A. This Section includes description of and requirements for telecommunications cabling backbones.

B. General

1. Backbone cabling consists of the backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.
2. In planning the routing and support structure for the backbone copper cabling, care shall be taken to avoid areas where sources of high levels of EMI, such as motors and transformers, may exist. ANSI/TIA/EIA-569 specifies separation of the backbone cabling pathways from typical sources of EMI.
3. The backbone cabling shall also include those cables that run from the MDF and IDF wall field to the network racks.

C. Backbone Cabling Distances

1. The distance between the entrance point and the main cross-connect shall be included in the total distance calculations. The length and type of media (including gauge size for copper), shall be recorded and be provided to the Owner.

D. Recognized Cable Types

1. The following types of cables are recognized for use in the backbone cabling system. These cables are:
 - a. High pair count copper cables with Category 3 performance characteristics (inside/outside plant).
 - b. Multimode OM1: 62.5/125 μ m Indoor/Outdoor loose tube optical fiber.
 - c. Single Mode OS2: 8.3/125 μ m Indoor/Outdoor optical fiber.
 - d. Air Blown Optical Fiber Cable Systems
2. The specific performance characteristics for the recognized cables, associated connecting hardware, and cross-connect jumpers and patch cords are described elsewhere.
3. Hybrid cables, consisting of more than one of the recognized cables listed herein, under a common sheath, may be used in the backbone cabling system provided that they meet the established requirements, when approved by the Engineer.

E. Cross Connections & Interconnections

1. General
 - a. Backbone building cables shall be terminated on connecting hardware that meets the requirements of this specification. All connections between horizontal and backbone cables shall be made through a horizontal cross-connect.
 - b. Equipment cables that consolidate several ports on a single connector shall be terminated on dedicated connecting hardware. Equipment cables that extend a single port appearance may either be permanently terminated or interconnected directly to horizontal or backbone terminations.
 - c. Products for this installation shall be furnished in new and factory packaged condition. Each product shall be inspected by the Contractor to ensure completeness and that no damage was incurred during shipping. The Contractor shall return to the manufacturer, any product found to be deficient. The cost of the

return and replacement product shall be borne by the Contractor. All products provided for this installation shall meet the following minimum criteria.

- d. Rack mounted termination blocks shall be provided for termination of high pair count Cat 3 cables. These termination blocks shall employ 110 Style IDC hardware.
- e. Only 110 style of IDC hardware shall be permitted for all connections.

F. Backbone Cable Requirements

1. Backbone cables shall be manufactured in compliance with the specifications.
2. All cables shall be furnished in full, factory packaged reels. The reels shall be marked with the respective cable part number and lot number by the manufacturer. The supplier shall provide manufacturer's proof of compliance with the required manufacturing guidelines presented in the aforementioned standards. Each reel shall be visually inspected upon receipt and prior to installation to ensure that no damage was incurred during shipment. Any damaged cable shall be returned to the manufacturer for replacement of the entire reel. The cost for replacement cable shall not be passed on to the Owner.

2.4 HIGH PAIR COUNT COPPER CABLES WITH CATEGORY 3 PERFORMANCE CHARACTERISTICS (OUTSIDE PLANT)

A. Multi Conductor Cable

1. Basis of Design:
 - a. General Cable Air Core Cable RDUP (RUS) PE-22 AL.
2. Cable type: PE-22, solid #24 AWG, copper, thermoplastic insulated solid conductors enclosed by a thermoplastic jacket.
3. Selected cable should bear industry standard color coding composed of 10 distinctive colors to identify 25 pairs (Refer to ANSI/CEA S-80-576).
4. Conductors dual insulated; inner layers of foam polyolefin, outer layer of solid colored polyolefin. Maximum diameter of insulated conductor shall be .04 inches.
5. Individual conductors twisted into pairs with varying lay lengths to minimize cross talk.
6. Core assembly filled with 80°C ETPR compound for moisture protection.
7. Shielding of corrugated copolymer coated 8-mil aluminum tape applied longitudinally with an overlap.
8. Black, low density polyethylene jacket.
9. Suitable for installation in PVC conduit, underground.
10. Transmission.
 - a. The DC resistance of any conductor shall not exceed 27.5 Ω per 1,000-ft at or corrected to a temperature of 68° F. Average DC unbalance shall be 1.5% maximum.
 - b. The mutual capacitance of any pair should be 15.7 pf/ft nominally.
 - c. Capacitance unbalance (pair to ground) shall be 800 pF/1,000-ft.
 - d. The cable shall have a characteristic impedance of 100 $\Omega \pm 15\%$ for frequencies where $1 \text{ MHz} \leq \text{freq} \leq 16 \text{ MHz}$.
 - e. Attenuation

1) The attenuation at 772 kHz is 29.8 dB/mile.

f. The minimum velocity of propagation shall not be less than 63%.

g. The dielectric breakdown of the cable shall be at least 2500 volts DC conductor to conductor.

11. Quality Control.

a. Every Reel shall be tested for SRL Attenuation and Impedance. This testing shall be performed using a sweep test method and include frequencies from .772 MHz to 16 MHz.

12. Test Report.

a. A test report shall be attached to each reel of cable indicating the Reel number, the date of the test, and test results for each pair. At a minimum, test results will be shown for the parameters listed in Table 1 for SRL, Table 2 for Attenuation. Characteristic impedance shall be shown for each pair.

2.5 8.3/125 MICRON SINGLE MODE AND 62.5/125 MICRON MULTIMODE HYBRID OPTICAL FIBER CABLE (OUTDOOR)

A. Basis of Design:

1. Nexans (Berk-Tek) Outside Plant All Dielectric Loose Tube (OPD, OPDD) Hybrid 48xOM1 & 48xOS2 Optical Fiber Cable

B. General:

1. Outside plant stranded loose tube 8.3/125-micron single mode optical fiber cable and 62.5/125-micron multi-mode optical fiber cable designed for installation in environments such as aerial lashing and conduit pathway backbone applications. The cable shall be designed for use outdoors and provide excellent protection from the elements.
2. Cable is composed of Gel-filled tubes containing 250-micron fibers, in up to 12 colors. 24 fiber tubes contains two 12-fiber bundles.
3. The cable is designed to be used in outside plant aerial and duct environments.
4. All fibers in the cable shall be usable and meet this specification. The entire cable shall be replaced for a single failure at no additional cost to the Owner.
5. Each optical fiber shall consist of a doped silica core surrounded by a concentric glass cladding. The fiber shall be matched clad design.
6. The fiber shall be designed to support IEEE 802.3ae performance criteria, including laser based 10 gigabit ethernet for 10GBASE-SX to 300 meters, IEEE 802.3 performance criteria, including laser based gigabit Ethernet for both 1000 BASE-SX at 1000 meters and 1000 BASE-LX at 600 meters.
7. All optical fiber provided shall be of the same manufacturer and part number throughout the installation.
8. All connectors, hardware, and fiber assemblies for single mode cabling shall be Laser Optimized 8.3 μm .
9. All connectors, hardware, and fiber assemblies for multi-mode cabling shall be Laser Optimized 62.5 μm .

C. Cable Construction:

1. A loose tube construction shall be used. The cable shall be constructed using buffer tubes, 3 mm in diameter. Each buffer tube shall contain, up to twelve optical fibers. For low fiber count cable the buffer tube positions shall be maintained using fillers. The buffer tubes and fillers, if used, shall be combined and covered with a flame retardant, non-corrosive outer jacket to provide excellent environmental protection.
2. The central member shall be a glass/epoxy composite dielectric rod which functions as an anti-buckling element.
3. The cables are protected against water penetration by waterblocking
4. The buffer tubes shall be distinguishable from each other by means of color coding. The color coding sequence shall be blue, orange, green, brown, slate, white, red, black, yellow, violet, rose, and aqua.
5. The fibers within each buffer tube shall be distinguishable from each other by means of color coding. The color coding sequence shall be blue, orange, green, brown, slate, white, red, black, yellow, violet, rose and aqua.
6. The cable core shall contain a minimum of five buffer tube positions. Filler rods must be used in place of buffer tubes to maintain positions. The filler rods shall be natural in color and shall be the same outer diameter as the buffer tubes.
7. The buffer tubes and filler rods, if used, shall be stranded around the central member using a reverse oscillating lay (SZ) stranding method with counter helically applied non-hydroscopic binder tapes.
8. A ripcord shall be incorporated into the cable design to provide easy access to the buffer tubes.
9. The cable jacket shall be designed for easy removal, with readily available tools. The design shall permit jacket removal without damage to the buffer tubes or optical fibers.
10. The cable jacket shall be printed with manufacturer name, the words 'Optical Cable', sequential length marking, month and year of manufacture and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC).

D. Mechanical:

1. Minimum Bend Radius:
 - a. The minimum static bend radius shall be 10 times the cable outside diameter. The minimum dynamic bend radius shall be 15 times the cable outside diameter.
 - b. The average increase in attenuation shall not be greater than specified by GR-20-CORE depending on the type of fiber used, single mode (OS2) or multi-mode (OM1). No mechanical damage shall occur to the cable jacket.
2. Impact Resistance:
 - a. The average increase in attenuation shall not be greater than specified by GR-20-CORE depending on the type of fiber used, single mode (OS2) or multi-mode (OM1). No mechanical damage shall occur to the cable jacket.
 - b. Testing shall be done in accordance with EIA-455-25A (Impact Testing of Fiber Optic Cables and Cable Assemblies). Optical Attenuation changes shall be measured following the procedures of EIA-455-20 (Measurement of Change in Optical Transmittance). The cable specimen shall be subjected to 25 impacts.

3. Compressive Strength:
 - a. A representative sample of the cable shall withstand a minimum compressive load of 170 lbf/in for armored cable, and 125 lbf/in for non-armored cable applied uniformly over the length to the compression plate. The average increase in attenuation shall not be greater than that specified by GR-20-CORE depending on the type of fiber used, single mode (OS2) or multi-mode (OM1).
 - b. Testing shall be done in accordance with EIA-455-41 (Compressive Loading Resistance of Fiber Optic Cable).
4. Tensile Strength:
 - a. The average increase in attenuation at the rated tensile load of the cable shall not exceed that specified by GR-20-CORE depending on the type of fiber used, single mode (OS2) or multi-mode (OM1). The maximum dynamic (short term) tensile load rating will be 600 lbs. The maximum static (long term) tensile load rating shall be 200 lbs.
 - b. Testing shall be done in accordance with EIA-455-33A (Fiber Optic Cable Tensile Loading and Bending Test).
5. Cable Twist:
 - a. The average increase in attenuation shall not be greater than specified by GR-20-CORE. No mechanical damage shall occur to the cable jacket.
 - b. Testing shall be done in accordance with EIA-455-85 (Fiber Optic Cable Twist Test). The test length (L) shall be a maximum of 4 meters.
6. Cable Cyclic Flexing:
 - a. The average increase in attenuation shall not be greater than specified by GR-20-CORE. No mechanical damage shall occur to the cable jacket.
 - b. Testing shall be performed in accordance with EIA-455-104 (Fiber Optic Cable Cyclic Test). The cable shall be flexed for 25 cycles at 30 cycles/minute.
7. The yield strength and ultimate elongation of the outer cable jacket shall be tested in accordance with EIA-455-89A (Fiber Optic Cable Jacket Elongation and Tensile Strength).
8. Jacket Shrinkage:
 - a. The maximum cable jacket shrink back shall be less than 5%.
 - b. Testing shall be done in accordance with EIA-455-86 (Fiber Optic Cable Jacket Shrinkage).
9. The cable shall maintain optical and mechanical integrity over the following temperature ranges:

Operation:	-104° F to +167° F
Installation:	-86° F to +140° F
Storage:	-140° F to +185° F

E. Cable Jacket:

1. The cable jacket shall be printed with the following information: Manufacturer, manufacturer's part number, cable type, number of strands, UL type, and sequential footage markings.

F. Glass Transmission Media - Single Mode OS2 Optical Fiber

1. Dispersion unshifted, low water peak.
2. Proof tested to 100 kpsi
3. Fiber cutoff wave length <1260 nm.
4. Glass Geometry
 - a. Fibercurl - > 4.0mm radius of curvature.
 - b. Cladding diameter – $125.0 \pm 0.7 \mu\text{m}$
 - c. Core – Clad Concentricity - < $0.50 \mu\text{m}$
 - d. Cladding non circularity < 1.0%.
 - e. Cabled Fiber Attenuation
 - 1) 1310 nm - < 0.4 dB/Km, maximum
 - 2) $1383 \text{ nm} \pm 3 \text{ nm} \leq 22 \text{ dB/Km}$
 - 3) 1550 nm - < 0.20 dB/Km, maximum
 - 4) Attenuation measurements shall be made in accordance with ANSI/TIA/EIA-455-61, measurement of fiber or cable attenuation using an OTDR.
 - f. Core diameter – $8.3 \mu\text{m}$
 - g. Zero dispersion wave length – $1302 \leq \text{wavelength} \leq 1322$
 - h. Zero dispersion slope – $0.092 \text{ ps}/(\text{nm.km})$
 - i. Refractive index difference – 0.36%

G. Glass Transmission Media - Multi-Mode OM1 Optical Fiber

1. Dispersion unshifted, low water peak.
2. Proof tested to 100 kpsi
3. Fiber cutoff wave length <1260 nm.
4. Glass Geometry
 - a. Fibercurl - > 4.0mm radius of curvature.
 - b. Cladding diameter – $125.0 \pm 0.7 \mu\text{m}$
 - c. Core – Clad Concentricity - < $0.50 \mu\text{m}$
 - d. Cladding non circularity < 1.0%.
 - e. Cabled Fiber Attenuation
 - 1) 1310 nm - < 0.4 dB/Km, maximum
 - 2) $1383 \text{ nm} \pm 3 \text{ nm} \leq 22 \text{ dB/Km}$
 - 3) 1550 nm - < 0.20 dB/Km, maximum
 - 4) Attenuation measurements shall be made in accordance with ANSI/TIA/EIA-455-61, measurement of fiber or cable attenuation using an OTDR.

- f. Core diameter – 62.5 μm
 - g. Zero dispersion wave length – $1302 \leq \text{wavelength} \leq 1322$
 - h. Zero dispersion slope – 0.092 ps/(nm.km)
 - i. Refractive index difference – 0.36%
- H. In compliance with TIA/EIA 492-CAAB and Telecordia's GR-20
- I. Enhanced water peak at 1383 nm, attenuation shall not exceed 2.1 dB/km.
- J. Optical fiber requiring the use of mode conditioning patch cords when using a laser transmitter shall not be acceptable.
- K. Optical Parameters – Single Mode OS2 Optical Fiber Cabling
 - 1. Attenuation
 - a. The attenuation, of the cabled fiber, shall not exceed .5 dB/km at 1310 nm and .4 db/km at 1550 nm.
 - b. Attenuation measurements shall be made in accordance with ANSI/EIA/TIA-455-61, Measurement of Fiber or Cable Attenuation Using an OTDR.
 - 2. Attenuation Variation
 - a. The attenuation variation shall be less than 0.05 dB/km for wavelengths between 1285 nm and 1330 nm compared to the attenuation at 1310 nm. The attenuation variation shall be less than 0.05 dB/km for wavelengths between 1525 nm and 1575 nm compared to the attenuation at 1550 nm.
 - b. Attenuation variation measurements shall be made in accordance with ANSI/EIA/TIA-455-61, Measurement of Fiber or Cable Attenuation Using an OTDR.
 - 3. Attenuation at Water Peak
 - a. The attenuation shall not exceed 2.1 dB/Km at 1383 nm ± 3 nm.
 - 4. Attenuation Uniformity
 - a. The attenuation discontinuity shall not exceed 0.1 dB at 1310 nm or 1550 nm throughout the cable length.
 - b. Attenuation Uniformity measurements shall be made in accordance with EIA-455-59, Generic Description of Optical Time Domain Reflectometry.
 - 5. Macrobending Attenuation
 - a. The maximum induced attenuation shall be less than or equal to 0.05 dB at 1310 and 0.10 dB at 1550 nm when wound 100 turns on a 75 mm diameter mandrel.
 - 6. Index of Refraction
 - a. The effective group index of refraction will be 1.4675 at 1310 nm and 1.4681 at 1550 nm.

7. Chromatic Dispersion

- a. The zero dispersion wavelength shall be between 1300 to 1322 nm, and the nominal zero dispersion wavelength should be 1310 nm.
- b. The maximum value of the dispersion slope shall not be greater than 0.092 psec/(nm-2 km) at the zero dispersion wavelength.
- c. The dispersion measurements shall be made in accordance with EIA-455-168, Chromatic Dispersion Measurement of Multimode Graded-Index and Single-Mode Optical Fibers by Phase-Shift Method, or EIA-455-175, Chromatic Dispersion Measurement of Optical Fibers by the Differential Phase Shift Method.

8. Cut-off Wavelength

- a. The cut-off wavelength shall be $<1250 \pm 100$ nm for matched clad fiber.
- b. Measurement shall be made on a routine basis according to EIA-455-170, Cut-off Wavelength of Single-Mode Fiber Cable by Transmitted Power, or EIA-455-80, Cut-off Wavelength of Uncabled Single-Mode Fiber by Transmitted Power.

9. Mode Field Diameter

- a. The nominal mode field diameter, for matched clad fiber, shall be 9.3 ± 0.5 μ m using a measurement wavelength of 1310 nm. At 1550 nm, the nominal mode field diameter shall be 10.50 ± 1.0 μ m.

L. Optical Parameters – Multi-Mode OM1 Optical Fiber Cabling

1. Attenuation

- a. The attenuation, of the cabled fiber, shall not exceed 3.5 dB/km at 850 nm and 1.0 dB/km at 1300 nm. The typical attenuation values should be 3.0 dB/km at 850 nm and 1.0 dB/km at 1300 nm.
- b. Attenuation measurements shall be made in accordance with either ANSI/TIA/EIA-455-46 (Spectral Attenuation Measurement for Long-Length Graded-Index Optical Fibers) or with ANSI/TIA/EIA-455-61 (Measurement of Fiber or Cable Attenuation Using an OTDR).

2. Bandwidth

- a. The minimum LED over filled launch bandwidth shall not be less than 200 Mhz-km at 850 nm and 500 Mhz-km at 1300 nm.
- b. The minimum RML Bw of 385 MHZ.KM @850 nm with laser performance specified to achieve 500 meters for gigabit ethernet (IEEE, 802.3Z) standard compliant links.

3. Numerical Aperture

- a. The numerical aperture shall be $.275 \pm 0.015$.

4. Macrobending Attenuation

- a. The maximum induced attenuation shall be less than or equal 0.5 dB at 850 and 1300 nm when wound 100 turns on a 75 mm diameter mandrel.

5. Group Refractive Index

- a. The group refractive index shall be 1.496 at 850 nm and 1.487 at 1300 nm.

M. Geometrical Parameters

1. Cladding Diameter
 - a. The cladding outside diameter shall be $125.0 \pm 1.0 \mu\text{m}$.
 - b. The cladding diameter shall be measured in accordance with ANSI/TIA/EIA-455-176, Method for Measurement of Geometry by Automated Grey-Scale Analysis.
2. Cladding Noncircularity
 - a. The cladding noncircularity shall not be greater than 1%.
 - b. The cladding non-circularity shall be measured in accordance with ANSI/TIA/EIA-455-176 (Method for Measurement of Geometry by Automated Grey-Scale Analysis).
3. Core/Cladding Concentricity Error
 - a. The offset between the center of the core and the center of the cladding shall not be greater than $0.6 \mu\text{m}$.
4. Coating
 - a. The coating shall be a U.V. curable acrylate and shall be 245.0 ± 10 microns in diameter. The coating shall be readily removable with commercially available stripping tools.
 - b. Measurements shall be in accordance with either EIA-455-55A, Methods for Measuring the Coating Geometry of Optical Fibers or EIA-455-48A, On-Line Diameter Measurement of Optical Waveguides.

N. Cable Jacket

1. The cable jacket shall be black and printed with the following information: Manufacturer, Manufacturer's part number, cable type, number of strands, UL type, and sequential footage markings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements to receive cable. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Separation of Wires: Comply with EIA/TIA-569D rules for separation of unshielded copper voice and data system cables from potential EMI sources, including electrical power lines and

equipment. Insure that all communication outlet locations in wall, surface mounted raceways, or floor boxes have adequate backbox enclosures to house communication wiring.

B. Backbone Cable Installation

1. General

- a. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- b. All cables terminated on rack mounted equipment shall be strain relieved to allow patch panel to be removed and worked on from the front.

2. All cables within conduit shall be installed in the following manner:

- a. Cable raceways shall not be filled greater than the NEC maximum fill for the particular raceway type.
- b. Cables shall be installed in continuous lengths from origin to destination (no splices - field or factory).
- c. The cable's minimum bend radius and maximum pulling tension shall not be exceeded.
- d. Cable shall not be attached to the fire system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- e. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost to the Owner.
- f. Cables shall be identified by a self-adhesive label or sleeve in accordance with this specification. The cable label shall be applied to the cable on a section of cable near the end that can be viewed, and properly associated with the termination, without the need to unbundle cables. Cable labels within the bundle shall not be accepted.

3. All cables within cable tray and on cable runway shall be installed in the following manner:

- a. Cables installed in cable tray and on cable runway shall be organized into bundles no larger than 2-1/2 inches in diameter. Hook and loop ties shall be spaced no farther than 5 feet on center in a horizontal line and no farther than 12 inches on center in a vertical line. Crosses and drops shall be neat and organized.

4. In addition, different cable types shall be installed under the following provisions:

C. Optical Fiber Cable Installation Guidelines

1. Installation of fiber optic cables shall be performed according to guidelines established by the product manufacturer and in compliance with industry standards. Special care shall be taken to avoid damage to cable.
2. While under pulling tension, the cable shall not be formed into a curve with a radius less than 20 times the cable diameter to avoid fracture of the fiber member.
3. Pulling tension shall not exceed the manufacturer's recommended maximum tensile load.
4. If a pull winch is used, it shall be equipped with tension control or a break-away link designed to separate at or below the recommended maximum tension.

5. A minimum 15' service loop shall be maintained inside the building.
6. A minimum of 30' service loop shall be maintained within each manhole or handhole. Where splice points exist within the manhole or handhole, the 30' service loop shall be divided with 15' on either side of the splice point.
7. Notify the Contracting Officer's Representative 48 hours in advance of fiber optic cable installation into any existing conduit or building facility.
8. When installation of fiber optic cable involves existing communications equipment, work shall be performed in the presence of owner, unless otherwise directed.
9. Any damage caused as a result of work performed under this scope shall be corrected within 48 hours.
10. The innerduct walls shall be completely lubricated when cable is pulled. The lubricant shall be applied immediately before or during the pull. The cable lubricant shall meet the following specification:
 - a. The lubricant shall be UL listed.
 - b. The lubricant shall produce no deleterious effects on physical or electrical properties of cable jackets.
 - c. The lubricant shall produce no stress cracking on LDPE cable jackets when tested per IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.
 - d. Cable jacket materials LLDPE, XLPE, CPE, and PVC heat aged in lubricant shall pass tensile and elongation compatibility requirements from IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.
 - e. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes.
 - f. The lubricant shall not phase-out after five freeze/thaw cycles or 5-day exposure at 60 degrees C.
 - g. A 200-gram sample of the lubricant, when placed in a one-foot, split metal conduit and fully dried for 24 hours at 105 degrees C., shall not ignite with a pilot flame and continuously burn for more than one minute at a continued heat flux of 40 kW/m².
11. Should a cable become kinked, skinned or stretched during installation, it shall be removed and replaced. Splicing at points other than those specified will not be acceptable.
12. Termination and closure of fiber optic cable shall be performed by installers who are properly trained and have prior experience in the handling and care of fiber optics and the preparation of termination points.
13. When installing fiber optic connectors and terminal cabinets, work area must be cleaned and free of excessive dust and moisture. Final preparation and installation of fiber equipment shall occur after all work which may produce fine dust or involve moisture such as sheet rock preparation and core drilling.
14. Bending radius of fiber optic cable shall not exceed manufacturer's specifications.
15. All indoor/outdoor Single Mode OS2 and Multi-mode OM1 loose tube optical fiber cables shall be installed in Maxcell fabric innerduct.
16. All indoor/outdoor single mode OS2 and multi-mode OM1 loose tube optical fiber cables shall be pre-terminated with MPO connectors for termination to cassette modules in optical fiber distribution panels.
17. All backbone fiber cables shall be cut to length with minimal extra length at each end.
18. No splices will be acceptable in fiber cables, except for the installation of factory pigtails.
19. All fiber cables shall be neatly dressed and secured at racks and cabinets.

20. All pulls of fiber optic cable shall be made with a recording tension meter and breakaway swivel.
21. Manufacturer's instruction shall be followed for terminating optical fiber cable. Install dust covers on all unused connector ports.
22. Perform all work in facilities (e.g. conduits, junction boxes, cabinets and buildings) containing existing communications equipment only in the presence of owner, unless otherwise directed.
23. Use shear pins or other failsafe means to prevent exceeding the maximum cable pulling tension specified by the cable manufacturer.
24. Replace any fiber optic cable segment not meeting the requirements of the specifications entirety between splice points shown on the plans.

D. Optical Fiber Cable Preparation

1. Remove the jacket without damaging buffer tubes.
2. Carefully expose the fibers by removing the buffer tube with a properly calibrated stripping tool that will not nick the fibers.
3. Clean the fibers and buffer tubes using a solvent designed to remove all water blocking gel from each exposed fiber.
 - a. Solvent requirements:
 - 1) Shall not remove any color from individual fibers or buffer tubes.
 - 2) Not harmful to the cable jacket.
4. Cleave fiber strands using a high precision cleave tool meeting the following requirements:
 - a. Ability to cleave the individual fibers as close to a perfect 90-degree angle as possible.
 - b. With minimum end angle averages that are less than 0.70 degree with no cleaves exceeding 1.5 degrees.
 - c. This cleave tool shall be used for all splicing and termination of fibers.

E. Splice Closure Installation

1. Assemble, seal, and install the fiber optic and copper splice closures per the manufacturer's recommendations.
2. Use all tools/kits required to assemble and test closures per manufacturer's recommendations.
3. Pressurize each enclosure to the manufacturer's recommended PSI and check for leaks with soapy water. After the closure passes the pressure test bleed the closure.
4. Furnish and install all required hardware to mount closures to manhole racks. Furnish and install racks in existing manholes.
5. Ground copper enclosures as required to existing grounding system in existing manholes.

F. Entry and Reentry of Optical Fiber Splice Closures

1. Perform all work in a suitable environment free from excess dust and moisture. Acceptable environments to work on splice closures include office type environments in buildings, splice trailers, splice vehicles, and splicing tents with floors.
2. Do not perform fiber splicing, testing, or connecting in freezing temperatures.
3. Do not expose open splice closures and fiber ends to rain, snow, or wind-blown dust.

G. Fusion Splicing

1. All fiber splicing shall be performed using fusion splice method. Mechanical or unicom connections are **not** acceptable.

2. Perform fusion splices with the following:
 - a. Use Equipment with automatic fiber alignment and automatic light injection with detection devices to minimize splice losses.
 - b. Provide splice closure as a protection for all splices and stripped cable.
 - c. House all splices in splice trays.
3. Use glass capillaries, heat shrink tubing, or silicone sealant to provide additional protection and strain relief.
4. Maximum splice loss allowance is 0.30 dB.
 - a. Install new splice enclosure end plates at each location where there is a new fusion splice in an existing splice enclosure per manufacturer's recommendations.
5. Test fiber strands before splicing using OTDR and power meter to assure acceptable cable attenuation and no events. Record testing.

H. Optical Fiber Cable Terminations

1. Fiber Optic Cable shall be installed in innerduct.
2. Terminations shall be performed by a manufacturer trained and certified technician for optical fiber connections.
3. Terminations shall be made in a controlled environment. The Contractor may choose to have the cables assembled off-site, although testing must be completed with the cable in its final installed condition.
4. The Contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer's specifications.

I. HPC CAT 3 Copper Cable Installation

1. Installation of HPC CAT 3 copper cables shall be performed according to guidelines established by the product manufacturer and in compliance with industry standards. Special care shall be taken to avoid damage to cable.
2. While under pulling tension, the cable shall not be formed into a curve with a radius less than 10 times the cable diameter to avoid cable pair damage.
3. Pulling tension shall not exceed the manufacturer's recommended maximum tensile load.
4. If a pull winch is used, it shall be equipped with tension control or a break-away link designed to separate at or below the recommended maximum tension.
5. A minimum 15' service loop shall be maintained inside the building.
6. Maintain one complete loop around inside of each manhole.
7. When installation of copper cable involves existing communications equipment, work shall be performed in the presence of Owner, unless otherwise directed.
8. Any damage caused as a result of work performed under this scope shall be corrected within 48 hours.
9. The conduit walls shall be completely lubricated when cable is pulled. The lubricant shall be applied immediately before or during the pull. The cable lubricant shall meet the following specification:
10. The lubricant shall be UL listed.
11. The lubricant shall produce no deleterious effects on physical or electrical properties of cable jackets.
12. The lubricant shall produce no stress cracking on LDPE cable jackets when tested per IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.
13. Cable jacket materials LLDPE, XLPE, CPE, and PVC heat aged in lubricant shall pass tensile and elongation compatibility requirements from IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.

14. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes.
15. The lubricant shall not phase-out after five freeze/thaw cycles or 5-day exposure at 60 degrees C.
16. A 200-gram sample of the lubricant, when placed in a one-foot, split metal conduit and fully dried for 24 hours at 105 degrees C., shall not ignite with a pilot flame and continuously burn for more than one minute at a continued heat flux of 40 kW/m².
17. Should a cable become kinked, skinned or stretched during installation, it shall be removed and replaced. Splicing at points other than those specified will not be acceptable.
18. Termination and closure of copper cable shall be performed by installers who are properly trained and have prior experience in the handling and care of copper and the preparation of termination points.
19. Bending radius of copper cable shall not exceed manufacturer's specifications.
20. Manufacturer's instruction shall be followed for terminating copper cable.
21. Perform all work in facilities (e.g. conduits, junction boxes, cabinets and buildings) containing existing communications equipment only in the presence of Owner, unless otherwise directed.
22. Use shear pins or other failsafe means to prevent exceeding the maximum cable pulling tension specified by the cable manufacturer.
23. Replace any copper cable segment not meeting the requirements of the specifications in its entirety between splice points shown on the plans. Compliance with industry standards. Special care shall be taken to avoid damage to cable.
24. While under pulling tension, the cable shall not be formed into a curve with a radius less than 20 times the cable diameter to avoid fracture of the fiber member.
25. Pulling tension shall not exceed the manufacturer's recommended maximum tensile load.
26. If a pull winch is used, it shall be equipped with tension control or a break-away link designed to separate at or below the recommended maximum tension.
27. A minimum 15' service loop shall be maintained inside the building. Service loops shall be properly contained and organized in slack loop managers. The slack loop managers shall be secured and supported and not hanging freely.
28. A minimum of 30' service loop shall be maintained within each manhole or handhole. Where splice points exist within the manhole or handhole, the 30' service loop shall be divided with 15' on either side of the splice point. Service loops shall be properly contained and organized in slack loop managers. The slack loop managers shall be secured and supported and not hanging freely.
29. When installation of fiber optic cable involves existing communications equipment, work shall be performed in the presence of owner, unless otherwise directed.
30. Any damage caused as a result of work performed under this scope shall be corrected within 48 hours.
31. The innerduct walls shall be completely lubricated when cable is pulled. The lubricant shall be applied immediately before or during the pull. The cable lubricant shall meet the following specification:
 - a. The lubricant shall be UL listed.
32. The lubricant shall produce no deleterious effects on physical or electrical properties of cable jackets.
33. The lubricant shall produce no stress cracking on LDPE cable jackets when tested per IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.

34. Cable jacket materials LLDPE, XLPE, CPE, and PVC heat aged in lubricant shall pass tensile and elongation compatibility requirements from IEEE Standard 1210, Standard Tests for Determining Compatibility of Cable-Pulling Lubricants with Wire and Cable.
35. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes.
36. The lubricant shall not phase-out after five freeze/thaw cycles or 5-day exposure at 60 degrees C.
37. A 200-gram sample of the lubricant, when placed in a one-foot, split metal conduit and fully dried for 24 hours at 105 degrees C., shall not ignite with a pilot flame and continuously burn for more than one minute at a continued heat flux of 40 kW/m².
38. Should a cable become kinked, skinned or stretched during installation, it shall be removed and replaced. Splicing at points other than those specified will not be acceptable.
39. Termination and closure of fiber optic cable shall be performed by installers who are properly trained and have prior experience in the handling and care of fiber optics and the preparation of termination points.
40. When installing fiber optic connectors and terminal cabinets, work area must be cleaned and free of excessive dust and moisture. Final preparation and installation of fiber equipment shall occur after all work which may produce fine dust or involve moisture such as sheet rock preparation and core drilling.
41. Bending radius of fiber optic cable shall not exceed manufacturer's specifications.
42. Manufacturer's instruction shall be followed for terminating fiber optic cable. Install dust covers on all unused connector ports.
43. Perform all work in facilities (e.g. conduits, junction boxes, cabinets and buildings) containing existing communications equipment only in the presence of owner, unless otherwise directed.
44. Use shear pins or other failsafe means to prevent exceeding the maximum cable pulling tension specified by the cable manufacturer.
45. Replace any fiber optic cable segment not meeting the requirements of the specifications entirety between splice points shown on the plans.

3.3 SPLICE ENCLOSURE INSTALLATION

- A. Assemble, seal, and install the fiber optic and copper splice closures per the manufacturer's recommendations.
- B. Use all tools/kits required to assemble and test closures per manufacturer's recommendations.
- C. Pressurize each enclosure to the manufacturer's recommended PSI and check for leaks with soapy water. After the closure passes the pressure test bleed the closure.
- D. Furnish and install all required hardware to mount closures to manhole racks. Furnish and install racks in existing manholes.
- E. Ground copper enclosures as required to existing grounding system in existing manholes.
 - 1) All placement shall conform to industry standards with regard to anchoring, cable support and separation from other facilities.
 - 2) Cables shall not sag or droop but shall be installed so as to maintain a flat plane with smooth transitions from one level or direction to another.

- 3) All cables shall be sufficiently racked and supported in order to eliminate stress on the cable.
- b. Backbone Copper Cables:
 - 1) Secure all backbone cables to wall within 12 inches of all terminations.
 - 2) UTP backbone cables shall be installed in conduit, cable tray, on cable runway, or cable trough.
 - 3) Cables above drywall ceilings shall be installed in conduit. Cables in exposed areas other than MER and TR shall be installed in conduit or surface raceway.
 - 4) Cables shall not be allowed to lay on the ceiling slab or ceiling support structure. They must be anchored in such a way as to not interfere with other services or space access.
- c. Optical Fiber Cable
 - 1) All fiber cables shall be terminated with LC Duplex style connectors, multimode OM1 and LC Duplex style single mode OS2.
 - 2) All backbone fiber cables shall provide no less than 15 feet of spare cable at each end.
 - 3) No splices will be acceptable in fiber cables, except for the installation of factory pigtails.
 - 4) All fiber cables shall be neatly dressed and secured at racks and cabinets.
 - 5) All pulls of optical fiber cable shall be made with a recording tension meter and breakaway swivel.
 - 6) Where 250 micron coated fiber is field terminated, breakout kits that build up the fiber to a minimum 900 microns shall be used.

F. Cross-Connect Installation

1. Termination and management hardware shall be installed in the following manner:
 - a. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-D document or most current documentation, manufacturer's recommendations and/or best industry practices.
 - b. Pair untwist at the termination shall not exceed ½ inch.
 - c. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
 - d. Cables shall be neatly bundled and dressed to their respective panels. Each panel shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack.
 - e. The cable jacket shall be maintained as close as possible to the termination point.
 - f. Each cable shall be clearly labeled where it can be viewed and properly associated with the termination, without the need to unbundle cables. Cables labeled within the bundle shall not be acceptable.
 - g. Fiber slack shall be neatly coiled within the fiber termination panel. No slack loops shall be allowed external to the fiber panel(s). Fiber cables shall be neatly bundled and dressed to their respective panels.

- h. Each cable shall be clearly labeled within the enclosure so that the label can be viewed when the panel is opened. Cables labeled within the bundle shall not be acceptable.
- i. Dust caps shall be installed on the connectors and couplings at all times unless physically connected.

3.4 CABLE SYSTEM TESTING

A. Quality Assurance:

- 1. Comply with UL.
- 2. Comply with NFPA 70.
- 3. Comply with ANSI/TIA/EIA 568-D.
- 4. Tester Qualification: All personnel performing testing shall be trained and certified in the operation of the test equipment and in the analysis of the results, by the equipment manufacturer.
- 5. Testing Conference: Meet with the Owner's Representative on approval of the testing plan to develop a mutual understanding of the detail. Provide seven days advance notice of scheduled meeting time and location.
 - a. Agenda Items: Include at least the following:
 - 1) Submittal distribution requirements.
 - 2) Contract documents examination report.
 - 3) Testing plan.
 - 4) Work schedule and project site access requirements.
 - 5) Coordination and cooperation of trades and subcontractors.
 - 6) Coordination of documentation and communication flow.
- 6. Certify the testing results for accuracy and compliance with the specifications.
- 7. Calibrate instruments at least every six months.

B. General:

- 1. All copper cables and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions in compliance with TIA/EIA 568-B. All conductors of each installed cable shall be verified usable by the contractor prior to system acceptance. Any defect in the cable system installation including but not limited to cable, connectors, feedthrough couplers, patch panels, and connector blocks shall be repaired or replaced, at no cost to the Owner, in order to ensure 100% useable conductors in all cables installed.
- 2. Test leads for all tests shall be of the same manufacturer, grade, and type as the test subject.
- 3. Test instrument data shall be submitted in accordance with Division 1 requirements. In addition, all test instruments utilized on this project shall be consistent throughout the duration of the project.
- 4. All optical fiber cable strands and termination hardware shall be 100% tested for defects in installation and to verify cable performance under installed conditions in compliance with TIA/EIA 568-B. All strands of each installed cable shall be verified useable by the

Contractor prior to system acceptance. Any defect in the cable system installation including, but not limited to, cable, connectors, feedthrough couplers, and patch panels shall be repaired or replaced, at no cost to the Owner, in order to ensure 100% useable strands in all cables installed.

C. Copper Cables:

1. Each cable shall be tested for continuity on all pairs and/or conductors. Twisted-pair data cables shall be tested for the all of the above requirements, plus tests that indicate installed cable performance. These data cables shall be tested using a Class I cable analyzer.
2. Each pair of each installed cable shall be tested using a "green light" test set that shows opens, shorts, polarity and pair-reversals. The test shall be recorded as pass/fail as indicated by the test set in accordance with the manufacturers recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance at no cost to the Owner.
3. Each installed cable shall be tested for installed length using a TDR type device. The cable length shall conform to the maximum distances set forth in the TIA/EIA-568-B Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number.
4. High speed unshielded twisted pair (UTP) data cable shall be performance verified using an automated test set. This test set shall be capable of testing for the continuity and length parameters defined above, shall be performed Bi-directionally and provide results for the following tests:
 - a. Near End Cross-Talk (NEXT)
 - b. Attenuation
 - c. Ambient Noise
 - d. Attenuation to Cross-Talk Ratio (ACR)
 - e. Power Sum NEXT
 - f. Propagation Delay
 - g. Propagation Delay Skew
 - h. Power Sum ACR
 - i. ELFEXT
 - j. Power Sum ELFEXT
 - k. Return Loss
5. Test results shall be automatically evaluated by the equipment, using the most up-to-date criteria from the TIA/EIA Standard, and the result shown as pass/fail. Test results shall be printed directly from the test unit or from a download file using an application from the test equipment manufacturer. The printed test results shall include all tests performed, the expected test result and the actual test result achieved. Hard and soft copies of the results shall be provided to the Owner in the format requested by the Owner.
6. Results which are marginal and cause 'flags' or other identifiers on the test results are unacceptable. These types of results are often referred to as Pass* by test equipment manufacturers. Cable installations providing Pass* results shall be corrected as necessary without additional cost to the Owner.

D. Optical Fiber Cables

1. Each fiber strand shall be tested for attenuation with an optical power meter and light source. Cable length and splice attenuation shall be verified using an OTDR.
2. Multimode optical fiber attenuation shall be measured at 850 nanometers (nm) and 1300 nm using an LED light source and power meter. Tests shall be performed at both wavelengths on each strand of fiber. The set-up and test shall be conducted in accordance with EIA/TIA-526-14 Standard, Method B. Two meter patch cords shall be used as test references and for the actual test. This test method uses a one jumper reference, two jumper test to estimate the actual link loss of the installed cables plus two patch cords. Test evaluations for the panel to outlet (horizontal) shall be based on the values set forth in the EIA/TIA-568-B Annex H, Optical Fiber Link Performance Testing.
3. Test evaluation for the panel to panel (backbone) shall be based on the values set forth in the EIA/TIA-568-B Annex H, Optical Fiber Link Performance Testing.
4. Each strand shall be tested with an Optical Time Domain Reflectometer (OTDR) to verify installed cable length and splice losses. The OTDR measurements for length shall be performed in accordance with EIA/TIA-455-60. The measurements to determine splice loss shall be performed in accordance with manufacturers' recommendations and best industry practices.
5. Cable Tests:
 - a. Test 1 - every strand shall be tested in one direction only, with an Optical Time Domain Reflectometer (OTDR) at a wavelength of 850 nm for multi-mode and 1310 nm for single-mode. The OTDR tests are to be printed out from the test equipment and delivered to the Owner with the other documents. This test can be performed utilizing a lab splice.
 - b. Test 2 - each strand is to be tested with an Optical Time Domain Reflectometer (OTDR), at wavelengths of 850 nm and 1300 nm for multi-mode and 1310 nm and 1550 nm for single-mode. The OTDR tests are to be printed out from the test equipment and delivered to the Owner with the other documents.
 - c. Test 3 - each strand is to be tested with an Optical Power Source (transmitter) and an Optical Power Meter (receiver) measured at wavelengths of 850 nm and 1300 nm for multi-mode and 1310 nm and 1550 nm for single-mode. The results of this test shall be recorded by the technician and delivered to the Owner with the other documents
6. Cable Testing - Pre Construction:
 - a. Perform Test 1
 - b. All strands of optical fiber cable shall be tested by the cabling contractor before it is installed. Every strand shall be tested with an Optical Time Domain Reflectometer (OTDR) at a wavelength of 850 nm multimode and 1310 nm, single mode.
 - c. If a single strand is found damaged, the cable will be considered a bad cable and must be replaced at no additional cost to the Owner.
7. Cable Testing - After Installation - Before Splicing or Termination:
 - a. Perform Test 1

- b. All strands for each cable segment shall be tested after they are installed and before they are spliced
- c. If a single strand is found damaged, the cable will be considered a bad cable and must be replaced at no additional cost to the Owner.
- d. Test the new segment to demonstrate acceptability.

8. Cable Testing - After Splicing and Terminating:

- a. Perform Test 2
- b. Perform Test 3
- c. If a single strand is found to exceed the performance criteria, the source of the problem must be identified and rectified or the cable will be considered a bad cable and must be replaced. The Owner shall not bear any additional expense to rectify the problem or to replace the cable.
- d. The results of the above tests are to be certified reports, provided in both hard copy and soft copy format. The soft copy shall be accompanied by all software necessary to fully utilize the test results. Tests are to be witnessed by the owner's field representative and manually recorded.
- e. Test results shall be organized in a manner that is acceptable to the Owner.

9. Maximum Acceptable Loss (Multimode Fiber):

- a. Every strand of each fiber optic cable shall have an allowable loss (from end to end) based on the formulas listed below. All strands of fiber must meet this criterion. A single fiber strand which does not meet criteria shall be considered as a bad cable and the cable will have to be replaced by the Contractor at no additional cost to the Owner.

1) Measuring at a wavelength of 850 nm:

_____ km X 3.0 dB/km	=	_____
_____ SC connectors X 0.5 dB/mated pair	=	_____
_____ Splices X 0.07 dB single fiber	=	_____ (max.)
_____ Splices X 0.2 dB ribbon fiber	=	_____ (max.)
_____ Total maximum (end to end) loss	=	_____

2) Measuring at a wavelength of 1300 nm:

_____ km X 1.0 dB/km	=	_____
_____ SC connectors X 0.5 dB/mated pair	=	_____
_____ Splices X 0.07 dB single fiber	=	_____ (max.)
_____ Splices X 0.2 dB ribbon fiber	=	_____ (max.)
_____ Total maximum (end to end) loss	=	_____

10. Maximum Acceptable Loss (Single-Mode Fiber):

- a. Every strand of each fiber optic cable shall have an allowable loss (from end to end) based on the formulas listed below. All strands of fiber must meet this criteria. A single fiber strand which does not meet criteria shall be considered as a

bad cable and the cable will have to be replaced by the Contractor at no additional cost to the Using Agency.

1) Measuring at a wavelength of 1310 nm:

_____ km X .50 dB/km	=	_____
_____ SC connectors X 0.4 dB/mated pair	=	_____
_____ Splices X 0.05 dB	=	_____
_____ Total maximum (end to end) loss	=	_____

2) Measuring at a wavelength of 1550 nm:

_____ km X .40 dB/km	=	_____
_____ SC connectors X 0.4 dB/mated pair	=	_____
_____ Splices X 0.05 dB	=	_____
_____ Total maximum (end to end) loss	=	_____

3.5 CABLE SYSTEM LABELING

A. General

1. This section describes the administration of cables, termination hardware, termination positions, and splices within the administrative jurisdiction. As changes are made to the wiring system, affected labels, records, reports, and drawings shall be updated.
2. Identical cables spliced together shall be administered as a single cable.
3. This section describes the administration of the wiring hierarchy specified in ANSI/TIA/EIA-606A.
4. All labeling shall utilize machine generated characters. No hand written labels shall be accepted.

B. Identifiers

1. Cable Identifiers

- a. A unique identifier shall be assigned to each cable to serve as a link to the cable record. This identifier shall be marked on each cable or its labels.

2. Cable Labeling

- a. Horizontal and backbone subsystem cables shall be labeled at each end. Labels shall be affixed at each end rather than marking the cable. For proper administration, additional cable labeling may be required on the cable at intermediate locations such as conduit ends, backbone splice points, manholes, and pull boxes. Both end termination positions shall be marked on the cable or its labels.

- 1) Note - For hybrid cables, additional cable labels should be used to identify the individual hybrid components.

- b. Cables of differing conductor counts that are spliced together may be administered as separate cables.
 - c. The difference splice segments (branches) may be labeled with a single cable identifier provided that the pair/conductor count of the largest cable is maintained end-to-end and indicated on the cable labels.
 - d. In the event that a cable is routed through multiple pathway segments, the pathway record linkage field shall contain references to all pathway segments used.
- 3. Termination Hardware Identifiers
 - a. A unique identifier shall be assigned to each termination hardware unit to serve as a link to its record.
 - b. An identifier shall be marked on each termination hardware or its label.
- 4. Termination Position Identifiers
 - a. A unique identifier shall be assigned to each termination position to serve as a link to the termination position record.
 - b. An identifier shall be marked on each termination position label. Each termination position shall be marked with the termination identifier except in cases where high termination densities make labeling impractical. In these cases, identifiers shall be assigned to each termination hardware unit and to the actual termination position identifier determined by the conventions used for that unit. Labeling at the work area end may also include the termination position identifier for the other end of the cable and the cable identifier.
- 5. Splice Closure Identifiers
 - a. A unique identifier shall be assigned to each splice closure to serve as a link to the splice record.
 - b. An identifier shall be marked on each splice closure or its label.

C. Labeling and Color Coding

- 1. Labels
 - a. Adhesive Labels
 - 1) Adhesive labels shall meet the legibility, defacement, and adhesion requirements specified in UL 969 (Ref D-16). Additionally, labels shall meet the general exposure requirements in UL 969 for indoor use. Outside plant labels shall meet the exposure requirements listed in UL 969 for indoor and outdoor use.
 - 2) Cable labels should have a durable substrate, such as vinyl, suitable for wrapping. It is recommended to use labels with a white printing area and a clear “tail” that self-laminates the printed area when wrapped around a cable. The clear tail should be of sufficient length to wrap around the cable at least one and one-half times.
 - 3) All characters shall be machine generated using a legible font large enough to read. All ink shall be permanent, non-fading, non-bleeding.

b. Insert Labels

- 1) Insert labels shall meet the legibility, defacement, and general exposure requirements specified in UL 969. Outside plant labels shall meet the exposure requirements listed in UL 969 for indoor and outdoor use. An insert label shall be securely held in place under the normal operating conditions and usage to which the labeled infrastructure element is subjected.
- 2) All characters shall be machine generated using a legible font large enough to read. All ink shall be permanent, non-fading, non-bleeding.

c. Pathway ID Tags

- 1) Each pathway, (conduit, cable tray, etc.), shall be appropriately tagged at both ends at strategic locations where midspans are accessible/visible.
- 2) Each tag shall be 2/32 inch thick stainless steel, 2 inch to 2-1/2 inch in diameter, and include a 5/32 inch hole for the fastener.
- 3) Authorized fasteners shall be wire-link chain or beaded chain.
- 4) Letters shall be stamped or engraved, 4/32 inch high, and be consistent with the specified labeling scheme.

D. Records

1. Cable Records

- a. The cable identifier, cable type, and unterminated, damaged, available pairs/conductors shall be recorded for each cable. Additionally, linkages to termination position records, splice records, pathway records, and grounding records shall be maintained. The cable record shall document every pair/conductor in the cable.
- b. The cable type field shall include the manufacturer and manufacturer's designation. The month and year of installation or acceptance shall also be recorded.
- c. The termination position linkage field is used to document the termination positions of every pair/conductor or set of pairs/conductors of the cable. Each pair/conductor or set of pairs/conductors has a linkage to two termination position records.

2. Termination Hardware Records

- a. The termination hardware identifier and type, and damaged position numbers shall be recorded for each element of termination hardware. Additionally, linkages to termination position records, space records, and grounding records shall be maintained. The termination hardware record shall identify every termination position within the hardware.

3. Termination Position Records

- a. The termination position identifier type, user code, and cable pair/conductor numbers shall be recorded. Additionally, linkages to cable records, termination

position records, termination hardware records, and space records shall be maintained.

4. Splice Records

- a. The splice identifier and type shall be recorded. Additionally, linkages to cable records and space records shall be maintained.

3.6 CLEANING

- A. On completion of system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

3.7 WARRANTY

- A. The installing contractor shall facilitate a manufacturer's warranty between the manufacturer and the Owner which provides coverage of the installed cabling system for twenty years. An extended component warranty shall be provided which warrants the functionality of all components used in the system for twenty years from the date of registration along with a twenty year performance warranty for the horizontal cable plant.
- B. At a minimum, the warranty shall define the following:
 1. That all passive components (those exhibiting no gain or energy contribution) comprising the registered solution will be free from manufacturing defects in material and workmanship under normal and proper use.
 2. That all cabling components utilized in the registered solution exceed the specifications of the TIA/EIA 568-D and ISO/IEC IS 11801 standards.
 3. That the installation will exceed the attenuation, near end crosstalk (NEXT), and power sum requirements of TIA/EIA Bulletin 568-D and ISO/IEC IS 11801 for cabling links and channels.
 4. That the installation will exceed the loss and bandwidth requirements set forth in of TIA/EIA Bulletin 568-D and ISO/IEC IS 11801 for fiber links and channels.
 5. That the registered solution will be free from failures which prevent operation of any current or future applications introduced by recognized standards or user forums that use the TIA/EIA 568-D and ISO/IEC IS 11801 component and link/channel performance specifications.
- C. The warranty shall include all parts and labor necessary.
- D. The warranty shall apply to the "LINK" as defined by TIA/EIA. B "CHANNEL" warranty is not applicable.

END OF SECTION 271350