

MAY 24, 2013

SOLICITATION

FOR

FIRE ALARM SYSTEM UPGRADE

FOR THE

WOOD-ALLIES PARKING GARAGE & OFFICE SPACE

FOR THE

PUBLIC PARKING AUTHORITY OF PITTSBURGH

David D. Onorato
Executive Director

FORM OF ADVERTISEMENT

PUBLICATION DATE: May 24, 2013

1. The Public Parking Authority of Pittsburgh ("Authority") shall accept sealed bids for the performance of the work described below (the "Work") at its office at 232 Boulevard of the Allies, Pittsburgh, Pennsylvania, 15222, until **11:00 a.m.** local time on **Tuesday, June 11, 2013.**
2. DESCRIPTION OF WORK: The Project entails Fire Alarm System Upgrade for the Wood-Allies Parking Garage & Office Space.
3. The Instructions to Bidders, including the Form of Bid, Form of Agreement, General Conditions, Plans and Specifications, may be obtained after **3:00 p.m.** local time on **Friday, May 24, 2013** at the Authority's office at 232 Boulevard of the Allies, Pittsburgh, Pennsylvania, 15222 at no charge.
4. A mandatory pre-bid conference will be held at the office of the Public Parking Authority of Pittsburgh, 232 Blvd. of the Allies, Pittsburgh, PA, 15222 at **3:00 p.m.** local time on **Thursday, May 30, 2013.** The purpose of the pre-bid conference is to provide additional detail regarding the Work. The information provided at the pre-bid conference will be essential in preparing a bid to perform the Work. Persons or entities that intend to submit bids to perform the Work are required to send to the pre-bid conference at least one representative who will understand the information presented at the pre-bid conference in a manner that allows such information to be incorporated in the preparation of the bid to perform the Work. It is expected that the representative who attends the pre-bid conference will be experienced in construction matters and employed by the bidder in a supervisory capacity. **Pre-bid attendance is mandatory.**
5. Sealed bids received prior to the deadline will be publicly opened and read at **11:00 a.m.** local time on **Tuesday, June 11, 2013.**
6. The Authority reserves the right to (i) change, at any time prior to the bid deadline at **11:00 a.m.** local time on **Tuesday, June 11, 2013** the Contract Documents; (ii) waive any informality in any or all submitted bids; and (iii) reject any or all submitted bids.

David G. Onorato
Executive Director

INSTRUCTIONS TO BIDDERS

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INSTRUCTIONS TO BIDDERS

Each bidder (“Bidder”) interested in bidding to perform the work for the Public Parking Authority (the “Authority”), generally described as Fire Alarm System Upgrade for the Wood-Allies Parking Garage & Office Space including the removal of the existing equipment, disposing of the existing unit, installation of the specified new devices and controls, and further described in the Plans and Specifications provided to the Bidder (the “Work”), must submit its Form of Bid (the “Bid”) to perform the Work in accordance with these Instructions to Bidders to be eligible for the award of this contract (the “Contract”).

1. Site of Work.

Wood-Allies Parking Garage & Office Space
232 Boulevard of the Allies
Pittsburgh, PA

2. Contract Documents.

The following contract documents (hereinafter the “Contract Documents”) are provided by the Authority to the Bidders with these Instructions to Bidders and are hereby incorporated herein:

- (1) the Form of Advertisement;
- (2) these Instructions to Bidders
- (3) the Form of Bid;
- (4) the Performance Bond;
- (5) the Labor and Material Bond;
- (6) the Warranty Bond;
- (7) any Addenda issued prior to the execution of the Form of Agreement
- (8) the Form of Agreement;
- (9) the General Conditions;
- (10) the Special Conditions, if any;
- (11) the Minority Participation Forms;
- (12) the Plans;
- (13) the Specifications;
- (14) the Contractor Waiver of Liens

The Bidder must review the Contract Documents to ensure that the Bidder fully understands and can comply with the rights and duties described therein.

3. Defined Terms.

All capitalized terms not otherwise defined herein shall have the meanings ascribed to them in the Form of Agreement and General Conditions and are incorporated herein and made a part hereof.

4. Prevailing Wage Act.

Each Bidder is hereby put on notice that, if awarded the Contract (If the Contract exceeds a value of \$10,000) the Bidder will be required to pay to the workers employed in the performance of the Contract the general prevailing minimum wage rates, including contributions for employee benefits, as shall have been determined by the Secretary of Labor and Industry of the Commonwealth of Pennsylvania ("Secretary"). The Contractor shall, and shall require all Subcontractors and Sub-subcontractors to: (i) pay no less than the wage rates as determined in the decision of the Secretary; (ii) comply with all conditions of the Pennsylvania Prevailing Wage Act, 43 P.S. §§ 165-1 - 165-17, as amended (the "Act"), and the regulations issued pursuant thereto (the "Regulations") to assure the full and proper payment of said rates; and (iii) submit certified payrolls in accordance Section 28.2(e) of the General Conditions. The Contract shall be read so as to include any provision required by the Act or the Regulations to be inserted in the Contract and not so inserted.

5. Pre-bid Conference.

A mandatory pre-bid conference will be held at the office of the Public Parking Authority of Pittsburgh, 232 Blvd. of the Allies, Pittsburgh, PA, 15222 at **3:00 p.m.** local time on **Thursday, May 30, 2013.** The purpose of the pre-bid conference is to provide additional detail regarding the Work. The information provided at the pre-bid conference will be essential in preparing a bid to perform the Work. Persons or entities that intend to submit bids to perform the Work are required to send to the pre-bid conference at least one representative who will understand the information presented at the pre-bid conference in a manner that allows such information to be incorporated in the preparation of the bid to perform the Work. It is expected that the representative who attends the pre-bid conference will be experienced in construction matters and employed by the bidder in a supervisory capacity. **Pre-bid attendance is mandatory.**

6. Receipt of Bids.

The Authority will receive sealed and separate Bids at its office at 232 Boulevard of the Allies, Pittsburgh, Pennsylvania, 15222, until **11:00 a.m.** local time on **Tuesday, June 11, 2013.** Each Bid shall be delivered to the Authority in a blank opaque sealed envelope marked with the name of the project and appropriate contract number. Bids received after **11:00 a.m.** local time on **Tuesday, June 11, 2012** will not be considered by the Authority.

7. Qualifications of Bidders.

The Authority shall review each Bid and evaluate each prospective Bidder. The final Selection of the Bidder for the performance of the Work shall be based upon the following factors: (i) the ability to meet the requirements set forth in the Contract Documents; (ii) the cost of the Work to the Authority; and (iii) the completeness of the Bidder's Bid. In addition, if a Bidder has previously performed construction work for the Authority, the Authority shall consider in its evaluation the quality of the prior construction work, including, without limitation, the ultimate cost to the Authority of the prior work.

The Authority shall also consider the following with regard to the City of Pittsburgh (the "City"). If the successful Bidder(s) is subject to the business privilege tax as specified in Chapter 243 of the Pittsburgh Code, failure to register with the City shall cause a Bidder to be disqualified from consideration for an award of the Contract. (Each Bidder should contact the City's Department of Finance to determine whether it is liable for the payment of the business privilege tax.) No contract will be awarded to any Bidder, who is from any cause, in arrears to the City (other than arrears which are the subject of a good faith dispute pursuant to which the Bidder has instituted appropriate legal action and has posted all necessary bonds and security) or who has failed in any former contract with the City to perform work satisfactorily, either as to the character of the work or the time consumed in its completion.

FAILURE OF A BIDDER, FOR ANY REASON WHATSOEVER, TO SUBMIT THE INFORMATION REQUIRED BY THESE INSTRUCTIONS OR A DULY SIGNED FORM OF BID (INCLUDING WITHOUT LIMITATION THE MBE/WBE FORMS), OR FAILURE TO QUALIFY AS A RESPONSIBLE BIDDER IN THE SOLE JUDGEMENT OF THE AUTHORITY, SHALL CONSTITUTE SUFFICIENT GROUNDS FOR REJECTION, OF THE BIDDER'S BID.

8. Inspections of Site, Premises, and Contract Documents.

- (1) It is crucial that Bidders visit the Work Site and fully inform itself as to the location, performance, completion and cost of the Work. Each Bidder is invited to tour the Work Site at any time the Work Site is open to the public. In addition, each Bidder should carefully examine the Contract Documents.
- (2) Any failure of the successful Bidder to acquaint itself with all available information concerning the Work, the Work Site or the Contract Documents will not relieve it from sole responsibility for estimating properly the difficulty or cost of successfully performing the Work.

9. Addendum.

- (1) No oral requests will be accepted, and no oral interpretations will be given to any Bidder, as to the meaning of the Contract Documents. If a written request is received, a written interpretation will be emailed to all Bidders in the form of an

addendum and all such addenda shall become part of the Contract Documents. No written requests will be accepted after **11:00 a.m.** local time on **Thursday, June 6, 2013**. No addendum will be made after five (5) days before Bids are due. **No change to or clarification of the Contract Documents shall be effective unless in writing and sent to all Bidders via email.**

- (2) Each Bidder shall acknowledge the receipt of each addendum as set forth in the Form of Bid. **Failure to acknowledge receipt of an addendum may disqualify the Bidder from consideration.**

10. Errors or Omissions.

Should a Bidder find errors in, or omissions from the Specifications and/or Plans, or have doubt as to their meaning, it should, before submitting a Bid, notify the Authority. Should a Bidder fail to give such notice, it shall, if awarded the Contract, be responsible for the results of such errors or omissions and the cost of rectifying same.

11. Bid Guaranty.

- (1) No Bid will be considered unless accompanied by a Bid bond, or a certified check, bank cashier's check or treasurer's check payable to the Authority in the amount specified in the Form of Bid.
- (2) With the exception of the Bid bond, certified, or bank check accompanying the Bid of the successful Bidder, all bonds and checks serving as Bid guaranties will be returned within thirty (30) days following the award of the contract.
- (3) If the award is deferred longer than thirty (30) days after the opening of the Bids, all Bid guaranties except those of the three lowest responsible Bidders will be returned.
- (4) Should no award be made within sixty (60) days, or longer if extension has been mutually agreed to, each Bid will be rejected and all guaranties returned.
- (5) The Bid guaranty of the successful Bidder will be returned to it at the time it furnishes acceptable bonds as required in Section 12 of these Instructions to Bidders and executes the Form of Agreement.

12. Bonds Required.

- (1) The Bidder to whom the Contract is awarded shall, within ten (10) days after the award, furnish a surety performance bond (the "Performance Bond"), in the amount of one hundred percent (100%) of the Contract Price and in form satisfactory to the Authority, guaranteeing security for the faithful performance of all covenants and agreements contained in the Contract.

- (2) The Bidder to whom the Contract is awarded shall, within ten (10) days after the award, furnish an additional bond (the "Labor and Material Bond") in the amount of one hundred percent (100%) of the Contract Price and in form satisfactory to the Authority, guaranteeing that the Bidder will promptly pay for all materials furnished and labor supplied or performed in the execution of the Work.
- (3) The Bidder to whom the Contract is awarded shall, within ten (10) days after the award, furnish a warranty bond (the "Warranty Bond"), in the amount of one hundred percent (100%) of the Contract Price and in form satisfactory to the Authority, guaranteeing the performance and quality of the Work.

13. Bids.

- (1) Each Bid shall be delivered to the Authority in blank opaque sealed envelopes marked with the name of the project and appropriate contract number.
- (2) Bids will be publicly opened and read at **11:00 a.m.** local time on **Tuesday, June 11, 2013.**
- (3) All Bids shall conform strictly with all requirements set forth in these Instructions to Bidders, including, without limitation, the Form of Bid.

14. Irregular Bids.

A Bid may be rejected if it shows any omission, alteration of form, additions or deductions not called for, conditional or uninvited alternate bids or proposals, or other irregularities of any kind.

15. Withdrawal of Bids.

No Bidder may withdraw its Bid for a period of sixty (60) days after the date set for the opening of Bids.

16. Award of Contract.

- (1) The Authority reserves the right to (i) change, at any time prior to the Bid deadline of **11:00 a.m.** local time on **Tuesday, June 11, 2013,** the Contract Documents; (ii) waive any informality in any or all submitted Bids; and (iii) reject all submitted Bids.
- (2) If any award is made by the Authority, it will be to the lowest responsible Bidder, within sixty (60) days from the date of the opening of Bids, unless this time is extended by the written consent of the lowest Bidder.

17. Execution of Contract.

The Bidder to whom the Contract is awarded shall properly execute and deliver the Form of Agreement and all other items required thereunder to be delivered within ten (10) days after notice of the award is sent to such Bidder. No Bids or awards shall be binding upon the Authority unless and until the Form of Agreement is properly executed.

18. Failure to Provide Information, Etc. or Execute Contract.

If the Bidder to whom the Contract is awarded fails to give or complete, as the case may be, any or all bonds, forms, documents, insurance or information within the time stipulated or requested by the Authority, the amount of its Bid guaranty shall be forfeited to the Authority, not as a penalty, but as liquidated damages, and the Authority shall have the right to award the Contract to the next lowest responsible bidder.

FORM OF BID

Project: _____

Project No: _____

Contract No: _____

PUBLIC PARKING AUTHORITY OF PITTSBURGH

1. The undersigned, on behalf of _____ (the "Bidder"), hereby certifies that the Bidder has carefully examined all available information relating to the work, generally described as: Fire Alarm System Upgrades at the Wood-Allies Parking Garage & Office Space. This work shall include, but is not limited to, the disconnection and installation of a fire alarm system. The disconnection shall include the removal of the existing fire alarm system and include all conduits, wiring, junction boxes, supports, devices, and repair/patching/painting of surfaces to match existing where equipment remove. The installation shall include all devices, pathways, raceways, supports, penetrations between floors/walls, testing, and obtainment of approvals for occupancy with new fire alarm system in operation. The scope of this work is further described in the Plans and Specifications provided to the Bidder (the "Work"), and the Bidder has fully examined the Contract Documents (as detailed in Section 2 of the Instructions to Bidders), which the successful Bidder shall enter into with the Public Parking Authority of Pittsburgh (the "Authority") for the performance of and payment for the Work.

2. Bidder by submitting this Form of Bid (the "Bid"), offers and agrees to provide all labor, equipment, materials, services, and anything else necessary to fully perform the Work to the satisfaction of the Engineer and the Authority, including, without limitation, the furnishing of the Performance Bond (as defined in the Instructions to Bidders), for the following amount (such amount is referred to herein as the "Base Bid"):

Base Bid Lump Sum Amount: \$ _____

The Base Contract Amount covers all work in the Contract Documents and based on a **July 1, 2013** construction start date. Base contract will utilize the approved schedule drawings submitted by the Contractor based on the Bid documents and assumes 40 hour work weeks.

The bidder agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed", and proposes to complete all Base Contract work within **90 calendar days** or no later than **September 28, 2013**, whichever is earlier, for the Base Contract from and after date of Notice to Proceed.

3. All capitalized terms not otherwise defined herein shall have the meanings ascribed to them in the Form of Agreement and General Conditions and are incorporated herein and made a part hereof.

4. Bidder understands and agrees that the Authority reserves the right to determine whether it shall contract for all or a portion of the Work or any one or more alternates described in the Plans and Specifications and, pursuant to such determination, to award the Contract on the basis of the Base Bid alone or on the basis of the Base Bid and any combination of alternate bids.

5. The undersigned hereby certifies that Bidder is the only person(s) interested in this Bid as principal, and that the Bid is made without collusion with any person, firm or corporation.

6. The undersigned hereby certifies that enclosed is a completed experience questionnaire (the form of which is attached as Schedule 1 to this Bid) and the most current financial statement of the Bidder. The undersigned further certifies that the information contained in the Bidder's experience questionnaire and financial statement is true and correct. The undersigned agrees that, in the event the Authority requests additional information, the Bidder shall supply such information when and as requested by the Authority. The undersigned further understands that failure to submit such information when and as requested by the Authority may disqualify the Bidder from consideration to perform the Work.

7.

(a) The undersigned states on the Bidder's behalf and on behalf of any subcontractors used to complete the Work:

- (1) that applicants for employment are hired without regard to their race, color, religion, gender, ancestry, national origin, place of birth, disability, age or sexual orientation;
- (2) that employees are treated without regard to their race, color, religion, gender, ancestry, national origin, place of birth, disability, age or sexual orientation;
- (3) that the No Discrimination provisions in Section 38 of the General Conditions shall be strictly adhered to; and
- (4) the Bidder proposes to attempt to provide that there will be minority group representation in all trades and in all phases of their operations in accordance with the applicable provisions of the Form of Agreement.

(Bidders are invited to consult with the Mayor's Commission on Human Relations,

Contract Compliance Division, for information, advice and assistance in the preparation of their Bid.)

(b) The undersigned understands and agrees that the Mayor's Commission on Human Relations, or its representative may direct that any Bidder shall submit, as part of its Bid, a statement in writing, signed by an authorized officer or agent on behalf of any labor union or any agency referring workers or providing or supervising apprenticeship or other training, with which the Bidder, with supporting information, to the effect that the signer's practices and policies do not discriminate on the grounds of race, color, religion, gender, ancestry, national origin or place of birth, and that the signer will cooperate affirmatively in the implementation of the policy and provisions of the Contract in accordance with the purposes and provisions of the Contract. In the event that the union, or the agency, shall refuse to execute such a statement, the Bidder shall so certify and set forth what efforts have been made to secure such a statement and such additional factual material as the Mayor's Commission on Human Relations may require.

(c) The undersigned understands and agrees that the Contract will not be awarded to any corporation, firm or individual which has failed to perform satisfactorily any prior undertaking to insure minority group representation as required by the Mayor's Commission on Human Relations or which has not satisfied the Mayor's Commission on Human Relations that it has established and will carry out personnel and employment policies in compliance with the provisions of the Contract.

(d) The following forms / documents, which are attached as Schedule 2, and are hereby incorporated, are submitted as part of this Bid:

- (1) Certificate of MBE/WBE Participation.
- (2) Subcontractor Solicitation Statement.
- (3) Bidder's Previous MBE/WBE Participation History Form.
- (4) Minority and Women Business Commitment Statement.

Further information on Minority and Women Business Enterprises may be obtained from the City of Pittsburgh Office of Business Employment Opportunities (OBEO).

8. The undersigned hereby certifies that the Bidder is / is not [circle one] a Minority Business Enterprise ("MBE") or a Women's Business Enterprise ("WBE"). Bidder is certified as a _____ [state whether an MBE or WBE or NA if not an MBE or WBE] by _____ [insert name of certifying agency].

9. The undersigned agrees that if awarded the Contract, within ten (10) days after notice of the award, it shall furnish to the Authority: (1) Certificates of insurance evidencing that the insurance required under Section 31 of the General Conditions has been obtained. (2) The schedule of values described in Section 28.1 of the General Conditions, and (3) The construction schedule described in Section 6 of the General Conditions.

10. If awarded the Contract, the undersigned agrees to execute and deliver the Form of

Agreement and complete the Work or provide the materials, equipment or items under the Contract in accordance with the time schedule set forth in the Contract, with respective work or provision of materials, equipment or items to commence only after Contract is signed and notification is received from the Authority to proceed with the same.

11. If awarded the Contract, the undersigned agrees to commence the Work within ten (10) days of notification by the Authority to do so and complete the Work within fifteen (15) days as listed in the Form of Agreement.

12. (The following is to be completed only if addenda are issued):

The undersigned acknowledges receipt of the addenda hereinafter listed and agrees that the said addenda shall become a part of the Contract. (List below the number and the issuing dates of each addenda received).

_____	Date _____
_____	Date _____
_____	Date _____

13. The undersigned hereby certifies that the Bidder has taken all necessary action, whether a person, corporation or other entity, required for due authorization, execution and delivery of this Bid, Bidder is qualified to do business in the Commonwealth of Pennsylvania and that Bidder is legally bound to comply with the terms and conditions of this Bid if awarded the Contract.

Name of Bidder

By: _____
Signature of Authorized Officer, Partner
or Individual (as applicable)

Print Name of Person Signing

Title of Authorized Officer or Partner
(if applicable)

Bidder's City of Pittsburgh
Tax I.D. Number

Bidder's MBE/WBE Certification
Number (if applicable)

Schedule 1

Experience Questionnaire
(see attached)

Bidders' Name _____

Primary Contact
Person's Name _____

Phone No. _____

No. Years
in Business _____

Aggregate Amount (In Dollars)
of Work Completed Within Last Twelve Months \$ _____

Bonding Company
(include address) _____

Phone No. _____

Bonding Limit \$ _____

List Three Architect and/or Engineer References

1. _____

Phone No. _____

2. _____

Phone No. _____

3. _____

Phone No. _____

List the Last Three Projects Completed by Bidder:

1. Project Name:	Name, Address and Phone No. of Owner
_____	_____
Contract Amount: _____	_____
Date Project Completed: _____	_____
Description of Project:	

2. Project Name:	Name, Address and Phone No. of Owner
_____	_____
Contract Amount: _____	_____
Date Project Completed: _____	_____
Description of Project:	

3. Project Name:	Name, Address and Phone No. of Owner
_____	_____
Contract Amount: _____	_____
Date Project Completed: _____	_____
Description of Project:	

Schedule 2

MBE/WBE Forms

(see attached)

CERTIFICATE OF MBE/WBE BUSINESS PARTICIPATION

The undersigned ("Bidder") certifies that it understands and agrees to the requirement that Minority and Women Business Enterprises' participate in every contract awarded by the Public Parking Authority of Pittsburgh ("Authority") and the goal of the Authority is that Minority Business Enterprise participation be equal to a minimum of twenty-five (25%) percent and Women Business Enterprise participation be equal to a minimum of ten (10%) percent of the dollar volume of any contract awarded by the Authority.

Failure of Firm to comply with these conditions or failure to sign and submit this Certificate with the Firm's Bid shall disqualify the Bid.

Name of Firm _____

By (Signed) _____

Title _____

Date _____

Project:

Department: _____

MBE/WBE SOLICITATION STATEMENT

Failure to complete this form and submit it with the Bid shall be sufficient cause for rejection of the Bid.

BIDDER'S FIRM:

ADDRESS:

TELEPHONE:

CONTACT PERSON:

PROPOSAL AND BID FOR:

List Certified MBE/WBE that you have solicited and those you have commitments to in reference to your Bid.

Company Name & Certification	Address	Telephone	M B E	W B E	Contact Person	Date Contacted		Type of Transaction	
						Mail	Phone	Joint Venture	Sub-Contractor

Prepared by: _____ Title: _____ Telephone: _____

PUBLIC PARKING AUTHORITY OF PITTSBURGH

MINORITY AND WOMEN BUSINESS COMMITMENT STATEMENT

PROJECT:

Department:

BIDDER MAY UTILIZE THE SERVICES OF SUBCONTRACTOR(S) AND/OR SUPPLIER(S) FOR THE FOLLOWING CATEGORIES:

	<u>Total Estimated Subcontractor(s)</u>	<u>MBE Estimated Dollar Amount</u>	<u>WBE Estimated Dollar Amount</u>
(Identify by name, Certification Number and Certifying Agency)			

	<u>Total Estimated Dollar Amount</u>	<u>MBE Estimated Dollar Amount</u>	<u>WBE Estimated Dollar Amount</u>
Supplier(s) (Identify by name, Certification Number and Certifying Agency)			

BIDDER SHALL PROVIDE EMPLOYMENT FOR THE WORK AS FOLLOWS:

Estimated Compensation
All Employees

Estimated Compensation
Minority and Women Employees

I, the undersigned do hereby certify that this form contains no misrepresentations or falsifications, omissions or concealment of material fact, and that the information given by me is true and complete to the best of my knowledge and belief. I am aware that all information on this form is subject to investigation.

Bidder Name _____

By (Signed) _____

Title _____

Date _____

MBE/WBE COMMITMENT STATEMENT

Additional Information

The Bidder wishes to present the following as additional and supplemental information to its MBE/WBE Solicitation and Commitment Statement:

Prepared by: _____ Title: _____ Telephone:

**PITTSBURGH PARKING AUTHORITY
MWBE AND MINORITY EMPLOYMENT
MONTHLY PROGRESS PAYMENT STATUS REPORT**

PROJECT NAME: _____ REQUEST FOR PAYMENT NO: _____

PRIME CONTRACTOR: _____ PERIOD: _____ TO _____

1	2	3	4	5	6	7
PRIME CONTRACT AMOUNT	PRIME PAYMENTS MADE-TO-DATE	MWBE SUBCONTRACTOR/SUPPLIER NAME, CERTIFICATION NO.	MWBE PROJECTED PARTICIPATION AMOUNTS	% MWBE PROJECTED PARTICIPATION 5=(4/1)	MWBE PAYMENTS MADE-TO-DATE	% MWBE GOAL MET TO-DATE 7=(6/1)
\$	\$		\$		\$	

INSTRUCTIONS:

1. Any changes or substitutions of M/WBE must be submitted in writing.
2. Assistance is available to identify M/WBE companies.
3. When a change order increases the contract amount, Prime Contractors are encouraged to increase M/WBE allocation goal accordingly.

MINORITY EMPLOYMENT FOR THE PROJECT			
8	9	10	11
PROJECTED PAYROLL PAYMENTS \$	% PROJECTED PARTICIPATION 9=(8/1)	PAROLL PAYMENTS TO-DATE \$	% GOAL MET TO DATE 11=(10/1)

I, the undersigned do hereby certify that this form contains no misrepresentations or falsifications, omissions or concealment of material fact, And that the information given by me is true and complete to the best of my knowledge and belief. I am aware that all information on this Form is subject to investigation

Contractor: _____ Title: _____

By (signed): _____ Date: _____

PLEASE ATTACH SUBCONTRACTOR INVOICES WITH THIS FORM

Exhibit A

FORM OF AGREEMENT
(see attached)

THIS FORM OF AGREEMENT (this "Agreement") made as of the _____ day of _____, _____ is by and between _____ ("Contractor"), located at _____ and the Public Parking Authority of Pittsburgh ("Authority").

WHEREAS, the Authority solicited bids from contractors for the performance of the Work (hereinafter defined); and

WHEREAS, in response, the Contractor submitted to the Authority a Form of Bid (the "Bid"), a true and correct copy of which is attached to this Agreement as Exhibit A and made a part hereof ; and

WHEREAS, the Authority and Contractor desire to enter into this Agreement to set forth the terms and conditions, including those set forth in the General Conditions (the "General Conditions") which are attached as Exhibit B and made part hereof, under which the Contractor shall perform the Work.

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained herein, and intending to be legally bound hereby, the parties hereto covenant and agree as follows:

1. Work. The term "Work" as used in this Agreement means the construction related to the work at the Wood-Allies Parking Garage & Office Space, Pittsburgh, Pennsylvania, generally described as Fire Alarm System Upgrade, and further described in the Plans and Specifications provided to the Bidder, in conjunction with all of the terms and specifications in the Bid, whether completed or partially completed, and includes all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations under the Contract Documents (as defined below).

2. Definitions:

(a) The term "Contract Documents" means the documents listed below:

1. the Instructions to Bidders related to the Form of Bid;
2. the Form of Bid
3. this Agreement;
4. the Performance Bond;
5. the Labor and Material Bond;
6. the Warranty Bond;
7. any addenda issued prior to the execution of this Agreement;
8. the following modifications to the Contract issued after execution of this Agreement: (i) a written amendment to the Agreement signed by both parties, and (ii) a Change Order (as defined in the General Conditions);
9. the General Conditions;
10. the Special Conditions, if any;

11. the Minority Participation Forms attached as Schedule 3 to the Form of Bid;
12. the Plans (as defined in the General Conditions); and
13. the Specifications (as defined in the General Conditions).
14. the Contractor Waiver of Liens

3. The term "Engineer" refers to the third party employed by the Authority to conduct the engineering duties or the employee of the Authority given the duty to conduct the functions of the Engineer. The Engineer will be acting as an agent of the Authority, and shall conform to the final decision of the Authority in any and all matters.

(a) The term "Labor and Material Bond" means the bond furnished by the Contractor prior to execution of this Agreement in the amount of one hundred (100%) percent of the Contract Price (hereinafter defined), guaranteeing that the Contractor will promptly pay for all materials furnished and labor supplied or performed in the prosecution of the Work.

(b) The term "Performance Bond" means the surety performance bond furnished by the Contractor prior to execution of this Agreement in the amount of one hundred twenty (120%) percent of Contract Price for the Work set forth in this Agreement guaranteeing security for the faithful performance of all covenants and agreements contained in the Contract Documents, including without limitation, coverage against any additional costs incurred by the Authority in the event that the Authority must complete Work.

(c) The term "Warranty Bond" means the warranty bond furnished by the Contractor prior to execution of this Agreement in the amount of one hundred percent (100%) of the Contract Price for the Work set forth in this Agreement, guaranteeing the performance and quality of the Work.

4. Scope of the Work: The Contractor shall execute, perform and complete the Work and shall do everything required by the Contract Documents. The Contractor understands and agrees that time is of the essence of the Contract Documents wherein a definite and certain length of time is fixed for the performance of any act whatsoever.

5. Time of Completion: The Work shall be commenced within ten (10) days after notification by the Authority to commence the Work so and shall be completed within the time specified in the Construction Schedule as prescribed in the General Conditions. The time for completion of the Work set forth in the Construction Schedules, as amended from time to time by Change Orders executed in accordance with the General Conditions, shall hereinafter be referred to as the "Contract Time."

6. The Contract Price: The Authority shall pay the Contractor _____ (\$ _____) in immediately available funds for the execution, performance and completion of the Work. The price to be paid by the Authority for the execution, performance and completion of the Work under this Section 5, as modified from time to time by Change Orders executed in accordance with the General Conditions, shall hereinafter be referred to as the "Contract Price."

7. Payment: Payment shall be made in accordance with the applicable provisions of the General Conditions.

8. Examination of Work Site. Execution of this Agreement by the Contractor is a representation that the Contractor has carefully examined the Contract Documents, visited the Work Site, become familiar with the location and field conditions under which the Work is to be performed and incorporated personal observations with the requirements of the Contract. Any failure of Contractor to acquaint itself with all available information concerning the Work will not relieve it from performing the Work within the Contract Time or for the Contract Price.

9. Liquidated Damages. If the Work is not completed to the satisfaction of the Authority within the Contract Time or as may be extended in accordance with the Contract, or the Contractor violates a Contract provision, which specifies the applicability of Liquidated Damages, the Authority shall, at its option:

(i) in the event that actual damages are speculative and difficult to ascertain, deduct from payments due and owing the Contractor, or the Contractor shall pay directly to the Authority, the sum of FIVE HUNDRED AND NO/100 DOLLARS (\$500) for:

(a) each calendar day of delay until the Work is completed to the satisfaction of the Engineer and the Authority; or

(b) each calendar day until the Contract violation is resolved to the satisfaction of the Authority; or

(ii) deduct from payments due and owing the Contractor, or the Contractor shall pay directly to the Authority, the sum of the actual damages sustained by the Authority due to the delay of completion of Work or Contract violation (hereinafter "Liquidated Damages").

10. Contractor Waiver of Liens. Contractor agrees that it will execute a Waiver of Liens, as provided by the Authority (the "Contractor Waiver of Liens"), whereby the Contractor will ensure that no mechanics' liens or claim or other lien or claim of any kind shall be filed against the Premises or the Authority. The Contractor shall not be permitted to commence the Work until the Waiver of Liens has been fully executed and properly recorded.

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

CONTRACTOR

ATTEST:

By: _____

Name: _____

Title: _____

**PUBLIC PARKING AUTHORITY
OF PITTSBURGH**

ATTEST:

By: _____

Name: _____

Title: _____

Exhibit B
(to the Form of Agreement)

General Conditions

(see attached)

GENERAL CONDITIONS

1. **General Definitions.**

- (a) The term "Agreement" shall have the meaning set forth in Section 1 (e) below.
- (b) The term "Authority" shall have the meaning set forth in the Form of Agreement (the "Agreement") by and between the Authority and the Contractor providing for performance of and payment for the Work and to which these General Conditions are attached as Exhibit B.
- (c) The term "Change Order" means an agreement signed by the Authority, the Engineer and the Contractor, stating their agreement as to (i) a change in the Work; (ii) the amount of the adjustment in the Contract Price, if any; and (iii) the extent of the adjustment in the Contract Time, if any.
- (d) The term "Construction Schedule" means a report that sets forth the proposed dates for the commencement and completion of each phase of the Work, including a description of each line item and estimated dollar amounts per line item that will commence or be completed during each phase. Each phase described shall include readily identifiable milestones from which progress can be gauged.
- (e) The term "Contract" means the Contract for the performance of the Work, which consists of all of the Contract Documents. The intent of the Contract Documents is to form the Contract and include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreement, whether written or oral.
- (f) The term "Contract Documents" shall have the meaning set forth in the Agreement.
- (g) The term "Contract Price" shall have the meaning set forth in the Agreement.
- (h) The term "Contract Time" shall have the meaning set forth in the Agreement.
- (i) The term "Contractor" shall have the meaning set forth in the Agreement.
- (j) The term "Plans" means the graphic and pictorial portions of the Contract issued by the Engineer, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including drawings, elevations, sections, details, schedules and diagrams.
- (k) The term "Emergency" means an event endangering the immediate safety of persons or property.
- (l) The term "Engineer" shall have the meaning set forth in the Agreement.

(m) The term "Form of Bid" means the Form of Bid required to be submitted by all contractors bidding to perform the Work.

(n) The term "Inspector" means the duly authorized representative of the Authority.

(o) The term "Labor and Material Bond" shall have the meaning set forth in the Agreement.

(p) The term "Overhead" means all costs not directly attributed to the completion of the Contract, and shall include without limitation, administrative costs incident to the management, supervision, or conduct of the Contractor (Subcontractor(s), Sub-subcontractor(s), or Suppliers) associated with completing the Contract.

(q) The term "Performance Bond" shall have the meaning set forth in the Agreement.

(r) The term "Reasonable Time" means the amount of time which a reasonably prudent person, aware of the obligations imposed by the Contract that the Work be completed within a specified time, would deem to be reasonable under the circumstances existing at the time. For example, if a Change is requested which will affect the progress of the Work, then Reasonable Time shall be a shorter length of time than in the case where the progress of the Work is not affected.

(s) The term "Specifications" means the portion of the Contract consisting of the written requirements issued by the Engineer for the materials, equipment, construction systems, standards and workmanship for the Work and performance of related services.

(t) The term "Subcontractor" means a person or entity that has a direct contract with the Contractor to perform a portion of the Work.

(u) The term "Sub-subcontractor" means a person or entity that has a direct contract with the Subcontractor to perform a portion of the Work.

(v) The term "Substantial Completion" means when the Work is sufficiently completed in accordance with the Contract so that the applicable governmental authority can and does issue a permanent Certificate of Occupancy (if applicable), and the Authority may occupy and/or fully use the Work for its intended use, as evidenced by a certificate to such effect from the Engineer.

(w) The term "Supplier" means a person or entity that is to furnish materials or equipment fabricated to a special design to perform any portion of the Work.

(x) The term "Warranty Bond" shall have the meaning set forth in the Agreement.

(y) The term "Work" shall have the meaning set forth in the Agreement.

2. **Contract Documents.** The Contract Documents shall not be construed to create a contractual relationship of any kind between (i) the Engineer and Contractor, (ii) the Authority and a

Subcontractor or Sub-subcontractor, or (iii) any persons or entities other than the Authority and the Contractor.

3. Engineer.

(a) The Engineer will provide for the administration of the Contract as described in the Contract. The Engineer will have authority to act on behalf of the Authority only to the extent provided in the Contract, unless otherwise modified by written instrument signed by the Authority. The Engineer has authority to stop the Work whenever such stoppage may be necessary to insure the proper administration of the Contract and compliance with the Contract.

(b) In the event that no Engineer is retained by the Authority for the Work, the Authority shall perform the functions of the Engineer under this and every other section of the Contract.

4. Inspector.

(a) An Inspector may be put upon the Work by the Authority. The Inspector's duty will be to observe whether the Work is being performed according to the Plans and Specifications, and such other duties as the Authority may assign.

(b) The Inspector, the Authority and any of its other representatives, shall at all times have access to and the right to inspect the work site and the Work. If the Inspector, Authority or any other representative of the Authority observes any irregularities in the performance of the Work or any portion of the Work, he shall so notify the Engineer who shall take appropriate action as provided in the Contract.

(c) The Inspector shall in no case act as foreman, superintendent or project manager for the Contractor, nor interfere with the management of the Work by the Contractor.

5. Subcontractors and Suppliers.

(a) No more than eighty percent (80%) of the Work may be performed by Subcontractors or Sub-subcontractors. Further, Contractor shall not hire any Subcontractor or Sub-subcontractor who is listed on the most recent list as of the date of the Agreement produced by the Commonwealth of Pennsylvania's Department of Labor and Industry and listing persons or entities in violation of the Pennsylvania Prevailing Wage Act.

(b) As soon as practicable after the award of the Contract and before awarding any subcontracts, the Contractor shall provide the Engineer and the Authority with a listing of the Subcontractors and Suppliers proposed to perform any portion of the Work, by completing the Subcontractor/Supplier Information Sheet, attached as Exhibit D and made part of this Exhibit hereof. The Subcontractor/Supplier Information Sheet must be completed in full. The Engineer will reply within ten (10) days to the Contractor in writing stating whether or not the Authority or Engineer has reasonable objection to any such proposed Subcontractor or Supplier. The Contractor shall not contract with any Subcontractor or Supplier to whom the Authority or Engineer has a reasonable objection and shall promptly supply the Engineer with an acceptable alternative

Subcontractor or Supplier. Failure of the Engineer to reply within ten (10) days of receipt of any list shall constitute notice of no reasonable objection.

(c) Once the names of the Subcontractors and Suppliers are submitted, Subcontractors or Suppliers may not be changed nor may the dollar value of work/supplies be reduced, without prior written approval of the Authority. If the Contractor fails to obtain written approval from the Authority for any such change or reduction, the Authority shall have the option, at its sole discretion, to select one or more of the following remedies: stop the Work in accordance with Section 21 hereof, until the matter is resolved to the Authority's satisfaction; have the Contractor pay Liquidated Damages in accordance with Section 8 of the Form of Agreement; or terminate the Contract in accordance with Section 34 hereof.

(d) Notwithstanding the existence of any Subcontractor, Sub-subcontractor, or Supplier, Contractor shall be liable to the Authority for performance under the Contract as if no Subcontractor, Sub-subcontractor, or Supplier exists. No subcontract, sub-subcontract, or supply contract shall create any contractual relationship between any Subcontractor, Sub-subcontractor, or Supplier and the Authority or any obligation of the Authority to any Subcontractor, Sub-subcontractor, or Supplier.

(e) The Contractor is responsible and liable for the acts and omissions of its Subcontractors or Suppliers and their direct and indirect employees (including, without limitation, Sub-subcontractors and their direct and indirect employees), to the same extent as it (he/she) is responsible for the acts and omissions of its employees.

(f) For convenience of reference and to facilitate the letting of subcontracts, the Specifications are separated into titled sections. Such separations shall not, however, operate to make the Engineer an arbiter to establish limits of the contracts between the Contractor and Subcontractors or Suppliers.

(g) The Contractor shall pay all Subcontractors or Suppliers who have provided services or materials related to the Work and to whom payment is due and owing within five (5) business days after the Authority makes payment to the Contractor. Failure to make such payment, absent a good faith dispute regarding the amount owed to a Subcontractor or Supplier (it being understood that quality of work shall not be a basis upon which Contractor may withhold payment to a Subcontractor or Supplier of any amount which Contractor has received from Authority for such work), shall constitute a material breach of the Contract and the Authority shall have the option, at its sole discretion, to select one or more of the following remedies: have the Contractor pay Liquidated Damages in accordance with Section 8 of the Form of Agreement; or terminate the Contract in accordance with Section 34 hereof. In the event of a good-faith dispute between the Contractor and a Subcontractor or Supplier, any amount not in dispute shall not be withheld by the Contractor from the Subcontractor or Supplier.

6. Construction Schedule.

(a) The Contractor, within fifteen (15) days after notice of award by the Authority, shall prepare and submit to the Authority and Engineer a detailed Construction Schedule, as defined in Section 1 hereof, for the Work. This schedule shall be used as a basis for monitoring project progress and reviewing the Contractor's Applications for Payment.

(b) The Contractor shall provide the Authority with a monthly status report regarding the Construction Schedule with every monthly Application for Payment, or in the event that an Application for Payment will not be made during a month, a status report shall be provided on the first (1st) day of that month (hereinafter "Construction Schedule Update"). A Construction Schedule Update dated and signed by the Contractor shall certify:

(i) that the Work, and each phase thereof, is on schedule;

(ii) that the cost of each line item is within the proposed cost estimates in the Construction Schedule;

(iii) that each milestone from the Construction Schedule has been met in a timely fashion;

(iv) that all Work performed subsequent to the prior Construction Schedule Update has been performed in conformity with the Construction Schedule and those changes approved in writing by the Authority; and

(v) that the Subcontractors and Suppliers, previously approved by the Authority, have been engaged in conformity with the Subcontractor/Supplier Information Sheet, and those changes as approved in writing by the Authority.

(c) In addition to the foregoing, the Contractor shall not revise the Construction Schedule, regardless of whether the Contract Time is extended, unless and until the Contractor receives prior written approval from the Authority for such change. A lack of response from the Authority shall be considered a rejection of the requested change. If the Contractor makes any such change without obtaining the necessary written approval, the Authority shall have the option, at its sole discretion, to select one or more of the following remedies: stop the Work in accordance with Section 21 hereof until satisfactory corrections are provided; have the Contractor pay Liquidated Damages in accordance with Section 8 of the Agreement; or terminate the Contract in accordance with Section 34 hereof.

(d) In the event that the Authority is not satisfied, in its reasonable discretion, with the form or substance of a Construction Schedule Update, the Contractor shall have five (5) days to revise the Construction Schedule Update to the satisfaction of the Authority. If the Contractor fails to revise the Construction Schedule Update to the satisfaction of the Authority within said five (5) day time period, the Authority shall have the right, at its sole discretion, to institute the remedy of Liquidated Damages in accordance with Section 8 of the Form of Agreement. In addition, the Authority may, at its sole discretion, delay the approval of the Contractor's Application for Payment in accordance with Section 28.2(d) hereof.

(e) In addition to Construction Schedule Updates, the Contractor shall immediately notify the Authority when the Contractor believes that the cost of a particular line item will or may exceed the estimated costs in the Construction Schedule or the total line item cost as provided in the Bid, See Exhibit A. Upon providing said notice the Contractor shall utilize the Change Order process in Section 27, to attempt to revise the Contract. If the Contractor fails to inform the Authority under this provision, the Authority shall have the option, at its sole discretion, to select one or more of the following remedies: stop the Work in accordance with Section 21 hereof until satisfactory corrections are provided; have the Contractor pay Liquidated Damages in accordance with Section 8 of the Agreement; or terminate the Contract in accordance with Section 34 hereof. In addition, the Contractor shall have no right to receive compensation for Work completed in excess of any line item estimate, unless the Contractor has received written permission to proceed from the Authority pursuant to the Change Order process.

7. **Shop Drawings.** The Contractor shall submit to the Engineer a sufficient number of sets, as determined by the Engineer, in its sole discretion, in accordance with the schedule referenced below the Contractor's shop drawings, settings, schedules and such other drawings as may be necessary for the performance of the Work in the shop and in the field as required by the Plans, Specifications or Engineer's instructions. Deviations from the Plans and Specifications shall be called to the attention of the Engineer at the time of the submission of shop drawings and other drawings for approval. The Engineer's approval of any shop drawings shall not release the Contractor from responsibility for such deviations.

Shop drawings, etc. shall be submitted according to the following schedule:

- (1) The requested number of shop drawings shall be submitted at least fourteen (14) days before the materials indicated thereon must be ordered in order to prevent delay of the Work, or earlier if required to prevent delay of the Work.
- (2) The Engineer shall, within fourteen (14) days of the submittal of any shop drawings, return one copy to the Contractor marked with all corrections and changes.

8. **Copies Furnished.** The Engineer will furnish to the Contractor a sufficient number of sets of Plans and Specifications (including a set for the Record Documents), as determined by the Engineer, to be necessary for the execution and completion of the Work, but in no case to exceed seven (7) sets. Additional copies requested by the Contractor will be furnished to the Contractor by the Engineer at the cost of reproduction.

9. **Ownership of Plans and Specifications.** All Plans, Specifications and copies thereof furnished by the Engineer are the property of the Engineer. They are not to be used on other work, and with the exception of the set accompanying the signed Agreement, are to be returned to the Engineer upon completion of the Work.

10. **Labor.** Only competent and first class workers and mechanics, who will work in harmony with other trades and crafts at the Work site, or adjacent thereto, shall be engaged in the Work. Should the Authority deem anyone employed on the Work incompetent or unfit for their duties and so certify, the Contractor, Subcontractor or Sub-subcontractor shall remove such worker or

mechanic from performance of the Work, and shall not again, without the Authority's permission, employ or otherwise engage such person in performance of the Work.

11. Supervision.

(a) The Contractor must give as much personal attention to the Work as is necessary to secure consistent, regular and prompt prosecution of the Work. The Contractor shall employ a qualified superintendent or project manager and necessary assistants, with the knowledge and experience necessary to professionally complete the Work, who shall be in attendance at the site during performance of the Work. If in the opinion of the Authority or the Engineer, the Contractor fails to provide satisfactory individuals, the Authority shall have the option, at its sole discretion, to select one or more of the following remedies: stop the Work in accordance with Section 21 hereof until satisfactory individuals are provided; have the Contractor pay Liquidated Damages in accordance with Section 8 of the Form of Agreement; or terminate the Contract in accordance with Section 34 hereof.

(b) The superintendent or project manager shall represent the Contractor, and communications given to the superintendent or project manager shall be as binding as if given to the Contractor.

(c) The Contractor shall carefully study and compare all Plans, Specifications, and the other Contract Documents and shall report immediately to the Authority any error, inconsistency or omission which he may discover, but he shall not be held responsible for their existence or discovery.

12. Maintenance of Plans/Specifications. The Contractor shall maintain at all times one (1) copy of all Plans and Specifications in good order, on the work site, available to the Authority or its representative.

13. Samples and Tests.

(a) Wherever samples or tests of materials are called for in the Specifications, or where it is desired to substitute another material or article for that specified, the Contractor shall submit samples in triplicate to the Engineer with all freight charges prepaid prior to the incorporation of the material in the Work. One sample will be returned to the Contractor at its expense, with letter stating that it is approved or rejected; provided, however, samples which are of value after testing will all be returned to and remain the property of the Contractor. The Contractor shall perform no portion of the Work requiring samples or tests until the materials subject to such requirements have been approved by the Engineer. Contractor shall be solely responsible for delays due to samples not being submitted in time to allow for proper time to complete sampling or tests. All materials used in completing the Work shall be equal to the approved sample in every respect.

(b) Materials or portion of the Work requiring tests are so specified in the Specifications. Other material may be tested at the discretion of the Engineer. Tests shall be made under the supervision of, as directed by and at such places as may be convenient to the Engineer.

(c) All sampling and tests shall be conducted by a properly qualified person or testing laboratory, approved by the Engineer, who shall furnish the Engineer with certified reports, showing the results of sampling or tests, as the case may be, and stating that they were made in accordance with the Specifications and calling attention to deviations from the Specifications on the laboratory report. All tests, as well as sampling and preparation of samples, shall be in accordance with the standard as of the date of the test adopted by the standards organization set forth in the Specifications, or, if no organization is so stated, the A.S.T.M.

(d) Costs of initial sampling or testing materials called for in the Specifications shall be borne by the Authority, unless otherwise stated, but the cost of furnishing and preparing these materials for sampling or testing shall be borne by the Contractor. Costs of sampling or testing of materials substituted for previously accepted materials and re-sampling or re-testing made necessary by the failure to comply with the requirements of the Specifications shall be paid for by the Contractor.

(e) All tests of the completed Work shall be made at the expense of the Contractor, who shall repair all damage resulting from these tests, if they show defects from some fault of the Contractor. The Contractor shall not make any tests upon portions of construction already completed except with the written consent and under the direction and control of the Engineer.

14. **Materials.** Where certain makes or brands are called for and mentioned as "Standard", others of equal quality may be used provided that the substitute/alternative material is specified in the bid. Unless substitutions or alternates are requested, no such deviation from the Specifications may be allowed. No delay or extra time to complete the Work will be allowed on account of a request for substitute/alternative makes or brands.

15. **Temporary Equipment and Scaffolding.**

(a) The Contractor shall provide and maintain, as approved by the Engineer, temporary stairs, ladders, barricades, runways, hoists, chutes, etc., as required for the proper performance of the Work by all trades.

(b) Contractor shall provide all necessary scaffolding for the performance of the Work. All scaffolding shall be constructed to meet all the requirements of all applicable building codes and laws.

16. **Permits and Fees.** The Contractor shall secure and pay for all building and other permits, and governmental fees, licenses and inspections necessary for proper execution and completion of the Work and shall post bond as required by the same. Contractor shall furnish receipts for any fees to secure the foregoing to the Authority.

17. **Taxes.** The Contractor shall pay sales, business privilege, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor, Subcontractor and Sub-subcontractors.

18. **Royalties and Patents.** The Contractor shall pay all royalties and license fees necessary for the Contractor's execution and completion of the Work and shall hold and save the Authority and its officers, agents, lessees, servants, and employees harmless from all costs, expenses, or liabilities of any nature or kind, including, without limitation, cost and expenses of defending legal actions, for or on account of the use of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Authority, unless otherwise specifically stipulated in the Contract.

19. **Compliance Required.** The Contractor shall give all notices required by and comply with all laws, ordinances, rules, regulations and lawful orders of public authorities bearing on the performance of the Work. If the Contractor performs any portion of the Work contrary to such laws, ordinances, rules, regulations or lawful orders, it shall bear all costs and expenses arising therefrom. In addition, the Contractor shall enforce and comply with the Authority's instructions regarding signs, advertisements, fires and smoking.

20. **Warranty.** Contractor warrants to the Authority that:

(a) the materials and equipment furnished under the Contract will be of good quality and new, unless otherwise permitted by the Contract;

(b) the materials and equipment furnished under the Contract will be under warranty for replacement of parts and labor costs for a minimum of five (5) years from the date the Authority receives certification from the Engineer that the Work has reached Substantial Completion, unless otherwise permitted by the Contract. The Authority shall have, at its the sole discretion, the authority to request the assignment of any and all manufacturer or distributor warranties. Any assignment of a manufacturer or distributor warranty shall not relieve the Contractor of the five-year warranty provided in this Section 20(b). If the manufacture or distributor provides a warranty in excess of the five-year warranty provided by the Contractor, the Contractor shall assign the remainder of said warranty to the Authority upon the expiration of the five-year term noted above;

(c) the Work will be free from defects not inherent in the quality required or permitted;

(d) the Work will conform with the requirements of the Contract; and

(e) Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

21. **Authority's Right to Stop Work.** If the Contractor fails to correct the Work or any portion of the Work that is not in accordance with the requirements of the Contract as required by Section 20 above or persistently fails to carry out the Work in accordance with the Contract, the Authority, by written order signed by the Authority, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated. The Contractor may not claim any damages for injury caused by delay due to a stoppage of the Work in accordance with this Section 21.

22. **Authority's Right to Carry Out Work.** If the Contractor defaults and neglects to carry out the Work in accordance with the Contract and fails within a three (3) day period after receipt of written notice from the Authority to commence and continue correction of such default or neglect with diligence and promptness, the Authority may after such three (3) day period give the Contractor a second written notice to correct such deficiencies within a second three (3) day period. If the Contractor fails to commence and continue to correct any deficiencies within such second three (3) day period, the Authority may, without prejudice to other remedies the Authority may have, correct such deficiencies. In such case the Authority shall deduct from payments then or thereafter due the Contractor the cost of correcting such deficiencies, including, without limitation, the cost of the Engineer's or other professionals' additional services and expenses made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Authority within thirty (30) days of notice from the Authority that such amounts are due and owing.

23. **Other Contracts.** The Authority reserves the right to let other contracts in connection with the Work. The Contractor shall cooperate with the other contractors with regard to storage of materials and execution of their work, and shall properly connect and coordinate its work with theirs. If any part of the Work is dependent upon or is affected by the work of any other contractor, the Contractor shall inspect such work and promptly report to the Engineer any defects in the other contractor's work, including, without limitation, any discrepancy between the executed work and the Plans or Specifications. Failure to so inspect and report defects shall constitute acceptance of the other contractor's work as satisfactory and proper for the reception of the Work, except as to defects which may develop in the other contractor's work after the execution of the applicable portion of the Work.

24. **Work Performed by the Authority or Other Parties.** Wherever work being done by the Authority or its agents or by other contractors is contiguous to the Work, the respective rights of the various interests involved shall be established by the Engineer. The goal of the Engineer shall be to secure the completion of the various portions of the Work in general harmony.

25. **Delays and Extension of Time.** If the Contractor is delayed in the performance and completion of the Work by an act or neglect of the Authority or Engineer, or an employee of either, or by fire, flood, or other causes beyond the control of the Contractor, or by other causes which the Engineer determines may justify delay, the deadline for the completion of the Work set forth in the Agreement may be extended by the Authority for a period equivalent to the actual number of calendar days lost by reason of any or all causes aforementioned if the request for extension is presented in writing to the Engineer within seven (7) calendar days after the commencement of the cause of the delay. The length of time of the extension shall be determined and fixed by the Engineer, subject to the approval of the Authority. The Contractor may not claim any damages for injury caused by a delay caused by an event described in this Section 25.

26. **Concealed or Unknown Conditions.** If subsurface or other latent physical conditions are encountered at the Work site which (i) differ materially from the conditions expressly represented in the Contract; or (ii) if no express representation is made in the Contract, differ in such an extreme and unusual nature from what reasonably could have been anticipated, then notice by the Contractor shall be given to the Engineer promptly before conditions are disturbed and in no event later than

fourteen (14) days after first observance of the conditions. The Engineer will promptly investigate such conditions to determine whether they differ materially from those conditions that were expressly represented in the Contract or which reasonably could have been anticipated, and shall notify the Contractor and the Authority of his or her determination. If the Engineer determines that the conditions at the work site are not materially different, the Engineer shall so notify the Authority and the Contractor in writing, stating his or her reasons. If the Engineer determines that the conditions at the work site are materially different and the Authority disagrees, the Authority shall promptly notify the Contractor and Engineer and the Authority, Contractor and Engineer shall attempt to reach a mutually agreeable determination. The Authority shall not be obligated to modify the Contract unless the parties reach such determination. If the Engineer determines and the Authority agrees that the conditions at the site are materially different and will materially affect the cost of performing the Work, the Contractor shall be entitled to a Change Order equitably adjusting the Contract Price or Contract Time, or both. In any request for a Change Order or other claim for an equitable adjustment in the Contract Price as a result of differing work site conditions, the Contractor shall be required to document and substantiate the request or claim by producing the relevant portions of its bid sheets or estimates to show the amount he reasonably expected to pay for the Work based upon the conditions that were expressly represented in the Contract or which reasonably could have been anticipated.

27. **Change Orders.**

27.1 **Restrictions on Ability to Undertake Change.** Changes to the Work, including without limitation the increased cost of any line item in the Bid (Exhibit A) may be undertaken by the Contractor **only** upon receipt of a Change Order issued and executed by the Authority in accordance with Section 27. Notwithstanding the foregoing, in an Emergency, the Contractor, without obtaining a signed Change Order, may undertake only such changes to the Work as are necessary to alleviate the Emergency, after which time the Contractor shall immediately seek a Change Order pursuant to the procedures outlined in Section 27.2 (e) prior to undertaking any further changes to the Work. The parties understand and agree that the unit prices set forth in the Contract Documents shall be employed in determining whether to approve a Proposed Change Order.

27.2 **Procedure to be Followed when Change to the Work is Required.** The Authority, the Engineer and the Contractor shall follow the following procedures whenever a change to the Work is required.

(a) Notice of Change Required. Whenever any party determines that a change to the Work is required, that party shall immediately notify the Engineer in writing of the need for the change, describing in such notice in reasonable detail the nature and scope of the change required. It shall be the responsibility of the Engineer to notify the other parties of its receipt of any such notice.

(b) Preparation of Design and Proposed Change Order. Within a Reasonable Time after the Engineer receives the notice of change required, the Engineer shall evaluate the situation, prepare any needed designs for the requested change, and request that the Contractor prepare a Proposed Change Order which includes the Contractor's estimate of any additional costs, time required to complete the requested change and/or any extension of the Contract Time, or any credit to the Authority, based upon the design provided by the Engineer (the "Proposed Change Order").

Additional costs in the Contractor's Proposed Change Order must be limited to direct costs of any additional labor, materials, tools and equipment necessary to perform the change, plus a maximum amount of ten percent (10%) of the aforesaid additional costs to cover all other expenses to the Contractor, including without limitation insurance, bonding costs, Overhead, profit and taxes. If a Subcontractor or Sub-subcontractor will perform any of the Work included in the Change Order, the Subcontractor's and Sub-subcontractor's additional costs, including without limitation insurance, bonding costs, Overhead, profit and taxes, shall be limited to five percent (5%) of the cost of the Work to be performed by that Subcontractor or Sub-subcontractor.

(c) Submission of Proposed Change Order. The Contractor shall sign and submit to the Engineer the Proposed Change Order within a Reasonable Time following delivery of the design described in Section 27.2 (b).

(d) Review of Cost Estimate and Preparation of Change Order. If, in the Engineer's opinion, the amount of any additional costs and/or time requested by the Contractor in the Proposed Change Order is excessive or otherwise unreasonable, the Engineer shall have the right to request that the Contractor revise the Proposed Change Order before it is submitted to the Authority for approval.

(e) Process for Approval or Disapproval of Change Orders by the Authority. The following procedures shall be followed without exception whenever the approval of the Authority is required for a Change Order:

(i) Changes Less than \$10,000 or 5% of Contract Price. The Director of Contract Management of the Authority shall be authorized to approve and execute or disapprove on behalf of the Authority Change Orders reflecting a change to the original Contract Price of an amount less than \$10,000 or less than 5% of the original Contract Price, whichever amount is less; provided, however, that from and after the date that Change Orders have been approved on the Contract which, in the aggregate, total an amount equal to 10% of the original Contract Price, no additional Change Orders may be approved by the Director of Contract Management without approval of the Authority Board.

(ii) Changes Less than \$25,000 or 10% of the Contract Price. The Executive Director and the Director of Contract Management of the Authority jointly shall be authorized to approve and execute or disapprove on behalf of the Authority Change Orders reflecting a change to the original Contract Price of an amount less than \$25,000 or less than 10% of the original Contract Price, whichever amount is less; provided, however, that from and after the date that Change Orders have been approved on the Contract which, in the aggregate, total an amount equal to 10% of the original Contract Price, no additional Change Orders may be approved by the Executive Director and the Director of Contract Management without approval of the Authority Board. In the event of Change Orders approved under this Section 27.2(e)(ii), the signatures of both the Director of Contract Management and the Executive Director shall be required on the Change Order in order for it to be binding upon the Authority.

(iii) All Other Changes. The approval or disapproval of the Authority Board shall be required for (i) all Change Orders reflecting a change to the original Contract Price in excess of

\$25,000 or more than 10% of the original Contract Price, whichever amount is less; and (ii) all Change Orders requested from and after the date that Change Orders have been approved on the Contract which, in the aggregate, total an amount equal to 10% of the original Contract Price.

(iv) Execution of Change Order. In the event the Authority approves a Change Order in accordance with this Section 27.2(e), the appropriate officers of the Authority shall execute and deliver the Change Order. The Contractor and Engineer by their execution hereof are hereby notified of the procedures contained in this Section 27.2(e) and understand that no Change Order shall be binding upon the Authority unless approval is obtained as required herein.

(f) Time in which Authority must act upon Change Order Requests. The Authority shall either approve or disapprove a Proposed Change Order in accordance with the following schedule:

(i) If the Proposed Change Order requires only the approval of the Director of Contract Management and/or the Executive Director, the Proposed Change Order shall be approved or disapproved within seven (7) days after submission to the Authority by the Engineer.

(ii) If the Proposed Change Order requires the approval of the Authority Board, the Proposed Change Order shall be approved or disapproved within fourteen (14) days after submission to the Authority by the Engineer.

In the event that a Proposed Change Order must be approved sooner than the times set forth above in order to avoid a delay in the completion of the Work, Contractor immediately shall so notify the Authority. In such notice, Contractor shall include a detailed explanation of the reasons that the completion of the Work shall be delayed without an expedited review process, a request for an expedited approval of the Proposed Change Order and the time within which approval is required in order to complete the Work within the Contract Time. The Authority shall use reasonable efforts to comply with the Contractor's request.

(g) Event of Disapproval of a Change Order as Submitted by the Contractor. In the event the Authority disapproves a Proposed Change Order prepared by the Contractor, the Authority shall have the right to select one of the following procedures:

(i) The Authority, with the assistance of the Engineer, shall prepare, execute and issue its own Change Order stating the amount of additional costs and/or time required to complete the requested Change, and the Contractor shall proceed promptly to undertake the change to the Work described therein. All changes in the Work pursuant to Change Orders issued by the Authority shall be performed under applicable provisions of the Contract Documents and shall not invalidate the Contract. The Contractor shall be deemed to accept the additional costs and/or time set forth in the Change Order issued by the Authority unless the Contractor notifies the Authority in writing within seven (7) days of its receipt of the Change Order that the Work is being performed under protest. Contractor's protest shall not excuse Contractor from promptly undertaking the change to the Work described in such Change Order. The Contractor shall be entitled to bring a claim against the Authority for an equitable adjustment to the Contract for any Change Order the Contractor is required to perform under protest, but in no event may the Contractor recover damages

on any such claim that exceed the difference between the additional costs in the Change Order issued by the Authority and the additional costs requested in the Contractor's Proposed Change Order; or

(ii) If the Change Order increases the contract price more than 20% or constitutes a substantial change in the Work ("Substantial Change Order"), the Authority shall have the right, if not the duty under the Authority's enabling statute, to terminate the Contract. The Contractor recognizes that the Authority, under state law, may be obligated to terminate and re-bid this Contract upon the occurrence of a Substantial Change Order. Contractor agrees not to hold the Authority responsible for any losses or damages that it may incur due to a termination under this provision.

27.3 Unit Prices. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are so changed in a Proposed Change Order that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Authority or the Contractor, the applicable unit prices shall be equitably adjusted.

28. Payment.

28.1 Schedule of Values. Upon notification of award, the Contractor must submit to the Engineer a schedule of values allocated to various portions of the Work, giving a complete breakdown of the price of the various items of the Work (the sum of which shall equal the total Contract Price) and otherwise prepared in such form and supported by such data to substantiate its accuracy as the Engineer may require. This schedule, unless objected to by the Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment.

28.2 Application for Payment.

(a) The Contractor shall submit to the Engineer once each calendar month an Application for Payment in accordance with the schedule of values for (i) operations completed as of the last day of the previous calendar month; and (ii) payments made on account of materials delivered and suitably stored and insured at the site for subsequent incorporation in the Work, provided such storage was approved in advance by the Authority. If approved in advance by the Authority, an Application for Payment may include payment for materials suitably stored off site at a location agreed upon in writing. "Suitably stored" as used in the preceding sentence shall mean that materials stored off site shall be stored in a bonded warehouse and clearly marked "Property of the Public Parking Authority of Pittsburgh." Notwithstanding anything to the contrary, in no event will the Authority pay more than eighty percent (80%) of Contractor's cost of stored materials (whether stored on or off site) until such materials are fully incorporated in the Work. An Application for Payment shall be supported by such data substantiating the Contractor's right to payment as the Engineer or the Authority may require.

(b) Applications for Payment may not include requests for payment of amounts that the Contractor does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason.

(c) The Contractor warrants that title to the portion of the Work covered by an Application for Payment will pass to the Authority no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all portions of the Work for which Certificates for Payment have been previously issued and payments received from the Authority shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, Sub-subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

(d) Every Application for Payment must include a Construction Schedule Update. If the Contractor fails to provide a Construction Schedule Update or there is a discrepancy concerning a Construction Schedule Update, as described in Section 6(d) hereof, the Authority may, at its sole discretion, delay the approval of the Contractor's Application for Payment until the Construction Schedule Update is provided or the discrepancy is resolved to the Authority's satisfaction.

(e) Every Application for Payment must include an adequate partial release, satisfaction and waiver of liens, satisfactory to the Authority, from all Subcontractors, Suppliers or other parties having a right to file a mechanic's or materialman's liens, with respect to all work, materials and services for which Application for Payment proceeds are being requested. The failure to provide adequate waivers and releases will delay payment until waivers and releases satisfactory to the Authority are provided;

(f) Every Application for Payment must include a certified payroll in accordance with the Pennsylvania Prevailing Wage Act, 43 P.S. § 165-10, stating the amounts due to the Contractor, Subcontractor(s), and Sub-subcontractor(s) for wages. This report shall include the name of each person who is due wages and the amount due to each person respectively. A failure to provide a certified payroll or a discrepancy concerning the certified payroll, will delay payment until a certified payroll is provided or the discrepancy is resolved to the Authority's satisfaction.

28.3 Certificates for Payment.

(a) The Engineer shall, not later than ten (10) days after receipt of an Application for Payment from the Contractor either issue to the Authority a Certificate for Payment, with a copy to the Contractor, for such amount as he or she determines to be properly due, or notify the Contractor and Authority in writing of his or her reasons for withholding the Certificate for Payment in whole or in part as provided in Section 28.4.

(b) The issuance of a Certificate for Payment by the Engineer constitutes a representation by the Engineer to the Authority, based on the Engineer's observations at the site and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Engineer's knowledge, information and belief, the quality of the Work is in accordance with the Contract. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified.

(c) The Authority shall pay, no later than fifteen (15) days after receipt of the Certificate for Payment from Engineer, unless payment shall otherwise be withheld under the Contract, the amount specified in the Certificate for Payment, subject to the following:

(i) ten (10%) percent of the value of the Certificate for Payment shall be retained by the Authority until the Contractor submits an application, certified by the Engineer, that the Work has reached Substantial Completion: whereupon

(ii) the Authority shall pay over to the Contractor fifty percent (50%) of amounts previously retained by the Authority unless such amounts are being otherwise retained by the Authority as provided in the Contract: and thereafter

(iii) the Authority shall retain only five (5%) percent of the value of each Certificate for Payment until Final Payment.

All amounts retained by the Authority and not otherwise held by the Authority or previously paid over to the Contractor shall be included in the Final Payment (hereinafter defined). Upon receipt of the applicable payment by the Authority, the Contractor shall promptly pay each Subcontractor and Supplier in accordance with Section 5(e) of these General Conditions.

(d) Neither the Authority nor the Engineer shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may be otherwise required by law. Sections of this Contract that dictate payment by the Contractor to a Sub-contractor or Supplier are included to further the timely completion of the Work and shall not create or impose any liability upon the Authority or Engineer for said payments.

(e) No Certificate for Payment issued, nor payment made to the Contractor, shall constitute an acceptance of any portion of the Work that is not in accordance with the Contract.

28.4 Decisions to Withhold Certification.

(a) The Engineer may refuse to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Authority, if in the Engineer's opinion the representations to the Authority required by Section 28.3(b) cannot be made. If the Contractor and the Engineer cannot agree on a revised amount, the Engineer will promptly issue a Certificate for Payment for the amount which the Engineer is able to make such representation to the Authority.

(b) The Engineer may also refuse to certify payment and withhold a Certificate for Payment in whole or in part as may be necessary to protect the Authority from loss on account of:

(i) Defective work not remedied;

(ii) Third Party claims filed against the Authority or reasonable evidence indicating probable filing of such claims;

(iii) Failure of the Contractor to utilize the Subcontractor(s) and Supplier(s) indicated in the Construction Schedule;

(iv) Failure of the Contractor to make payment properly to Subcontractors or Suppliers for labor, equipment or materials in accordance with Section 5(g) hereof;

(v) A reasonable doubt that the Work can be completed (i) for the balance then unpaid, or (ii) within the Contract Time and the unpaid balance would be adequate to cover actual or liquidated damages for the anticipated delay;

(vi) Damage to the Authority or another contractor;

(vii) Payments improperly or incorrectly made to the Contractor; or

(viii) Persistent failure to carry out the Work in accordance with the Contract.

When the above problems recited are removed, payment shall be made for amounts withheld because of such grounds.

28.5 Closeout Submittals to the Authority.

- A. Provide a set of Final Record Documents and Drawings, "As-Builts", that reflect actual construction conditions. Ensure the Record set of drawings is legibly marked.
1. Upon award of the Contract, secure from the Authority, at no charge, one complete set of all Contract Documents to be used to produce the Final Record Documents.
 2. The purpose of the Final Record Documents is to record the detail of all visible and concealed construction changes to enable future modification or design to proceed without additional measurement, investigation and/or examination.
- B. Provide Operation and Maintenance Manuals for all new products used in a bound manual.
1. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors per Specifications.
 2. Provide original signed product warranty, bond or service/maintenance contract in separate packet.

28.6 Final Payment.

(a) Upon receipt of written notice from the Contractor that the Work is ready for final inspection and acceptance, upon receipt of the Final Record Documents, and upon receipt of a final Application for Payment, the Engineer shall promptly inspect the Work. When the Engineer finds the Work acceptable under the Contract and the Contract fully performed, the Engineer will promptly issue a Final Certificate for Payment, stating that to the best of the Engineer's knowledge,

information and belief, and on the basis of the Engineer's observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract and the entire balance found to be due the Contractor and noted in said Final Certificate for Payments is due and payable. The Engineer's Final Certificate for Payment will constitute a further representation that conditions listed in Section 28.5 (b) below as precedent to the Contractor's being entitled to Final Payment have been fulfilled.

(b) Neither Final Payment nor any remaining retained amounts shall become due until the Contractor submits to the Engineer and the Authority (i) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Authority or the Authority's property might be responsible or encumbered (less amounts retained by the Authority) have been paid or otherwise satisfied; (ii) a certificate evidencing that insurance required by the Contract will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Authority; (iii) consent of surety, if any, to Final Payment; (iv) a final Construction Schedule Update; and (v) adequate releases, satisfactions and waiver of liens, satisfactory to the Authority, from all Subcontractors, Suppliers or other parties having a right to file a mechanic's or materialman's liens, with respect to all work, materials and services for which Final Payment proceeds are being requested, accompanied by the Contractor's affidavit to the effect that to the best of its knowledge and information the releases and receipts cover all labor and materials supplied and all payments due Subcontractors. A failure to provide adequate waivers and releases will delay payment until waivers and releases satisfactory to the Authority are provided. If any Subcontractor or Sub-subcontractor refuses to furnish a release or receipt in full, the Contractor may furnish a bond satisfactory to the Authority to guarantee payment of the claim of such Subcontractor.

(c) Further, in accordance with Section 165-10 (a) of the Pennsylvania Prevailing Wage Act, neither Final Payment nor any remaining retained amounts shall become due until the Contractor, each Subcontractor and each Sub-subcontractor, respectively, submit to the Engineer and the Authority a statement in writing, in form satisfactory to the Secretary of Labor and Industry of the Commonwealth of Pennsylvania (the "Secretary"), certifying to the amounts then due and owing from such Contractor, Subcontractor and Sub-subcontractor, respectively, filing such statement to any and all workers for wages due on account of the Work, setting forth therein the names of the persons whose wages are unpaid and the amount due to each respectively, which statement so to be filed shall be verified by the oath of the Contractor, Subcontractor or Sub-subcontractor, as the case may be, that he or she has read such statement subscribed by him or her, knows the contents thereof and that the same is true of his or her own knowledge.

(d) If, after the Engineer has determined that the Work has reached Substantial Completion, final completion of the Work is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Engineer so confirms, the Authority shall upon application by the Contractor and certification by the Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. Such payment shall be made under terms and conditions governing Final Payment, except that it shall not constitute a waiver of claims. If the remaining balance for the portion of the Work not fully completed or corrected is less than amounts retained by the Authority and not otherwise retained by the Authority as provided in the Contract, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work

fully completed and accepted shall be submitted by the Contractor to the Engineer prior to certification of such payment.

(e) Within thirty (30) days of receipt of the Final Certificate for Payment, if the Authority agrees that the Final Payment amount in the Final Certificate for Payment is true and correct, the Authority shall pay to the Contractor the balance stated to be due it in the Final Certificate for Payment ("Final Payment").

(f) Acceptance of Final Payment by the Contractor, a Subcontractor, Sub-subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of the final Application for Payment.

29. **Protection of Persons and Property.**

(a) The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

(b) The Contractor shall take all precautions necessary for the safety of, and shall provide protection to prevent damage, injury or loss to:

(i) its employees on the Work and other persons who may be effected thereby;

(ii) the Work and materials and equipment to be incorporated therein or used in connection therewith, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

(iii) other property at the site or adjacent thereto, including, without limitation, trees, shrubs, lawns, walks, pavements, roadways, structures and utilities.

(c) The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful order of public authorities bearing on the safety or persons or property or their protection from damage, injury or loss.

(d) The Contractor shall erect and maintain, as required by existing conditions and the Contract, safeguards for safety and protection, including, without limitation, posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

(e) When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel and in accordance with local, state and federal laws and regulations.

(f) The Contractor shall designate a responsible member of the Contractor's organization at the work site whose duty shall be the prevention of accidents.

(g) In case any direct or indirect injury is done to existing streets or underground structures, sewers, or mains, conduits, etc., or to any public or private property of any kind, by or because of the Work, or in consequence of any act or omission on the part of the Contractor, its employees, or agents, the Contractor, at its own cost and expense, shall restore such structures, property, materials, etc., to a condition equal to that existing before such damage or injury was done, by repairing, rebuilding, replacing, or otherwise, as may be required, or shall make good such damage or injury in a manner satisfactory to the owner of the damaged property.

(h) The Contractor shall, if requested, furnish proof to the Authority of the settlement of any suits or actions arising out of the performance of the Work and involving possible liability on the part of the Authority, its officers, agents, lessees, employees, or the Engineer before Final Payment is made by the Authority for the Work.

30. **Responsibility for Loss or Damage.** The Contractor will be responsible for the protection of its materials, equipment and work. Contractor shall immediately and at its own expense make good any loss or damage due to loss, theft, vandalism or any other cause.

31. **Assumption of Liability/Indemnification/Insurance.**

(a) Except for the gross negligence or willful misconduct of the Authority, Contractor shall indemnify and hold the Authority, its successors and assigns and its directors, officers, agents, lessees, employees and authorized representatives harmless from and against any and all loss, damage and liability and for any and all claims for damages on account of or by reason of: (i) bodily injury, including death, which may be sustained or claimed to be sustained by any person, including employees of Contractor; (ii) all contractual disputes or liability not directly attributable to the Authority's acts or failure to act; and (iii) any and all damages to property, including the property of the Authority, its successors and assigns, caused by or arising out of or claimed to have been caused by or to have arisen out of any act, error or omission in connection with this Contract or the performance of the Work, whether or not occasioned by the negligence of the Authority, Contractor, or their respective agents, servants or employees. For purposes of enforcing this provision, Contractor hereby waives any or all immunities it may have under the Pennsylvania Workers' Compensation Act or otherwise.

(b) The Contractor shall maintain at all times until completion of the Work, the following insurance:

(i)	Worker's Compensation	Statutory (in conformance with Pennsylvania Worker's Compensation Act)	
(ii)	Employers Liability	Each Accident	\$500,000.00
		Disease – each employee	\$500,000.00
		Disease – policy limit	\$500,000.00
(iii)	Contractor's General Liability (Bodily Injury and Property Damage)	Per Occurrence	\$1,000,000.00
		Fire Damage	\$1,000,000.00

	(any one fire)		
	Medical Expenses (any one person)		\$10,000.00
	Personal Liability and Advertising Injury		\$1,000,000.00
	Products and Completed Operations Aggregate Limit		\$2,000,000.00
	General Aggregate Limit (per project)		\$2,000,000.00
(iv)	Automotive Liability Property Damage and Bodily Injury (any auto, hired autos and non-owned autos)	Per Occurrence	\$1,000,000.00
(v)	Builders Risk/Renovation	Per occurrence	Equal to Contractor's Contract amount
		Aggregate	Equal to Contractor's Contract amount
(vi)	Riggers Liability (if applicable)	Per Occurrence	\$1,000,000.00
		Aggregate	\$2,000,000.00
(vii)	Asbestos & Lead Abatement (if applicable)	Per Occurrence	\$1,000,000.00
		Aggregate	\$1,000,000.00
(viii)	Professional Liability (if applicable)	Per Occurrence	\$1,000,000.00
		Aggregate	\$1,000,000.00
(ix)	Owners & Contractors Protective Liability	Per Occurrence	\$1,000,000.00
		Aggregate	\$2,000,000.00
(x)	Umbrella Liability: Projects Under \$100,000	Per Occurrence	\$1,000,000.00

	Aggregate	\$1,000,000.00
Projects Over \$100,000.00 to Under \$1,000,000.00	Per Occurrence	\$5,000,000.00
	Aggregate	\$5,000,000.00
Projects Over \$1,000,000.00	Per Occurrence	\$10,000,000.00
	Aggregate	\$10,000,000.00

(c) The Contractor shall provide the Authority, upon execution of this Contract, with a copy of each insurance policy, evidencing the required coverage. All policies must include, a provision providing direct and timely, sixty (60) day, notice of cancellation, non-renewal, or amendment to the Authority. Each policy shall also provide a verification that the carrier is "A" rated or better by AM Best.

(d) Each insurance policy shall include the following provisions, unless otherwise specified:

- (i) The Contractor shall at all times until the Work is completed, include the Authority, its successors, assigns, officers, directors, agents, lessees, employees and authorized representatives as an "Additional Insured" on the insurance listed in Sections 31 (b) (iii), (v), (vi) and (vii) above. Upon reviewing any policy, the Authority may require that additional language be added to a policy to ensure that the Authority is adequately protected as an Additional Insured;
- (ii) For insurance listed in Sections 31(b)(iii) and (x) the policy should indicate the aggregate limit is per location / per project or designate construction project general aggregate. Policy should also indicate that it includes contractual liability and coverage includes damages caused by explosion, collapse and underground causes;
- (iii) A Waiver of Subrogation clause; and
- (iv) To the extent that the Contractor is a joint venture, all such insurance policies shall be specifically endorsed to provide coverage for the joint venture.

(e) The Contractor shall provide the Authority with evidence of payment in full of any subsequent premiums at least 20 days prior to the expiration date of each policy.

(f) The Contractor shall obtain and maintain such other insurance as may be required from time to time by the Authority. The amounts, coverage and other terms and conditions of the insurance policies shall at all times be to the satisfaction of the Authority, in its sole discretion.

(g) If the Contractor shall not at any time comply with the insurance requirement terms of this Section, the Authority shall have the option, at its sole discretion, to select one or more of the following: cure such non-compliance and may purchase such insurance as it may elect whereupon

Contractor shall reimburse the Authority on demand for any costs incurred by the Authority in connection with any such actions; stop the Work in accordance with Section 21 hereof until satisfactory insurance is provided; have the Contractor pay Liquidated Damages in accordance with Section 8 of the Form of Agreement; or terminate the Contract in accordance with Section 34 hereof.

(h) Contractor is responsible for requiring each of its subcontractors to obtain insurance of the same type and amount required of Contractor as stated above. Contractor is responsible for obtaining copies of insurance policies from each of its subcontractors, and shall make said copies available to the Authority upon demand.

32. Claims and Arbitration.

(a) All claims hereunder shall be submitted to and decided by an Arbitrator, in Pittsburgh, Pennsylvania until the aggregate amount of claims for damages hereunder reaches \$75,000. From and after the date that the aggregate amount of claims for damages exceeds \$75,000, all claims shall be handled in accordance with Subsection 32(e) hereunder. The Arbitrator shall be selected in accordance with Subsection 32(b) hereunder. The arbitration proceeding shall be conducted in accordance with the AAA Construction Industry Arbitration Rules, except that the "Expedited Procedures" shall not apply if either party notifies the Arbitrator, in writing with a copy to the other party, of its election to opt out of the "Expedited Procedures" within 10 days after the respondent's answering statement is due. The Arbitrator shall have no power to change the provisions of this Contract and the Arbitrator shall base his or her decision on the provisions of this Contract and, as appropriate, shall apply the law of the Commonwealth of Pennsylvania. The parties shall be permitted to conduct reasonable discovery in accordance with the Pennsylvania Rules of Civil Procedure on any claim or defense, and the failure of any party to respond to a reasonable discovery request shall be grounds for the arbitrator to disallow any claim or defense made by the defaulting party. The Arbitrator shall have no power to award punitive, consequential or exemplary damages. The Arbitrator shall submit his/her decision in writing within the later of: fourteen (14) days of the Arbitration hearing; or thirty (30) days of the Arbitrator's appointment. The arbitration shall occur in the City of Pittsburgh at a site chosen by the Arbitrator. The parties shall share the expense of the arbitration equally.

(b) The Contractor or the Authority shall each choose an impartial arbitrator (collectively, the "Initial Arbitrators") within ten (10) days of a written request from either party for arbitration and the two Initial Arbitrators shall choose a third impartial arbitrator within three (3) days of the date that both Initial Arbitrators are appointed (said third arbitrator shall be herein referred to as the "Arbitrator") who shall alone decide the matter and whose decision shall be binding on the parties, be final, and shall not be subject to appeal. If the two Initial Arbitrators fail to agree on the third arbitrator within the required period, then within three (3) days after such period, the parties shall so notify the Chief Judge of the United States District Court for the Western District of Pennsylvania (the "District Court") who will appoint the Arbitrator as soon as practicable but within five (5) business days of such notice. Should the Chief Judge not appoint the Arbitrator within such time period, then the parties shall immediately notify the Duty Judge then acting for the District Court, and the Duty Judge shall choose the Arbitrator. Should the Duty Judge not appoint the Arbitrator within five (5) business days after a request to do so, then the Arbitrator shall be appointed by such other judge of the District Court as the Initial Arbitrators shall agree (the

“Judge”). Should the Initial Arbitrators not appoint a Judge or should such Judge not appoint the Arbitrator within five (5) business days of his or her appointment, then the Arbitrator shall be chosen in accordance with Section 14 of the Construction Industry Arbitration Rules. If any party fails to timely designate an Arbitrator, such dispute or disagreement shall automatically be deemed resolved by the single arbitrator appointed (who in such case shall be deemed the Arbitrator). The Arbitrator will have a minimum of ten (10) years experience in Pittsburgh, Pennsylvania, in the practice of construction law or in a profession related to the subject matter of the dispute and will use the then-prevailing Construction Industry Arbitration Rules of the American Arbitration Association (the “AAA Rules”) to govern the proceeding.

(c) No demand for arbitration by the Contractor shall be considered timely unless made within one year from the date the cause of action accrued on the claim, and any failure by the Contractor to meet this requirement shall be a complete defense to the claim.

(d) The Contractor shall not cause a delay in the Work during or as a result of any arbitration proceeding, except with the express written agreement of the Authority.

(e) Any suit over any claim not subject to arbitration shall be filed and maintained only in a court of competent jurisdiction located within Allegheny County, Pennsylvania.

33. Use of Site.

(a) The Contractor shall provide the Authority, five (5) days prior to the end of each month, a listing of Subcontractors, Sub-subcontractors and Suppliers that shall need access to the site during the next month. Individuals not directly associated with the Contractor or reported to the Authority in the aforementioned list shall not be granted access to the site.

(b) The Contractor shall confine its apparatus, storage of materials and the operation of its workers to limits indicated by law, ordinances, permits or directions by the Engineer and shall not unreasonably encumber the Work site with its materials.

(c) The Contractor shall not load or permit any part of the Work site to be loaded with a weight that will endanger its safety during construction.

(d) The Contractor shall comply with and enforce the Engineer's directions regarding signs, advertisements and smoking.

34. Authority's Right to Terminate Contract.

(a) The Authority may terminate the Contract if the Contractor (i) persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials; (ii) fails to make prompt payment to Subcontractors for materials or labor in accordance with the respective agreements; (iii) fails to utilize the agreed to Subcontractor(s) or Supplier(s) in accordance with Section 5 hereof; (iv) fails to provide sufficient and qualified supervision of the Work in accordance with Section 11 hereof; (v) persistently disregards laws, ordinances, or the instructions of the Engineer; (vi) fails to obtain a required Change Order in accordance with Section 27 hereof; (vii)

fails to notify the Authority of changes in line item cost estimates in accordance with Section 6 hereof; (viii) is adjudged bankrupt; (ix) makes a general assignment for the benefit of its creditors; (x) becomes insolvent and a receiver should be appointed on account of the Contractor's insolvency; or (xi) is otherwise guilty of a substantial breach of any provision of the Contract. In addition, the Authority may terminate the Contract upon the occurrence of a Substantial Change Order, in accordance with Section 27(g)(ii) hereof. Upon the certificate of the Engineer that any one of the above reasons for termination exists, the Authority may without prejudice to any other right or remedy and after giving the Contractor, and its surety if any, seven days' written notice, terminate the Contract and take possession of the premises and of all materials, tools and appliances thereon and finish the Work by whatever method the Authority may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

(b) If the unpaid balance of the Contract Price exceeds the expense to the Authority of correcting all defects and finishing the Work, including compensation for additional architectural, engineering or professional consultants, such excess shall be retained by the Authority. If such expense and the amount of any damages incurred through the Contractor's default shall exceed such unpaid balance, the Contractor shall pay the difference to the Authority. The amount to be paid by the Contractor to the Authority shall be certified by the Engineer. The obligation to make payment under this section shall survive termination of the Contract.

35. Contractor's Right to Stop Work or Terminate the Contract.

(a) If the Work should be stopped under an order of any court, or other public authority, for a period of thirty (30) days or longer, through no act or fault of the Contractor or of anyone employed or subcontracted by him, then the Contractor may, upon seven (7) days' written notice to the Authority and the Engineer, terminate this Contract and recover from the Authority: (i) payment for all of the Work executed as of the date of such termination, and (ii) any demonstrated unavoidable loss sustained due to damage to any materials, equipment, tools and machinery.

(b) Should the Engineer fail to issue any Certificate for Payment through no fault of the Contractor, within fifteen (15) days after the Contractor's formal request for payment or if the Authority should fail to pay to the Contractor within thirty (30) days of its receipt of the Certificate for Payment, the Contractor may, upon seven (7) days' written notice to the Authority and the Engineer, stop the Work, terminate the Contract and receive from the Authority the amounts listed in the preceding section.

36. Registration with the City Finance Department. The Contractor shall maintain registration with the Department of Finance at 412-255-2582 of the City of Pittsburgh, and shall pay all taxes due and owing to the City of Pittsburgh. The Contractor understands and agrees that its failure to maintain such registration or pay such taxes shall be a breach of the Contract and entitle the Authority to immediately terminate the Contract. Such termination shall become effective upon Contractor's receipt of written notice from the Authority of such termination.

37. Requirements of the Pennsylvania Prevailing Wage Act. For contracts exceeding a value of ten thousand dollars (\$10,000), the general prevailing minimum wage rates, including contributions for employee benefits, as shall have been determined by the Secretary must be paid to

the workers employed in the performance of the Contract. The Contractor shall, and shall require all Subcontractors and Sub-subcontractors to, (i) pay no less than the wage rates as determined in the decision of the Secretary; (ii) comply with all conditions of the Pennsylvania Prevailing Wage Act, 43 P.S. §§ 165-1 - 165-17, as amended (the "Act"), and the regulations issued pursuant thereto (the "Regulations") to assure the full and proper payment of said rates; and (iii) submit certified payrolls in accordance Section 28.2(e) of these General Conditions. The Contract shall be read so as to include any provision required by the Act or the Regulations to be inserted in the Contract and not so inserted.

38. No Discrimination.

(a) The Contractor, Subcontractor(s) or any person acting on behalf of the Contractor or Subcontractor(s) will not discriminate against any employee or applicant for employment, who is qualified and available to perform the work to which the employment relates, because of race, color, religion, ancestry, national origin, gender, place of birth, disability, age or sexual orientation. The Contractor and Subcontractor(s) will take affirmative action in accordance with the terms outlined in the Form of Bid and the Contract to ensure that applicants are employed, and that employees are treated, without regard to their race, color, religion, ancestry, national origin, place of birth, gender, or sexual orientation. The Contractor, Subcontractor(s) or any person acting on behalf of the Contractor or Subcontractor(s) shall not in any manner discriminate against or intimidate any employee hired for the performance of work under the Contract on account of race, color, religion, ancestry, national origin, gender, place of birth or sexual orientation.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, ancestry, national origin, place of birth, gender, or sexual orientation.

(c) The Contractor will send to each labor union or representative or workers with which he has a collective bargaining agreement or other contractor, a notice to be provided by the Authority, advising the labor union or workers' representative of the Contractor's commitments. In addition, the Contractor shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of the Fair Practices Ordinance, Ordinance No. 75, approved February 28, 1967, and of the rules, regulations and relevant orders of the City of Pittsburgh's Commission on Human Relations.

(e) If and when requested by the Authority or the Mayor's Commission on Human Relations, the Contractor shall file, and shall cause each of its Subcontractors to file, Compliance Reports with the Mayor's Commission on Human Relations. Compliance Reports shall contain such information as to the practice, policies, programs, and employment policies, programs and employment statistics of the Contractor and each Subcontractor, and shall be in such form as the Mayor's Commission on Human Relations may prescribe.

(f) The Contractor will furnish all information and reports required by this Contract, and by the rules, regulations and orders of the Mayor's Commission on Human Relations pursuant hereto, and will permit access to its books, records and accounts by the Mayor's Commission on Human Relations, or its representative, for purposes of investigation to ascertain compliance with this Contract and said rules, regulations and orders.

(g) In the event the Contractor fails to comply with the nondiscrimination provisions of the Contract, or with any of the rules, regulations or orders herein referred to, it is agreed that the Authority, at its sole discretion, may do any or all of the following:

(i) cancel or terminate the Contract in whole or in part, whereupon all the money due or to become due under the Contract may be forfeited by the Contractor;

(ii) suspend the Contract in whole or in part;

(iii) declare the Contractor ineligible for further Authority contracts;

(iv) recover from the Contractor, by set-off against the unpaid portion of the Contract Price, or otherwise pursuant to this Contract, the sum of \$200 per day, as liquidated damages and not as a penalty, for each day that the Contractor shall fail to comply with these provisions of the Contract, as determined by the Mayor's Commission on Human Relations, in accordance with its rules and regulations, the said sum being fixed and agreed upon by and between the Contractor and the Authority because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages which the Authority would sustain in the event of such a breach of contract, and said amount is agreed to be the amount of damages which the Authority would sustain; and

(iv) such other sanctions as may be imposed by the Mayor's Commission on Human Relations or remedies as may be provided by law.

(h) The Contractor will include the provisions of Subsections (a)-(f) of this Section in every subcontract, so that such provisions will be binding upon each Subcontractor used to perform the Work. The Contractor will take such action with respect to any subcontracts as the Mayor's Commission on Human Relations may direct as a means of enforcing such provisions, including sanctions against the Subcontractor for non-compliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor as a result of such direction by the Mayor's Commission on Human Relations, the Contractor shall notify the Authority so that the Authority may enter into such litigation to protect its interests if it so desires.

39. **Assignment.** Neither party to the Contract shall assign the Contract without the written consent of the other, nor shall the Contractor assign monies due or to become due him hereunder, without the previous written consent of the Authority.

40. **Gender.** Words used in the Contract, regardless of the gender specifically used, shall be deemed and construed to include the other gender, masculine, feminine or neuter, as the context requires.

41. **Notice.** Notice under the Contract shall be deemed to have been duly given if in writing and (i) delivered in person to the individual, a member of the firm or entity or an officer of the corporation for which it was intended, or (ii) sent by registered or certified mail to the last business address of the party receiving notice known to the party giving notice.

42. **Section and Other Headings.** The section and other headings contained in the Contract are for reference purposes only and shall not affect the meaning or interpretation of the Contract.

43. **Governing Law.** Any controversy, dispute or claim arising out of or relation to the Contract, or the breach thereof, shall be governed by the laws of the Commonwealth of Pennsylvania.

LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

as Principal, and _____

_____, as Surety, are held and firmly bound unto the Public Parking Authority of Pittsburgh (the "Authority"), its attorney, successors or assigns, in the sum of _____ (\$_____) Dollars, lawful money of the United States, for the payment of which we bind ourselves, our legal representatives, heirs, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a Contract with the Authority dated _____, 2013, for the _____

_____,
_____,
_____,
(herein called the "Contract"), which Contract, together with all related contract documents (the "Contract Documents"), shall be deemed a part hereof as fully as if set out herein.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall promptly pay or cause to be paid all sums of money which may be due any person, co-partnership, association or corporation for all materials furnished and labor supplied or performed in the prosecution of the work under the contract, including rental for equipment and services rendered by public utilities, whether or not said material or labor entered into or became a component part of the work or improvement contemplated in the Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

It is further agreed that any change, extension of time, alteration or addition to the terms of the Contract or Contract Documents or to the work to be performed or materials to be furnished thereunder and any forbearance by the Authority or the Principal to the other shall not in any way release the Principal or the Surety, or either of them, from their liability hereunder. The Surety does hereby waive notice of any such change, extension, alteration, addition or forbearance.

The Principal and Surety further jointly and severally agree with the Authority that every person, co-partnership, association or corporation, who, whether as subcontractor or otherwise, has furnished material or supplied or performed labor or rented equipment or furnished public utility services in the prosecution of the work and who has not been paid in full therefor before the expiration of a period of sixty (60) days after the date such payment was due, may sue in assumpsit on this Bond in the name of the Authority, for his, their or its use, prosecute the same to final judgement for such sums of money as may be justly due him, them or it, and have execution issued thereof, provided, however, that the Authority shall not be liable for the payment of any costs or expenses of any such suit. Suit and recovery by any such person, co-partnership, association or corporation hereunder shall be subject to the provisions of Section 11 of Act of General Assembly, approved June 5, 1947, P.L. 458, as amended, to the same extent as if said provisions were fully incorporated in the Bond.

It is further agreed that in case of default in and/or any action arising out of rights and liabilities secured by this obligation, any party hereto or any person claiming by or through either may use the purpose of establishing his, its or their claim a copy of this obligation, certified by the Authority and the action or actions, if any, arising on the within obligation, shall not be a bar to any subsequent action that may arise through any liability incurred in any other action therein and based upon any other part of this obligation.

IN WITNESS WHEREOF, the Principal and Surety, intending to be legally bound, have executed this instrument and these presents have been duly signed by their undersigned representative pursuant to authority of their governing bodies.

(INDIVIDUAL PRINCIPAL SIGN HERE)

WITNESS:

(Individual Principal)

(Business Address)

(Individual Principal)

(Business Address)

(CORPORATE PRINCIPAL SIGN HERE)

ATTEST:

(Corporate Principal)

(Business Address)

By _____

(Title)

(Title)

(SURETY SIGN HERE)

ATTEST:

(Corporate Surety)

(Business Address)

By _____

(Title)

(Title)

The rate of premium on this Bond is _____ per thousand, total amount of premium charge, \$_____.

(The above must be filled in by corporate surety).

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

as Principal, and _____

_____, as Surety, are held and firmly bound unto the Public Parking Authority of Pittsburgh (the "Authority"), its attorney, successors or assigns, in the sum of _____ (\$ _____) Dollars, lawful money of the United States, for the payment of which we bind ourselves, our legal representatives, heirs, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a Contract with the Authority dated _____, 2013, for the _____, (herein called the "Contract"), which Contract, together with all related contract documents (the "Contract Documents"), shall be deemed a part hereof as fully as if set out herein.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall faithfully perform and keep all undertakings agreed by it to be performed and kept at the time and in the manner provided in the Contract and related contract Documents, as the same may be from time to time amended or altered, and shall indemnify and save harmless the Authority, its officers, agents and employees from any and all cost, damage, liens or demands by reasons of the Principal's failure to perform and keep its undertakings under the Contract, or by reason of the manner in which such undertakings are performed or kept, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

It is further agreed that any change, extension of time, alteration or addition to the terms of the Contract or Contract Documents or to the work to be performed or materials to be furnished thereunder and any forbearance by the Authority or the Principal to the other shall not in any way release the Principal or the Surety, or either of them, from their liability hereunder. The Surety does hereby waive notice of any such change, extension, alteration, addition or forbearance.

Whenever the Principal shall be, and declared by the Authority to be in default under the Contract, the Authority having performed its obligations thereunder, the Surety shall: (i) promptly remedy the default; provided however that Surety shall not utilize Principal for such remedy without the approval of the Authority, which approval shall not be unreasonably withheld; (ii) promptly complete the Contract in accordance with its terms and conditions; provided, however, that Surety shall not utilize Principal to complete the Contract without the approval of the Authority, which approval shall not be unreasonably withheld; or (iii) promptly obtain a bid or bids for completing the work under the Contract in accordance with its terms and conditions and, upon determination of the Surety and Authority jointly of the lowest responsible bidder, make available as work progresses (even though there should be a default or a succession of default under the Contract or any contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion of the work under the Contract less the balance of the Contract Price (as defined in the Contract); provided, however, such funds shall not exceed the amount set forth in the first paragraph hereof. The term "Balance of the Contract Price", as used in this paragraph, shall mean the Contract Price less amounts properly paid by the Authority to the Principal.

It is further agreed that in case of default in and/or any action arising out of rights and liabilities secured by this obligation, any party hereto or any person claiming by or through either may use the purpose of establishing his, its or their claim a copy of this obligation certified by the Authority and the action or actions, if any, arising on the within obligation, shall not be a bar to any subsequent action that may arise through any liability incurred in any other action therein and based upon any other part of this obligation. This Bond shall not be amended or modified by the parties hereto without the prior written consent of the Authority.

IN WITNESS WHEREOF, the Principal and Surety, intending to be legally bound, have executed this instrument this _____ day of _____ 2013, and these presents have been duly signed by their undersigned representatives, pursuant to the authority of their governing bodies.

(INDIVIDUAL PRINCIPAL SIGN HERE)

WITNESS:

(Individual Principal)

(CORPORATE PRINCIPAL SIGN HERE)

ATTEST:

(Corporate Principal)

(Business Address)
By _____

(Title) (Title)

(SURETY SIGN HERE)

ATTEST:

(Corporate Surety)

(Business Address)

By _____

(Title)

(Title)

The rate of premium on this Bond is _____ per thousand, total amount of premium charge, \$_____.

(The above must be filled in by corporate surety).

WARRANTY BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

as Principal, and _____

_____, as Surety, are held and firmly bound unto the Public Parking Authority of Pittsburgh (the "Authority"), in the sum of _____

(\$_____) Dollars, lawful money of the United States of America, to be paid to the Authority, or its successors and assigns, to the payment of which sum well and truly to be made, do bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a Contract with the Authority dated _____

_____, 2013, for _____

(the "Contract"), which Contract, together with all related contract documents (the "Contract Documents"), shall be deemed a part hereof as fully as if set out herein; and

WHEREAS, the Authority requires that these presents be executed on or before the final completion and acceptance of the work required under the contract or Contract Documents; and

WHEREAS, said work required under the Contract Documents was completed and accepted on the _____ day of _____, 2013.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if Principal shall remedy, without cost to the Authority, any defects in the work performed by Principal, its agents employees or subcontractors under the contract or Contract Documents, that may develop its agents, employees or subcontractors under the contract or Contract Documents, that may develop during a period of one (1) year from the date of completion and acceptance of such

work and are caused by defective or inferior materials or workmanship, then this obligation shall be void; otherwise it shall be an remain in full force and effect.

Whenever the Principal shall fail, and be declared by the Authority to have failed, to remedy any defects in the work performed by Principal, its agents, employees or subcontractors under the Contract or the Contract Documents that may develop during a period of one (1) year from the date of completion and acceptance of such work, and said defect is caused by defective or inferior materials or workmanship, the Surety shall promptly: (i) remedy the defect; provided however that Surety shall not utilize Principal for such remedy without the approval of the Authority, which approval shall not be unreasonably withheld; or (ii) promptly obtain a bid or bids for remedying the defect and, upon determination by the surety and Authority jointly of the lowest responsible bidder, make available, as work on the defect progresses, sufficient funds to pay the cost of remedying the defect; provided, however, all such funds shall not exceed in the aggregate the amount set forth in the first paragraph hereof.

IN WITNESS WHEREOF, the Principal and Surety, intending to be legally bound, have executed this instrument and these presents have been duly signed by their undersigned representatives pursuant to authority of their governing bodies.

(INDIVIDUAL PRINCIPALS SIGN HERE)

In the presence of:

(Individual Principal)

(Business Address)

(Individual Principal)

(Business Address)

(CORPORATE PRINCIPAL SIGN HERE)

ATTEST:

(Corporate Principal)

(Business Address)

By _____

(Title)

(Title)

(SURETY SIGN HERE)

ATTEST:

(Corporate Principal)

(Business Address)

By _____

(Title)

(Title)

The rate of premium on this Bond is _____ per thousand, total amount of premium charge, \$_____.

(The above must be filled in by corporate surety).

SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 INTENT OF PLANS AND SPECIFICATIONS

- A. The intent of the Plans and Specifications is to describe the work which the Contractor undertakes to do, in full compliance with the Contract, and it is understood that the Contractor will furnish, unless otherwise provided in the Contract, all materials, machinery, equipment, tools, supplies, transportation, labor, and all other incidentals necessary to the satisfactory prosecution and completion of the Work. The Plans and Specifications are complementary, and what is called for by either is as binding as if called for by both.
- B. The Special Conditions shall control where in conflict with the Standard Specifications. However, such portions of the Standard Specifications not in conflict or not rendered meaningless by the Special provisions shall remain in full force and effect and be binding on the parties hereto.
- C. In the event the Contractor discovers any error or discrepancy in the Contract Documents, he shall immediately call upon the Engineer for his decision. The Engineer shall then make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the Specifications, Special Provisions, Plans and other Contract Documents, as construed by him and his decision shall be final.

1.03 SUMMARY OF WORK

- A. General Mobilization: This work consists of all labor, materials, tools and equipment required for setting-up general plant, storage/staging areas and facilities required by State Laws and City Ordinances; and the general mobilization of equipment required for the completion of the work shown on the Contract Documents. The cost of this item shall include all permits and fees required to perform the project, unless otherwise noted in the Contract Documents, and all expenses for the de-mobilization after the work has been completed. If a building permit is required, it will be the contractor's responsibility to get the necessary permit to perform the repair work, unless noted otherwise in the documents. This work shall also include the following items:
 - 1. Review of the existing fire alarm system and existing systems for each phase of work to identify how phasing and scoping are to be accomplished in order to maintain a complete operational fire alarm system during the entire renovation period.
 - 2. Prepare submittals and documents for submission to local code authority for purposes of obtaining permits. The contractor shall include within their bid and pay for all fees in to obtain permits.
 - 3. Furnish and install a complete, code compliant, operational fire alarm system. The installation shall include all devices, pathways, raceways, supports, penetrations between floors/walls, testing, and obtainment of approvals for occupancy with new fire alarm system in operation.

SECTION 260500 – COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 GENERAL STIPULATIONS

- A. The contractor shall procure all necessary permits to carry out their work. They shall also arrange for all tests required on any and all parts of their work by local authorities, paying all regular and proper chargers for same. They shall also obtain all certificates of inspection and approval from all required authorities and the Underwriters. Underwriters' certificates in duplicate shall be furnished to the owner at the completion of the project. Also, the contractor shall furnish two copies of each intermediate Underwriter's inspection report to the Architect and the owner. All fees and permits required shall be satisfied and obtained by the contractor and the cost shall be included in the contract price.
- B. When the installation is reported in writing by the Contractor to be complete and ready for acceptance, tests and inspection shall be made by the Contractor in the presence of representatives of the Architect to ascertain whether it complies with the specifications and Contract, and upon its failure to do so, the Contractor shall at once remedy all defects and shortcomings, and any additional tests that may be required shall be entirely at the Contractor's expense.
- C. The Contractor shall have a managerial representative at each and every regularly scheduled job conference to receive the items that are furnished by others, to inventory them and coordinate his work with the other trades.
- D. This Contractor shall be entirely responsible for all apparatus, equipment, and appurtenances furnished under this Contract in connection with the work, and special care shall be taken to protect all parts thereof in such a manner as may be necessary or as may be directed. Protection shall include covers, crating, sheds, or other means to prevent dirt, grit, plaster, or other foreign substances from entering the working parts of machinery or equipment. Special care shall be taken to keep all open ends of conduit and other equipment closed while in storage and during the course of installation. Where equipment must be stored outside the building, it shall be totally covered and secured with heavy waterproof tarps and kept dry at all times. Where equipment has been subjected to moisture, it shall be suitably dried out before placed in service. All apparatus, equipment, conduit and other appurtenances shall be stored in areas designated by the Architect.

1.4 DEFINITIONS

- A. Approved Equal: The term “approved equal”, “approved”, “equal”, “equivalent”, etc. shall mean equal in all respects in the opinion of the Architect.
- B. As Required: The term "as required" refers to making final connections to and/or coordinating with the appropriate authorities regarding the installation of the indicated equipment.
- C. Contractor: The term "Contractor", "this Contractor" or "Electrical Contractor" when used in the Contract Documents refers to the Contractor responsible for all work specified in Division 26, Division 28, and as indicated on the Electrical Drawings.
- D. Directed: Terms such as "directed," "requested," "authorized," "selected," and "permitted" when used separately without referencing any authority, shall mean directed by the Architect, requested by the Architect, and similar phrases.
- E. Disconnect: Disconnect electrical service to indicated items. Associated conduit and wire shall be disconnected and removed, complete, back to its source. Where electrical equipment (i.e. generator) is connected to radiator, fuel, and exhaust piping, intake and exhaust ductwork, etc., this Contractor shall disconnect and remove all associated appurtenances, complete, back to their source unless noted otherwise.
- F. Existing to Remain: Protect construction and/or indicated items to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.
- G. Finished/Unfinished Space: The term “finished space” shall mean areas where drywall is hung and installed with wall coverings and/or painted, floors are polished or coverings are installed on the floor, and the ceiling is plaster/gypsum board and/or suspended A.C.T. The term “unfinished space” refers to any area that does not meet the definition for a “finished space” as specified above. Mechanical rooms, electrical rooms, garages, etc. are typically considered “unfinished spaces”.
- H. Furnish: The term "furnish" when used separately, shall mean to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations by others.
- I. Indicated: The term "indicated", "shown," "noted," "scheduled," and "specified" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents.
- J. Install: The term "install" when used separately, shall mean to mount in place, connect and make operable. Installation operations at the Project site shall include, but not be limited to, the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- K. Provide: The term "provide" when used in these specifications, shall mean to furnish and install, complete and ready for the intended use. See above definitions for additional requirements.
- L. Regulations: The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- M. Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

- N. Remove: Remove and legally dispose of items except those indicated to be reinstalled or salvaged or to remain the Owner's property as directed.
- O. Salvage (Turn Over to Owner): Items indicated to be salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- P. Subcontractor: The term "Subcontractor" when used in these Contract Documents refers to an experienced installer (i.e. manufacturer, vendor, etc.) whom has successfully completed a minimum of five (5) previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction. Any reference to, or letting of work contained in these Contract Documents to any Subcontractor does not relieve this Contractor of his/her responsibility for all work, material and equipment indicated in these Contract Documents.
- Q. Work: The term "work" refers to all labor and materials provided by the Contractor and/or Subcontractor to make a complete and operable system.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and as indicated below.
 - 1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
 - 2. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 - 3. Do not submit Product Data on the following items and/or systems until compliance with requirements of the Contract Documents has been confirmed
- B. All drawings, etc., submitted for approval shall be marked with the name of the project and shall bear the stamp of approval of the Contractor as evidence that the material has been checked by the Contractor. Any drawings, etc., submitted without this stamp of approval will not be considered and will be returned to the Contractor for resubmission.
- C. Additional copies may be required by individual sections of these Specifications.
- D. None of the items throughout the electrical specifications which require a submission and/or review, shall be installed in the work or orders placed for same until final review has been given by the Architect.
- E. Submit product data for the following products:
 - 1. Access panels and doors.
 - 2. Joint Sealers.

- F. Welder certificates, signed by Contractor, certifying that welders comply with requirements specified under "Quality Control" article of this Section.

- G. Selective Demolition
 - 1. Schedules indicating proposed methods and sequence of operations for selective demolition prior to commencement of Work. Include coordination for shut off of electrical service, and details for dust and noise control.
 - a. Coordinate sequencing with construction phasing and Owner occupancy as directed.
 - 2. Inventory of items removed and salvaged by the Contractor for the Owner for inclusion in the Operation and Maintenance Manuals.
 - 3. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.
 - 4. Record drawings at Project closeout according to Division 1 Section "Contract Closeout."
 - a. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

1.6 SUBSTITUTIONS

- A. General: In order to establish standards of quality and performance, all types of materials listed hereinafter by manufacturer's names and/or manufacturer's catalog number shall be provided as specified. If this Contractor desires to substitute an item, he/she shall comply with the following administrative and procedural requirements which are included in this Section to expand the requirements as defined by Part 1 paragraph "Related Documents".

- B. Substitutions will be permitted only on products specified with the phrase "or approved equal", "or as approved", "or equal", "or equivalent", etc. and the burden shall be upon the bidder to prove such equality. If the Contractor elects to prove such equality, he/she must request the Architect's approval in writing to substitute such item for the specified item, and shall submit supporting data, and samples if required, to permit a fair evaluation of the proposed substitution with respect to quality, serviceability and warranty.
 - 1. Samples: When requested, samples of items that the Contractor proposes to use as substitutions for the specified products/systems shall be submitted as follows.
 - a. A sample of both the specified item and the proposed substitute item shall be submitted simultaneously. The scheduling of the submission of such samples shall be as directed and shall in no way delay the progress of the Project.
 - b. Fixtures shall be submitted complete with lamps and a line cord ready for temporary operation.
 - c. The Architect will assume no responsibility whatsoever for any samples submitted.

- C. When the phrase "or approved equal", "or as approved", "or equal", "or equivalent", etc. appears and the Contractor desires to furnish equipment of a manufacturer other than that specified or intended, he/she shall include a complete specification of the substituted item, along with each submission copy of shop drawings, indicating the necessary modifications to the substituted product to satisfy the requirements of the Contract Documents.
 - 1. Compliance Report: Along with each submission copy of the product data and/or shop drawing, the manufacturer shall indicate the necessary modifications to the product and/or system to satisfy the requirements of the Contract Documents. Each paragraph including all subparagraphs shall

bear the same paragraph number as the contract specification so that a close comparison can be made to the manufacturer specified herein by catalog number(s).

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

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

1.7 REGULATIONS

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

1.8 DRAWINGS AND SPECIFICATIONS

- A. The drawings are generally diagrammatic and indicative of the work to be installed. Exact locations of equipment and points of termination shall be reviewed with the Architect. Should it be found that any

system or equipment cannot be installed as shown on the drawings, the Architect shall be consulted before installing or making changes to the layout.

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

1.9 FAMILIARITY WITH CONTRACT REQUIREMENTS

- A. It is the responsibility of the Contractor, prior to submitting a bid on this Project, to satisfy himself as to the nature and location of the work, the character, quality and quantity of the materials which will be required, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and of all other matters which can in any way affect the work under this Contract.
- B. Failure to make an on-site inspection prior to submitting a bid, or failure to comply with any or all of the above requirements will not relieve this Contractor from the responsibilities of properly estimating the requirements or costs of successful completion of the work nor from the responsibility for the faithful performance of the provisions of this Contract.
- C. The Electrical Contractor shall confer with all other Contractors and shall apply for detailed and specific information regarding the location of all equipment as the final location may differ from that indicated on the drawings. Outlets, equipment or wiring improperly placed because of the Electrical Contractor's failure to obtain this information shall be relocated and reinstalled by the Electrical Contractor without additional expense to the Owner.

1.10 ELECTRICAL COORDINATION DRAWINGS

- A. Prepare coordination drawings at a scale of 1/4"=1' 0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components for the following:
 - 1. Electrical equipment room
 - 2. Generator room
 - 3. Telephone/Communication room
- B. Indicate the proposed locations of major raceway systems, equipment, and materials. Include the following:

1. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance.
 2. Exterior wall and foundation penetrations.
 3. Equipment connections and support details.
 4. Sizes and location of required concrete pads and bases.
- C. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
- D. The Contractor shall obtain written approval of the coordination drawings from all other Contractors involved in the project. Once written approval is obtained, the Contractor shall submit the signed documents to the Architect for review and approval prior to the start of work.
- 1.11 RECORD DOCUMENTS
- A. Prepare record documents in accordance with the requirements as defined by Part 1 paragraph "Related Documents" and the following:
- B. Markup Procedure: During construction, maintain a set of blue or black line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
 - a. Revisions to details shown on the Drawings.
 - b. Locations of interior conduits larger than 2" diameter not installed underslab.
 - c. Locations of all feeder conduits.
 - d. Revisions to Branch and Feeder Circuits: Record circuit numbers and associated panelboard space numbers for all existing, new, or relocated electrical appurtenances, mechanical equipment, owner furnished equipment, etc. that required power or reconnection of existing electrical services. Each circuit number shall be shown with a homerun coming off the equipment it serves. Circuit numbers indicated on the record drawings shall match the new or updated panelboard indexes.
 - e. Actual installed equipment locations.
 - f. Changes made by change order, Architect's written orders, and Owner requested.
 2. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 4. Note Construction alternate numbers, change order numbers, and similar identification.
 5. Accurately record information in an understandable drawing technique.
 6. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
 7. At time of Substantial Completion, submit record drawings to the Architect for the Owner's records. Organize into sets and bind and label sets for the Owner's continued use.
- C. Copies and Distribution: After completing the record drawings, print/copy 3 blue or black line prints of each drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets.

1. Organize and bind original marked up set of prints that were maintained during the construction period in the same manner.
2. Submit the marked up record set and a minimum 3 copy sets to the Architect for the Owner's records. Should more copies be requested by the Architect, they shall be provided at no cost to the Owner.

1.12 OPERATION MAINTENANCE MANUALS

- A. General: Prepare maintenance manuals in accordance with Part 1 paragraph "Related Documents" and the following:
- B. Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.
 1. Binders: For each manual, provide heavy duty, commercial quality, 3 ring, vinyl covered, loose leaf binders, in thickness necessary to accommodate contents, sized to receive 8 1/2 by 11 inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
 - a. Where two (2) or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Identify each binder on front and spine, with the printed title "ELECTRICAL OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
 2. Dividers: Provide heavy paper dividers with celluloid covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the Section on each divider.
 3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
 4. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8 1/2 by 11 inch, 20 lb/sq. ft. white bond paper.
 5. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
 - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
 - b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual
- C. Manual Content
 1. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
 - a. General system or equipment description.
 - b. Design factors and assumptions.
 - c. Copies of all approved Shop Drawings and Product Data, including products/systems installed during construction by change order, etc.
 - d. System or equipment identification, including:

- 1) Name of manufacturer.
 - 2) Model number.
 - 3) Serial number of each component.
- e. Operating instructions.
 - f. Emergency instructions.
 - g. Wiring diagrams.
 - h. Inspection and test procedures.
 - i. Inspection reports and certificates.
 - j. Maintenance procedures and schedules.
 - k. Precautions against improper use and maintenance.
 - l. Copies of warranties.
 - m. Repair instructions including spare parts listing.
 - n. Sources of required maintenance materials and related services.
 - o. Manual index.
2. Organize each manual into separate Sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of Product Data, supplemented by Drawings and written text; and copies of each warranty, bond, and service contract issued.
- a. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - 1) Subject matter covered by the manual.
 - 2) Name and address of the Project.
 - 3) Date of submittal.
 - 4) Name, address, and telephone number of the Contractor.
 - 5) Name and address of the Architect.
 - 6) Cross reference to related systems in other operation and maintenance manuals.
 - b. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - 1) Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 - c. General Information: Provide a general information Section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the Subcontractor or Manufacturer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
 - d. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
 - e. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.

- f. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
 - 1) Do not use original project record documents as part of operation and maintenance manuals.
- g. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.
- h. Approval letters from the following:
 - 1) Local authority having jurisdiction
 - 2) Inspection agency
 - 3) Field representative for specific systems, i.e. fire alarm, signal/communication, intrusion detection, etc.

D. Electrical Maintenance Manual

- 1. Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
 - a. Description: Provide a complete description of each unit and related component parts, including the following:
 - 1) Equipment or system function.
 - 2) Operating characteristics.
 - 3) Limiting conditions.
 - 4) Performance curves.
 - 5) Engineering data and tests.
 - 6) Complete nomenclature and number of replacement parts.
 - b. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
 - 1) Printed operation and maintenance instructions.
 - 2) Assembly drawings and diagrams required for maintenance.
 - 3) List of items recommended to be stocked as spare parts.
 - c. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
 - 1) Routine operations.
 - 2) Troubleshooting guide.
 - 3) Disassembly, repair, and reassembly.
 - 4) Alignment, adjusting, and checking.
 - d. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
 - 1) Startup procedures.
 - 2) Equipment or system break in.

- 3) Routine and normal operating instructions.
- 4) Regulation and control procedures.
- 5) Instructions on stopping.
- 6) Shutdown and emergency instructions.
- 7) Summer and winter operating instructions.
- 8) Required sequences for electric or electronic systems.
- 9) Special operating instructions.

- e. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
- f. Controls: Provide a description of the sequence of operation and as installed control diagrams by the control manufacturer for systems requiring controls.
- g. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following:
 - 1) Electric service.
 - 2) Controls.
 - 3) Communication.

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

1.13 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Labels and Listings: "Labels and Listings" for appliances and equipment provided meet the requirements of the Underwriters Laboratories, Inc. (UL), Electrical Testing Laboratories (ETL) and other standards organizations.
- C. Seismic Requirements: Provide equipment anchoring and support to resist shear and overturning moments.
- D. Current Models:
 1. Manufactured items furnished shall be the current, cataloged product of the manufacturer.
 2. Replacement parts shall be available.
 3. There shall be a permanent service organization maintained or trained by the manufacturer to provide satisfactory service.
- E. Experience: Manufactured items shall have been installed and used, without modification, renovation or repair, on other projects for not less than three years prior to the date of bid opening for this project.
- F. All work shall be installed in a first class, neat and workmanlike manner by mechanics skilled in the trade involved. The quality of workmanship shall be subject to the approval of the Architect. Any work found by the Architect to be of inferior quality and/or workmanship shall be replaced and/or reworked until approval of the Architect is obtained. Any cost involved in obtaining said approval shall be the responsibility of the Electrical Contractor.

1.14 CONTINUITY OF SERVICE

- A. The Contractor shall maintain electrical service to the Existing Buildings during the course of construction. Temporary equipment, switches, cable and whatever else necessary shall be provided as required to

maintain electric service. Rules and regulations of local, state and federal authorities respecting safety provisions shall be observed. The Contractor shall use all precautions so as not to endanger the lives of the building occupants or the public. The Contractor shall furnish and install a temporary service should it be required and remove same after need is satisfied. All charges and costs shall be included in the Electrical Contract.

- B. When it becomes necessary to temporarily interrupt electric service to any portion of the buildings, the Contractor shall notify the Architect and the Owner in writing at least seven days in advance to enable necessary arrangements to be made. No interruptions will be permitted without the expressed written permission of the Owner.
- C. The existing fire alarm system shall be fully maintained in service during the execution of work under this Contract. The Contractor shall furnish and install, and later remove any temporary equipment, wiring or other appurtenances necessary to provide the continuity of service for the system.

1.15 INSTRUCTIONS TO OPERATING PERSONNEL

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

1.16 DELIVERY, STORAGE, AND HANDLING

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

1.17 GUARANTEE/WARRANTY

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

1.18 SEQUENCING, SCHEDULING AND COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."
- E. Arrange selective demolition so as not to interfere with Owner's on site operations.
- F. Coordinate electrical equipment installation with other building components.
- G. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations.
- H. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning prior to closing in the building.
- I. Coordinate connecting electrical service to components furnished under other Sections.
- J. Coordinate connecting electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

- K. Notify the Architect at least 5 days prior to commencing demolition operations.
- L. Perform selective demolition in phases as indicated.

PART 2 - PRODUCTS

2.1 SLEEVE SEALS

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

2.2 GROUT

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

2.3 MISCELLANEOUS METALS

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

2.4 TOUCHUP PAINT

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

2.5 JOINT SEALERS

- A. General: Joint sealers, joint fillers, and other related materials compatible with each other and with joint substrates under conditions of service and application.
- B. Colors: As selected by the Architect from manufacturer's standard colors.
- C. Elastomeric Joint Sealers: Provide the following types:
 - 1. One-part, nonacid-curing, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non-traffic areas for masonry, glass, aluminum, and other substrates recommended by the sealant manufacturer.
 - 2. One-part, mildew-resistant, silicone sealant complying with ASTM C 920, Type S, Grade NS, Class 25, for uses in non-traffic areas for glass, aluminum, and nonporous joint substrates; formulated with fungicide; intended for sealing interior joints with nonporous substrates; and subject to in-service exposure to conditions of high humidity and temperature extremes.
 - 3. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. One-Part, Nonacid-Curing, Silicone Sealant:
 - 1) "Chem-Calk N-Cure 2000," Bostic Construction Products Div.
 - 2) "Dow Corning 790," Dow Corning Corp.
 - 3) "Silglaze N SCS 2501," General Electric Co.
 - 4) "Silpruf SCS 2000," General Electric Co.
 - b. One-Part, Mildew-Resistant, Silicone Sealant:
 - 1) "Dow Corning 786," Dow Corning Corp.
 - 2) "SCS 1702 Sanitary," General Electric Co.
 - 3) "863 #345 White," Pecora Corp.
 - 4) "Rhodorsil 6B White," Rhone-Poulenc, Inc.
 - 5) "Proglaze White," Tremco Corp.
 - 6) "OmniPlus," Sonneborn Building Products Div.
- D. Acrylic-Emulsion Sealants: One-part, nonsag, mildew-resistant, paintable complying with ASTM C 834 recommended for exposed applications on interior and protected exterior locations involving joint movement of not more than plus or minus 5 percent.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:
 - a. "Chem-Calk 600," Bostik Construction Products Div.
 - b. "AC-20," Pecora Corp.
 - c. "Sonolac," Sonneborn Building Products Div.
 - d. "Tremco Acrylic Latex 834," Tremco, Inc.
- E. Fire-Resistant Joint Sealers: Two-part, foamed-in-place, silicone sealant formulated for use in through-penetration fire-stopping around cables, conduit, pipes, and duct penetrations through fire-rated walls and floors. Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with ASTM E 814, by Underwriters' Laboratories, Inc., or other testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Available Products: Subject to compliance with requirements, products which may be incorporated in the Work include, but are not limited to, the following:

- a. "Dow Corning Fire Stop Foam," Dow Corning Corp.
- b. "Pensil 851," General Electric Co.

2.6 REPAIR MATERIALS

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

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

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

3.2 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in other Specification Divisions and approved product data and shop drawings for rough-in requirements.

3.3 ELECTRICAL INSTALLATIONS

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

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

B. Performance of Equipment

1. All materials, equipment and appurtenances of any kind, shown on the drawings, hereinafter specified or required for the completion of the Project in accordance with the intent of these specifications, shall be completely satisfactory and acceptable in operation, performance, and capacity. No approval either in written or verbal of any drawings, descriptive data, or samples of such material, equipment and/or appurtenances shall relieve this Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the Project.
2. Any material, equipment or appurtenances, the operation, capacity or performance of which does not comply with the drawings and/or specification requirements or which is not new or which is damaged prior to acceptance by the Owner will be held to be defective material and shall be removed and replaced with the proper acceptable materials, equipment and/or appurtenances or put in proper acceptable working order, satisfactory to the Architect with no additional expense to the Owner.
3. All auxiliary systems specified herein including the emergency lighting system, fire alarm system, intercommunication system, telephone distribution system, MATV system, or other similar systems shall be furnished by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than five (5) years. This Contractor shall deliver to the Architect, prior to final payment, a statement from the manufacturer or his authorized representative, certifying that the equipment has been inspected by him and found to be properly installed and functioning satisfactorily. Installation, final connections and testing of such systems

shall be performed under the direct supervision of competent authorized service engineers who shall be in the employ of the respective equipment manufacturer. Any and all expenses incurred by these equipment manufacturer's representatives shall be borne by the Contractor.

4. All details of the installation of all equipment shall be electrically and mechanically correct. All equipment shall operate without objectional noise or vibration should be produced and transmitted to occupied portions of the building by apparatus, conduit or other parts of a system, any corrections to eliminate noise and vibration shall be at no expense to the Owner.

3.4 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Part 1 paragraph "Related Documents." In addition to the requirements referenced in the "Related Documents" paragraph, the following requirements apply:

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

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

1. Electrical Contractor shall be responsible for all cutting, patching, and finishing of existing construction for the proper installation of all electrical equipment and materials to be installed in the existing portion of this project. This will also be required for the removal of the existing equipment and materials. All cutting shall be kept to an absolute minimum consistent with the requirements of the project. Cutting, patching and finishing shall be done by workmen skilled in this type of work. All patching shall be done utilizing materials of the same quality and texture as the adjacent undisturbed areas perfectly and to the satisfaction of the Architect.
 - a. Cutting: Cut and remove existing construction only to the extent required by new Work and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
 - 1) Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

- 2) Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3) Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.
 - 4) Maintain adequate ventilation when using cutting torches.
 - 5) Cut concrete and masonry at junctures with construction to remain, using power driven masonry saw or hand tools; do not use power driven impact tools.
- b. Patching: Return elements of construction and surfaces to remain to condition existing before start of cutting operations.
- c. Painting
- 1) Painting of the final finished areas will be by the General Contractor as shown in the "Interior Finish Schedule" on the Architectural Drawings.
 - 2) Where cutting and patching occurs in areas that the General Contractor does not have any work and/or the General Contractor is not required to finish the wall and/or ceiling that was affected by this Contractor's work, the Electrical Contractor shall paint the affected surface from "natural" break to "natural" break as directed by the Architect. When other trades other than the General Contractor damage the same wall and/or ceiling, the Electrical Contractor shall coordinate his painting responsibilities with the other trades before proceeding with any work in that area.
 - 3) All surfaces to be painted shall receive an undercoat 24 hours before the final coat is applied. Undercoats which show lumps or rough areas shall be smoothed with fine sandpaper or steel wool and dusted off before the final coat is applied. Final coat shall be solid, even color, free of lumps, drops, sags, run brush marks, laps, or other defects, finished to a line where they adjoin other colors or unpainted surfaces.
 - 4) Drop cloths shall be used to protect floors and all other work from damage. Any covering temporarily removed from any part of the work or finish shall be promptly replaced and any damage from neglect to so protect all surfaces shall be good at the Contractor's expense.
 - 5) Paint color shall match adjoining surfaces as closely as possible and to the satisfaction of the Architect.
2. No cutting shall be done which may affect the building structurally or architecturally including building systems without first securing the approval of the Architect. Cutting shall be accomplished in such a manner as not to cause damage to the building or leave unsightly surfaces which cannot be concealed by plates, escutcheons, or other construction. Where unsightly conditions are caused, the Contractor shall be required, at his own expense, to repair the damaged areas.
 3. Cutting of the construction excessively or carelessly done shall be repaired by this Contractor to match the original work and to the satisfaction of the Architect who will make the final decision with respect to excessive or careless cutting work.
 4. This Contractor shall seal all openings he has made in plenum spaces, fire rated floors, ceilings or partitions after his work has been installed. The material used for sealing the openings shall have a fire rating equal to or greater than the rating of the floor, ceiling or partition material. Openings shall be suitably treated to prevent passage of stray light, air or sound.
 5. Where present equipment is removed and unused openings remain in walls, floors, partitions, etc., this Contractor shall properly patch all such openings. All patching and repairing shall be done by workmen skilled by this type or work and shall match present or new finishes.
 6. All holes or openings for the passage of conduit to be put in existing concrete shall be bored.
 7. Cutting, patching, and repairing of openings in the existing exterior walls and roof shall be by the General Contractor.
- C. Chases and Openings (New Building)

1. All openings or chases required for the installation of the work in the new portion of the building shall be provided by the General Contractor, providing the Electrical Contractor notifies the General Contractor of the size and location of the required openings or chases in sufficient time before the work is closed in, so that the work of the General Contractor will not be delayed.
2. If the Electrical Contractor fails to notify the General Contractor in sufficient time, the Electrical Contractor shall cut and patch the openings at his expense.
3. The Electrical Contractor shall set all sleeves, hangers, and anchors required for his work and shall be responsible for their proper and permanent location.
4. The Electrical Contractor shall seal all openings he has utilized in fire rated floors, ceilings, or partitions after his work has been installed. The material used for sealing the openings shall have a fire rating equal for greater than the rating of the floor, ceiling, or partition material. Openings shall be suitably treated to prevent passage of stray light, air or sound.

3.5 PROTECTION OF WORK, MATERIALS, AND EQUIPMENT

- A. This Contractor shall effectually protect at his own expense, all existing facilities and such of his new work, materials or equipment as is liable to injury during the construction period. All openings in to any part of the conduit system as well as all associated fixtures, equipment, etc. both before and after being set in place shall be securely covered or otherwise protected to prevent obstruction, damage, or injury due to carelessly or maliciously dropped tools or materials, grit, dirt moisture, water or any foreign matter. This Contractor shall be held responsible for all damage so done, until his work is fully accepted by the Architect. Conduit ends shall be covered with capped bushings.
- B. All surfaces, either finished or in preparation for finishing or finish material application, shall be protected against damage from painting, welding, cutting, burning, soldering or similar construction functions. The protection shall be accomplished by care in operations, covering and shielding. Special care shall be directed to exposed finished masonry, metal or wood surfaces and painted surfaces. Corrective measures required shall be accomplished by the trade which made the original installation and shall be at the expense of the Contractor causing the damage with no cost to the Owner.
- C. Any damage caused by neglect on the part of this Contractor or his representative, or by the elements due to neglect on the part of this Contractor or his representatives, either to the existing work, or to his work or to the work of any other Contractor, shall be repaired at his expense to the Architect's satisfaction.

3.6 SLEEVE-SEAL INSTALLATION

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

3.7 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7.

3.8 CLEAN-UP

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

END OF SECTION 260500

SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. UTP cabling.
 - 2. 50-62.5/125-micrometer, multimode optical fiber cabling.
 - 3. Coaxial cabling.
 - 4. RS-232 cabling.
 - 5. RS-485 cabling.
 - 6. Low-voltage control cabling.
 - 7. Control-circuit conductors.
 - 8. Fire alarm wire and cable.
 - 9. Identification products.

1.3 DEFINITIONS

- A. BICSI: Building Industry Consulting Service International.
- B. EMI: Electromagnetic interference.
- C. IDC: Insulation displacement connector.
- D. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- E. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).
- F. RCDD: Registered Communications Distribution Designer.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An NRTL.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test each pair of UTP cable for open and short circuits.

1.7 FIELD CONDITIONS

A. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.

1. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 UTP CABLE

A. Subject to compliance with requirements, provide product by one of the following:

1. ADC.
2. AMP Netconnect; a brand of Tyco Electronics Corporation.
3. Belden Inc.
4. Berk-Tek; a Nexans company.
5. CommScope, Inc.
6. Draka Cableteq USA.
7. Genesis Cable Products; Honeywell International, Inc.
8. Mohawk; a division of Belden Networking, Inc.
9. Superior Essex Inc.

10. SYSTIMAX Solutions; a CommScope, Inc. brand.
11. 3M; Communication Markets Division.

B. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 5e.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - a. Communications, General Purpose: Type CM or CMG
 - b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
 - c. Communications, Riser Rated: Type CMR, complying with UL 1666.
 - d. Communications, Limited Purpose: Type CMX.
 - e. Multipurpose: Type MP or MPG.
 - f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
 - g. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

2.3 UTP CABLE HARDWARE

A. Subject to compliance with requirements, provide product by one of the following:

1. ADC.
2. American Technology Systems Industries, Inc.
3. AMP Netconnect; a brand of Tyco Electronics Corporation.
4. Belden Inc.
5. Dynacom Inc.
6. Hubbell Incorporated; Hubbell Premise Wiring.
7. Leviton Commercial Networks Division.
8. Molex Premise Networks; a division of Molex, Inc.
9. Panduit Corp.
10. Siemon.

B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.

2.4 RS-232 CABLE

A. Standard Cable: NFPA 70, Type CM.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Polypropylene insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. PVC jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Plastic insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.

5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

2.5 RS-485 CABLE

A. Standard Cable: NFPA 70, Type CM or CMG.

1. Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Fluorinated ethylene propylene jacket.
5. Flame Resistance: NFPA 262, Flame Test.

2.6 LOW-VOLTAGE CONTROL CABLE

A. Paired Cable: NFPA 70, Type CMG.

1. One pair, twisted, tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

2.7 CONTROL-CIRCUIT CONDUCTORS

A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway.

B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, complying with UL 83, in raceway.

C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

2.8 FIRE ALARM WIRE AND CABLE

A. Subject to compliance with requirements, provide product by one of the following:

1. Comtran Corporation.
 2. Draka Cableteq USA.
 3. Genesis Cable Products; Honeywell International, Inc.
 4. Rockbestos-Suprenant Cable Corp.
 5. West Penn Wire.
- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, No. 18 AWG.
1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
1. Low-Voltage Circuits: No. 16 AWG, minimum.
 2. Line-Voltage Circuits: No. 12 AWG, minimum.
 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

2.9 IDENTIFICATION PRODUCTS

- A. Subject to compliance with requirements, provide product by one of the following:
1. Brady Worldwide, Inc.
 2. HellermannTyton North America.
 3. Kroy LLC.
 4. Panduit Corp.
- B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.10 SOURCE QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.
- C. Factory test UTP cables according to TIA/EIA-568-B.2.
- D. Factory test multimode optical fiber cables according to TIA-526-14-A and TIA/EIA-568-B.3.
- E. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.
- F. Cable will be considered defective if it does not pass tests and inspections.

- G. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for installation of supports for cables.

3.2 WIRING METHOD

- A. Install wiring in metal pathways and wireways.
 - 1. Minimum conduit size shall be 1/2 inch. Control and data transmission wiring shall not share conduit with other building wiring systems.
 - 2. Comply with requirements in Section 280528 "Pathways for Electronic Safety and Security."
- B. Install cable, concealed in accessible ceilings, walls, and floors when possible.
- C. Wiring within Enclosures:
 - 1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
 - 2. Install lacing bars and distribution spools.
 - 3. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer.
 - 4. Install conductors parallel with or at right angles to sides and back of enclosure.
 - 5. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks.
 - 6. Mark each terminal according to system's wiring diagrams.
 - 7. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.
- C. General Requirements for Cabling:
 - 1. Comply with TIA/EIA-568-B.1.
 - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 - 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 - 5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.

6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- D. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 5e rating of components and that ensure Category 5e performance of completed and linked signal paths, end to end.
1. Comply with TIA/EIA-568-B.2.
 2. Install 110-style IDC termination hardware unless otherwise indicated.
 3. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

3.4 FIRE ALARM WIRING INSTALLATION

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method:
1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 2. Fire-Rated Cables: Use of 2-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is permitted.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- F. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
- G. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.5 POWER AND CONTROL-CIRCUIT CONDUCTORS

- A. 120-V Power Wiring: Install according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.

B. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

3.6 CONNECTIONS

- A. Comply with requirements in Section 283111 "Digital, Addressable Fire-Alarm System for connecting, terminating, and identifying wires and cables.

3.7 FIRESTOPPING

- A. Comply with TIA-569-B, "Firestopping" Annex A.
- B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.8 GROUNDING

- A. For communications wiring, comply with J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections:
1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

- F. Prepare test and inspection reports.

END OF SECTION 280513

SECTION 280528 - PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits, tubing, and fittings.
 - 2. Nonmetallic conduits, tubing, and fittings.
 - 3. Surface pathways.
 - 4. Boxes, enclosures, and cabinets.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Pathway routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of pathway groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Qualification Data: For professional engineer.
- C. Seismic Qualification Certificates: For pathway racks, enclosures, cabinets, and equipment racks and their mounting provisions, including those for internal components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which certification is based and their installation requirements.
4. Detailed description of conduit support devices and interconnections on which certification is based and their installation requirements.

D. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

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

1. AFC Cable Systems, Inc.
2. Allied Tube & Conduit.
3. Alpha Wire Company.
4. Anamet Electrical, Inc.
5. Electri-Flex Company.
6. O-Z/Gedney.
7. Picoma Industries.
8. Republic Conduit.
9. Robroy Industries.
10. Southwire Company.
11. Thomas & Betts Corporation.
12. Western Tube and Conduit Corporation.
13. Wheatland Tube Company.

B. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

C. IMC: Comply with ANSI C80.6 and UL 1242.

D. EMT: Comply with ANSI C80.3 and UL 797.

E. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Fittings for EMT:

- a. Material: Steel.
- b. Type: Setscrew.

2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 467, rated for environmental conditions where installed, and including flexible external bonding jumper.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. Subject to compliance with requirements, provide products by one of the following:
1. Adalet.
 2. Cooper Technologies Company; Cooper Crouse-Hinds.
 3. EGS/Appleton Electric.
 4. Erickson Electrical Equipment Company.
 5. Hoffman.
 6. Lamson & Sessions; Carlon Electrical Products.
 7. Milbank Manufacturing Co.
 8. Molex.
 9. Mono-Systems, Inc.
 10. O-Z/Gedney.
 11. Quazite:Hubbell Power Systems, Inc.
 12. RACO; Hubbell.
 13. Robroy Industries.
 14. Spring City Electrical Manufacturing Company.
 15. Stahlin Non-Metallic Enclosures.
 16. Thomas & Betts Corporation.
 17. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets:
1. Comply with TIA-569-B.
 2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cabinets:
1. NEMA 250, Type 3R, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.
 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

- A. Outdoors: Apply pathway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
 2. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Concealed in Ceilings and Interior Walls and Partitions: EMT.
3. Damp or Wet Locations: GRC.
4. Boxes and Enclosures: NEMA 250, Type 1

C. Minimum Pathway Size: 1/2-inch (16-mm) trade size.

D. Install surface pathways only where indicated on Drawings.

3.2 INSTALLATION

- A. Comply with NECA 1, NECA 101, and TIA-569-B for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.
- B. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.
- C. Complete pathway installation before starting conductor installation.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications wiring conduits for which only two 90-degree bends are allowed. Support within 12 inches (300 mm) of changes in direction.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- G. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- H. Stub-ups to Above Recessed Ceilings:
 1. Use EMT, IMC, or RMC for pathways.
 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.
- K. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- L. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- M. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to conduit assembly to assure a continuous ground path.

- N. Cut conduit perpendicular to the length. For conduits of 2-inch (53-mm) trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.
 - O. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground pathways designated as spare above grade alongside pathways in use.
 - P. Install pathway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway sealing fittings according to NFPA 70.
 - Q. Install devices to seal pathway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service pathway enters a building or structure.
 - 3. Where otherwise required by NFPA 70.
 - R. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.
 - S. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
 - T. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
 - U. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
 - V. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
 - W. Set metal floor boxes level and flush with finished floor surface.
 - X. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electronic Safety and Security Pathways and Cabling."
- 3.4 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 280528

SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Heat detectors.
5. Notification appliances.
6. Device guards.
7. Firefighters' two-way telephone communication service.
8. Remote annunciator.
9. Graphic annunciator.
10. Addressable interface device.
11. Digital alarm communicator transmitter.
12. System printer.

- B. Related Requirements:

1. Section 280513 "Conductors and Cables for Electronic Safety and Security" for cables and conductors for fire-alarm systems.

1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. NICET: National Institute for Certification in Engineering Technologies

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including furnished options and accessories.

1. Include construction details, material descriptions, dimensions, profiles, and finishes.
2. Include rated capacities, operating characteristics, and electrical characteristics.

- B. Shop Drawings: For fire-alarm system.

1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 2. Include plans, elevations, sections, details, and attachments to other work.
 3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
 4. Detail assembly and support requirements.
 5. Include voltage drop calculations for notification-appliance circuits.
 6. Include battery-size calculations.
 7. Include input/output matrix.
 8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
 9. Include performance parameters and installation details for each detector.
 10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 11. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shutdown on alarm.
 - c. Show field wiring and equipment required for HVAC unit shutdown on alarm and override by firefighters' control system.
 - d. Show field wiring and equipment required for HVAC unit shutdown on alarm and override by firefighters' smoke-evacuation system.
 - e. Locate detectors according to manufacturer's written recommendations.
 - f. Show air-sampling detector pipe routing.
 12. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
 13. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.
- C. General Submittal Requirements:
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Engineer.
 2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. NICET-certified, fire-alarm technician; Level III minimum.
 - c. Licensed or certified by authorities having jurisdiction.
- D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
 2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
 3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

1.6 Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
 - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - b. Provide "Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
 - d. Riser diagram.
 - e. Device addresses.
 - f. Record copy of site-specific software.
 - g. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
 - 1) Equipment tested.
 - 2) Frequency of testing of installed components.
 - 3) Frequency of inspection of installed components.
 - 4) Requirements and recommendations related to results of maintenance.
 - 5) Manufacturer's user training manuals.
 - h. Manufacturer's required maintenance related to system warranty requirements.
 - i. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.
- B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On compact disk, complete with data files.
 - 3. Device address list.

4. Printout of software application and graphic screens.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no less than one unit.
 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no less than one unit.
 3. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no less than one unit of each type.
 4. Detector Bases: Quantity equal to two percent of amount of each type installed, but no less than one unit of each type.
 5. Keys and Tools: One extra set for access to locked or tamperproofed components.
 6. Audible and Visual Notification Appliances: One of each type installed.
 7. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.10 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
 1. Notify Engineer no fewer than seven days in advance of proposed interruption of fire-alarm service.
 2. Do not proceed with interruption of fire-alarm service without Engineer's written permission.
- B. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

1.11 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.

- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing fire-alarm equipment, conduit, and wiring.

1.12 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Gamewell-FCI
 - 2. NOTIFIER
 - 3. Siemens Industry, Inc.
 - 4. Silent Knight

2.2 SYSTEM DESCRIPTION

- A. The new system's control panel shall as listed to be used as a Mass Notification System (MNS) in consideration for future expansion.
- B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation. System shall include ability to provide future voice evacuation.
- C. Automatic sensitivity control of certain smoke detectors.
- D. All components provided shall be listed for use with the selected system.

- 2.3 Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Automatic sprinkler system water flow.
 - 6. Fire standpipe system.
 - 7. Fire pump running.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm notification appliances.
2. Identify alarm and specific initiating device at fire-alarm control unit.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Release fire and smoke doors held open by magnetic door holders.
5. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
6. Recall elevators to primary or alternate recall floors.
7. Activate elevator power shunt trip.
8. Record events in the system memory.
9. Record events by the system printer.
10. Indicate device in alarm on the graphic annunciator.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Elevator shunt-trip supervision.
3. Fire pump running.
4. Fire-pump loss of power.
5. Fire-pump power phase reversal.
6. User disabling of zones or individual devices.
7. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
4. Loss of primary power at fire-alarm control unit.
5. Ground or a single break in internal circuits of fire-alarm control unit.
6. Abnormal ac voltage at fire-alarm control unit.
7. Break in standby battery circuitry.
8. Failure of battery charging.
9. Abnormal position of any switch at fire-alarm control unit or annunciator.

E. System Supervisory Signal Actions:

1. Initiate notification appliances.
2. Identify specific device initiating the event at fire-alarm control unit
3. Record the event on system printer.
4. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
5. Display system status on graphic annunciator.

2.5 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Unit: This Panel shall be compatible to be used as a Voice System for future expansion to a Mass Notification System.

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled as such by a National Research Testing Laboratory.

- a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
 - b. Include a real-time clock for time annotation of events on the event recorder and printer.
 - c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
 - d. The FACP shall be listed for connection to a central-station signaling system service.
 - e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
 3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, two line(s) of 80 characters, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.
- C. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1. Pathway Class Designations: NFPA 72, Class B
 2. Pathway Survivability: Level 0.
 3. Install no more than 319 addressable devices on each signaling-line circuit.
 4. Serial Interfaces:
 - a. One dedicated RS 485 port for central-station operation using point ID DACT.
 - b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
 - c. Two USB ports for printers.
- D. Notification-Appliance Circuit:
1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
 2. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.
- E. Elevator Recall:
1. Elevator recall shall be initiated only by one of the following alarm-initiating devices:
 - a. Elevator lobby detectors except the lobby detector on the designated floor.
 - b. Smoke detector in elevator machine room.
 - c. Smoke detectors in elevator hoistway.
 2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.
 3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.

- a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
- F. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.
- G. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.
- H. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- I. Mass Notification System – The system control panel shall be able to perform as a Mass Notification System for future expansion.
- J. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- K. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.
 - 1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- L. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
 - 1. Batteries: Sealed, valve-regulated, recombinant lead acid.
- M. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.6 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 - 1. Double-action mechanism requiring two actions to initiate an alarm mechanism, with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 - 2. Station Reset: Key operated switch.
 - 3. Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.7 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be four or two-wire type, as required.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
 - a. Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
 - b. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
 - c. Multiple levels of detection sensitivity for each sensor.
 - d. Sensitivity levels based on time of day.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

C. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.8 HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
 1. Temperature sensors shall test for and communicate the sensitivity range of the device.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
- C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).
 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.9 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
 1. Combination Devices shall not be used.
- B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dba, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
- C. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "ALERT" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 1. Rated Light Output:
 - a. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted unless otherwise indicated.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, red.

D. Voice/Tone Notification Appliances: Future

1. Provide separate mounting boxes for Horn Audible devices and for Strobe Visual Devices and separate circuits for each for future expansion to a Mass Notification System.
2. Mounting: surface mounted and bidirectional

2.10 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Surface cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.11 ADDRESSABLE INTERFACE DEVICE

A. General:

1. Include address-setting means on the module.
2. Store an internal identifying code for control panel use to identify the module type.
3. Listed for controlling HVAC fan motor controllers.

B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall] [to circuit-breaker shunt trip for power shutdown

1. Allow the control panel to switch the relay contacts on command.
2. Have a minimum of two normally open and two normally closed contacts available for field wiring.

D. Control Module:

1. Operate notification devices.
2. Operate solenoids for use in sprinkler service.

2.12 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by a National Research Testing Laboratory.

- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture one telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
 - 1. Verification that both telephone lines are available.
 - 2. Programming device.
 - 3. LED display.
 - 4. Manual test report function and manual transmission clear indication.
 - 5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
 - 1. Address of the alarm-initiating device.
 - 2. Address of the supervisory signal.
 - 3. Address of the trouble-initiating device.
 - 4. Loss of ac supply.
 - 5. Loss of power.
 - 6. Low battery.
 - 7. Abnormal test signal.
 - 8. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
 - 1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101 (as required by AHJ), and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

1. Devices placed in service before all other trades have completed cleanup shall be replaced.
 2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
1. Comply with requirements for seismic-restraint devices specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- C. Manual Fire-Alarm Boxes:
1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
 2. Mount manual fire-alarm box on a background of a contrasting color.
 3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- D. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to NFPA 72.
 5. HVAC: Locate detectors not closer than 36 inches (910 mm) from air-supply diffuser or return-air opening.
 6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- E. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- F. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.
1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- G. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- H. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- I. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install horns on surface-mounted boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- J. Visible Alarm-Indicating Devices: Install adjacent to each alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated meeting required ADA installation heights.

- K. Audible and Visual Devices shall be install in separate surface mounted boxes and controls by separate circuits. Circuits may be run in the same pathway were applicable. Use shield cable on Audible circuits.

3.3 PATHWAYS

- A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed.
 - 1. Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT.
- B. Pathways shall be installed in EMT.
- C. Exposed EMT shall be painted red enamel.

3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Smoke dampers in air ducts of designated HVAC duct systems.
 - 2. Magnetically held-open doors.
 - 3. Electronically locked doors and access gates.
 - 4. Alarm-initiating connection to elevator recall system and components.
 - 5. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 - 6. Supervisory connections at valve supervisory switches.
 - 7. Supervisory connections at elevator shunt-trip breaker.
 - 8. Data communication circuits for connection to building management system.
 - 9. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 10. Supervisory connections at fire-pump engine control panel.

3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.6 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.7 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
- D. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
 - 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
 - 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 - 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.
- H. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- I. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3.9 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.
- C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
 - 1. Upgrade Notice: At least **30** days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111

4. Provide effective ventilation system to safely remove all dust and hazardous fumes generated during construction.
 5. Protection and/or relocation of fire detection system, if any, in order to implement upgrade.
 6. Protection and/or relocation of existing mechanical and electrical systems, in order to implement upgrade.
 7. Coordinate and assist the security and property management personnel in respect to the security of commercial spaces during the repair work.
 8. The disconnection and removal of the existing fire alarm system. Disconnection and removal shall include all conduits, wiring, junction boxes, supports, devices, and repair/patching/painting of surfaces to match existing where equipment removed.
- C. Miscellaneous Items: This work consists of items not otherwise specifically indicated or shown on the plans, but which are ancillary to the specified scope of work. This work shall also include the following:
1. The Contractor shall furnish, install, maintain, relocate, and remove all construction fences, signs, barricades, cones, warning lights, and other safety control devices and temporary signage required for the proper execution of the project. The Engineer shall review the safety control device placement before work begins and also prior to the beginning of work on any subsequent construction stages. Any deficiencies in the location or arrangement of devices shall be corrected by the contractor before starting work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION