



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
GSD126413

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
**KRISTA FERRELL
 304-558-2596**

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE

SHIP TO

DEPARTMENT OF ADMINISTRATION
 GENERAL SERVICES DIVISION
 BUILDING 1
 1900 KANAWHA BOULEVARD, EAST
 CHARLESTON, WV
 25305 304-558-3517

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
05/07/2012				

BID OPENING DATE: **05/24/2012** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
ADDENDUM NO. 1						
THIS ADDENDUM IS ISSUED TO:						
1.) PROVIDE A COPY OF THE MANDATORY PRE-BID ATTENDEE LIST,						
2.) PROVIDE CLARIFICATIONS TO THE SPECIFICATIONS						
3.) PROVIDE SECTION 017301 WORK ON WV STATE FACILITIE						
4.) PROVIDE SECTION 283111 ADDRESSABLE FIRE ALARM (REPLACES ORIGINAL SPECIFICATION SECTION),						
5.) PROVIDE REPLACEMENT DRAWINGS, FA-010, FA-501, AND FA-601,						
6.) PROVIDE NEW DRAWING FA-408, AND						
7.) TO CLARIFY THE INSURANCE LIMITS.						
INSURANCE LIMITS SHALL BE IN ACCORDANCE WITH THE SAMPLE INSURANCE CERTIFICATE IN THE PROJECT MANUAL.						
BID OPENING DATE REMAINS: 05/24/2012						
BID OPENING TIME REMAINS: 1:30 PM						
***** END ADDENDUM NO. 1 *****						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.
5. Payment may only be made after the delivery and acceptance of goods or services.
6. Interest may be paid for late payment in accordance with the *West Virginia Code*.
7. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
10. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern the purchasing process.
11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at www.state.wv.us/admin/purchase/vrc/hipaa.html and is hereby made part of the agreement provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
14. **CONFIDENTIALITY:** The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>.
15. **LICENSING:** Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.
16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.
2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130
5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).

PRE-BID CONFERENCE
SIGN IN SHEET

Request for Quotation Number:

GSD126413

Date:

05/03/2012 @ 2:00 pm

Project Description:

Bathroom Renovation Building 1, Main Capitol

PLEASE PRINT LEGIBLY. THIS INFORMATION IS ESSENTIAL TO CONTACT THE ATTENDEES IN A TIMELY MANNER. FAILURE TO DO SO MAY RESULT IN DELAYS IN YOUR COMPANY GETTING IMPORTANT BID INFORMATION.

Firm Name:	<u>WV State Purchasing Division</u>
Firm Address:	<u>2019 Washington St., East Charleston, WV 25305</u>
Representative Attending:	<u>Krista S. Ferrell, Buyer Supervisor</u>
Phone Number:	<u>304-558-2596</u>
Fax Number:	<u>304-558-4115</u>
Email Address:	<u>krista.s.ferrell@wv.gov</u>

Firm Name:	<u>MAYNARD C. SMITH CONST. CO</u>
Firm Address:	<u>3410 CHESTERFIELD AVE CHARLESTON WV 25304</u>
Representative Attending:	<u>JOHN STRICKLAND</u>
Phone Number:	<u>304-925-3190</u>
Fax Number:	<u>304-925-3228</u>
Email Address:	<u>JSTRICKLAND@MCSCONST.COM</u>

Firm Name:	<u>Wiseman Const. Co</u>
Firm Address:	<u>1616 6th Ave Charleston, WV 25387</u>
Representative Attending:	<u>Hop White</u>
Phone Number:	<u>304-344-1200 Ex 201</u>
Fax Number:	<u>304-344-1281</u>
Email Address:	<u>hwhite@wisemanconst.com</u>

Firm Name:	<u>NEWTECH SYSTEMS</u>
Firm Address:	<u>420 16th STREET DUNBAR, WV 25064</u>
Representative Attending:	<u>ANDY ANGELL</u>
Phone Number:	<u>304-766-8000 304-766-0000</u>
Fax Number:	<u>304-766-0083</u>
Email Address:	<u>ANDY.ANGELL@NEWTECHWV.COM</u>

Firm Name:	<u>JOHN STRICKLAND</u>
Firm Address:	<u>304-925-3190 304-925-3228</u>
Representative Attending:	
Phone Number:	
Fax Number:	
Email Address:	

Firm Name:	<u>Allegheny Restoration</u>
Firm Address:	<u>PO Box 18032 Morgantown WV 26507</u>
Representative Attending:	<u>Doug Richardson</u>
Phone Number:	<u>304 594-2570</u>
Fax Number:	<u>304 594-2810</u>
Email Address:	<u>blair@alleghenyrestoration.com</u>

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Firm Name:	<u>ELCO MECHANICAL</u>
Firm Address:	<u>P.O. Box 349</u> <u>CHARLESTON WV 25302</u>
Representative Attending:	<u>WILLIAM E. ASHWORTH</u>
Phone Number:	<u>304 346 0546</u>
Fax Number:	<u>304 346 0548</u>
Email Address:	<u>RONALD.KING@SUDDENLINK.MAIL.COM</u>

Firm Name:	<u>Paramount Builders</u>
Firm Address:	<u>P.O. Box 1370</u> <u>Scint Allegas, WV 25177</u>
Representative Attending:	<u>DERICK FOSTER</u>
Phone Number:	<u>304.727.2770</u>
Fax Number:	<u>304.727.0502</u>
Email Address:	<u>dfoster@paramountwv.com</u>

Firm Name:	<u>PENNINGTON PLUMBING & HEATING, INC</u>
Firm Address:	<u>301-A GEORGE STREET</u> <u>BELLEVUE, WV 25801</u>
Representative Attending:	<u>MARK BOWLES</u>
Phone Number:	<u>304-252-7529</u>
Fax Number:	<u>304-253-1123</u>
Email Address:	<u>mbowles@pphww.com</u>

Firm Name:	<u>Oral Const Management</u>
Firm Address:	<u>P.O. Box 401</u> <u>Charleston WV 25302</u>
Representative Attending:	<u>John Harrison</u>
Phone Number:	<u>304-347-8820</u>
Fax Number:	<u>304-347-8821</u>
Email Address:	<u>E Collier Goal Construction</u> <u>management.com</u>

Firm Name:	<u>Mountaineer Glass Inc</u>
Firm Address:	<u>413 Dunbar Avenue</u> <u>Dunbar WV 25064</u>
Representative Attending:	<u>Jeff Goins</u>
Phone Number:	<u>(304) 768 0049</u>
Fax Number:	<u>(304) 768 9360</u>
Email Address:	<u>jeffrey.goins@mountaineerglass.net</u>

Firm Name:	<u>NEIGHBORGALL CONSTRUCTION</u>
Firm Address:	<u>1266 7TH AVE</u> <u>HUNTINGTON, WV 25701</u>
Representative Attending:	<u>DAVID R. MCCARTY</u>
Phone Number:	<u>(304) 525-5181 x246</u>
Fax Number:	<u>(304) 525-7795</u>
Email Address:	<u>dmcarty@neighborgall.com</u>

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Firm Name:	DAN HILL CONSTRUCTION
Firm Address:	PO Box 685 SAULEY BRIDGE, KJV 25085
Representative Attending:	MICHAEL SIEMIACKO, Jr
Phone Number:	1-304-632-1600
Fax Number:	1-304-632-1501
Email Address:	R DAN HILL @ Hotmail - COM

Firm Name:	
Firm Address:	
Representative Attending:	
Phone Number:	
Fax Number:	
Email Address:	

Firm Name:	Hayslett Construction
Firm Address:	P.O. Box 447 3707 Teays Valley Road Hurricane, WV 25526
Representative Attending:	James Linkinogor
Phone Number:	(304) 757-9348
Fax Number:	(304) 757-9561
Email Address:	whayslett@aol.com

Firm Name:	
Firm Address:	
Representative Attending:	
Phone Number:	
Fax Number:	
Email Address:	

Firm Name:	
Firm Address:	
Representative Attending:	
Phone Number:	
Fax Number:	
Email Address:	

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05/03/2012 @ 2:00 pm

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Firm Name:	<u>Plateau Electric Inc</u>
Firm Address:	<u>P.O. Box 39</u> <u>Scarbora WV 25917</u>
Representative Attending:	<u>Rodney Toney</u>
Phone Number:	<u>304-465-0947</u>
Fax Number:	<u>304-465-0948</u>
Email Address:	<u>rod@pei@shen.net</u>

Firm Name:	<u>MIRC Construction Services, LLC</u>
Firm Address:	<u>P.O. Box 465</u> <u>Scott Depot, WV 25560</u>
Representative Attending:	<u>Tim Malcomb</u>
Phone Number:	<u>304-257-0880</u>
Fax Number:	<u>304-257-0881</u>
Email Address:	<u>tmalcomb@mircconstruction.com</u>

Firm Name:	<u>The Summit Electric Group</u>
Firm Address:	<u>Bx 254</u> <u>Hurricane WV 25526</u>
Representative Attending:	<u>Richard Milam</u>
Phone Number:	<u>304-562-7091</u>
Fax Number:	<u>304-562-7137</u>
Email Address:	<u>rm@TSEGROUP.COM</u>

Firm Name:	<u>BEL CARPETS LLC</u>
Firm Address:	<u>600 KANAWHA BLVD, EAST</u> <u>SUITE 200</u> <u>CHARLESTON, WV 25301</u>
Representative Attending:	<u>TODD COREY</u>
Phone Number:	<u>(304) 345-1300</u>
Fax Number:	<u>(304) 345-1304</u>
Email Address:	<u>tc@coreybbcarpets.com</u>

Firm Name:	<u>Eric Smith & Dougherty Co</u>
Firm Address:	<u>600 50th Street</u> <u>Charleston WV</u>
Representative Attending:	<u>Eric Smith</u>
Phone Number:	<u>304-925-6664</u>
Fax Number:	<u>304-925-4280</u>
Email Address:	<u>eric.smith@dougherty.co</u>

Firm Name:	<u>CORNERSTONE INTERIORS</u>
Firm Address:	<u>Po Box 412</u> <u>ELEANOR WV 25070</u>
Representative Attending:	<u>Dennis Waller</u>
Phone Number:	<u>304-549-2124</u>
Fax Number:	<u>304-546-9540</u>
Email Address:	<u>d.waller@cornerstone-int.com</u>

Addendum #1

CLARIFICATIONS

NOTICE TO PROCEED: Purchasing Request for Quotation language (on Page 4) regarding Notice to Proceed is modified to read:

“Notice to Proceed: This contract is to be performed within 775 calendar days after the Notice to Proceed is **issued**. The Agency will issue a written notice to proceed to the successful bidder. See Instructions to Bidders Section 1.3.D for more information.”

INSURANCE: Insurance requirements for this project are listed on the sample Acord certificates appended to the State of West Virginia Supplementary Conditions to the AIA Document A201-2007 General Conditions of the Contract for Construction. This corrects the error on Page 4-5 of the Request for Quotation document.

ELIGIBILITY TO BID: Bidders are NOT required to be on record as being plans holders.

SECTION 017301 – WORK ON WEST VIRGINIA STATE FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Project Closeout:
 - 1. Closeout documents including marked-up shop drawings shall be submitted in bound format prior to final application for payment.
 - 2. Final cleanup shall be completed prior to final acceptance.
 - 3. Submit As-Built Drawings and Record Documents.
 - 4. Submit "Affidavit of Payment of Debts and Claims".

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements for working in the West Virginia State Capitol Building including, but not limited to, the following:
 - 1. Schedules
 - 2. Limits of Work.
 - 3. Work Hours
 - 4. Security
- B. Where conflicts occur, work requirements under this section take precedence over requirements of other Sections.
- C. Related Requirements:
 - 1. Division 01 Section 017300: Execution
 - 2. Other Division 01 Sections

1.3 INFORMATIONAL SUBMITTALS

- A. Restroom Closure and Exiting Plan: Contractor shall submit a plan at least two (2) weeks prior to each phase of construction indicating restrooms to be closed and proposed signage to the closest available alternate restroom for building occupants and visitors. Following approval of plan, provide signage indicating restrooms under renovation are closed and directing visitors to nearest operational restrooms. Signage shall be minimum 8" x 10" and shall be clearly readable.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment. A minimum of three copies shall be turned over to Owner at completion of first set of restrooms.

PART 2 - PRODUCTS

2.1 MATERIALS

- 1. In general, all new materials shall match surface and finish of adjoining original construction.

PART 3 - EXECUTION

3.1 CONTRACTOR VISITOR BADGES

- A. The Capitol Building is a secure facility. Prior to beginning work, Contractor shall provide a list of all personnel working on the project. This list shall include a copy of a valid driver's license or other legal identification and include date of birth. All proposed workers may be subjected of a criminal history / driver's license background check prior to being permitted to work in state buildings. Workers shall carry valid Contractor Photo ID Badges to be worn when working in the building. Under no circumstances shall a worker be assigned to this project without the validation first being submitted to the General Services Division and approval given.

3.2 ACCESS CARDS:

- A. If required, a limited number of access cards may be provided to Contractors senior personnel for access to controlled areas and for entering the building after normal working hours. If needed, Owner's project manager will provide contractor with necessary forms which must be completed and returned to Project Manager for submission to the appropriate agency for granting access.

3.3 LIMITS OF WORK

- A. Work areas shall be limited to those spaces scheduled for renovation or required for access to the areas under renovation and limited areas in the corridors for access to the rooms during each phase of construction.
- B. Corridors, including those outside the restrooms may not be closed. If part of the corridor must be used for renovation or temporary construction staging, maintain a minimum 44 inch wide pedestrian walkway.

- C. Some interior space may be utilized for temporary (overnight) storage of equipment and tools. Coordinate storage needs and locations with the GSD Project Manager.
- D. Owner, State Government and agency facilities shall remain in use during this contract. Contractor shall work with the GSD Project Manager, Building Supervisor and Protective Services to coordinate temporary access to work areas and otherwise provide for the Contractor needs to complete work. Contractor shall minimize disruption to Capitol; work areas and maintain the building in business operation during construction.

3.4 ACCESS / USE OF SITE:

- A. Contractor shall have limited use of the site for construction operations during the construction period.
- B. Work shall generally be performed inside the existing building during normal business working hours of 7:00 am to 7:00 pm, Monday through Friday except state recognized holidays. Work on evenings after hours may be permitted with prior approval of the project manager. Submit such request at least one week ahead of time when evening work is desired.
- C. Use of Facilities: Contractor shall be permitted reasonable use of building utilities including power, water, and sanitary sewage disposal as required for conducting work. Coordinate the locations of service connections or use of power receptacles with the Project Manager to avoid overloading existing circuits.
- D. Use of Existing Building: Maintain existing building in a weathertight condition throughout the construction period. Immediately repair damage caused by construction operations. Protect building and its occupants during the construction period.
- E. Use of Site: Limit use of site outside of building to only those areas designated or in which project related work is shown. Keep driveways and entrances serving premises clear and available to Owner, Owner's employees and emergency vehicles at all times. Do not use these areas for parking, unloading or storage of materials. If use of an entrance is needed for delivery of materials, schedule delivery during evening hours when the Capitol is closed. Note that some areas have been designated as emergency responder entrances, these entrances cannot be used or blocked by construction related activities without first obtaining permission of the Project Manager, Protective Services and making arrangements for and notification of alternative emergency access.
- F. Note that three entrances to the Capitol are handicapped accessible entrances. These entrances cannot be closed or blocked without prior approval and alternative ADA accessibility arrangements approved.

3.5 WEEKLY CONFERENCE

- A. A weekly conference shall be held with the contractor, major subcontractors and project manager to review past week's activity, proposed activity during coming week, potential issues, required approvals and coordinate activities for the coming week.

3.6 WEEKLY SCHEDULE AND WORK ACTIVITY FORM

- A. Contractor shall provide a weekly schedule and work activities that outline the proposed work during the following week. Schedule shall include names of workers on project, work times, anticipated work to be completed, work areas, deliveries anticipated, estimated time of deliveries, and potential problems and issues (dust, noise, odor, heat and smoke).
- B. The Weekly Work Activity Form must be approved by various branches of State Government for coordination of weekly activities in the State Capitol. Contractor shall expect that modifications to proposed the activities may be necessary to coordinate with other Capitol activities and usage.

3.7 DELIVERY OF MATERIALS AND USE OF LOADING DOCKS

- A. Contractor shall note that delivery of materials will be limited to off-peak hours.
- B. **USE OF LOADING DOCKS:** Use of the East Loading Dock may be permitted for deliveries of materials. Provide schedule of delivery times at least 24 hours in advance to notify Owner of access. Avoid deliveries during peak daytime hours. Materials may not be stored in Loading dock area. Contractor responsible for unloading materials. Delivery vehicle may not remain in dock area for more than thirty minutes. Vehicle engine may remain on only while vehicle is arriving and departing dock. Engine must remain off at all other times.

3.8 ELEVATORS

- A. Do not use passenger elevators for material handling. A freight elevator is located in the Main Capitol Building. This elevator is used by state agencies and legislature users. Schedule use of elevator with project manager so construction related elevator use does not conflict with other users.
- B. Contractor is responsible for damage to elevators resulting from construction related use.

3.9 WORK HOURS:

- A. **Work Hours:** Normal Capitol hours are 7:00 am through 7:00 pm. Work may be scheduled for evenings and nights with prior approval of the Owner's Project Manager. Special arrangements will be require for access and supervision.
- B. Work shall not be scheduled during regular Legislative sessions, interim sessions or special sessions. When requested by Contractor, Owner will provide a tentative schedule of such events. Exceptions to these Contractor non-work periods may be requested through the Owner's Project Manager.

3.10 HOLIDAYS

- A. Normal State Holidays include New Year's Day; Martin Luther King Day; President's Day; Memorial Day; West Virginia Day; Fourth of July; Labor Day; Columbus Day; Veteran's Day; Thanksgiving Day (Thursday and Friday) and Christmas. During election years Primary and General Elections day(s) are also taken. Work may be permitted on State Holidays with prior approval of Owner's Project Manager.

3.11 LEGISLATIVE SESSIONS:

- A. Work shall cease during Regular, Special and Interim Legislative sessions

3.12 PARKING

- A. No parking is available on the project site. Parking in non-designated areas is not permitted. A limited number of parking spaces will be allocated for contractor's vehicles near the project site. Parking for contractor's personnel will be available in the designated contractor's parking area near Laidley Field. Provisions will be made for locating refuse dumpsters if required by the project.
- B. Use of loading dock areas for parking is strictly prohibited.
- C. With prior approval, contractor's vehicles may be brought on-site for loading or unloading or to provide equipment necessary for conducting the work. Vehicles not necessary for conduct of work shall be removed from the site within one-half hour.

3.13 UTILITY SHUTDOWNS:

- A. No shutdowns of electrical, water, sewer or other building utilities shall occur without at least two weeks prior approval.
- B. No existing electrical circuits shall be switched off without prior approval.

3.14 DIRT AND CLEANING:

- A. Contractor shall install and maintain dirt and dust barriers around construction areas.
- B. Clean dirt and dust created by construction operations immediately following the work period. Contractor shall be responsible for cleaning construction related dirt and dust in public spaces and adjacent work areas.
- C. General Contractor shall arrange for trash removal and shall provide dumpsters for construction related debris. Dumpsters shall be removed on a regular basis. Arrange location for dumpsters with project manager. Remove dumpsters from site when requested by project manager or when removal is required to facilitate Capitol Campus activities.

3.15 WASTE REMOVAL:

- A. Contractor to make arrangements for the collection and disposal of Contractor's waste and construction related debris. Such waste and debris shall be removed on a daily basis.

3.16 SAFETY:

- A. Perform all work in compliance with applicable safety regulations. While work shall be subject to verification and inspection by GSD Safety Representatives, Contractor shall retain full responsibility and liability for safety issues. Verification by GSD Personnel shall not relieve the Contractor from meeting all applicable safety regulations and inspections by other agencies.
- B. Notify Owner if suspected hazardous materials are encountered. Any areas requiring abatement will be abated by the GSD under separate contract.
- C. Notify GSD project manager immediately of any accidents, fires, incidents or damage to the building.

3.17 NOISE

- A. Noise shall not exceed 10db above the ambient noise for the surrounding space during working hours or when activities are scheduled.
- B. Noise shall not disrupt legislative sessions, meetings or other scheduled activities.
- C. If specified noise levels cannot be met, reschedule construction work for non-working or evening hours or after scheduled activities.

3.18 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Roof Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties. Obtain approval of roof manufacturer providing warranty prior to cutting roof.

3.19 HOT WORK PERMIT:

- A. All work performed by the use of welding equipment, soldering equipment, cutting torches or other assembly/ disassembly/demolition types of equipment that may create a fire hazard or affect indoor air quality shall be preapproved by the Safety-Manager of the General Services

Division. Contractor shall be responsible for communication with the project manager and safety manager necessary to prepare the permit and obtain necessary approvals.

- B. Hot work permits shall be prepared for individual work items/areas. The maximum term of any hot work permit shall be limited to one week. The original signed copy of the permit shall be turned over to the project manager prior to beginning work stipulated in the permit.
- C. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.20 FIRE ALARM SERVICE AND FIRE WATCH:

- A. Fire alarm systems shall remain in operation at all times. When systems or portions of systems must be taken out of operation for connection, testing or repairs, notify Owner at least one week in advance to coordinate preparations and fire watch.
- B. If fire alarm system has to be taken out of service for installation, maintenance or service, provide fire watch for the entire building structure affected. Prior to the Fire Watch, meet with the General Services Division Safety Personnel to review areas to be patrolled, frequency of patrol and observations required. Documentation of the fire watch including areas patrolled and time of patrol shall be provided to General Services' Safety Personnel on the Log Forms provided..

3.21 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

- B. Site: Maintain Project site free of waste materials and debris.

3.22 STARTING AND ADJUSTING

- A. Schedule startups and adjustments of HVAC systems during non-peak or working hours to minimize disruptions to occupants.

3.23 FINAL INSPECTION

- A. The Final inspection will be conducted by the Architect /Engineering firm and a designated Project Manager from the General Services Division Architecture/Engineering Section.
- B. Work found in accordance with the Contract Documents will be accepted as complete for final payment once all contract provisions have been met.
- C. With approval of project manager, sections of this project may have final inspections performed before the overall project is complete.

END OF SECTION 017301

SECTION 283111 – FIRE ALARM MASS NOTIFICATION SYSTEM

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish and install a complete microprocessor based, electrically operated and supervised, closed circuit fire alarm mass notification system, locating all units of equipment as shown on the drawings. The system shall be UL listed to monitor and control the existing EST devices and panels located on campus. The system shall allow for network connection to existing EST 3 panels on campus. Scope of work will be limited to the renovated bathrooms, new panel locations and where shown on the project drawings.

1.2 SUMMARY

A. Section Includes:

1. Fire-alarm control unit.
2. Remote Annunciator
3. NAC Power Supply
4. System smoke detectors.
5. Notification appliances.
6. Eight Channels of multiplexed digital audio.
7. Addressable interface device.
8. Voice over IP Campus Network Paging.
9. Graphic Command Interface.
10. Surge Protection

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. HLI: High Level Interface.
- D. NICET: National Institute for Certification in Engineering Technologies.
- E. PC: Personal computer.
- F. Inominal: Nominal discharge current.

- G. MCOV: Maximum continuous operating voltage.
- H. MOV: Metal-oxide varistor; an electronic component with a significant non-ohmic current-voltage characteristic.
- I. SCCR: Short-circuit current rating.
- J. SPD: Surge protective device.
- K. VPR: Voltage protection rating.

1.4 SYSTEM DESCRIPTION

- A. Non-coded, UL864 Listed intelligent analog addressable system, one way voice communications with multiplexed signal transmission and survivable network nodes. UL2572 listed for Mass Notification operations. Provide EST FireWorks Graphic Command Interface or approved equal.
- B. The System supplied under this specification shall utilize node to node, direct wired or Fiber, multi priority peer-to-peer network operations. The system shall utilize independently addressed, input/output modules, audio amplifiers, voice communications as described in this specification. The peer-to-peer network shall contain multiple nodes consisting of the command center, main controller, remote control panels, and LCD panels. Each panel shall be an equal, active functional member of the network, which is capable of making all local decisions and generating network tasks to other panels in the event of panel failure or communications failure between panels. Master/slave system configurations shall not be considered as equals.
- C. The system shall provide bi-directional communication isolators to comply with NFPA 72-2010.
- D. The system shall be provided by an authorized dealer with operations and staff to support the installed system. System supplier shall have factory trained technicians for the product provided. Fire Alarm technicians shall be NICET II, project manager shall be a NICET III.
- E. The system shall be 100% compatible with the existing addressable EST panels and devices.

1.5 SUBMITTALS

- A. The Contractor shall purchase no equipment for the system specified herein until the Owner has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications. The Contractor shall submit three (3) complete sets of documentation within 30 calendar days after award of purchase order.
- B. The contractor shall provide to the West Virginia Fire Marshal a complete set of shop drawings including battery calculations, lumen output of strobe lights at each location, etc.

- C. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the Contract Documents. In addition the Contractor shall provide specific notation on each Shop Drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to the Architect.
 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 or registered Professional Engineer.
- D. Product Data: Product Data sheets with the printed logo or trademark of the manufacturer of all equipment. Indicated in the documentation shall be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Owner.
- E. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72 Edition 2010.
 2. Include voltage drop calculations for notification appliance circuits.
 3. Include battery-size calculations.
 4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 5. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
 6. Include floor plans to indicate final device locations showing address of each addressable device. Show size and route of cable and conduits.
 7. Include input/output matrix.
- F. Informational Submittals
1. Qualification Data: For Designer, Installer and Project Manager.
 2. Field quality-control reports.
 3. Sample Warranty.
- G. Operation and Maintenance Data: For fire-alarm systems and components to be included in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data, include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
 2. Provide "Record of Completion Documents" according to NFPA72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 3. 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.
 4. Riser Diagram.

5. Record copy of site-specific software database file, hardcopy print-out and CD, with password for delivery to the owner. Proprietary system/service companies will not be acceptable.
 6. Provide "Maintenance, Inspection and Testing Records" according to NFPA72 article of the same name and include the following:
 - a. Frequency of testing of installed components.
 - b. Frequency of inspection of installed components.
 - c. Requirements and recommendations related to results of maintenance.
 - d. Manufacturer's user training manuals (hardcopy) and electronic on CD.
 7. Manufacturer's required maintenance related to system warranty requirements.
 8. Abbreviated operating instructions for mounting at fire-alarm control unit.
 9. Copy of NFPA72.
- H. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
 2. Program Software Backup: On magnetic media or compact disk, complete with EST-SDU data files.
 3. Device address list.
 4. Printout of software application and graphic screens.
 5. CD of site-specific software database files with password and electronic product data sheets. Provide hard copy print-out of the software program. Proprietary system/service companies will not be acceptable.
 6. Provide a complete system comparison report for each change implemented during the warranty period.
 7. Provide a list of global system settings
 8. Provide a list of the contents of each system cabinet and their settings
 9. Provide a list of all addressable devices with their addresses and settings

1.6 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. Project Manager shall be a NICET Level III fire alarm technician.
- C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA70, by a qualified testing agency, and marked for intended location and application.
- E. NFPA Certification: Obtain certification according to NFPA72 in the form of a placard by an approved alarm company.

1.7 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 Owner 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 Owner'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.

1.8 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. Mass Notification strobes will not be put in service as part of this project. Maintain "NOT IN SERVICE" labels on the mass notification strobes.

1.9 WARRANTY and SOFTWARE SERVICE AGREEMENT

- 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.
- B. A copy of the manufacturers' warranty shall be provided with closeout documentation and included with the operation and installation manuals.
- C. **Technical Support:** Beginning with Substantial Completion, provide software support for three (3) years, shall be included in this project.
- D. **Upgrade Service:** Update software to latest version at Project completion. Install and program software upgrades that become available within three (3) years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.10 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Smoke Detectors, heat detectors, monitor modules and control modules: Quantity equal to 2% percent of amount of each type installed, but no fewer than 2 units of each type.
 2. Keys: Ten extra set for access to locked and tamperproof components.
 3. Audible and Visual Notification Appliances: 2% of each type installed, but no fewer than two (2) units of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide a new EST3 Fire Alarm System panel, or approved equal, and interface with the existing fire alarm panels using monitor modules for monitoring of alarm signals / alarm condition. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling fire alarm system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- B. The Contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply, with the requirements of these Specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.
- C. Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building Owner. All specified operational features must be met without exception.
- D. All control panel assemblies and connected (new) field appliances shall be provided by the same System Supplier, and shall be designed and tested to ensure that the system operates as specified. All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.
- E. Upon completion of the project the Owner shall be provided with a hard copy printout of the system software database and an electronic version of the system program and database with all required passwords.
- F. That equipment proposed to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:
1. A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.

2. The supplier of alternate equipment shall furnish evidence that the proposed alternate system performance is equal to or superior than the system operation stated in the specification. Such evidence shall be submitted to the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.
 3. The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written and the supplier feels the proposed system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.
 4. The supplier of alternate equipment shall submit a list from the alternate manufacture on the manufactures letterhead indicating the names and addresses of all authorized suppliers in the area. Proprietary products will not be considered.
 5. The acceptability of any alternate proposed system shall be the sole decision of the Owner or his authorized representative
- G. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component. The catalog numbers specified under this section are those of EST by Edwards and shall constitute the type, product quality, material and desired operating features.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 1. Smoke detectors.
 2. Existing fire alarm system being monitored for alarm condition.
- B. Fire-alarm signal shall initiate the following actions:
 1. Continuously operate alarm notification appliances, including voice evacuation notices.
 2. Identify alarm and specific initiating device at fire-alarm control unit, connected network control panels, off-premises network control panels.
 3. Transmit an alarm signal to the remote alarm receiving station.
 4. Activate voice/alarm communication system.
 5. Record events in the system memory.
 6. Record events by the system printer.
 7. Indicate device in alarm and its specific location at the Graphics Work Station.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
 1. User disabling of zones or individual devices.
 2. 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.
10. Voice signal amplifier failure.

E. System Supervisory Signal Actions:

1. Identify specific device initiating the event at fire-alarm control unit, connected network control panels, off-premises network control panels.
2. Record the event on system printer.
3. After a time delay of 200 seconds, transmit supervisory signal to the remote alarm receiving station.
4. Transmit system status to building management system.
5. Display system status and its specific location on graphic annunciator.

F. System Trouble Signal Actions:

1. Identify specific device or event initiating the signal at fire-alarm control unit, connected network control panels, off-premises network control panels.
2. Record the event on system printer.
3. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
4. Transmit system status to building management system.
5. Display system status and its specific location on graphic annunciator.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.4 FIRE-ALARM CONTROL UNIT

- A. The main control panel or remote control panel(s) shall be a multi-processor based networked system designed specifically for detection, and one-way emergency audio communications applications. The control panel(s) shall be listed and approved for the application under the standard(s) as listed. The control panel shall be model EST3 or approved equal.
- B. The control panel(s) shall include all required hardware, software and site-specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any applications can be configured, and modified using

software provided by a single supplier. The control panel operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

- C. The network of control panels shall include the following features.
1. Ability to download all network applications and firmware from the configuration computer on the network or at any control panel (network node) location.
 2. Each control panel (network node) shall have an LCD display with common controls. The display shall be configurable to display the status of any and all combinations of alarm, supervisory, trouble, monitor, or group event messages.
 3. From each LCD display on the system shall be capable of being programmed for control functions of any node or the entire network. The LCD display shall reside on the network as a node and continue to operate with fault on the network. An LCD can be programmed to be only operation when a node is operational in stand-alone mode, with a network fault.
 4. The system program shall have a minimum of 100 system definable Service Groups to facilitate the testing of installed system based on the physical layout of the system. Service groups that disable entire circuits serving multiple floors or fire zones shall not be considered as equal.
 5. Advanced Windows based programming with Program Version Reporting to document any and all changes made during system start-up or system commissioning. Time and date stamps of all modifications made to the program must be included to allow full retention of all previous program version data. The operator display shall clearly identify unacknowledged and acknowledged alarm, supervisory, trouble, and monitor status messages. The system shall provide the ability to download data from the analog/addressable detectors to a PC while the system is on-line and operational in the protected premises. The downloaded data may then be analyzed in a diagnostic program supplied by the system manufacturer.
 6. Provide system reports that list a detailed description of the status of system parameters for corrective action or for preventive maintenance. Reports shall be displayed on the operator interface or be capable of being sent to a printer.
 7. Provide an authorized operator with the ability to operate or modify system functions such as system time, date, passwords, holiday dates, restart the system and clear the control panel event history file.
 8. Provide an authorized operator the ability to perform test functions within the installed system.
 9. Supervision of system components, wiring, initiating devices and software shall be provided by the control panel. Failure or fault of system component or wiring shall be indicated by type and location on the LCD display. Software and processor operation shall be independently monitored for failure. The system shall provide fail-safe operation, with multiple-levels of system operation
- D. Each network control panel shall be capable of:
1. Supporting up to 2500 intelligent analog/addressable points.
 2. Supporting up to ten (10) intelligent addressable loops, each loop supporting 125 detectors and 125 modules, total of 250 points.
 3. Supporting network connections up to 63 other control panels and annunciators.
 4. Supporting up to 124 (security/access control) Keypad/Displays.

5. Support up to ten network digital dialers with Contact ID or SIA format and TAP Pager protocol.
 6. Supporting multiple RS-232 communication ports and protocol.
 7. Supporting up to 1740 chronological history events.
 8. Total network response shall not exceed 3 seconds.
- E. 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, monitor, trouble and component status messages and control menu.
1. The common control switches and with corresponding LEDs provided as minimum will be; Reset Alarm Silence, Panel Silence, and Drill. It shall be able to add additional switches/LEDs as required.
 2. The main control panel shall have display that is 24 lines by 40 character graphic LCD and backlit when active.
 3. Each point shall have custom event message of up to 40 characters, for total of 80 characters. In addition to instructional text message support a maximum of 2,000 characters each.
 4. Provide 8 simultaneous events to be displayed. The first seven (7) highest priority events in addition to the most recent event. The events shall be automatically placed in event types (Alarm, Supervisory, Monitor & Trouble) for easy access and shall be possible to view the specific event type separately. Having to scroll through a mixed list of event types is not acceptable.
 5. Provide an internal audible signal with different programmable patterns to distinguish between alarm, supervisory, trouble and monitor conditions.
 6. This display shall be an EST 3-LCDXL1 or approved equal.
 7. Systems not capable of such a display on the main panel faceplate shall include a CRT/Monitor display meeting the above requirements and battery stand-by.
- F. Audio One-Way Voice Communications
1. The voice communication system shall be eight (8) channel audio evacuation systems, to allow the ability to have eight simultaneous announcements/paging. The audio channels shall be design as such:
 - a. Manual Paging
 - b. Mass Notification Message
 - c. Fire Message
 - d. Alert Message
 - e. Stand-by Message
 - f. Elevator Message
 - g. Stairwell Message
 - h. Security/Weather Threat
 2. The system custom digital voice message shall provide a minimum of 100 minutes and be created as a .wav file format. All messages shall be able to be created on-site without any special tools or burning of chips. Provide as minimum one twenty (20) watt supervised audio amplifier per paging zone. The system software shall be capable of selecting the required audio source signal for amplification. To enhance system survivability, each audio amplifier shall automatically provide an internally generated local 3-3-3, 1000 Hz

- temporal pattern output upon loss of the audio signal from the one-way emergency audio control unit, during an alarm condition.
3. Audio amplifiers shall be power limited and protected from short circuits conditions on the audio circuit wiring. Each amplifier output shall be a supervised, dedicated, selectable 25/70 Vrms output.
 4. Provide a standby audio amplifier, per node that will automatically sense the failure of any primary amplifier installed in the same panel and replace the function of the failed amplifier.
- G. Provide an emergency Voice Communication System with the following design features:
1. An audio control unit with Microphone for Paging.
 2. Provide 3-position switch for each evacuation signaling zone, with "Voice", "Auto" and "EVAC" positions identified and two LED status indicators for each audio visual evacuation signaling "zone", one red and one yellow.
 3. These LED's shall illuminate to indicate respectively:
 - a. Evacuation signals activated (red),
 - b. Trouble in audio (speaker) or visual (strobe) circuit(s) (yellow).
- H. Provide 2-position switch for "All-Call" to activate all the evacuation signaling zones, with "Voice" and "Auto" positions identified and two LED status indicators for each audio visual evacuation signaling "zone", one red and one yellow.
1. These LED's shall illuminate to indicate respectively:
 - a. Evacuation signals activated (red)
 - b. Trouble in audio (speaker) or visual (strobe) circuit(s) (yellow).
- I. 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
- J. Circuits Requirements:
1. Signaling Line Circuits for Intelligent Analog Addressable Loop:
 - a. Class B.
 - b. No more than 100 detectors or 100 modules installed on a loop.
 2. Initiating Device Circuit:
 - a. Class B
 3. Notification Appliance Circuits:
 - a. Class B.
 - b. Maximum circuit loading to 2 amps for visuals.

4. Activation of alarm notification appliances, smoke control, elevator recall and other functions shall occur within 3 seconds after the activation of an initiating device.
- K. Smoke-Alarm Verification:
1. Initiate an audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
 2. Activate an NRTL-listed and -approved "alarm-verification" sequence at fire-alarm control unit and detector where required by owner / user.
 3. Record events by the system printer.
 4. Sound general alarm if the alarm is verified.
 5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.
- L. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change to alternate 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.
- M. Digital Alarm Communicator Transmitter: The system shall have an integrated off premise communications capability using a digital alarm communications transmitter (DACT) for sending system events to multiple central monitoring station (CMS) receivers. The system shall provide the CMS(s) with point identification of system events using 4/2, 3/1, Contact ID or SIA DCS protocols. The dialer shall have the capability to support up to 255 individual accounts and to send account information to eighty (80) different receivers, each having a primary and secondary telephone access number. System events shall be capable of being directed to one or more receivers depending on event type or location as specified by the system designed. In the event of a panel CPU failure during a fire alarm condition, the DACT degraded mode shall transmit a general fire alarm signal to the CMS.
1. Digital data transmission shall include the following (Contact ID)
 - a. Address of the alarm-initiating or supervisory device.
 - b. Loss of ac supply or loss of power.
 - c. Low battery.
 - d. Abnormal test signal.
 - e. Communication bus failure
 2. Shall be EST, model 3-MODCOM or approved equal.
- N. Alpha-Numerical Pager Interface: The system shall transmit an alphanumeric system activity message, by event, by point descriptor to a commercial paging system of the owner's choice, using TAP Pager protocol.
1. Shall be EST, model 3-MODCOM/P or approved equal.

- O. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, shall be powered by nominal 24-V dc source.
 - 1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- P. Secondary Power: Shall provide 24 hours supervisory and 15 minutes of alarm with batteries, automatic battery charger, and automatic transfer switch. 20 percent safety factor for battery power will be provided in accordance with NFPA 72.
- Q. NAC Power Supply: The NAC power supply shall be independent unit that will provide power to visual strobe notification appliances. It shall be possible to configure the NAC's to follow the main panel's NAC or activate from intelligent synchronized modules. The booster NAC's must be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. Fault conditions on the power supply shall not impede alarm activation of host NAC circuits or other power supplies. The NAC power supply must be able to provide concurrent power for notification devices, security devices, access control equipment and auxiliary devices such as door holders. All the NAC Power Supplies shall be synchronized. The power supply shall support up to 24 amp hour batteries.
 - 1. Power supply shall be minimum of 10 amps and UL 864 Listed.
 - 2. Four independent 3amp NAC circuits. Each being configurable as auxiliary power.
 - 3. All circuits shall be synchronized.
 - 4. Shall be EST, model BPS10A or approved equal.

2.5 REMOTE ANNUNCIATOR

- A. Annunciator shall match those of fire-alarm control unit LCD display functions for alarm, supervisory, monitor and trouble indications and common system controls including; acknowledging, silencing, resetting, and testing.

2.6 NAC Power Supply:

- A. The NAC power supply shall be independent unit that will provide power to visual strobe notification appliances. It shall be possible to configure the NAC's to follow the main panel's NAC or activate from intelligent synchronized modules. The booster NAC's must be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. Fault conditions on the power supply shall not impede alarm activation of host NAC circuits or other power supplies. The NAC power supply must be able to provide concurrent power for notification devices, security devices, access control equipment and auxiliary devices such as door holders. All the NAC Power Supplies shall be synchronized. The power supply shall support up to 24 amp hour batteries.
 - 1. Power supply shall be minimum of 10 amps and UL 864 Listed.
 - 2. Four independent 3amp NAC circuits. Each being configurable as auxiliary power.

3. All circuits shall be synchronized.
4. Shall be Edwards-EST, model BPS10A, APS10A or approved equal.

2.7 SYSTEM PRINTER

- A. 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.
1. Each control panel (network node) shall be capable of supporting a printer. All control panel printer ports shall be configurable to output any combination of alarm, supervisory, trouble, monitor, or group event messages.
 2. Printer shall be EST, PT-1P or approved equal.

2.8 INTELLIGENT ANALOG SYSTEM SMOKE DETECTORS

A. General Requirements for Intelligent Analog Detectors

1. Integral Microprocessor: All decisions are made at the detector determining if the device is in the alarm or trouble condition.
2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, last maintenance date, number of alarms and troubles, time of last alarm and analog signal patterns for each sensing element just before last alarm.
3. Electronic Addressing: Permanently stores programmable system address. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable.
4. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location and the device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.
5. Sensitivity Range: Each analog addressable smoke detector's sensitivity shall be capable of being programmed individually as: most sensitive, more sensitive, normal, less sensitive or least sensitive. It shall be possible to automatically change the sensitivity of individual analog/addressable detectors for the day and night periods. It shall be possible to program control panel activity to each level.
6. Pre-Alarm: Detector stores 20 pre-alarm sensitivity values to alert local personnel prior to the sensor reaching a full evacuation sensitivity. Sensitivity values can be set in 5% increments.
7. Environmental Compensation: The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its reference value. The detector shall provide a maintenance

alert signal when the detector reaches 75% (Dirty) to 99% (More Dirty) compensation has been used. The detector shall provide a dirty fault signal when 100% or greater compensation has been used.

8. Twin Status LEDs: Flashing Green LED shows normal; flashing RED shows alarm state; steady RED and steady GREEN show alarm state in stand-alone mode, visible from any direction.
9. UL Sensitivity Testing: The detector shall utilize a supervised microprocessor that is capable of monitoring the sensitivity of the detector. If the detector sensitivity shifts outside of the UL limits, a trouble signal is sent to the panel.
10. Device Replacement: The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.

B. Intelligent Photoelectric Detector

1. Provide intelligent analog addressable photoelectric smoke detectors at the locations shown on the drawings.
2. Provide EST, model SIGA2-PS or approved equal.

C. Detector Base Types

1. Provide standard detector mounting bases suitable for mounting on 1-gang, or 4inch octagon box and 4 inch square box. The base shall, contain no electronics and support all series detector types. Bases with electronics or dip-switches are not acceptable.
 - a. Provide EST, model SIGA-SB or SB4 or approved equal.

2.9 INTELLIGENT MODULES

- A. It shall be possible to address each intelligent module without the use of DIP or rotary switches. Devices using switches for addressing shall not be acceptable. The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller.
1. Integral Microprocessor: All decisions are made at the module determining if the device is alarm or trouble condition.
 2. Non-Volatile Memory: Permanently stores serial number, and type of device. Automatically updates historic information including hours of operation, number of alarms and troubles, time of last alarm.
 3. Automatic Device Mapping: Each detector transmits wiring information regarding its location with respect to other devices on the circuit, creating an As-Built wiring diagram. This will also provide enhanced supervision of the device physical location. The device message shall reside with the location and not the device address. Devices installed in the wrong location will always report the correct message of the physical location.

4. Twin Status LEDs: The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status.
 5. Input and output circuit wiring shall be supervised for open and ground faults.
 6. Two styles of modules shall be available, those designed for gang box mounting, and where multiple modules are required in a single location, plug in modules shall be provided with a Universal Input/Output motherboard.
- B. Intelligent Input Module. The Input Module shall provide one or two supervised Class B input circuit capable of a minimum of 4 personalities, each with a distinct operation. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1 ½" (38mm) deep 4" square box with 1-gang covers. The single input module shall support the following circuit types:
- Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
 - Normally-Open Alarm Delayed Latching (Waterflow Switches)
 - Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.)
 - Normally-Open Active Latching (Supervisory, Tamper Switches)
1. Provide EST model SIGA-CT1 or CT2 or SIGA-MCT2 or approved equal.
- C. Intelligent Relay Module. Provide addressable control relay circuit modules shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware. The module shall be suitable for mounting on North American 2 ½" (64mm) deep 1-gang boxes and 1-1/2" (38mm) deep 4" square boxes with 1-gang covers.
1. Provide EST, model SIGA-CR or SIGA-MCR or approved equal.
- D. NAC Control Module: Provide intelligent NAC control module shall provide one (1) supervised Class B output circuit capable of a minimum of 2 personalities, each with a distinct operation. The gang box -mounted version shall be suitable for mounting in North American 2 ½" (64mm) deep 2-gang boxes and 1 ½" (38mm) deep 4" square boxes with 2-gang covers, or European 100mm square boxes. The plug-In version shall plug into a universal multi-module motherboard. The NAC control module shall support the following operations:
- 24volt NAC circuit
 - Audio notification circuit 25v or 70v
 - Telephone Power Selector with Ring Tone (Firefighter's Telephone)
 - Visual Synchronized Output to Genesis appliances or to NAC Power Supply.
1. Provide EST, model SIGA-CC1 or -CC1S or SIGA-MCC1 or MCC1S or approved equal.

2.10 NOTIFICATION APPLIANCES

- A. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that

- the application of the appliances are done in accordance with the single manufacturers' instructions.
- B. Any appliances, which do not meet the above requirements, and are submitted, for use must show written proof of they're compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers which clearly states that their equipment (as submitted) are 100% compatible with each other for the purposes intended. All appliances shall be UL listed Fire Protective Service and shall be UL 1971.
- C. Notification Appliances – Visible Notification Appliances:
1. Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 2. For mass notification visible notification appliances, provide listed strobe with amber lens and the word "ALERT" engraved in minimum 1-inch high letters on the lens.
 3. Strobes shall provide a smooth light distribution pattern field selectable candela 15 cd, 30 cd, 75 cd, and 110 cd flash output rating. The strobe (15, 30, 75, 110) candela rating shall be view from the side window to verify the setting. All strobes shall be synchronization to within 10 milliseconds for an indefinite period shall not require the use of separately installed remote synch modules. The strobes shall mount to one-gang electrical box. De-rate mass notification strobe candela as indicated by manufacturer.
 4. The device shall have plastic protective cover for during installation.
 5. The actual candela setting on the visual shall be marked on the appliance.
 6. Provide EST, model Genesis Series devices or approved equal.
- D. Notification Appliance - 4" Cone Speaker
1. Speakers shall have a 4" mylar cone, paper cones shall not accept as equal. The rear of the speakers shall be completely sealed protecting the cone during and after installation. In and out screw terminals shall be provided for wiring. Speakers shall provide 1/4w, 1/2w, 1w, and 2w power taps. The actual speaker wattage & strobe candela setting shall be view from the device window to verify the wattage setting, without removing the device. To make any changes to the speaker wattage will only require the removal of the cover plate.
 2. At the 2-watt setting, the speaker shall provide a 90 dBA sound output over a frequency range of 400-4000 Hz. as measured in reverberation room per UL-1480.
 3. Combination speaker strobes shall meet both sections of above.
 4. The device shall have plastic protective cover for during installation.
 5. The actual wattage setting on the speaker shall be marked on the face of the appliance.
 6. Provide EST, model Genesis Series devices or approved equal.

2.11 GRAPHIC COMMAND INTERFACE

- A. Provide a graphic user interface where indicated on the project drawings that shall communicate with the fire alarm network(s) via supervised RS232 communications protocol, or TCP-IP, with full command and control capability. The graphics command interface shall be password protected to operate common control functions from the Workstation including acknowledging, silencing, and resetting of fire alarm functions as well as manually activating, deactivating, enabling and disabling of individual system points while maintaining UL 864 listing. The

workstation shall be capable of generating status, maintenance and sensitivity reports. The workstation must be capable upon receipt of any event to activate an audio WAV file over the workstation speakers alerting the operator to an event, and providing audible instructions. The computer shall operate using Windows XP, SP3. Any other operating systems not meeting this strict UL and operating requirement will not be acceptable.

- B. The Graphic User Interface shall be UL listed and display the address of an alarm or off-normal point with type and description and time of the event in a prioritized color coded event list. Highlighting an event in the event list shall automatically cause the three quadrants to display information relating to the highlighted event. The display shall provide color graphical representation of the area in which the alarm or off normal device is located. It shall be possible for the operator to manually zoom down to any portion of a vector-based graphic without aliasing, artifacting, or pixilation of the image. Preset zoom levels shall not be considered equal. There shall be a set of written operator instruction for each point. The operator shall be able to Log comments for each event to history with time and date. The history must be accessible for future review.
- C. To support future potential growth or expansion to other Facilities, the Graphics Command Interface shall support a minimum of 80 Networks Systems via Ethernet using IP protocol communications. In addition the Graphics Command Interface shall be able to support Digital Alarm Receiver unit that will monitor systems using Contact ID format via phone lines or Ethernet. The Graphics Command Interface shall have the ability to create multiple commands between Networks to operate any sequence of operation.
- D. The Graphic Command Interface shall have a paging microphone that has the capability to selectively communicate to any zone or level within a building network or multiple selective combination or All Call. This voice paging shall have the capability to support Voice over IP communications to each network.
- E. The Graphic Command Interface shall be capable upon receipt of an alarm to activate an audio WAV file over the workstation speakers alerting the operator to an alarm, and providing audible instructions. The workstation shall be capable upon receipt of an off normal condition, to send e-mail message to appropriate recipients via a SMTP mail server.
- F. The software shall have the ability to customize each Access Level with the ability to limit system restrictions and be password protected. Provide minimum of 128 users with access levels.
- G. Graphical Maps shall be able to be imported from anyone of the following formats: DXF, DWG, JPEG, RLE, TIF, BMP, and WMF.
 - 1. Drawing display shall allow for zoom out to full floor view or zoom in to individual device location. It shall be possible for the operator to manually zoom down to any portion of a vector-based graphic without aliasing, artifacting, or pixilation of the image. Preset zoom levels shall not be considered equal. Include floor plan Legend to identify location on floor plan key view.

2. There shall be a toggle button on screen for all drawing levels that allow instant migration to the floor above or the floor below the floor currently being displayed on screen.
 3. Floor plans shall have the minimum capability of:
 - a. 32 Zoom field views on drawing.
 - b. Door swings.
 - c. Window locations.
 - d. Room number and designation of occupancy.
 - e. All initiating and notification device locations.
 - f. Locations of video camera/view.
- H. PC Computer shall have the following minimum operating requirements:
1. Operating software shall be MS XP, SP3.
 2. Dual Core 2.13GHz Intel Core 2 Duo Processor with 1066 MHz system bus.
 3. 1GB memory DDR2 800Mhz, upgradeable to 8GB.
 4. Dual video; DVI and SVGA
 5. Audio sound
 6. Dual 1G LAN
 7. 500GB Hard Drive
 8. 24X DVD-R/W, DVD+RW, CD-R/W
 9. Computer hardware shall be UL864 listed.
- I. Provide EST – FWCGSUL Software or approved equal for proper system operation.
- J. Provide a Command Center Printer for real time events and reports.
- K. Provide a 22” LCD monitor. The video display shall be minimum of 22” inch LCD display monitor or larger with built-in audio speakers. The monitor shall also have Touch Screen control operation.
- L. The Graphics Command Center shall have secondary power source to support for minimum of 8 hours operation. Shall be a UPS System by GE Digital Energy GT Series, or approved equal.
- M. The Graphics Command Interface shall be EST FireWorks or approved equal.
- 2.12 SURGE PROTECTION
- A. General Requirements

1. SPD with Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 2. Comply with NFPA 70.
 3. Comply with UL 1449.
 4. MCOV of the SPD shall be the nominal system voltage.
- B. Panel Suppressors
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ABB France
 - b. Eaton Corporation
 - c. Emerson Electric Co.
 - d. GE Zenith Controls
 - e. Leviton Manufacturing Co., Inc.
 - f. PowerLogics Inc.
 - g. Siemens Industry, Inc.
 2. SPDs: Comply with UL 1449, Type 2.
 - a. Include LED indicator lights for power and protection status.
 - b. Internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 3. Peak Surge Current Rating: The minimum single-pulse surge current withstand rating per phase shall not be less than 100 kA. The peak surge current rating shall be the arithmetic sum of the ratings of the individual MOVs in a given mode.
 4. Comply with UL 1283.
 5. Protection modes and UL 1449 VPR for grounded wye circuits with 208Y/120 V, three-phase, four-wire circuits shall not exceed the following:
 - a. Line to Neutral: 700 V for 208Y/120 V.
 - b. Line to Ground: 700 V for 208Y/120 V.
 - c. Neutral to Ground: 700 V for 208Y/120 V.
 - d. Line to Line: 1200 V for 208Y/120 V
 6. Protection modes and UL 1449 VPR for 240/120-V, single-phase, three-wire circuits shall not exceed the following:
 - a. Line to Neutral: 700 V.
 - b. Line to Ground: 700 V.
 - c. Neutral to Ground: 700 V.
 - d. Line to Line: 1200 V.
 7. SCCR: Equal or exceed 100 kA.
 8. Inominal Rating: 20 kA.h

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, 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. Equipment Mounting: Install fire-alarm control unit on finished floor with tops of cabinets not more than 72 inches above the finished floor.
- C. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
 1. Connect new equipment to existing monitoring equipment at the supervising station.
 2. Connect existing fire alarm panel to new fire alarm control panel for purposes of monitoring for alarm, supervisory and trouble conditions.
- D. Smoke Detector Spacing:
 1. Comply with NFPA72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 2. Smooth ceiling spacing shall not exceed 30 feet.
 3. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A in NFPA 72.
 4. HVAC: Locate detectors not closer than 5 feet from air-supply diffuser or return-air opening.
 5. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.
- E. Notification Appliance Devices: Install between 80 and 96 inches on the wall. Strobes will be no lower than 80 inches to the bottom of the lens, and no greater than 96 inches to the top of the lens.
- F. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.

- G. Annunciator: Install with top of panel not more than 56 inches above the finished floor.

3.3 CONNECTIONS

- A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm monitoring of existing fire alarm control panel located adjacent to the new EST 3 fire alarm control panel to be installed as part of this contract.
 - 2. Control modules for notification appliance circuit panels and speaker circuits as required for system operation.

3.4 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.

3.5 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.

3.6 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by the Owner and authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 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 NFPA72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.

- b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
 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 of Fire Alarm Systems" Chapter in NFPA72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA72.
- 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: During the warranty period, each year test fire-alarm system complying with visual and testing inspection requirements in NFPA72. Use forms developed for initial tests and inspections.

3.7 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.

3.8 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for three years.
- C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within three 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.

3.9 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111