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SPECIFICATIONS FOR THE DESIGN AND INSTALLATION OF AN AUTOMATIC FIRE DETECTION, EMERGENCY VOICE COMMUNICATION AND ALARM SYSTEM FOR THE TONOPAH RESIDENCE HALL COMPLEX UNIVERSITY OF NEVADA LAS VEGAS

Prepared For:

University of Nevada Las Vegas (UNLV)
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V62266

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1.0 GENERAL

1.1 GENERAL DESCRIPTION

Provide all materials and labor for the design and installation of a new automatic fire detection, emergency voice communication and alarm system, hereafter referred to as the Work (or System), in the Tonopah Residence Complex.

The work shall be subject to the terms and conditions contained in the standard UNLV Construction Contract.

All work shall be performed in accordance with these Specifications. No modifications to these Specifications will be accepted without the express written approval of the Owner or its Consultant. It is the Contractor's responsibility to document approval of any such modifications prior to the execution of work. Modifications resulting in a change of project cost or schedule will be documented on the UNLV Change Order Form.

The system shall meet the building and fire code requirements of the local authority having jurisdiction (AHJ) and shall be installed, tested and documented in accordance with the requirements of NFPA 72.

1.1.1 INTENT OF SPECIFICATIONS

A. Work performed pursuant to these Specifications shall be complete in every respect, resulting in a System installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and Underwriters Laboratories, Inc. (ULI) listings.

Upon completion of this Work, the Contractor shall provide the Owner with:

1. Complete information and Contractor’s record drawings describing and depicting the entire System as installed, including all information necessary for maintaining, troubleshooting and/or expanding the system at a future date.

2. Complete documentation of system testing.

3. Certification that the entire system has been inspected and tested, is installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and ULI listings, and is in proper working order. The Contractor shall follow the requirements of NFPA 72 and provide completed Inspection and Testing forms.

4. A copy of the final software program in each of the following: written form, electronic media appropriate for technician downloading onto the system, and permanent electronic disk format.

5. All necessary Owner-operator passwords.

6. A letter stating that the fire alarm system installed has enough capability for future expansion. The future expansion being the inclusion of the Centre/South towers.

7. All points of contact at the manufacturer and all site specific system information necessary to permit the complete access to and modification of the system programming by qualified technicians.

8. Provide executed “Release of Lien” form from Contractor and each Subcontractor.

9. A warranty letter indicating the date of commencement and duration of the system warranty and of the service and maintenance agreement.

B. All equipment, devices, appliances, conductors, raceway and other materials shall be new except where re-use of existing components is specifically permitted by these Specifications.

1.1.2 WORK INCLUDED

A. Design, provide and install a new fire alarm system consisting of:

1. Main Fire alarm control unit located in the fire alarm control room located in the existing fire alarm control room in the South Tower. Including a new firefighters Smoke Control Panel which will incorporate the smoke control systems and pressurized exit stairways into one panel.

2. Audible notification appliances installed, spaced and tapped so as to produce a sound output on alarm that is clearly audible above the ambient noise level in all areas including elevator cabs and stairwells throughout the building. In no case shall the audible alarm be less than 15 dBA above the ambient room noise level or less than 5 dBA above the maximum ambient noise level in public and common areas. In no case shall the audible alarm be less than 75 dBA at the pillow level in all residence sleeping areas/rooms, with intervening doors closed during the alarm. A speaker shall be provided in each residence sleeping room. Speakers shall meet the intelligibility requirements of NFPA 72.

3. Visible notification appliances installed in all public areas including but not limited to, public restrooms, meeting rooms, dining rooms, ball rooms, residence room corridors, common area corridors, back of house areas and high noise areas and as required by local jurisdiction

4. Visible notification appliances shall installed in all sleeping area and parlors and associated bathrooms of designated residence rooms with communication features.

5. Duct smoke detectors in supply, return air, and exhaust air systems at each connection to a vertical duct riser serving two or more stories as per requirements of NFPA 90 and/or applicable mechanical code

6. Area smoke detectors within residence room corridors, elevator machine rooms, top of elevator shafts, mechanical, storage and electrical rooms, phone rooms, back of house areas, laundry rooms, smoke dampers, magnetically held-open doors at fire rated walls, office spaces and current locations.

7. System-connected carbon monoxide (CO) detectors in rooms and areas containing fuel burning appliances and equipment CO detectors shall be installed following the manufacturer's recommended instructions. They shall be fully supervised and annunciated at the main fire alarm control unit.

8. A manual fire alarm box at each exit and exit stairwell.

9. Devices, equipment and conductors necessary to monitor special fire suppression systems (if applicable).

10. Conductor and modules necessary to monitor the signals from the fire pump, sprinkler and standpipe system alarm, and supervisory devices with each device having its own discrete address. Work shall include integration of any sprinkler monitoring points not already integrated into the system.

11. Devices, equipment and conductors necessary to monitor available generator functions in accordance with NFPA 110. These functions should be monitored as supervisory alarms with each device having its own discreet address.

12. Devices, equipment and conductors necessary to transmit alarm, trouble and supervisory signals in a Contact ID format to the central station as required by the local code.

13. Devices, equipment and conductors necessary to provide the following annunciator functionality:

    - Main Fire alarm control unit Printer and LCD
    - Center Reception Area – Remote LCD Annunciator
    - North Lobby – Remote LCD Annunciator

14. Magnetic door holders located at all existing locations in all tower locations.

15. Devices, relays, conductors and conduit necessary to perform fan start-up or shutdown, damper control, and any other control functions as a part of a smoke control scheme as may exist in the complex.

16. Devices, programming and equipment for the duplication of all monitoring and control functions of the existing fire fighter's smoke control system panel located in the fire alarm control room. This includes panel and system design (including interface points) and testing/commissioning of system.

17. Devices, relays, conductors and conduit necessary to initiate primary and alternate elevator recall, and activate the visual signal ("hat flash") within all associated elevator cabs, terminating at the elevator controller in each elevator machine room.

18. Devices, relays, conductors, conduit and equipment necessary to shut down existing music systems or paging throughout the Complex.

19. Devices, relays, conductors and conduit necessary to provide speakers and firefighter telephones in each elevator cab. .

20. Devices, relays, conductors and conduit necessary to provide shunt trip of power to elevators per ANSI A17.1, including heat detectors located within 24 inches of all sprinklers Contractor shall provide all equipment and interface with on-going elevator modernization project.

21. Fire-Fighter's telephone jacks/handsets designed and installed in accordance with NFPA 72 and State Fire Marshal's office. The system shall operate between the fire command center and each stairwell landing and elevator lobby and elevator cab, emergency and standby power rooms, Mechanical rooms, Elevator equipment rooms, fire pump rooms.

22. Include programming and switches for up to five (5) pre-recorded voice messages for manual activation. Owner shall provide the .wav file for the pre-recorded message.

23. Provide the following individual disconnect switches/buttons and associated LEDs for testing purposes at the Fire alarm control unit (FACU). Provide visible status of the associated control circuits.

    a. Audible appliances and visible strobes.

    b. Door hold open mechanisms, door locking mechanisms, rotating doors. door unlocking mechanisms, door releasing mechanisms, Won Doors.

    c. Elevator recall.

    d. Air handler units (AHUs).

24. Alarm Sensitivity testing capability at FACU.

25. Provide all modification or additional emergency power where required by the specifications and vendor's equipment.

B. Provide protection of previously installed smoke detectors per this Specification.

C. Identify capability to provide Positive Alarm Sequencing (PAS) without physical changes and include cost to provide PAS programming.

D. Subsequent to approval of the new system, remove the existing fire detection and alarm system(s) in its entirety.

E. Test and adjust all new equipment and systems per this Specification.

F. Prepare and submit shop drawings, Contractor record drawings and other submittals required herein.

G. Guarantee all new equipment and systems as well as existing equipment and conductors selected for re-use as part of the new system during installation and for three (3) years after final acceptance of the System by the Owner and AHJ.

H. Repair all damage resulting from this Work in accordance with the requirements of the attached Cutting, Patching and Painting Specifications including removal of existing annunciators in Service elevator lobbies. (See Appendices F & G).

I. Coordinate all work with other Contractors working in the building (*e.g*., adjusting water flow alarm switch retards by the Sprinkler Contractor). Fire alarm contractor to retain all sub-contractors necessary to conduct the work required in the specifications (i.e. sprinkler, elevator, electrical, etc.)

J. Provide UL listed electrical surge protection for all control equipment including primary power supplies.

K. Provide system connection to an existing proven ground. Lightning protection shall include grounding of primary power to fire alarm control units

L. All devices installed outdoors or within areas exposed to unconditioned spaces or wet locations shall be listed for "outdoor use." Electrical raceway, fittings and enclosures shall be NEMA Type 4X.

M. Provide protection of fire alarm units located in storage rooms utilizing bumpers to protect from side impact.

1.1.3 OWNER'S REPRESENTATIVE

A. All contacts with UNLV shall be directed to the Owner's Representative, hereafter referred to as the Owner:

Mr. David Pierce
4505 S. Maryland Parkway
Box 451048
Las Vegas, NV 89154-1048

B. The Owner or the Owner's Consultant will issue all approvals and instructions required for this work. No other person may issue an approval or instructions to the Contractor without the written authorization of the Owner.

1.1.4 WORKING CONDITIONS

A. It shall be the responsibility of all bidders to inspect the job site and become familiar with the conditions under which the work will be performed. Inspection of the building may be made by appointment with the Owner's Representative. Bidders are required to inspect the building prior to bid.

B. Existing drawings and conceptual drawings which are in the possession of the Owner will be made available to bidders. It shall be the bidders' responsibility to review the existing drawings for the purpose of preparing a bid. Electronic copies of the existing drawings will be made available at no cost, upon request. The Owner makes no warranty as to the accuracy of any drawings. Bidders shall field verify any information on which the bidder intends to rely prior to submittal of a bid.

C. The Contractor will be responsible for attending a pre-construction meeting, weekly construction coordination meetings with the Owner's Representative, and monthly meetings with the Owner's Consultant and Quarterly Project Team Meetings.

D. All work, shall be conducted during normal working hours of 9 a.m. to 6 p.m. Some areas may only be accessed during non-peak times (off-hours), as per Owner's requirements. All work shall be coordinated with the Owner's Representative. Noise restrictions shall apply and will be explained at the pre-bid meeting.

E. The Contractor shall be responsible for prior coordination of all work and demolition with the Owner's Representative.

Existing fire protection system(s) shall not be taken out of service without prior written approval from the Owner's Representative, the Owner's Consultant and notification to the State Fire Marshal's office. If such systems are taken out of service, the Contractor shall provide fire watch acceptable to the Owner and the Authority Having Jurisdiction, until those systems are replaced or restored to service. No area of the building shall be unprotected where/when existing and new systems are not operational. A fire watch shall be provided for the portion of the fire alarm system (panels) down for more than eight (8) hours or for any duration the system is down when the contractor is not on site actively working on the system. Note: Contractor must meet fire watch requirements of State Fire Marshal's office.

F. New or revised fire alarm systems, devices, and appliances shall be put into service as soon as they are functional. Once put into service, they shall not be removed from service without the Owner's written authorization.

1.2 QUALITY ASSURANCE

1.2.1 CODES, STANDARDS, ORDINANCES AND PERMITS

ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE PORTIONS OF THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS AND OTHER GUIDELINES OR STANDARDS LISTED HEREIN:

1. *International Building Code, 2012 Edition, as amended by the State of Nevada.*

2. *International Fire Code, 2012 Edition, as amended by the State of Nevada.*

3. *NFPA 13, 2010 Edition*

4. *NFPA 70, 2010 Edition - National Electrical Code.*

5. *NFPA 72, 2010 Edition - National Fire Alarm Code.*

6. *NFPA 90A, 2002 Edition- Standard for the Installation of Air Conditioning and Ventilation Systems.*

7. ANSI A17.1, Safety Code for Elevators and Escalators, 2004.

8. ANSI S3.41, Audible Emergency Evacuation Signal, 1996.

9. UL 864, Control Units for Fire Protective Signaling Systems, 9th Edition, 2003.

10. UL 1481, Power Supplies for Fire Protective Signaling Systems, 5th Edition, 2006.

11. UL 268, Smoke Detectors for Fire Protection Signaling Systems, 5th Edition, 2006.

12. UL 464, Audible Signal Appliances, 8th Edition, 2003.

13. UL 1971, Signaling Devices for the Hearing Impaired, 3rd Edition, 2002.

14. UL 1480, Speakers for Fire Protective Signaling Systems, 5th Edition, 2003.

B. All work and materials shall conform to all Federal, State and local codes and regulations governing the installation, including the codes outlined by Section 1.2.1.A.

C. If there is a conflict between the referenced NFPA standards, federal, state or local codes, and this specification, it shall be the Contractor's responsibility to immediately bring the conflict to the attention of the Owner's Consultant for resolution. Contractor shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the Owner.

D. The Contractor shall be responsible for filing of all documents, paying all fees, securing all permits, inspections and approvals necessary for conducting this work. Upon receipt of approved drawings, executed permits, or inspection reports from the authority having jurisdiction, the Contractor shall immediately forward three (3) sets to the Owner's Consultant. These documents shall either be drawings stamped approved or a copy of a letter from the authority having jurisdiction stating approval of this work.

E. All devices, appliances, systems, equipment and materials furnished and installed shall be of types or models approved for use in systems and occupancies of this type in accordance with the codes identified.

F. All devices, appliances, systems, equipment and materials furnished and installed shall be new and listed by Underwriters Laboratories Inc. (ULI) for the intended use. All equipment shall be installed in accordance with the manufacturer's recommendations and the ULI listing limitations. Compatibility listing requirements for separate voice, fire alarm systems and smoke detectors shall be met. The Contractor shall provide evidence, with the submittals, of listings of all proposed equipment and combinations of equipment.

1.2.2 QUALIFICATIONS OF CONTRACTOR

The Contractor shall:

A. Be a manufacturer of fire alarm systems and devices or an authorized representative.

B. Hold all licenses and obtain all permits necessary to perform work in the State Fire Marshal's office. Bidders shall submit copies of their Contractor's license with bid submittal.

C. Provide a job site supervisor, employed by the fire alarm manufacturer, who is to be present full-time on-site each day that work is actively in progress. This individual shall be the same person throughout the course of the project, unless written authorization is obtained from the Owner through an approved Change Order.

D. Be qualified and authorized by ULI to issue certificates for the installation and maintenance of fire alarm systems in accordance with the requirements of the applicable NFPA Standards.

1.3 SUBMITTALS

1.3.1 GENERAL

A. The Owner's Consultant will review and recommend approval/disapproval or take other appropriate action on the Contractor's submittals including shop drawings, samples, and documentation and record drawings. This review is to verify conformance to project Specifications and design concepts expressed in the Contract Documents. This action will be taken with all reasonable promptness as to cause no delay in the work, while allowing sufficient time to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details (e.g., dimensions) or for substantiating installation or performance of equipment or systems designed by the Contractor, all of which remain the Contractor's responsibility to the extent required by the Contract Documents. The Consultant's review shall not constitute approval of construction safety precautions, means, method, techniques, sequences of procedures, or a specific assembly of which the item is a part, nor shall it be considered to override more restrictive requirements of the authority having jurisdiction. Approval of the shop drawings by the Owner's Consultant does not grant relief from compliance with these Specifications, local Code requirements, or serve as authorization of a change in contract time or cost. Only complete submittals will be reviewed, partial submittals will be returned to the contractor without being reviewed by the Owner's consultant.

B. If the Contractor's submittals, upon review by the Owner's Consultant, do not conform to the requirements of these Specifications; the Contractor shall be required to resubmit with modifications within ten (10) working days of receipt of notification to Contractor. The Contractor shall be responsible for the Owner's extra expenses for subsequent review(s) of rejected submittals necessitated by the Contractor's failure to make the requested modifications. Such extra fees shall be deducted from payments by the Owner to the Contractor via a deductive change order. Approval of the submittals by the Owner shall, in no case, relieve the Contractor of its responsibility to meet the requirements of this specification. See Appendix C for submittal schedule.

1.3.2 COORDINATION OF SUBMITTALS

A. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.

B. Verify that each item and the submittal for it conform in all respects with the specified requirements.

C. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.

1.3.3 REIMBURSEMENT OF CONSULTANT'S COSTS

A. In the event substitutions are proposed to the Owner after the Contract has been awarded, the Consultant will record all time used by him and by its consultants in evaluation of each such proposed substitution.

1.3.4 SUBCONTRACTORS

A. Contractor shall submit with its bid, a list of all proposed Subcontractors. All proposed Subcontractors are subject to the approval of the Owner.

B. The installing electrical Subcontractor(s) shall:

1. Hold all licenses and permits necessary to perform this work.

2. Have at least five years of experience in the installation of systems of this type and be familiar with all applicable local, state and federal laws and regulations.

3. Be regularly engaged in the servicing, installation and testing of fire detection, emergency voice communications, and alarm systems, as appropriate.

4. Have worked on one or more large, retrofit projects in the last five years.

1.3.5 PROJECT LIST

Contractor shall submit with the bid a list of large retrofit fire alarm system projects performed by the electrical Subcontractor(s) in the last 5 years.

1.3.6 EQUIPMENT LIST

A. The Contractor shall submit with the bid a detailed equipment list, identifying types, models and quantities of all materials, devices and equipment proposed. At a minimum it shall include all of the devices indicated in Appendix A. This submittal shall include original version of manufacturers' data sheets showing the types and models of all equipment, devices, material and wire proposed. Evidence of ULI listings and local approvals, if required, shall be submitted with the data sheets.

B. When a data sheet shows more than one product, the proposed product shall be clearly indicated by arrows or other suitable means.

1.3.7 WORK SCHEDULE

A. The Contractor shall submit with the bid in accordance with the instructions given at the pre-bid meeting, a proposed work schedule in bar chart format. This schedule shall indicate the time necessary in calendar days for:

1. Project start-up.

2. Property survey and delivery of existing conditions report.

3. Design.

4. Development of background drawings.

5. Shop drawing submittals.

6. Installation, identifying specific areas or floors. Installation shall include demolition, conductor, devices, patching and painting.

7. Pre-acceptance test/commissioning activity to be completed by the Contractor.

8. Final inspection by Owner’s Consultant.

9. Final inspection and testing by the local AHJ and testing, as required by Section 3.0.

10. Estimated number of rooms, if any, to be taken out of and brought back into service during each week.

B. The proposed work schedule will be reviewed and finalized during the pre-construction meeting and will be updated prior to each weekly construction coordination meeting.

C. The proposed work schedule shall include appropriate review times for the Owner, the Owner's Consultant, and the authority having jurisdiction.

1.3.8 SAMPLES

Within 30 days of authorization to proceed, the Contractor shall submit to the Owner and Owner's Consultant for approval, samples of all proposed alarm initiating devices, audible/visible alarm notification appliances, wire and cable.

1.3.9 PERMITS, LICENSES AND CERTIFICATES

Prior to start of installation, the Contractor shall obtain and submit to the Owner's Consultant copies of all permits, licenses, certificates and approvals necessary to conduct this work.

1.3.10 SHOP DRAWINGS

A. Prior to the start of any demolition or installation, but within 30 days after the Contract has been awarded, the Contractor shall submit two full sets of shop drawings including calculations and two full sets of data sheets and installation manuals/instructions detailing the manufacturer's installation recommendations for all equipment to be installed, to the Owner's Consultant for approval.

B. Shop drawings shall be at 1/8" = 1'-0" scale unless otherwise noted. One set of shop drawings files prepared in AutoCAD Version 2010 or later and provided in electronic format on recordable media (i.e. CD or DVD), and .pdf format

C. The shop drawings shall consist of the following:

1. A legend sheet, match lines, site plan, north indication.

2. Clean, accurate building floor plans drawn to minimum 1/8-inch scale except as otherwise noted hereinafter and a system riser diagram in 1/4-inch scale with a title block on each drawing. The title block shall include name, address and phone number of Contractor and Subcontractor, date of drawing issue, drawing revision number and name and location of work.

a. The floor plan drawings shall indicate the following:

(1) Labeling of all rooms by type; including, but not limited to, electrical, mechanical and storage rooms; and any rooms or areas that are non-standard or unusual for the building.

(2) Location of all devices, appliances, circuits, equipment, risers and electrical power connections.

(3) The digital address or sequential zone/device number of all initiating devices and notification appliances.

(4) Schedule(s) outlining the number, size and type of each conductors and conduit used.

(5) Standby battery capacity calculations including the number, size, type and location of all batteries. Battery calculations shall list the type of powered devices and modules, quantities, unit and extended amperage draw for quiescent and alarm conditions, total amperage draw and battery amp/hour rating. For design criteria, the battery amp/hour rating listed by the manufacturer shall be de-rated by 20% and provide 20% spare capacity after de-rating.

(6) Voltage drop calculations.

(7) Primary power supply calculations which include all system requirements including any requirements for electrical door unlocking systems, visible signaling appliances, or any other auxiliary function powered by the system. The quantity, location, model or part number, rated capacity and loaded capacity shall be included for each power supply.

(8) Point-to-point conductors showing individual circuits and circuit/conduit, routing, number, and type and size of conductors used and unique identification for each circuit. Where new circuits/raceways are provided, these shall be drawn as installed. Existing circuits that are reused shall at a minimum be drawn diagrammatically. Contractor will be required to validate minimum voltage at the last notification appliance the circuit during final testing.

(9) Typical wiring diagrams (1/4-inch scale) for all alarm initiating devices and notification appliances, showing the number, size and type of conductors, wiring terminations and terminal identifications.

(10) Detailed internal and external wiring diagrams for all fire alarm control units, remote transmitting panels, central station signaling equipment, auxiliary function relays and remote annunciation equipment showing size and type of conductors, wiring terminations and terminal identifications.

(11) When data gathering panel power is derived from a "local" source of building emergency power, the shop drawings shall show wire routing and point of connection (location, panel number, description and circuit breaker number) to the building emergency circuit.

b. The riser diagram shall indicate:

(1) Location, number and size of riser conduits.

(2) Number, type and size of conductors in each riser.

(3) Number of each type of device and appliance on each circuit on each floor. This shall correspond with the plan layout for the floors. Indicating general numbers of devices and appliances is not permitted.

1. Schedules for conductors type, conduit fill, amplifier calculations, power supplies and circuit voltage drop calculations.

2. A device list containing descriptors provided by the Owner which identify locations by room or area of the individual devices along with the respective address.

D. If local code requires a recorded voice message, Contractor shall provide text for review and approval by Owner’s Consultant and UNLV. Once approved, Consultant will review with AHJ and document approval.

E. Each drawing shall be cross-referenced to all related drawings and specific drawing details, as necessary for the submittal as a whole to clearly depict the proposed installation. Each drawing shall show revision number, date and name and signature of the individual making the revision in the title block. Revisions shall be described or indicated on the drawing.

F. The Contractor will be authorized to start installation when all of the shop drawings, calculations, and data sheets are received, reviewed and approved in writing by the Owner’s Consultant and State Fire Marshal’s office. Installation prior to these approvals, or prior to the issuance of required permits, shall be at the risk of the Contractor.

1.3.11 OPERATION AND MAINTENANCE MANUAL

A. The Contractor shall provide a loose-leaf manual containing:

1. A detailed description of the system, based on the “as-built” installation provided in the property. General or generic descriptions provided of installed systems will result in rejection of Operations and Maintenance (O&M) Manual.

2. A detailed description of routine maintenance required or recommended or which would be provided under a maintenance contract including a maintenance schedule and detailed maintenance instructions for each type of device installed.

3. Original versions of manufacturers' data sheets, detailing the exact equipment installed, and installation manuals/instructions for all equipment installed.

4. A list of recommended spare parts.

5. Service directory which includes the main 24-hour emergency service number and at least three alternate numbers which are monitored on a 24-hour basis.

6. Small scale (11 inches by 17 inches) Contractor record drawings of the system.

7. USB Flash drive and DVD with electronic copies of Contractor record drawings of the system in .dwg format and/or .pdf format.

8. A detailed description of the operation of the system, including operator responses. The approved sequence of operation shall be placed in, or adjacent to, the operator's fire alarm control unit.

B. Within 90 days of authorization to proceed, the Contractor shall submit to the Owner’s Consultant a draft manual for approval (excluding Contractor record drawings).

C. Prior to Owner training, six (6) copies of the approved manual shall be delivered by the Contractor to the Owner’s Representative.

1.3.12 CONTRACTOR RECORD DRAWINGS

A. The Contractor shall provide and maintain on the site an up-to-date record set of approved shop drawing prints which shall be marked to show each and every change made to the approved shop drawings. This shall not be construed as authorization to deviate from or make changes to the shop drawings approved by the Owner without written instruction in each case. This set of drawings shall be used only as a record set.

B. Upon completion of the work, the record set of prints shall be used to prepare complete, accurate final record drawings reflecting any and all changes and deviations made to the fire alarm system and other work covered by this specification.

C. Upon completion of the work, two sets of black-line record drawings shall be submitted to the Owner's Consultant for review. If the Contractor's record drawings, upon review by the Owner's Consultant do not conform to the requirements of these specifications; the Contractor shall be required to resubmit with modifications. The Contractor shall be responsible for the Owner's extra expenses for subsequent review(s) of a rejected record drawing(s) necessitated by the Contractor's failure to make requested modifications. Such extra fees shall be deducted from payments by the Owner to the Contractor. Approval of record drawings by the Owner shall, in no case, relieve the Contractor of its responsibilities to meet the requirements of this Specification.

D. Upon review of the record drawings, before final approval, one (1) package of corrected, or amended as necessary, drawing files prepared in AutoCAD Version 2010 or later and provided in electronic DWG and PDF format on recordable media (i.e. USB, flash drive, or DVD), and four (4) additional sets of record drawings shall be submitted to the Owner.

E. The use of "French Curve" lines to depict circuit routing shall only be permitted for existing conduit buried in concrete.

F. The depiction of conductors in a diagrammatic manner shall only be permitted where circuits are existing and where validated as meeting the minimum voltage at the last notification appliance on the circuit (as the end of line device or resistor). New conductors and conduit shall be depicted as installed.

1.3.13 APPROVALS BY CODE AUTHORITY

A. The Contractor shall provide the Owner's Consultant with one copy of all documents that are reviewed and approved by the local code authorities. These documents shall include, but not be limited to, the following:

1. Site inspection forms

2. Permits and permit drawings

3. Final inspection forms (NFPA 72 Record of Completion)

B. All documents must include all required approval stamps, signatures or other information necessary to properly certify that the installation has been reviewed and accepted by the State Fire Marshal's office and all other required regulatory agencies or departments.

1.3.14 TEST RECORD

A. System certification and documentation of system testing required by Specification Section 3.4.1 shall be submitted to the Owner's Consultant for review and approval at least 14 days prior to the final acceptance test. At a minimum, the Fire Alarm System Record of Completion form of NFPA 72 shall be completed and submitted to the Owner for review.

B. A UL Certificate for the installation and monitoring of the system shall be provided by the equipment supplier prior to final acceptance of the system by the Owner.

C. Provide assistance with the recertification of the existing the smoke control systems to ensure proper fire alarm system interface and sequence of operations is properly maintained throughout the property The Owner is responsible for hiring the Special Inspection company to witness the recertification of the existing smoke control systems.

1.3.16. SOFTWARE DOCUMENTATION

A. All software changes to the fire alarm system, once it is in service, shall be performed by a certified manufacturer's representative trained in the execution of such changes. A complete printout of the system program changes shall be provided and submitted with the Operation and Maintenance Manual.

B. A unique version number and date shall identify each revision to the software.

C. The Contractor shall maintain a copy of the program changes in electronic format at the job site and shall provide all passwords/codes to access the program to the Owner in accordance with NFPA 72. Acceptable storage media shall be USB Flash drive and DVD or electronic media (USB drive).

D. A copy of the final system program shall be provided to the Owner on a DVD, including all passwords/codes to access the program at the completion of the project in accordance with NFPA 72.

E. A copy of the system point descriptors shall be provided to the Owner for review prior to final system programming and acceptance. The Contractor shall be responsible for all descriptor changes prior to Owner's approval.

1.4 GUARANTEE

1.4.1 GUARANTEE PERIOD

The Contractor shall guarantee all materials and workmanship during the installation period and for a period of three (3) years, beginning with the date of final acceptance by the Owner. The Contractor shall be responsible during the design, installation, testing and guarantee periods for any damage caused by the Contractor or Subcontractors, or by defects in the Contractor's or Subcontractors' work, materials or equipment.

1.4.2 EMERGENCY SERVICE

The Contractor shall provide emergency repair service for the system, at no cost to the Owner, within four hours of a request for such service by the Owner. This shall occur during both the installation and the guarantee period (a period of three (3) years beginning on the date of final acceptance). This service shall be provided on a 24-hour per day, seven days per week basis.

1.4.3 MAINTENANCE & TESTING

The Contractor shall provide all required service, maintenance, and testing of the system during design and installation of the new system and the three (3) year guarantee period. This shall include testing, inspection and maintenance required of the system in the conformance with the State Fire Marshal's office and NFPA 72. The guarantee period shall include the annual inspections and testing as well as the periodic maintenance and testing requirements of the local Code and NFPA standards from the design and installation of the new system until the end of the three (3) year guarantee period.

1.4.4 SPURIOUS ALARMS

A. If the Owner experiences an unacceptable number of spurious or unexplained false alarms during the installation and guarantee periods, the Contractor shall be responsible for providing the necessary labor, material and technical expertise to correct the problem to the satisfaction of the Owner.

B. The following number of spurious alarms, calculated as a ratio of false alarms to number of initiation devices, shall be considered unacceptable:

1. Automatic photoelectric-type (system connected) smoke detectors - More than two spurious alarms per 100 detectors per six months during the system guarantee period. If this number is calculated to be less than two, two spurious alarms shall be considered unacceptable. Any calculated number shall be rounded up.

2. Automatic duct-mounted type smoke detectors - More than two spurious alarms per 50 detectors per six months during the system installation and guarantee periods. If this number is calculated to be less than two, two spurious alarms shall be considered unacceptable. Any calculated number shall be rounded up.

C. Any spurious alarms shall be considered unacceptable for the following types of equipment:

1. Manual fire alarm boxes.

2. Sprinkler or standpipe system water flow devices.

3. Sprinkler or standpipe system valve supervisory switches.

4. Kitchen hood and duct fire suppression system monitoring devices.

5. Fire pump supervisory devices.

1.5 TRAINING

1.5.1 TIMING

The Contractor shall submit a proposed training agenda for review by the Owner's Consultant within 45 days of authorization to proceed. The final, approved training agenda shall be submitted 14 days prior to the final system acceptance test. Not less than three (3) 2-hour training sessions shall be provided by the Contractor after coordination with the Owner's Representative. The Owner shall be provided with a video recording of one of the training sessions conducted by the Contractor.

1.5.2 AGENDA

Training shall include all system operational functions needed by UNLV staff. This shall include, but will not be limited to:

A. Alarm acknowledgement.

B. Interpretation of the scheme used to provide identifiers.

C. Voice system operation.

D. System reset.

E. Basic troubleshooting.

1.6 SPARE PARTS AND SPECIAL TOOLS

The Contractor shall supply the Owner, as part of this contract, the following:

A. Printer paper and cartridges - Sufficient quantity to last through the three (3) year guarantee period.

B. Keys - A minimum of three (3) sets of keys shall be provided and appropriately identified.

C. If a handheld programmer is required to change out initiating devices for service or repair, a minimum of one (1) programmer shall be provided to the Owner.

1.7 FINAL APPROVAL AND ACCEPTANCE

A. Final approval and acceptance of the work will be given by the Owner when:

1. The complete system has been inspected, tested and approved in writing by the Owner’s Consultant and the authority having jurisdiction.

2. All required submittals, including system operation and maintenance manuals, accurate Contractor record drawings, test reports, spare parts, special tools and training have been provided to, reviewed by and accepted in writing by the Owner’s Consultant.

3. Record of Completion documents per NFPA 72.

B. The Owner will not release retained funds for the project until final approval and acceptance of the system is achieved by the Contractor.

2.0 DESCRIPTION OF THE SYSTEM

2.1 GENERAL

A. The system shall be of the networked analog addressable type.

B. All equipment and system components furnished and installed shall be new and listed by ULI for their intended use. The equipment and system components shall be installed in accordance with the applicable codes and standards, the manufacturers' recommendations and within the limitations of the ULI listings. All equipment and system components shall predominantly be the standard product of a single manufacturer unless the submittals clearly indicate additional products that are required to meet requirements of these Specifications. Evidence of ULI listing is required.

C. System components shall be modular in design to provide future expansion capability of the system. Expansion capability shall pertain to capacity and quantities of devices, circuits, primary and secondary power supplies, amplifiers, conductor ampacities (size) and lengths.

The system shall be capable of expansion to support a 20 percent increase in initiating, control, and notification appliance devices on the installed circuits with no additional panel hardware. Control cabinets, power supplies and amplifier capacities installed as a part of this work shall be sized accordingly. Spare cabinet and power supply capacity shall be evenly distributed throughout the system.

2.1.1 ALARM VERIFICATION

The system shall incorporate an alarm verification function in the fire alarm control unit for system type smoke detectors. Alarm verification shall not be provided for manual fire alarm boxes or water flow alarm switches.

2.1.2 ELECTROMAGNETIC INTERFERENCE

A. All fire alarm control equipment, devices and conductors shall be protected against unwanted radiated electromagnetic interference (EMI) and radio frequency interference (RFI) which can interfere with normal system processing and possibly cause unwanted alarms.

B. The system shall be designed and installed to be unaffected by the operation of a hand-held portable radio (walkie-talkie) within 12 inches of any system device with all appropriate covers installed.

2.2 SYSTEM CONFIGURATION

2.2.1 INITIATING AND SIGNALING LINE CIRCUITS

A. Fire alarm signaling line circuits, including circuits monitoring manual fire alarm boxes, smoke and heat detectors, water flow alarm switches and devices used for detecting activation of special fire suppression systems shall be Class “B” signaling line circuit as described by NFPA 72, utilizing isolation modules to isolate each floor and the control panel when such circuits serve more than one floor.

B. Redundant, separate paths shall be provided for all signaling line circuits, both horizontally on a floor or vertically in a riser when Class “A” or Class “X” circuits are used.

The redundant return of a Class “A” or Class “X” signaling line circuit shall extend through a new conduit riser and shall be separated by a minimum of one (1) ft. when running vertically and a minimum of four (4) ft. when running horizontally, as recommended by NFPA 72.

C. Fault isolator modules shall be required on each floor on the incoming and outgoing legs of the signaling line circuit serving that floor, when the signaling line circuit serves more than one floor.

Fault isolator modules shall be installed in accordance with the manufacturer's listing and published installation instructions.

D. Supervisory initiating circuits, including circuits monitoring valve supervisory switches, fire pump functions, air pressure supervisory switches, magnetic contacts, electrical power supervision and low battery supervision shall be Class "B" as described by NFPA 72.

E. Signaling Line Circuits connecting the main system riser between the remote transmitting panels and the fire alarm control unit(s) shall be Class "A" or Class "X" as described by NFPA 72. Audio circuits connecting the main system riser between the remote transmitting units shall be Class "A".

F. Circuits connecting remote annunciation devices and central station monitoring equipment with the fire alarm control unit shall be Class "B" as described by NFPA 72.

G. All addressable or digital data circuits shall be considered signaling line circuits with the exception of those covered by Item D immediately above.

H. The survivability requirements of NFPA 72 shall be met as required for notifications circuits and signaling line circuits that impact the operation of notification circuits. The State Fire Marshal's office requirements for survivability shall be met.

2.2.2 NOTIFICATION APPLIANCE CIRCUITS

Notification appliance circuits shall be Class "B", 2-conductor circuits as described by NFPA 72 Audio circuits connecting the main system riser between the remote transmitting units shall be Class "A".

2.3 POWER SUPPLIES

2.3.1 GENERAL

Except where otherwise required by local code, all AC power connections, shall be to dedicated branch circuits of the building emergency electrical power system and shall meet the requirements of NFPA 72 and applicable electrical code. Shop and record drawings shall indicate the electrical distribution panel number and location and the circuit breaker number where terminated for each such connection. Contractor is responsible for verifying the location and capacity of the complex's emergency electrical power system to support the selected design. Modifications and/or expansion to the emergency electrical power supply will be the responsibility of the Contractor.

2.3.2 POWER CONDITIONER/VOLTAGE REGULATOR & TRANSIENT PROTECTION

Provide Power Conditioners/Voltage Regulators (PC/VR) for the main and remote fire alarm control unit. The PC/VR kVA capacity (rating) shall be capable of supporting the fire alarm equipment. The PC/VR shall have Automatic Voltage Regulation capable of maintaining output voltage to within 5% of its nominal voltage rating with an input voltage variation of +15% to -25%. The conditioner shall meet ANSI/IEEE standard C62.41, 1991 (IEEE 587 category A and B), IEC 1000-4 and 1000-5 for surge suppression and noise attenuation. The units shall be ULI listed and shall provide Power Conditioning, Automatic Voltage Regulation and Transient Protection.

2.3.3 BATTERIES/SECONDARY POWER SOURCES

A. System control equipment shall receive secondary operating power from batteries integral to the equipment. Such batteries shall supply operating power for a duration of 24 hours

B. Any portion of the system operation on secondary power shall annunciate as a trouble signal, identifying the inoperable power supply(ies). Low capacity conditions of secondary power supplies shall immediately annunciate as a trouble signal, and shall identify the power source. All standby batteries shall be continuously monitored by the system. Low battery conditions shall immediately annunciate as a trouble signal, identifying the deficient batteries.

C. Secondary operating power provided shall be capable of operating all notification appliances simultaneously for a minimum of 15 minutes after a duration of 24 hours on secondary power.

D. Design load connected to any power supply, amplifier or secondary power source shall not exceed 80% of its rated capacity (not including the 20% de-rating of the battery

E. Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any alarm, trouble or operator acknowledgement signals.

2.4 ANNUNCIATION

2.4.1 GENERAL

A. The system shall be designed and equipped to receive, monitor, annunciate and retransmit signals from devices and circuits installed throughout the building.

B. Unless Positive Alarm Sequencing has been approved by the Authority Having Jurisdiction, the time delay between activation of an alarm initiating device (excluding water flow alarm switches with a retard feature or smoke detector circuits arranged for alarm verification) and activation of alarm notification appliance, including automatic evacuation signaling and auxiliary functions shall not exceed 10 seconds. Where Positive Alarm Sequencing has been approved by the Authority Having Jurisdiction, the sequence of operation and timing outlined in NFPA 72 shall be utilized.

C. Receipt of alarm and trouble signals shall activate integral audible devices at the fire alarm control unit(s) and at each remote annunciation device.

1. The integral audible devices shall produce a sound output upon activation of not less than 85 dB at 10 feet.

2. Alarm and trouble signals shall initiate recognizably different audible outputs.

3. Integral audible devices shall continue to sound until silenced by a system operator actuating a switch designated for that purpose.

4. Receipt of subsequent alarm or trouble signals shall cause the integral audible devices to resound.

5. The audible trouble signal that has been silenced shall automatically re-sound every 24 hours or less until the fault conditions have been restored to normal.

D. The system shall be designed and equipped to provide inputs and outputs as described in the approved UNLV matrix and meet the requirements of the State Fire Marshal’s office.

E. The system shall recognize, annunciate and store in a memory log each and every instance of the following signals by time and date:

1. Fire alarms.

2. Supervisory signals.

3. Trouble conditions.

4. Operator acknowledgement of annunciated signals.

5. System reset.

F. All alarm signals, supervisory signals and trouble signals shall be annunciated by the fire alarm control unit(s) and by each remote annunciation appliance. Operator acknowledgement of alarm and supervisory signals and system reset shall be annunciated by the fire alarm control unit (s) and by each video display unit, and printer.

2.4.2 FIRE ALARM SIGNALS

A. Fire alarm signals shall be distinctive in sound from all other signals and shall be an alert tone in accordance with NFPA 72 and meet the American National Standard Audible Emergency Evacuation Signal, ANSI S 3.41 for general evacuation buildings.

B. Activation of the following devices shall be recognized and annunciated by the system as fire alarms:

1. Manual fire alarm boxes.

2. System-type smoke detectors.

3. Heat detectors.

4. Water flow alarm switches.

5. Devices monitoring actuation of special fire suppression systems.

2.4.3 SUPERVISORY SIGNALS

The following conditions shall be recognized and annunciated by the system as supervisory signals:

A. System connected smoke detectors with sounder bases in guest rooms with communication features (hearing-impaired).

B. Valve supervisory switch actuation.

C. Fire pump supervisory signals.

D. Generator supervisory signals.

E. Magnetic contact activation (where provided for monitoring openings).

F. Supervisory conditions and/or signals from pre-action sprinkler systems

G. Emergency generator running.

H. Emergency generator low fuel.

I. Emergency generator low battery.

J. Duct smoke detectors.

K. Hi-lo supervisory air pressure for dry pipe sprinkler system (if applicable)

L. Carbon monoxide detection (if applicable)

2.4.4 TROUBLE SIGNALS

A. The system shall recognize and annunciate initiating device and signaling line circuit trouble conditions as required by NFPA 72 for the type of circuits utilized. All other fire alarm and two-way telephone communication circuits shall be supervised for opens or grounds.

B. The system shall also recognize and annunciate the following trouble conditions:

1. Power supply trouble conditions as required by Specification Section 2.3.

2. Remote annunciation device trouble conditions as required by Specification Section 2.7.

3. Trouble conditions for suppression systems.

2.4.5 OPERATOR ACKNOWLEDGEMENT SIGNALS

Silencing of integral audible devices required by Specification Section 2.4.1.C shall be recognized and annunciated by the system as operator acknowledgement of the signal(s) displayed.

2.5 FIRE ALARM CONTROL UNIT(S)

2.5.1 DESCRIPTION OF EQUIPMENT

The fire alarm control units shall be designed and equipped to provide the following:

A. A visual display or displays indicating current status of the entire system.

B. A permanent hard copy of all signals received in accordance with the requirements of Specification Section 2.7.2.A.

C. An interface for a central station connection.

D. Standby power supplies capable of supporting all dependent devices and equipment as required by Specification Section 2.3.

E. The system control unit shall have provision for an alarm verification feature for alarm signals received from smoke detectors or smoke monitoring heads. The alarm verification feature shall only be enabled if the conditions of NFPA 72 are met.

1. If employed, the features shall be:

a. Integral to the fire alarm control unit.

b. A module that can be wired or plugged into the control panel.

c. A separate entity that can be field wired to interface between the fire alarm control unit and the initiating device circuit or,

d. An equivalent ULI listed arrangement.

2. Alarm verification shall be:

a. Arranged on a per circuit (zone) basis or,

b. On a multiple circuit (zone) or system basis provided the retard duration of the verification procedure is not more than 15 seconds.

3. The retard-reset period before an alarm signal can be confirmed and indicated at the control unit shall be 60 seconds, unless a shorter period is required by the AHJ.

4. Alarm verification shall not be used in initiating device circuits intended for cross zoning operations.

5. Appropriate "warning" signage as described in UL 864 shall be placed on the face of all fire alarm control units, data gathering panels and firemen's command panels.

F. Auxiliary relays to effect the following functions:

1. Fan or damper control

2. Elevator recall

3. Door release

4. Music shutdown

5. Smoke control/stair pressurization systems

G. Devices or controls to effect reset of the system.

H. The fire alarm control unit(s) shall not be capable of being reset until all alarm conditions have been cleared.

I. A back-up evacuation signal tone generator shall be provided. At the manufacturer's option this shall be either an auxiliary circuit board in the master control unit, a second source of auxiliary tone, or other ULI listed backup means of tone generation as provided by the manufacturer.

J. The main fire alarm control unit shall have a switch for silencing the alarm notification appliances (audible). The switch shall be key-operated or located within a locked cabinet. Upon activation, any existing alarm shall be transferred to a visual indicator. Any subsequent alarms from other zones shall operate the alarm notification appliances. If there is no alarm and the switch is in the "silence" position, a visual alarm indicator shall be lit and a trouble signal shall sound until the switch is restored to "normal." The panel shall also provide a common switch to disable audible and visible signaling devices for system test purposes. When activated ("silence" position) a system trouble signal shall be activated until the switch is returned to the "normal" position.

K. The main fire alarm control unit shall be provided with a single switch arranged to activate all audible and visible notification appliances simultaneously for building evacuation purposes.

2.5.2 EMERGENCY VOICE COMMUNICATION SYSTEM

The fire alarm control unit shall also contain controls for the building's emergency voice communication system, consisting of:

A. Multi-channel digital distributed amplification, one-way emergency voice communication/evacuation tone capability on either an automatic or operator selectable zone-by-zone or "all-call" basis via the fire alarm speakers. Installed system will have the capability to simultaneously send a minimum of 2 different audio messages to different audio zones (e.g. alarm message to 3 floors and alert message to all other floors).

B. The system shall be installed using manufacturer approved cable and shall be provided for selective communication to any individual floor, zone, stairway, elevator groups, combinations of floors, zones or stairways, or for general emergency public address announcements throughout the complex.

C. The system shall be electrically supervised against faults in speaker circuits and interface wiring, loss of power, module removal, or amplifier, tone generator or pre-amp failure.

D. Electrical failures shall be annunciated audibly and visually at the fire alarm control units.

E. Amplifiers shall be sized to power all speakers simultaneously, while operating at a maximum of 80% of their rated capacity. The rated capacity shall be confirmed upon receipt of the certificate of completion to allow speaker wattage taps to be corrected based on the site specific sound levels. Calculations of amplifier capacity shall be provided.

F. One backup amplifier shall be provided for each set of primary amplifiers and shall be equal to the highest rated (wattage) primary amplifier provided.

G. The backup amplifier set shall automatically transfer in place of the defective primary amplifier.

H. Floor or stair speaker zones to be addressed shall be manually connected to the system using speaker zone switches or an "All-Call" switch located at the fire alarm control unit.

I. Emergency voice communication messages shall have priority over all other audible signals on the selected floors.

J. Upon activation of the manual page after an alarm event has been initiated, the fire alarm system shall only annunciate an alert tone when the paging microphone is released.

2.5.3 FIRE-FIGHTERS TELEPHONE SYSTEM

The fire alarm control unit shall also contain controls for the building's fire-fighter telephone system, consisting of:

A. Listed two-way telephone communication capability on a zoned, operator selectable basis.

B. The system shall be electrically supervised against faults in telephone circuits and interface wiring, and loss of power. Circuits shall be Class “B," supervised with end-of-line resistors.

C. An LED identifying floor and/or zone (per local requirements shall light and an audible signal shall sound at the central fire alarm control unit when a remote telephone is plugged into a remote telephone jack or a handset is lifted.

D. The remote telephone shall receive a standby indication signal until the telephone is accessed by the central control panel.

E. Operation of the respective telephone select switch shall establish communications between the selected telephone zone(s) and the central fire alarm control unit.

F. Warden phones shall be provided at each top of stairwell and in fire pump and emergency generator room and as required by the State Fire Marshal's office.

G. Meet the NFPA 72 survivability requirements. An approved two-way, Fire Department communication system shall be provided for Fire Department use. Each phone or jack on the two-way Fire Department communication system shall have a separate control switch on the fire alarm control unit which distinctly annunciates the location of the phone in use.

2.6 REMOTE CONTROL EQUIPMENT

2.6.1 DESCRIPTION OF EQUIPMENT

Remote fire alarm control units shall:

A. Interface local initiating device circuits, signaling line circuits, notification appliance circuits and their associated devices and appliances with the fire alarm control unit(s) via the signaling line circuit riser(s).

B. Be provided with primary operating (electrical) power derived from the fire alarm control unit(s) via a supervised circuit.

or

Be provided with primary AC power supplied by a local connection to the building emergency ("E") circuit. All required modifications, alterations or modifications to the building "E" circuits are the responsibility of the Contractor and must be specifically approved by the Owner, Owner's Representative and Owner's Consultant.

C. Secondary power for remote fire alarm control units shall be configured in accordance with Section 2.3.C.

D. Upon loss of communication to the main fire alarm control unit, the remote transmitting panel shall convert to the degrade mode of operation, allowing operation of all notification circuits served by the panel to operate upon activation of any alarm.2.6.2

E. Peer to peer systems shall:

1. Interface local initiating device circuits, signaling line circuits, notification appliance circuits and their associated devices and appliances with the fire alarm control unit(s). Connections between peer fire alarm control panels shall be via signaling line circuit riser(s)

2. Be provided with primary AC power supplied by a dedicated branch circuit connection to the building emergency ("E") system. All required modifications, alterations or modifications to the building “E” circuits are the responsibility of the Contractor and must be specifically approved by the Owner, Owner’s Representative and Owner’s Consultant.

3. Have secondary power configured in accordance with Section 2.3.C.

4. Upon loss of communication with its peers, have the fire alarm control unit operate its portion of the system including alarm initiation and operation of all notification circuits served by the panel upon activation of any alarm from the fire alarm control unit.

2.7 ANNUNCIATION DEVICES

2.7.1 DESCRIPTION OF EQUIPMENT

2.7.2 PRINTERS

A. Each printer shall produce a permanent hard copy of all signals received, in the order in which they are received, with alarm taking precedence over other signals.

B. The printout shall include a clear description of the specific type of signal received, the origin of that signal and the time and date at which the signal was received.

C. Primary operating (electrical) power shall be derived from the fire alarm control unit(s) via a supervised circuit.

or

Primary AC power for the printer shall be supplied by a local connection to the building emergency ("E") circuit. All required modifications, alterations or modifications to the building “E” circuits are the responsibility of the Contractor and must be specifically approved by the Owner, Owner’s Representative and Owner’s Consultant.

D. Whether derived from the fire alarm control unit or from the building emergency circuit, power supplied to the UL listed printer shall be continuous and uninterrupted by loss of the primary source of system operating power.

2.7.3 LCD REMOTE ANNUNCIATORS

A. Alpha-numeric LCD remote annunciators shall identify all signals received, in the order in which they are received, with alarm taking precedence over other signals.

B. The remote LCD annunciator shall be capable of displaying fire alarms, supervisory alarms, and trouble conditions on a device-by-device basis to replicate device descriptions at the fire alarm control unit LCD display.

C. LCD annunciator panel shall be programmed to display a clear description of the specific type of signals received, in the order and the time and the date in which they are received, up to the capacity of the screen. Alarm signals and supervisory signals shall be displayed until the condition is cleared. Subsequent signals shall be stored and shall be displayed sequentially as the preceding signals are acknowledged.

D. The LCD annunciator shall not allow system resetting or silencing of the building initiating devices or notification appliances, without the use of a key.

2.7.4 RESERVED

2.7.5 GRAPHIC/MATRIX STYLE ANNUNCIATORS

A. Shall be incorporated into the fire alarm control panel and meet all State Fire Marshal's office requirements.

2.7.6 FIRE FIGHTRER SMOKE CONTROL PANEL

A. The operation and appearance of the existing fire fighter's smoke control panel and annunciator panel shall be duplicated. This includes system operation and interface including all necessary control relays and monitor points to duplicate existing system status and control. LED annunciation shall be duplicated and all State Fire Marshal's office requirements shall be met.

B. Contractor shall be responsible for assisting the Owner hired Special Inspection company with the recertification of existing smoke control systems. Final testing acceptance shall meet the requirements of the State Fire Marshal's office.

2.8 MANUAL FIRE ALARM BOXES

2.8.1 DESCRIPTION OF EQUIPMENT

A. Manual fire alarm boxes shall be of the double-action, non-coded type. They shall consist of a housing, fitted with a pull-down lever, which when operated, locks in position after releasing a spring-loaded contact switch to effect activation of an alarm circuit. Resetting the box after operation shall require the use of a special tool or key. The manual fire alarm box shall be suitable for surface or semi-flush mounting. Manual fire alarm boxes shall be semi-flush mounted in all public areas. Manual fire alarm boxes shall be semi-flush mounted in all back-of-house areas unless mounted on concrete or masonry surfaces where surface mounting is permissible. Where mounted manual fire alarm boxes shall be protected from physical damage and vandalism by installation of a protective clear Lexan/plastic cover.

B. Addressable manual fire alarm boxes shall be factory assembled with the addressable module an integral part of the UL listed product.

C. Manual fire alarm boxes installed outdoors or within areas exposed to unconditioned spaces or wet locations, shall be UL listed for outdoor use. They shall be installed using NEMA Type 4X enclosures, electrical raceway and fittings.

2.9 SMOKE DETECTORS

2.9.1 DESCRIPTION OF EQUIPMENT

Provide 24 VDC addressable system connected smoke detectors connected to the building fire alarm system as follows:

A. Detectors shall be addressable system operated, photoelectric type plug-in detectors which mount to a twist lock base and shall be provided with a tamper-resistant feature to prevent unauthorized removal of smoke detector heads. The detector shall contain an alarm initiating LED which will illuminate to signal activation of the detector. Detectors shall be listed by UL as “Smoke-Automatic Fire Detectors” tested according to UL Standard 268. Detectors listed as “Single and Multiple Station Smoke Alarm,” tested according to UL Standard 217 shall not be used. The contractor is responsible for verifying that the minimum and maximum cfm range of the ductwork is within the range of the selected duct detectors.

2.9.2 NOT USED

2.9.3 DUCT-MOUNTED SMOKE DETECTORS

A. Duct-mounted photoelectric type smoke detectors shall be installed in all new and existing air handling systems over 2,000 CFM, installed in conformance with the requirements of NFPA 72, NFPA 90A, the International Mechanical Code, or local requirements and in accordance with the detector manufacturer's installation instructions. Duct-mounted smoke detectors shall be suitable for the full range of air velocity conditions in the air-handling systems in which they are installed.

B. Duct-mounted smoke detectors shall be of the analog, addressable type, consisting of a plug-in type detector head in a duct-mounted housing equipped with metal air-sampling tubes providing air flow through the detector housing. Duct-mounted smoke detectors shall be listed or approved for that application. Duct-mounted smoke detector operating voltage shall be 24 (nominal) VDC.

C. Each duct-mounted smoke detector shall be monitored individually via an integral addressable element.

D. Duct-mounted detectors shall be arranged to initiate shutdown of their associated fan and air-handling unit or initiate smoke control functions on alarm from their associated addressable control relays.

E. Provide necessary wiring, wiring and ancillary equipment to fan and air-handling unit starters and motor control centers for shutdown of fans, or to the smoke control system (if provided) when smoke is detected.

F. Shall be clearly labeled with device address utilizing a P-Touch labeling system or equivalent.

G. Duct detectors not reachable with a standard 6-foot ladder shall have a remote test switch and remote indicator LED. The location of the remote test switches are subject to Owner's approval and shall be indicated on the contractor drawings.

2.9.4 PROJECTED BEAM SMOKE DETECTORS (NOT USED)

2.10 HEAT DETECTORS

2.10.1 DESCRIPTION OF EQUIPMENT

A. Heat detectors shall be low profile, combination rate-of-rise and fixed temperature type.

B. Heat detectors shall actuate when the temperature either increases at a rate exceeding 15°F per minute or reaches 135°F except where otherwise required by NFPA 72.

C. Heat detectors shall be of the addressable type with each device individually annunciated on the system. If ambient conditions will not permit, an equivalent arrangement can be provided.

D. Heat detectors for elevator power interrupt if applicable, shall be provided and installed in sprinklered elevator machine rooms and hoist ways in accordance with ANSI A17.1. Where heat detectors are used to shut down elevator power prior to sprinkler operation, the detector shall have both a lower temperature rating and a higher sensitivity as compared to the sprinkler.

2.11 CARBON MONOXIDE DETECTORS

A. Carbon Monoxide detectors shall be listed in accordance with UL 2075 and provided with local sounder bases capable of providing a temporal code 4 (TC4).

B. Carbon Monoxide detectors shall actuate when the concentration of carbon monoxide exceeds 30 parts per million (ppm).

C. Carbon Monoxide detectors shall be of the addressable type with each device individually annunciated on the system.

2.12 SPRINKLER ALARM AND SUPERVISORY EQUIPMENT

A. All sprinkler alarm and supervisory devices are existing or shall be installed by others. The contractor shall include equipment, conduct and wire necessary to interface with all sprinkler system monitor points. The known devices will be located as indicated on the drawings and testing documentation and include:

1. Water flow alarm switches.

2. Valve supervisory switches.

3. Hi-Lo supervisory air pressure switches (on dry or pre-action sprinkler systems only).

4. Fire pump controller supervisory contacts.

B. Sprinkler supervisory devices shall be connected to the fire alarm system and monitored under this contract.

C. Water flow alarm switches shall be monitored as fire alarms. All other sprinkler supervisory devices shall be monitored as supervisory signals.

D. Fire pump controller supervisory contacts shall be individually monitored, via dry contacts or an intermediary terminal interface provided by the fire alarm Contractor, for Pump Running, Loss of Phase, Phase Reversal, and Controller Connected to Alternate Source.

E. The Contractor shall make all terminations necessary to monitor sprinkler supervisory devices, except for terminations between the fire pump controller and the fire alarm system terminal interface, which shall be provided by others.

F. The Contractor shall coordinate with the Sprinkler Contractor and the Owner’s Representative for testing these devices. Documentation of sprinkler supervisory device testing shall be a part of this contract. Testing of these devices shall be performed in accordance with the requirements of NFPA 13, which shall as a minimum include the flowing of water to physically activate the water flow alarm switches.

2.13 AUDIBLE/VISIBLE NOTIFICATION APPLIANCES

2.13.1 DESCRIPTION OF EQUIPMENT

A. Notification appliances shall consist of fire alarm speakers and visible notification appliance assembled in a common enclosure or as separate devices. All appliances shall be white in color unless otherwise approved by the Owner in writing.

B. Audible notification appliances shall be installed, spaced and tapped so as to produce a sound output on alarm that is clearly audible above the ambient noise level throughout the building. In no case shall the audible alarm be less than 15 dB above the average ambient room sound level or 5 dB above the maximum ambient room sound level as defined in NFPA 72. 75 dB shall be present at the pillow of each residence room bed.

C. Visible signaling appliances shall not be less than minimum candela as required by NFPA 72.

2.13.2 FIRE ALARM SPEAKERS

Re-use of speakers is not prohibited; however, Contractor assumes liability for re-use of any speaker, including audibility, circuit integrity, and intelligibility. Prior authorization from the Owner is required prior to the re-use of existing devices. Fire alarm speakers shall:

A. Be listed in accordance with UL 1480.

B. Be equipped with variable watt input taps. Speakers shall be sized, spaced and tapped to provide a sound output, on alarm, of no less than 15 dBA above average ambient sound levels and 5 dBA above maximum ambient sound levels.

C. Be located in each residence room, public assembly rooms, corridors, elevator lobbies and elevator cabs, rooms over 1,000 square feet, and every 3rd floor in interior exit stairs. Speakers shall be zoned by floor, except stairs shall be zoned by individual stairway. Speaker zones for individual floors shall not include exit stairways. (One zone equals one floor or stair for typical residential floors). Speakers installed within stairs shall be provided on vertical risers, which shall only be utilized for live voice message or all-call messages. Speaker zones must also include elevator groups if applicable.

D. Installation of speakers shall meet the audibility and intelligibility requirements of NFPA 72.

2.13.3 VISIBLE NOTIFICATION APPLIANCES

A. Visual notification appliances shall be UL 1971. Candela ratings will be a minimum of 15 candela. Synchronization of visual notification devices per NFPA 72 is required.

B. Visual notification appliances shall consist of a vibration resistant solid state flasher assembly which, upon activation, illuminates a white or clear lens labeled "Fire" in red letters.

C. When a visual notification appliance is mounted on the wall, the word "Fire" shall read from top to bottom. When mounted on the ceiling, the word "Fire" shall read left to right.

D. Visual notification appliances shall be installed in all public areas, public rest rooms, meeting rooms, conference rooms, dining rooms, residence room corridors, common area corridors and within residence rooms with communication features and associated bathrooms. Spacing and layout shall be as required by NFPA 72.

E. Visible notification appliances shall be provided in each accessible residence room with communication features, and associated bathrooms in accordance with NFPA 72.

1. Activation of the system connected smoke detector in the residence room with communication features shall cause activation of the sounder base(s) and the visible notification appliance(s) in that room(s).

2. Activation of notification condition on a floor having communication features shall cause activation of the visible notification features in those rooms.

3. All associated conductors shall be supervised.

F. Audible/visible appliances shall be placed in all public areas, assembly areas and in all back-of-house areas having high ambient noise conditions.

2.14 DOOR HOLDERS

A. Magnetic door holders shall have an approximate holding force of 25 pounds. For service and back-of-house areas the holding force shall be a minimum of 35 pounds.

B. The door portion shall have a stainless steel pivotal mounted armature with shock absorbing nylon bearing.

C. Unit shall be capable of being either surface, flush, semi-flush, or floor mounted as required.

D. Door holders shall be ULI listed for their intended purpose.

2.15 FIRE-FIGHTER'S PHONE JACKS/HANDSETS AND CABINETS

A. Where acceptable to the AHJ and allowed by Brand Standard, phone jacks should be installed instead of phones.

B. Fire-fighter's telephone jacks/handsets shall be suitable for flush mounting in finished areas, and surface mounting in non-public unfinished areas. Jacks shall be mounted to stainless steel plates, which are labeled to indicate their function.

C. A permanent phone with a six (6) foot retractable armored cable shall be provided in a red remote phone cabinet with "Local Fire Emergency Phone" silkscreened on the door in the fire pump room and emergency generator area.

D. A cabinet with six (6) handsets shall be provided near the fire alarm control unit.

E. Fire-Fighter's phone systems shall meet survivability as required per NFPA 72.

2.16 ADDRESSABLE CIRCUIT INTERFACE MODULES

A. The Contractor shall provide, install, and test addressable circuit interfaces or polarity supervised relays, as necessary to comply with cause and effects matrix whether interfaces are shown on drawings or not.

B. All circuit interlaces used for supervisory or control functions shall be securely mounted within 3 feet of the monitored switch, control device or interface circuit except for inherently safe (fail-safe) circuits.

2.17 TRANSIENT SUPPRESSION

A. Transient suppression shall be provided for each circuit connected to the Fire Alarm System that enters or exits the building housing the fire alarm control unit. Provide and install in accordance with NFPA 780.

B. Catalog data sheets for the transient devices installed shall be included in the submittal. Each device shall be noted on the data sheets as UL listed to operate on the circuit (120V, SLC, NAC, IDC, etc.) for which it is being employed.

C. The installation of transient suppression shall be at a location that facilitates maintenance and inspection and is adjacent to the point of exit or entry to the building for all low voltage circuits. The suppression devices shall be installed in junction boxes that are sized to house the suppression module and the terminal blocks which interconnect them to the fire alarm circuits.

D. Surge arrestors on surge suppression devices which are integral to FACU components or circuit boards shall not be considered “as-equal” to this requirement for individual dedication circuit protection.

2.18 CONDUCTORS AND RACEWAY

Provide all connection paths and circuits in compliance with the requirements of NFPA 72, the State Fire Marshal’s office and NFPA 70 and this specification. All survivability requirements of NFPA 72 and this specification shall be met.

A. Except as otherwise required by Code and/or these Specifications, the installation of fire alarm circuits shall conform to the requirements of Article 760 and raceway installation to the applicable sections of Chapter 3 of NFPA 70, National Electrical Code. Fire alarm circuit conductors shall include all circuits described in NFPA 70, Section 760.1 including Fine Print Note No. 1 (FPN No. 1).

B. Power-limited circuit (PLFA) wiring material and installation methods shall be by either of two methods:

C. Cable listed and marked in accordance with NFPA 70, Section 760.71, or substitutions in accordance with NFPA 70, Section 760.61, using wiring methods in accordance with NFPA 70, Section 760.52 (B), except for individually insulated conductors of types approved in Article 760 which are installed in metallic raceway.

D. Conductors in raceway in accordance with NFPA 70, Sections 760.52(A) and 760.27 or cables in accordance with NFPA 70, Section 760.30.

E. Power-limited fire alarm (PLFA) cable, where used and not installed in UL Listed metal conduit or raceway, shall be mechanically protected by building construction features.

F. Installation shall be in areas not subjected to mechanical injury.

G. Fire alarm circuits shall be supported by the building structure. Cable shall be attached by straps to the building structure at intervals not greater than 10 feet. Wiring installed above drop ceilings shall not be laid on ceiling tiles. Wire shall not be fastened in such a manner that puts tension on the cable.

H. Cable shall be types FPLP, FPLR or FPL, or permitted substitutions, selected for the installation application as required by NFPA 70, Section 760.61.

H. All conductor runs shall be continuous between devices, without splices, wherever feasible. Where a continuous run is not feasible, connections shall be made using terminal blocks in a UL Listed metal electrical box. All other connections shall be to terminal blocks. Wire nuts shall not be permitted. Conductors connected to form a continuous circuit shall have the same color insulation. All connections shall be accessible for inspection and servicing and shall be clearly identified on the Contractor record drawing.

I. Conductor and cable shall be sized, twisted and shielded as recommended by the fire alarm system manufacturer, and shall meet the requirements of the National Electrical Code, Article 760, and the system manufacturer's recommendations.

J. All conduit shall be grounded by approved ground clamps or other means in conformance with the National Electrical Code.

K. Where conduit is imbedded in plaster, the Contractor shall use a type approved by the National Electrical Code for this use. All imbedded conduit shall be liquid and gas-tight. Continuous run of conduit without joints is preferred for imbedding.

L. All electrical enclosures, raceways and conduits shall contain only those electrical circuits associated with the fire detection, emergency voice communications and alarm system and shall not contain any circuits that are unrelated to the system.

M. All cable that is not enclosed by conduit shall be supported and anchored with nylon straps, brindle rings, j-hooks, clamps or other approved means. The use of staples is prohibited.

N. Cables and conductors having scrapes, nicks, gouges or crushed insulation shall not be used.

O. The use of aluminum conductor is prohibited.

P. All electrical circuits shall be labeled consistent with the shop drawing terminology at the terminations within all the fire alarm control units, remote fire alarm control units, strobe booster power supply units and the fire alarm terminal cabinets using labels suitable for tagging the electrical wiring.

Q. All system conductors, except grounding conductors, shall be solid copper.

R. All end-of-line resistors shall be mounted on terminal blocks and indicated on the contractor drawings.

S. All underground wiring shall be fire alarm listed suitable for direct burial, such as West Penn Aquaseal or Belden equivalent. All such wiring shall be installed in liquid-tight PVC conduit with no splicing below ground. Provide additional ground wire within conduit to maintain reference ground on system between buildings.

T. All conduit, junction boxes and enclosures subjected to moisture shall be weatherproof (NEMA 4 or 4X) as required.

U. MC Cable for fire alarm risers is prohibited.

2.19 BOX LOCATION

All device and appliance back boxes, junction boxes and pull boxes shall be accessible for inspection and maintenance. Junction pull boxes shall be installed on 100 foot centers maximum. Terminal cabinets installed outdoors or in areas subjected to moisture shall be weatherproof (NEMA 4 or 4X) and shall be installed no less than 18-inches above grade. In areas subject to lightning, terminal strips shall be isolated from the enclosure by non-metallic base plates to prevent arcing of contacts to enclosure. Boxes shall also be grounded using approved grounding rods.

3.0 EXECUTION

3.1 STARTING AND COMPLETION DATES

The schedule for the project will be established at the pre-bid meeting.

3.2 INSPECTION

The job site supervisor shall examine daily all areas in which the work will be performed on the day prior to beginning work. The supervisor shall immediately report unsatisfactory working conditions to the Owner's Representative for resolution. The Contractor shall not proceed with the work until all unsatisfactory working conditions have been corrected.

3.3 INSTALLATION

3.3.1 GENERAL

A. The Contractor shall remove existing walls, ceilings or floors as required for the installation of this work and shall restore the walls, ceilings, or floors to their original condition at the completion of the work.

B. All holes made by the Contractor in any wall, ceiling or floor shall be patched by the Contractor, restoring the wall, ceiling, or floor to its original condition, fire resistance and integrity. All work shall be done in accordance with the requirements of the attached Cutting, Patching and Painting Specifications.

C. The use of cover plates to cover existing back boxes is strictly forbidden unless required to conform with code requirements for accessibility to wiring or equipment. The prospective use of cover plates must be disclosed as part of the prospective Contractor's bid documents and approval must be provided in writing by the Owner.

D. All costs associated with testing of any type, including x-ray or ultrasound detection required prior to the coring or drilling of any building element are the complete responsibility of the Contractor.

E. Removal and repair of all finished surfaces shall be coordinated with the Owner's Representative and is subject to the Owner's approval.

F. All piping and conduit shall be installed at a height so as not to obstruct any portion of a window, doorway, stairway or passageway and shall not interfere with the operation of any existing mechanical or electrical equipment.

G. System riser(s) shall be installed in mechanical raceways or conduit, located to avoid physical harm. They shall be routed through protected spaces, such as electrical closets. Locations such as loading docks and less than 7 feet above the floor in elevator lobbies shall be avoided.

H. Locations of all equipment, controls and system components are subject to the approval of the Owner's Representative, Owner's Consultant and Owner.

I. Contractor is responsible for protecting both new and existing smoke detectors during construction. These detectors shall be covered during construction. Covers used for such protection shall be removed upon completion of work in that area and at the end of each work day.

3.3.2 CONCEALMENT

A. All conductors, cable, conduit, raceways, junction boxes and device back boxes shall be concealed in walls, ceiling spaces, electrical shafts or closets in all finished areas. Conduit, raceways, junction boxes and device back boxes may be exposed in unfinished back-of-house areas, electrical or mechanical equipment rooms.

B. Exposed conduit, raceways, junction boxes and equipment back boxes shall be painted to be as inconspicuous as possible. The Owner's Representative shall approve the paint color selected. The Contractor shall prepare color samples for inspection by the Owner's Representative prior to painting. Exposed conduit, raceways, junction boxes, and other associated items related to the conduit network shall be provided with red bands every 10 feet with junction box covers labeled as fire alarm, unless specifically instructed otherwise.

3.3.3 RETRANSMISSION OF FIRE ALARMS TO CENTRAL STATION

A. Receipt of any fire alarm signal (initial signal only) shall be automatically retransmitted to the ULI listed Central Station and to UNLV's police dispatch.

B. All wiring and terminations between the fire alarm system and any on-site equipment necessary for performing this function shall be electrically supervised. Faults in monitored circuits which may prevent retransmission of fire alarm signals to the Central Station shall cause a trouble signal at the Central Station.

C. All connections between the protected premises and the Central Station alarm station shall be electrically supervised from the Central Station.

D. Reporting scheme shall be programmed for Contact ID.

3.4 INSPECTION AND TESTS

3.4.1 SYSTEM TESTS

Sixty (60) days after award of contract, the Contractor shall submit a comprehensive Commissioning Plan with the Owner's Consultant for review and approval. The plan shall describe all aspects of the commissioning process including schedules, responsibilities, documentation requirements and communication protocols. At a minimum, the plan shall contain the following specific elements:

A. Scope of testing to include all system devices, control hardware and conductors. At a minimum, all items within Section 3.4.2 shall be included in the scope of testing.

B. Schedule of tests to include Contractor's pre-testing activity, final testing and those tests required by State Fire Marshal's office.

C. Personnel responsible for execution and oversight of test procedures.

D. Pass/Fail criteria shall be enumerated for all test procedures.

E. Test documentation for all testing activities shall include:

1. A description of each test performed.

2. The date and time of each test.

3. Testing Documentation in accordance with NFPA 72.

4. A reference set of Contractor record drawings, numerically identifying the individual components and circuits tested, test locations and indication of the measured sound level in each corridor and Residence room location tested.

5. A matrix of each circuit tested, including the associated devices and appliances on each circuit, along with the results of each test performed.

6. The names and signatures of the individuals conducting and witnessing each test.

7. Testing documentation in accordance with NFPA 72.

F. Planned notices that will be provided to the Owner, Owner's Consultant and the State Fire Marshal's office. At a minimum, the Contractor shall provide five (5) working days' notice prior to all tests, unless increased due to UNLV operations and/or by the State Fire Marshal's office. The Contractor shall post suitable signs the day prior to, and shall maintain such signs during testing, which indicate the date and time fire alarms testing is to occur. The signs shall be located in lobbies, elevator lobbies and other suitable locations so as to notify UNLV occupants of testing

G. System certification and documentation of system testing shall be submitted to the Owner's Consultant for review and approval at least 14 days prior to the final acceptance test. At a minimum, the Fire Alarm System Record of Completion form of NFPA 72 shall be completed and submitted to the Owner for review.

3.4.2 SCOPE OF TESTING

A. System testing shall cover the requirements of NFPA 72, for acceptance testing of new systems. Test methodology shall follow NFPA 72, , including test procedures prescribed.

B. Where modifications are made to the system following testing acceptance, reacceptance criteria of NFPA 72 shall be strictly enforced.

C. Receipt of all alarm, supervisory and trouble signals, initiated during the course of testing shall be verified at each annunciation device.

D. Correct labeling of all annunciation device LEDs shall be verified.

E. Sound level tests shall be performed in at least 10% of all residence rooms on each floor and all corridors to judge a minimum conformance with NFPA 72.

F. The system CPU and annunciators shall be load tested for four (4) hours or as required by local AHJ on standby battery power.

G. All remote transmitting units shall be load tested for four (4) hours on standby battery power.

3.4.3 TESTING SCHEDULE

A. The Owner and the Owner's Consultant will disclose those test procedures which will be witnessed when the Owner and/or Owner's Consultant has been advised by the Contractor that the work is completed and is ready for test. If the work has not been completed or the final acceptance tests are unsatisfactory, the Contractor shall be responsible for the Owner's, Owner's Consultant and UNLV's extra expenses for re-inspection and witnessing the retesting of the work. Such extra fees shall be deducted from the payments made by the Owner to the Contractor through a deductive change order. The procedure and fees associated with reimbursement shall be described in the Commissioning Plan.

B. All tests and inspections required by the referenced Codes and Standards, the State Fire Marshal's office and the Owner shall be performed by the Contractor. Where representatives of the State Fire Marshal's office are required to witness tests, the Contractor shall be responsible for making all necessary arrangements and coordinating the work with the Owner. The Contractor shall be responsible for obtaining all test documents with necessary approval stamps and signatures of the code authorities. The Contractor shall submit one copy of each of these documents to the Owner.

3.4.4 FINAL DOCUMENTATION

At the completion of the commissioning process, the Contractor shall provide the Owner with written certification that all equipment:

A. Is in proper working order.

B. Is installed in accordance with the manufacturer's recommendations and ULI listings.

C. Has been inspected and tested by a manufacturer's certified representative.

D. Has an Inspection and Testing form completed by the Contractor per NFPA 72. A record of completion must be submitted.

E. Assist with the testing of the existing smoke control systems to ensure proper fire alarm system interface and sequence of operations is properly maintained throughout the property and provide a written report stating the systems sequence of operations is correct and that the system functions properly.

3.5 MATERIAL HANDLING

3.5.1 STORAGE

A. The Owner's Representative will endeavor to provide the Contractor with a storage space for the Contractor's use during this project, subject to space limitation and use of the Complex's space. The Contractor shall be responsible for the security of this space.

B. Overnight storage of materials is limited to the assigned storage area. Materials brought to the work area shall be installed the same day, or returned to the assigned storage area unless previously approved by the Owner's Representative.

3.5.2 RECEIVING AND HANDLING

A. The Contractor shall be responsible for all receiving, handling and storage of materials at the job site.

B. Use of loading docks, service drives and freight elevators shall be coordinated with the Owner's Representative.

3.5.3 RUBBISH REMOVAL

A. The Contractor shall remove rubbish and debris resulting from its work on a daily basis. Rubbish not removed by the Contractor will be removed by the Owner's Representative and back charged to the Contractor.

B. Removal of debris and rubbish from the premises shall be coordinated with the Owner's Representative.

4.0 ALTERNATIVE BIDS

4.1 ALTERNATIVE BID NO. 1

Provide a 3-year maintenance contract to begin at the expiration of the guarantee period. During the term of the contract, the Contractor shall test, inspect and maintain the entire system in strict conformance with the minimum requirements of NFPA 72, *National Fire Alarm Code* and the requirements of State Fire Marshal's office.

4.2 ALTERNATIVE BID NO. 2

In all residence rooms, provide a new code compliant 120 vac single station smoke alarm (Gentex 9120). Units provided within suites shall be interconnected. Contractor is responsible for providing all necessary 120vac power, conduit and wire for a functioning system.

END OF SECTION

APPENDIX A

BIDDER'S CHECKLIST

APPENDIX A

BIDDER'S CHECKLIST

1. Does Bid Price include all necessary demolition and restoration of existing walls, floors, and ceilings? _____
2. Does Bid Price include all taxes? _____
3. Does Bid Price include all testing, inspection and permit fees? _____
4. Does price include a three (3) year guarantee? _____
5. Have existing building drawings been reviewed? _____
6. Have existing building conditions been surveyed? _____
7. Does price include all required x-ray or ultrasound detection where core drills will be performed in floor slabs? _____
8. Does Package include: _____
   a. Manufacturer's data sheets for equipment proposed? _____
   b. List of proposed sub-contractors? _____
   c. List of past retrofit projects? _____
   d. Functional block diagram of proposed system? _____
   e. Copies of Contractor's licenses required to perform this work? _____
   f. Proposed work schedule in calendar days? _____
9. Is it understood that the installing Contractor shall be completely responsible for the design, as well as installation of the Systems? _____

Contractor Name: _____

Signature: _____

Date: _____

APPENDIX B

CONTRACTOR'S SUBMITTAL CHECK LIST

ALARM INSTALLATION

APPENDIX B

CONTRACTOR'S SUBMITTAL CHECK LIST
ALARM INSTALLATION

Item	Specification Reference	Due
1. Response to Bid Questions	Appendix B	With bid
2. Subcontractor	1.3.5	With bid
3. Equipment List	1.3.7	With bid
4. Work Schedule (Proposed)	1.3.8.A	With bid
5. Licenses	1.3.10	With bid
6. Certificate(s) of Insurance	1.3.10	With bid
7. Work Schedule (Updated)	1.3.8.B	Pre-construction meeting
8. Samples	1.3.9	Within 30 days of authorization
9. Detailed Schedule of Values		With finalized/executed contract
10. Permits	1.3.10	Prior to start of installation
11. Shop Drawings	1.3.11	Prior to start of installation and in accordance with work scheduled
12. Shop Drawing Re-submittals	1.3.1.B	Within 10 working days of Owner's Consultants comments
13. Operation & Maintenance Manual (Draft)	1.3.12.B	Within 90 days of authorization to proceed
14. Operation & Maintenance Manual (Final)	1.3.12.C	Within 30 days of completion
15. Record Drawings	1.3.13	Upon completion of work
16. Copy of Local Approvals	1.3.14	Upon completion of work
17. Guarantee	1.4.1	For three (3) year beginning with date of final acceptance

Item	Specification Reference	Due
18. Emergency Service	1.4.2	During installation and guarantee period/within 4 hours of request
19. Commissioning Plan	3.4.1	60 days after award of contract
20. Test Record	1.3.15	14 days prior to final acceptance
21. Training	1.5	Scheduled with Owner's Representative
22. Spare Parts and Special Tools	1.6	Upon completion of work
23. Final Approval & Acceptance	1.7	After all final inspections, tests, approvals and required submittals

APPENDIX C

SEE UNLV INPUT/OUTPUT MATRIX

APPENDIX D

CUTTING AND PATCHING SPECIFICATION

APPENDIX E

CUTTING AND PATCHING SPECIFICATION

1.0 GENERAL

1.1 GENERAL DESCRIPTION

Work included:

A. Cutting, coring, or demolition and patching of existing walls, ceilings or floors required to:

1. Install the specified work.

2. Remove and replace defective work or work not conforming to contract requirements.

3. Remove samples of installed work as required for testing or inspection.

B. Providing and maintaining proper safety barricades and dustproof and weatherproof barriers.

1.2 SUBMITTALS

A. Prior to any coring or demolition which affects the structural safety of the project, work of another Contractor, existing occupied spaces or the safety of the public or Owner's employees, Contractor shall submit written notice to Owner’s Representative requesting consent to proceed with the work, including the following:

1. Area affected.

2. Reason for cutting, coring or demolition

3. Proposed method of cutting, coring or demolition and patching.

4. Shop drawings, indicating work required.

5. Methods of protecting exposed work, the public and UNLV employees.

D. Contractor is not to proceed with the work until the Owner’s Representative has approved the submittals, inspected the protection provided and given permission to proceed with the work.

1.3 PROTECTION

A. Provide and maintain protection for existing construction which is to remain, adjacent property, and the public and UNLV employees.

B. Provide all barricades, lights, signals and other protection, which may be required by federal, state and local laws or ordinances and maintain same for the full period of the operation.

C. Provide and maintain temporary weather-tight and/or dust-tight protection, as approved by the Owner, for openings which expose the existing or new construction and equipment to weather or separate that portion of Owner's existing occupancy (which will remain in operation during construction) from new construction areas.

1. Temporary barriers shall be of noncombustible or flame retardant-treated materials.

2. Where applicable, protection may be removed for working purposes and then replaced at end of each day's work.

3. Temporary protection in the construction area shall remain in place until removal of such protection is authorized by the Owner’s Representative.

1.4 EXISTING CONDITIONS

A. Details of existing construction to be removed, altered, or reused furnished are for Contractor's convenience. Owner, UNLV management or the Owner’s Consultant assume no responsibility of accuracy of details.

B. Contractor will be permitted to make its own investigation of existing conditions, when he visits site during the bid period.

2.0 PRODUCTS

2.1 MATERIALS

A. Replacement or repair materials shall match those of the existing adjacent surfaces.

B. Finished surfaces shall be repaired to match existing finished surfaces.

C. All surfaces, walls, floors and ceilings shall be repaired to maintain their integrity and fire resistance. Owner’s Representative may have materials in storage surplus for use. Coordination with Owner’s Representative is recommended for materials.

D. Replace fireproofing material removed from structural steel with new fireproofing material of equal or better fire rating. New or replacement fireproofing material shall be approved by the Owner's Consultant and the AHJ.

3.0 EXECUTION

3.1 INSPECTION

A. Contractor is to inspect the work during cutting, coring or demolition and patching.

B. After cutting, coring or demolition work is completed, Contractor is to inspect conditions affecting installation of new products.

3.2 PREPARATION

Prior to cutting, coring, or demolition, provide the following:

A. Shoring, bracing and support as required to maintain structural integrity of project.

B. Protection from elements.

C. X-raying or ultrasound detection of all locations to be core drilled though building floor slabs.

D. Other protection indicated in Paragraph 1.2.A of this Section.

3.3 PERFORMANCE

A. Perform operations in such manner as to avoid hazards to persons and property and interference with the use of adjacent areas or interruption of free passage to and from such areas. Take care to prevent the spread of dust and flying particles.

B. Execute cutting, coring demolition and debris removal work in a careful and orderly manner. Accumulation of rubbish will not be permitted.

C. Restore work which has been cut or removed and install new products to provide completed work in accordance with contract requirements.

D. Refinish entire surfaces as necessary to provide an even finish.

1. Continuous surfaces: Refinish to nearest intersection of surfaces.

2. Assembly: Refinish entire assembly.

E. Opening in stair floor shall be patched with a waterproof and fireproof sealant.

F. No utilities shall be interrupted without first notifying the Owner's Representative and having its concurrence with the interruption. Provide temporary support for utilities whose support is disturbed by removal work. Coordinate with related trades any disconnecting and rerouting of existing services.

3.4 OWNERSHIP AND DISPOSAL OF REMOVED MATERIALS

Removed materials shall become property of the Contractor and shall be removed from the premises and legally disposed of by the Contractor.

3.5 CLEAN-UP

The areas of cutting, coring, demolition and debris removal, inside and outside the building shall be left in a safe and clean condition suitable for the installation of new work.

END OF SECTION

APPENDIX E

PAINTING SPECIFICATION

APPENDIX F

PAINTING SPECIFICATION

1.0 GENERAL

1.1 WORK TO BE PAINTED

A. Existing construction where cutting and patching has been done to accommodate new work.

B. New construction required for the installation of the new work.

C. Piping, devices and equipment, in accordance with the specification requirements.

1.2 QUALITY CONTROL

A. Color and texture of finish coats shall match existing.

B. Color of priming coat shall be lighter than body coat.

C. Color of body coat shall be lighter than finish coat.

D. Color prime and body coats as required so as to not show through the finish coat and to mask surface imperfections.

1.3 SUBMITTALS

1.3.1 MANUFACTURER'S LITERATURE AND DATA

A. When required by the Owner, and before any work is done, or any color and finish panels are prepared, submit Manufacturer's literature, indicating brand names, kind, color, and texture of paint.

B. Prior to delivering products to the site, submit material safety data sheets to the Owner’s Representative for approval.

1.3.2 SAMPLE PANELS

When required by the Owner, and before any painting or finishing is done, submit panels for Owner's approval showing color and texture of finish coats or clear finishes. Panels to be composition board, 4 inch by 11 inch by 1/8 inch showing each color and finish. Attach labels to each panel stating the following:

A. Paint color and code.

B. Type of finish.

C. Name of Contractor.

D. Name of project.

E. Locations to be finished.

1.4 DELIVERY AND STORAGE

1.4.1 DELIVERY

A. All materials shall be delivered to the site in the Manufacturer's sealed container marked to show the following:

1. Name of Manufacturer

2. Kind of paint

3. Batch number

4. Instructions for use

5. Safety precautions

B. In addition to the Manufacturer's label, each container shall bear a label upon which is legibly printed the surface upon which material is to be applied.

1.4.2 STORAGE

A. Painting materials shall be stored at a location approved by the Owner Representative, protected by automatic sprinklers, and isolated from the construction area.

B. Maintain space for storage and handling of painting materials and equipment in a neat and orderly condition.

C. Store all materials at the site at least 24 hours before using in order to bring their temperature to between 65 and 85°F.

1.5 JOB CONDITIONS

1.5.1 SAFETY

A. Observe all required safety regulations and the manufacturer's warnings and instructions during the storage, handling and application of painting materials.

B. All safety rules supplied by OSHA or the EPA for fresh air supply in enclosed areas where spray painting is being done must be met.

C. Proper protective safety equipment (*i.e.*, respirators, dust mask, hard hats, goggles) must be supplied and worn by workers.

D. Necessary precautions shall be taken to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.

E. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at the end of each day's work.

1.5.2 LEAD-BASED PAINT

The responsibility of compliance with Section 40l of the Lead-Based Paint Poisoning Prevention Act, as amended, is placed upon the Contractor.

1.5.3 ATMOSPHERIC AND SURFACE CONDITIONS

A. Do no exterior painting in foggy, damp or rainy weather.

B. Do no exterior painting when it is windy and dusty.

C. Paint exterior and interior surfaces when the ambient temperature is between 45 and 90°F; except when water-thinned paints are used, the ambient temperature shall be between 50 and 90°F, unless otherwise designated in the Manufacturer's printed instructions. Maintain these temperatures until the paint dries hard.

D. Apply only on clean, dry and frost-free surfaces. Apply water-thinned acrylic and cementations paints to damp (not wet) surfaces where allowed by the Manufacturer's printed instructions.

E. Do no painting in direct sunlight or on surfaces which will soon be warmed by the sun. Concrete and masonry surfaces to which water-thinned acrylic and cementations paints are applied shall be dampened with a fine mist of water on hot, dry days to prevent excessive suction and to cool the surface.

2.0 PRODUCTS

2.1 PAINT

A. The Owner’s Representative will provide paint color specifications for use in obtaining matching paint.

B. All new paint colors and textures shall match those of the existing adjacent areas.

C. Repaint the entire existing ceiling and/or wall surface that has been altered or damaged or where soffits are added due to installation of new work.

D. Spot painting will be acceptable only if the painting matches the existing paint, to the Owner's Representative's satisfaction. If the spot painting does not match, the entire contiguous surface shall be repainted.

3.0 EXECUTION

3.1 PAINT PREPARATION

A. Thoroughly mix all painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.

B. Finish paint shall not be used as primer. Primers must be matched to substrate being painted:

1. Dry wall - polyvinyl acetate primer latex.

2. Metal - primer required by manufacturer for proper adhesion.

3. Masonry - proper masonry sealer/primers to insure proper adhesion to substrate.

C. No material shall be thinned, unless necessary for proper application and when finish paint is used for body and prime coats. Materials and the quantities used for thinning shall be in accordance with the manufacturer's printed instructions.

D. Remove paint skins, then strain paint through commercial paint strainer to remove all lumps and other particles.

E. Two-component and two-part paint and those requiring additives shall be mixed in such a manner as to be uniformly blended in accordance with the manufacturer's printed instructions.

F. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

3.2 SURFACE PREPARATION

3.2.1 GENERAL

A. Remove radiators, lighting fixtures and similar items for complete painting of such items and adjacent areas.

B. Contractor shall verify the requirements for surface conditions and prime coat.

C. Surfaces to be finished shall be dry, clean, smooth and prepared as specified.

D. Materials and methods used for cleaning shall be compatible with the substrate and specified finish. Remove any residue remaining from cleaning agents used.

E. Method of surface preparation is optional provided results of finish painting produce solid even color and texture specified.

3.2.2 MASONRY, CONCRETE, CEMENT PLASTER AND STUCCO

A. Remove all dust, dirt, oil, grease efflorescence, and other deterrents to paint adhesion.

B. Use emulsion-type cleaning agents to remove oil, grease, paint and similar products. The use of solvents, acid, or steam is not permitted.

C. Remove all loose mortar in masonry work.

D. Replace mortar and fill all open joints, holes, cracks and depressions with patching compound, finished flush with adjacent surface, with texture to match texture of adjacent surface.

E. Concrete floors to be painted shall be neutralized by washing with a solution of three pounds of zinc sulphate crystals to one gallon of water, allowed to dry three days and brushed thoroughly free of crystals.

F. Concrete shall have all broken and spalled edges repaired with patching compound to match adjacent surfaces. Remove projections to level of adjacent surface by grinding or similar methods.

3.2.3 GYPSUM PLASTER AND DRYWALL

A. Remove efflorescence, loose and chalking plaster. Remove dust, dirt, and other deterrents to paint adhesion.

B. Fill holes, cracks and other depressions with patching compound, finished flush with adjacent surface, with texture to match texture of adjacent surface.

3.3 APPLICATION

A. Start of surface preparation or painting will be construed as acceptance by the Contractor of the surface as satisfactory for the application of materials.

B. Unless otherwise specified, paint shall be applied in three coats: prime, body, and finish. When the two coats succeeding the prime coat are the same, the first coat applied over the primer shall be considered as the body coat, the second coat as the finish coat.

C. Before application of body and finish coats, surfaces shall be primed except as otherwise specified.

D. Retouch damaged and abraded painted surfaces before applying succeeding coats.

E. Apply each coat evenly and in full covering body.

F. No less than 48 hours shall elapse between application of succeeding coats, except as allowed by the Manufacturer's printed instructions, and approved by the Owner's Representative.

G. Finished painted surfaces shall have solid even color, free from runs, lumps, brush marks, laps, holidays, or other defects.

H. To prevent the items from sticking in the shut position, operable items such as access doors and panels, window sashes, rolling doors, and similar items shall not be painted when in the closed position.

I. All necessary precautions shall be taken to prevent painting of sprinklers. Painted sprinklers shall be replaced at no additional cost to the Owner.

J. Painting may be applied by brush, roller or spray, except as otherwise noted.

K. Spray painting will not be allowed unless approved by the Owner's Representative

1. Painting materials specifically required by the Manufacturer to be applied by spraying shall be so applied.

2. In areas where paint is applied by spray, all items not to be painted shall be masked, or enclosed with polyethylene, or similar air-tight material with all edges and seams continuously sealed.

3.4 PRIMERS

After surface preparation, apply prime coat to various materials as follows:

A. Cement, plaster, concrete and masonry: latex emulsion, except use two coats of latex primer when substrate has aged less than six months.

B. Drywall: latex primer, except use pigmented sealer in shower rooms.

3.5 PROTECTION

Protect all work from paint droppings and splattering by use of masking, drop cloths, removal of items or by other approved methods.

3.6 CLEAN-UP

A. Upon completion, clean paint from all hardware, glass and other surfaces and items not required to be painted.

B. Before final inspection, any work which has become damaged or discolored shall be touched up or refinished in a manner to produce solid even color and finish texture, free from defects.

C. Contractor shall be responsible for replacing and/or repairing any and all areas damaged during the execution of this work.

END OF SECTION

APPENDIX F

TONOPAH NORTH FIRE ALARM SCOPE

Tonopah North Residence Complex Bid Scope

1a. Replace the fire alarm system in Tonopah North as shown on the plans.

1b. Install a smoke detector inside every dorm bathroom in the North Tonopah Tower.

1c. Expand the existing Siemen's Fire Alarm Panel located in the South Tonopah Tower to include all new addressable fire alarm devices shown on the plans. This would include all software upgrades and expansion panels for the additional points.

1d. Remove WON doors on the first and second floor of Tonopah North Tower located at the elevators. Replace the WON doors with steel hinged doors and steel one piece fully welded frame. Door and Frame will have a two hour fire rating. Doors will be equipped with a hydraulic closure and a magnetic hold open tied into the fire alarm system so when a general alarm is activated the magnets will release and the doors will close shut. Price to include cutting into wall, relocation of elevator buttons and all architectural repair and painting of the doors, frames and walls.