3.05 INSTALLATION OF CROSS-CONNECTION EQUIPMENT
A. Only if required pursuant to meeting with the Owner:
1. Install connector blocks at backboards as directed by the Owner.
2. Install patch panels in equipment racks as directed by the Owner.
3. Install labels complying with TIA/EIA-606 using coded identifiers:
a. Patch Panels: Label each jack with a unique numerical identifier as to its type and function.
b. Patch Cords: Label with jack identifier corresponding to initial installation.

END OF SECTION

SECTION 283100 – FIRE DETECTION AND ALARM

PART 1 GENERAL
1.01 ADMINISTRATIVE
A. The word "should" used in NFPA 72 shall be considered a mandatory requirement.
1.02 PREPARATION
A. Examine the plans of all trades to determine scope of fire alarm and detection work including, but not limited to:
1. Architectural plans to determine occupancy classification, occupant loads, and locations where voice alarm will be required.
2. Fire sprinkler plans, including fire sprinkler plans that are designed by others, to determine locations of all flow switches, tamper switches, post indicator valves, corrosion monitoring probes, dry-type system compressors, and fire pumps.
3. Mechanical plans to determine locations of all individual HVAC units rated equal to or greater than 2,000 cubic feet per minute (CFM), locations of HVAC units serving the same room or area where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute (CFM), locations of HVAC units sharing a common return air plenum where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute (CFM), smoke dampers, smoke exhaust equipment, and Type 1 grease hood fire suppression systems.
B. Coordinate all notification appliance colors with the Architect.
1.03 SYSTEM DESIGN
A. Provide a fully engineered Code-compliant design of the fire detection and alarm system from a Fire Alarm Designer.
B. The Fire Alarm Designer shall be a NICET Level III or IV (3 or 4) certified fire alarm technician, registered fire protection engineer, employee of the fire alarm control unit manufacturer, or Contractor with experience designing fire detection and alarm systems in the jurisdictional area.
C. The Fire Alarm Designer shall develop all fire detection and alarm plans, riser diagrams, calculations, and equipment submittal packages required by NFPA 72-2013 section 7.4 and the Authority Having Jurisdiction and submit the same as a deferred permit.
D. The General Contractor shall include all costs associated with the development of the fully engineered fire detection and alarm plans and permit fees in the Bid.
E. Any fire detection and alarm information indicated on the Drawings is strictly for the purpose of establishing a minimum criteria to aid the Fire Alarm Designer in the design of the fully engineered fire alarm drawings. The Fire Alarm Designer is responsible to provide a design that is fully compliant with all applicable Codes and jurisdictional requirements.

PART 2 PRODUCTS
2.01 GENERAL
A. All new fire alarm initiation devices, including new initiation devices added to existing systems, shall be of the same manufacturer as the control unit and fully compatible with the system.
2.02 NEW FIRE ALARM AND DETECTION SYSTEMS
A. Fire Detection and Alarm System:
1. Control Unit: Notifier #NFW2-100 unless indicated otherwise.
2. Communicator: Digital Alarm Communicator Transmitter (DACT) connected to central station.
3. Secondary Power: Storage battery and battery charger capable of operating entire system for period of time specified by NFPA 72 plus 25 percent spare capacity.40. Auxiliary Battery Cabinet: As required for the batteries installed within.
5. Relay Module: As required for a complete operational system.
6. Remote Annunciator: Notifier #N-ANN-80-W unless indicated otherwise; provide when control unit is installed at a location other than the First Responder's primary point of entry.
B. Voice Alarm System:
1. Control Unit: Notifier #NFC-50-100 unless indicated otherwise.
2. Secondary Power: Storage battery and battery charger capable of operating entire system for period of time specified by NFPA 72 plus 25 percent spare capacity.
3. Auxiliary Battery Cabinet: As required for the batteries installed within.
4. Audio Amplifier Modules: As required for speakers served.
2.03 INITIATING DEVICES
A. Smoke Detectors:
1. Detector: Notifier #NP-100 unless indicated otherwise.
2. Base: Notifier #B210LP unless indicated otherwise; provide Notifier #B224RB relay base when smoke detector is used for door releasing service.
B. Duct Smoke Detectors:
1. General:
a. Provide for each HVAC unit rated equal to or greater than 2,000 cubic feet per minute.
b. Provide for all HVAC units serving the same room or area where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute.
c. Provide for all HVAC units that share a common return air plenum where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute.
d. Provide as required for control of each smoke damper.
2. Detector: Notifier #NP-100R base unless indicated otherwise.
3. Housing: Notifier #DNR unless indicated otherwise.
4. Sampling Tube: As required for the duct.
5. Remote Test Stations: Notifier #RTS151KEY unless indicated otherwise; provide when duct smoke detector is installed in a concealed location greater than 10 feet above finished floor or when duct smoke detector's status indicators are not readily visible.
6. Remote Alarm LED Annunciators: Notifier #RA100A unless indicated otherwise; provide for each duct smoke detector that is not connected to a fire alarm control unit.
C. Heat Detectors:
1. Detector: Notifier #NH-100R unless indicated otherwise.
2. Base: Notifier #B210LP unless indicated otherwise; provide Notifier #B224RB relay base when heat detector is used for elevator shunt trip.
D. Manual Pull Stations: Notifier #NOT-BG12LX unless indicated otherwise; semi-flush mounted in all finished areas and surface mounted with #SB-10 backbox in unfinished areas.
2.04 NOTIFICATION APPLIANCES
A. General:
1. All notification appliances shall be from the same manufacturer.
2. All notification appliances shall be semi-flush mounted in all finished areas; notification appliances are permitted to be surface mounted in unfinished areas.
3. All notification appliance housings shall be white unless indicated otherwise or unless the Authority Having Jurisdiction requires red housings.
4. Provide strobe synchronization modules when more than one strobe is located within a viewing area.
B. Horns: System Sensor #HW unless indicated otherwise.
C. Strobes: System Sensor #SW for wall-mount and #SCW for ceiling-mount unless indicated otherwise.
D. Combination Horn/Strobes: System Sensor #P2W for wall-mount and #PC2W for ceiling-mount unless indicated otherwise.
E. Speakers: System Sensor #SPW for wall-mount and #SPCW for ceiling-mount unless indicated otherwise.
F. Combination Speaker/Strobes: System Sensor #SPSW for wall-mount and #SPSCW for ceiling-mount unless indicated otherwise.
G. Exterior Combination Speaker/Strobes: System Sensor #P2RK unless indicated otherwise.
2.05 AUXILIARY DEVICES
A. Addressable Monitor Modules: As required for a complete operational system.
B. Addressable Control Modules: As required for a complete operational system.
C. Addressable Relay Modules: As required for a complete operational system.
D. Door Holders: Notifier DH24120 series with 24 volt coil and 40 pounds of holding force unless indicated otherwise; coordinate selection of door holders with architectural hardware requirements and verify required clearances, sizes and locations to operate properly with the doors and hardware specified.
E. Notification Appliance Circuit Power Supplies: As required for a complete operational system.
F. End-of-Line Resistors: As recommended by the manufacturer.
G. Wireguards: Provide for any wall-mounted notification appliances located in gymnasiums or where otherwise exposed to physical damage.
2.06 COMBINATION SMOKE/CARBON MONOXIDE ALARMS
A. Kidde #12010SCO unless indicated otherwise; for use within individual dwelling units only.
2.07 CONDUIT: See section 260534; painted red.
2.08 BOXES: See section 260537; painted red.
2.09 WIRE AND CABLE
A. All Wire and Cable:
1. Riser Cabling: Unshielded Type FPLR when installed in conduit and Type FPLP when not installed in conduit unless indicated otherwise or otherwise required; red jacket.
2. Horizontal Cabling: Unshielded Type FPL when installed in conduit and Type FPLP when not installed in conduit unless indicated otherwise or otherwise required; red jacket.
B. Initiating Device Circuits (IDC):
1. Number of Conductors: As recommended by the manufacturer.
2. Conductor Size: As recommended by the manufacturer but not smaller than 18 AWG.
C. Signaling Line Circuits (SLC):
1. Number of Conductors: As recommended by the manufacturer.
2. Conductor Size: As recommended by the manufacturer but not smaller than 18 AWG.
D. Notification Appliance Circuits (NAC):
1. Number of Conductors: As recommended by the manufacturer.
2. Conductor Size: As recommended by the manufacturer but not smaller than 14 AWG.

PART 3 EXECUTION
3.01 COORDINATION WITH OTHER TRADES
A. Coordinate all fire alarm work with all other trades including, but not limited to:
1. Connection of all fire sprinkler monitoring components including all flow switches, tamper switches, post indicator valves, corrosion monitoring probes, dry-type system compressors, and fire pumps with the Fire Sprinkler Contractor.
2. Connection of all individual HVAC units rated equal to or greater than 2,000 cubic feet per minute (CFM), locations of HVAC units serving the same room or area where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute (CFM), locations of HVAC units sharing a common return air plenum where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute (CFM), smoke dampers, smoke exhaust equipment, and Type 1 grease hood fire suppression systems with the Mechanical Contractor.
3. Connection of all elevator controllers and elevator recall systems with the Vertical Transportation Contractor.
4. Locations where boxes and/or conduit are to be roughed-in for initiating devices and/or notification appliances and locations where 120 volt power is required with the Electrical Contractor.
B. Change orders arising from a lack of coordination with the other trades will not be considered.
3.02 INSTALLATION
A. Install all components in accordance with all applicable codes including, NFPA 70, NFPA 72, and the applicable Fire and Building Codes.
B. Install all products in strict accordance with manufacturer's instructions.
C. Obtain Owner's approval of locations of all components prior to rough-in.
D. Install components at the following mounting heights:
1. Control Units: Top at 72 inches above finished floor.
2. Remote Annunciators: Top at 60 inches above finished floor.
3. Manual Pull Stations: Centerline at 46 inches above finished floor.
4. Audible Notification Appliances: Top at 90 inches above finished floor or 6 inches below finished ceiling, whichever is lower.
5. Visible Notification Appliances: Top at 96 inches above finished floor or 6 inches below finished ceiling, whichever is lower.
6. Combination Audible/Visual Notification Appliances: Top at 96 inches above finished floor or 6 inches below finished ceiling, whichever is lower.
E. Make conduit and wiring connections to all initiating devices, notification appliances, control units, fire sprinkler system components, HVAC system components, smoke control system components, vertical transportation components, grease hood fire suppression system components, monitor modules, control modules, relay modules, etc. for a complete fully functional system.
F. Install outlet boxes for door holders to withstand 80 pounds of pulling force.
G. Install control relays within 3 feet of the controlled equipment.
H. Install duct smoke detector remote test stations and/or remote alarm LED annunciators; coordinate locations with the Owner and the Authority Having Jurisdiction prior to rough-in.
I. Install end-of-line resistor in box with last device or separate box adjacent to last device in circuit.
J. Conceal all wiring, conduit, boxes, and supports where located within finished areas.
K. Install all concealed, inaccessible wiring, including wiring installed in walls, and all exposed wiring in conduit in accordance with NFPA 70.
1. Wiring may be installed without conduit where accessible and not subject to damage only when specifically permitted by the Authority Having Jurisdiction.
L. Plenum rated cable may be used only where concealed above accessible tile ceilings or accessible shafts.
M. Separate cables from any open conductors of Class 1 circuits and do not place in any conduit, junction box, or raceway containing Class 1 cables.
N. Provide the following circuit classes:
1. Initiating Device Circuits (IDC): Class B.
2. Signaling Line Circuits (SLC) Within Building: Class B.
3. Signaling Line Circuits (SLC) Between Buildings: Class A.
4. Notification Appliance Circuits (NAC): Class B.
5. Door Holders: Class D.
O. Provide a minimum of 25 percent spare capacity on all circuits.
P. Connect control unit to a separate dedicated branch circuit with a separate, red, dedicated circuit breaker with lock-on accessory and label circuit as FIRE ALARM.
Q. Connect any 120 volt exterior fire sprinkler alarm bells to the same circuit serving the control unit.
R. Install instruction cards and labels; provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
3.03 FIRE SAFETY SYSTEMS INTERFACES
A. Provide the following fire safety system interfaces upon activation. Coordinate all components requiring interface, including exact locations, with the associated Contractor. Change orders arising from a lack of coordination with the other trades will not be considered.
1. General:
a. Manual Pull Stations: Transmit alarm signal to control unit.
b. Smoke Detectors: Transmit alarm signal to control unit.
c. Heat Detectors: Transmit alarm signal to control unit.
2. Fire Sprinkler Systems:
a. Flow Switches: Transmit alarm signal to control unit.
b. Tamper Switches: Transmit supervisory signal to control unit.
c. Post Indicator Valves: Transmit supervisory signal to control unit.
d. Corrosion Monitoring Probes: Transmit supervisory signal to control unit.
e. Pressure Monitoring Systems: Transmit supervisory signal to control unit.
f. Fire Pumps: Transmit supervisory signal to control unit per NFPA 20 and NFPA 72.
3. HVAC System Duct Smoke Detectors:
a. Shut down supply fan on each individual unit rated equal to or greater than 2,000 cubic feet per minute.
b. Shut down all supply fans on all units that share a common return air plenum where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute.
c. Shut down all supply fans on all units that serve a common room or area where the total aggregate capacity of the units is equal to or greater than 2,000 cubic feet per minute.
d. Close smoke dampers.
e. Transmit alarm or supervisory signal to control unit; coordinate required signal type with the Authority Having Jurisdiction.
4. Grease Hood Fire Suppression System:
a. Disconnect power to all appliances located under hood.
b. Close gas valve(s) serving appliances located under hood.
c. Shut down all supply air fan(s).
d. Start hood exhaust fan(s) if not already running.
e. Transmit alarm signal to control unit.
5. Smoke Exhaust:
a. Shut down all supply air fan(s).
b. Start smoke exhaust fan(s).
c. Transmit alarm signal to control unit.
6. Smoke Barrier Door Holders:
a. Release upon activation of smoke detectors on either side of door.
b. Release upon activation of manual pull station on the same floor.
c. Release upon activation of fire sprinkler flow switch.
7. Electromagnetic Locks on Egress Doors: Release upon any alarm signal.
8. Vertical Transportation:
a. Elevator Shutdown Control Circuits: Transmit supervisory signal to control unit.
b. Smoke Detectors in Elevator Lobbies, Machine Rooms, and Hoistways:
1. Activate elevator recall.
2. Transmit alarm signal to control unit.
c. Heat Detectors in Elevator Machine Rooms and Hoistways:
1. Shunt trip elevator controller prior to machine room and hoistway fire sprinkler activation
2. Transmit alarm signal to control unit.
9. Fire Alarm Wiring:
a. Open Circuit: Transmit trouble signal to control unit.
b. Single Ground: Transmit trouble signal to control unit.
c. Short Circuit: Transmit trouble signal to control unit.
3.04 SEQUENCE OF OPERATION
A. Alarm:
1. Visual and audible alarm at control unit.
2. Visual and audible alarm at remote annunciator.
3. Transmit alarm signal to central station.
4. Activate visual notification appliances.
5. Activate audible notification appliances.
6. Transmit signal to building mechanical systems to initiate supply air fan shut down.
7. Transmit signal to building mechanical systems to close smoke damper(s).
8. Transmit signal to building mechanical system to grease hood exhaust fan(s).
9. Transmit signal to building mechanical system to start smoke exhaust fan(s).
10. Transmit signal to elevator controllers to initiate elevator recall.
B. Supervisory:
1. Visual and audible alarm at control unit.
2. Visual and audible alarm at remote annunciator.
3. Transmit supervisory signal to central station.
C. Trouble:
1. Visual and audible alarm at control unit.
2. Visual and audible alarm at remote annunciator.
3. Transmit trouble signal to central station.
4. Manual acknowledge silences audible trouble alarm at control unit and remote annunciator but visual alarm remains displayed until trouble condition is cleared.
3.05 INSPECTION, TESTING, AND ADJUSTMENT
A. Complete NFPA 72 "RECORD OF COMPLETION" form.
B. Notify the Authority Having Jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
C. Perform inspection and testing in accordance with NFPA 72 and requirements of the Authority Having Jurisdiction.
D. Document each inspection and test, correct any defective work, and retest until entire system complies with the requirements of NFPA 72, the Authority Having Jurisdiction, and the Contract Documents.
3.06 PERSONNEL INSTRUCTION
A. Provide hands-on instruction for the Owner's designated representative.
B. Provide the services of instructors, teaching aids, and copies of operation and maintenance data during instruction.
3.07 CLOSEOUT
A. Substantial Completion: Substantial Completion cannot be achieved until inspection and testing is successful, all aspects of operation have been demonstrated to Owner, final acceptance of the fire alarm system has been given by the Authority Having Jurisdiction, the occupancy permit has been issued, and the personnel instruction is complete.
B. Demonstration: Demonstrate proper operation of all functions to Owner. Demonstration may be combined with inspection and testing required by the Authority Having Jurisdiction.
C. Closeout Documentation and Materials:
1. Provide the following closeout documentation and materials to the Owner:
a. Manufacturer's cut sheets, owner's manual, manufacturer's published instructions, and troubleshooting guides covering all system equipment.
b. Detailed but easy to read explanation of procedures to be used by non-technical personnel in the event of system trouble, when routine testing is being conducted, and for fire drills.
c. Record drawings complying with NFPA 72-2013 section 7.5.5.
d. NFPA 72-2013 "RECORD OF COMPLETION" form.
e. NFPA 72-2013 "SYSTEM RECORD OF INSPECTION AND TESTING" form.
f. Preventive maintenance schedule.
g. Testing and inspection procedures and schedule.
2. All closeout documentation shall be neatly organized in a three-ring binder with labeled dividers separating sections.
3.08 MAINTENANCE CONTRACT
A. Provide, as an alternate to the base bid for later acceptance by the Owner, a proposal for a two-year maintenance contract that includes:
1. Services to perform routine inspection, testing, and preventive maintenance required by NFPA 72, including maintenance of fire safety interface and supervisory devices connected to fire alarm system, and repairs required.
2. Record keeping required by NFPA 72 and the Authority Having Jurisdiction.
3. Trouble call-back service upon notification by the Owner within two hours of notification.
a. Include allowance for call-back service during normal working hours at no extra cost to Owner.
b. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time.
c. Include hourly rate and definition of normal working hours in maintenance contract.
4. A complete description of proposed preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.
5. Maintenance of a log at each control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced.
6. Providing an updated NFPA 72-2013 "SYSTEM RECORD OF INSPECTION AND TESTING" form to Owner's representative upon completion of site visit.
7. Include the total cost of contract.
B. Proposal shall be valid for a minimum of 30 days after date of Substantial Completion.

END OF SECTION

PAUL DHANENS • ARCHITECT

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CONSULTANT

PROJECT

TENANT IMPROVEMENT FOR

FAMOUS FOR Steak 'n Shake STEAKBURGERS

1966 WEST AVE L
LANCASTER, CA

DATE	ISSUED FOR
9-24-18	BUILDING DEPT SUBMITTAL
6-25-19	

NO.	REVISIONS
1	
2	
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ELECTRICAL

FILE NAME: 2366A2-0

SHEET

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