Requirements for Plan Submittal, Design, Installation, and Inspection of Two-Way Communications Systems

Effective Date: January 1, 2023

1.0 Requirements

The intent of this guideline is to provide the San Jose Fire Department (SJFD) interpretation of the minimum standards necessary to meet the requirements for two-way communication systems in accordance with the 2022 California Fire Code (CFC), 2022 California Electrical Code (CEC), 2022 California Building Code (CBC), 2022 NFPA 72, as amended by Local Ordinance. This applies to two-way communications at areas of refuge (areas of rescue assistance), stairways, elevator landings, and occupant evacuation elevator lobbies. The provisions contained in 2022 CBC Sections 403.5.3.1, 1009.6.5, 1009.8, 1010.2.12.1, and 3008.6.6 are to be followed.

2.0 Permit

2.1 New or modifications to existing Two-Way Emergency Communications Systems require a complete plan submittal and inspection as part of the deferred submittal requirements and inspection checklists under the Fire Architectural Plan Check Directives.

2.2 Hard copy submittals are no longer accepted. Applicants shall email a request to submit plans electronically to: SJFDPermitSpecialist@sanjoseca.gov. Once an email request is received, SJFD permit specialists will provide instructions for uploading the required plan sheets, specifications, and pertinent documents.

The following shall be included in your email request:

2.2.1 The project's associated Building Plan Check # (this can be obtained from the Architect of Record or General Contractor)

2.2.2 A copy of the Fire Architectural Plan Check Directives (this can be obtained from the Architect of Record or General Contractor)

2.2.3 A copy of any approved "Variance" or "Alternate Means or Methods of Construction (AMMC)" if it is relevant to the system – check with the Architect or General Contractor if a variance or AMMC was submitted to and approved by the City of San Jose.

2.3 Installation, alteration, or demolition of a system shall not commence prior to the approval of plans.

2.4 Fees when submitted under the Architectural plan check will be included on an hourly basis as part of the Architectural plan review and inspection approval process.

2.5 The applicant shall be the installing contractor. All installing contractors shall have a valid worker's compensation certificate and a San Jose business license. When the design and plans are produced by a party other than contractor, the plans shall be stamped by a professional engineer. The SJFD approved set of plans shall be kept at the project site until final inspection approval after which they shall remain in the possession of the owner.

3.0 Plans

Note: Failure to provide any of the information required in sections 3.1 through 3.8 will result in the plans being disapproved.

3.1 General Requirements for all two-way communications system projects:

3.1.1 Plans and attachments shall be clearly labeled and legible.

3.1.2 Plans and all revisions to the plans shall be dated. If utilizing an existing drawing or portion of a drawing, the area of work shall be highlighted and clouded with an appropriate symbol (delta). Provide a revision list with a symbol, date, description, and initials.

3.1.3 When making alterations, additions, or deletions to an existing system, all existing devices and equipment shall be shown and properly identified on the floor plan and system riser (single line) diagram.

3.1.4 Plans shall include a title sheet, an equipment list, a written sequence of operation, a floor plan, a system riser diagram, and secondary power & voltage drop calculations (see sections 3.2 through 3.7).

3.1.5 Attachments for all products and equipment shall include the manufacturer's specification sheets indicating the products proposed are IBC, NFPA and ADAAG Code Compliant. California State Fire Marshal (CSFM) listing sheets, as applicable, shall also be provided. See section 3.8.

3.2 Title Sheet (front sheet shall contain the following information)

3.2.1 Project name and address of the project.

3.2.2 The designer's full name - no initials, pseudonyms, acronyms, or aliases- and signature. The designer of record shall be responsible for the entire system being worked on.

3.2.3 Business name, address, and California Contractor's License number of the installing contractor**.** If the designer of the system is not the installing contractor, the following shall be clearly indicated/printed on the plans:

3.2.3.1 **DESIGNED BY** - followed by the designer's business name, address, designer of record's full name and signature.

3.2.3.2 **INSTALLING CONTRACTOR** - followed by the installing contractor's business name, address and California Contractor's License number.

3.2.4 A note stating that the design and installation complies with 2022 NFPA 72, the 2022 CEC, the 2022 CFC, the 2022 CBC, and San Jose ordinances and standards.

3.2.5 Occupancy group(s) of building or area as defined by the 2022 CBC, number of stories, building height, and construction type.

3.2.6 A detailed narrative of the scope of work and why the system is being installed (i.e., required by the 2022 CBC or 2022 CFC, required due to a variance, or voluntary per property owner or stakeholders' request).

3.2.7 Type of system provided.

3.2.8 The supervising station for the Two-Way communications System and the building Fire Alarm System with its listing category (UL File number). If systems are monitored separately, include complete information of both monitoring stations dedicated for the Fire Alarm system and for Two-Way Communications System.

3.2.9 Pathway Survivability notes as applicable per fire rating or type of construction of building. Refer to 2022 CBC Chapter 6 for types of Construction. Refer to 2022 NFPA 72 section 24.3.14 and its subsections for the required pathway survivability level based on the fire rating of the building.

3.2.10 Cable/Wire schedule and color-coded wire schedule (as applicable). Include the type and size of conduits proposed to be used.

All horizontal and vertical wirings shall be routed within conduits for protection from potential risks of mechanical injury.

Please note that only Type EMT conduits or similar solid, liquid-tight conduits (RMC – rigid metallic conduit & IMC – intermediate metallic conduit) will be allowed for use. Flexible

metallic conduit (FMC) or similar conduits formed with helical, interlocking metal shall be prohibited.

For underground (direct buried to earth) and embedment in concrete, use wire and conduit types conforming with the requirements of 2020 NFPA 70 underground wirings and protections.

3.2.11 A key plan of the building and/or complex indicating the street location and the area of work within the building shall be provided.

3.2.12 All other pertinent notes

3.3 Equipment List

3.3.1 Provide the model number, manufacturer's name, description, quantity, CSFM listing number (when applicable), and symbols to be used (legend) for each device, equipment, and conductors proposed to be installed *(**Note:** SJFD reserves the right to disallow any listed product due to past performance).*

3.3.2 The symbols used on the plans shall match the legend. Strike out any "typical" symbols that do not pertain.

3.4 Sequence of Operation – a written description in a matrix format shall be provided to define the events that occur when initiating the two-way communications system. The description shall include details relating to annunciation, remote signaling, behavior of LED light(s) at call boxes at times when call is sent (activation of call box) and call is received (call connected with base/master station or with monitoring station), and activation of control functions, as applicable.

3.5 Floor Plan – The following shall be clearly indicated:

3.5.1 Scale used and a graphical representation of the scale. The minimum scale for plans is 3/32" = 1'-0". Metric scale shall not be accepted.

3.5.2 Rooms and spaces with their designated uses/labels/names.

3.5.3 The locations of partitions, non-rated walls, and rated walls. If not full height, indicate the height of the walls and the ceilings.

3.5.4 The location of all system equipment and components.

3.5.5 The locations of required fire-stop penetrations.

3.5.6 Detailed description of all vertical and horizontal pathways. Indicate how each pathway (cable and conduit) is routed from source (base station) to destination (call boxes) and to any system equipment/component in between.

3.5.7 Cross-section details of horizontal and vertical pathways to demonstrate rated enclosures, embedment of conduits in building elements, and other approved means of routing circuit pathways to meet pathway survivability requirements.

3.6 Riser Diagram – provide the following:

3.6.1 Single-line wiring diagram (riser diagram) that shows the interconnection of each device and equipment of the whole system.

Please note that wiring distribution shown on the riser diagram shall match manufacturer's specifications. Analog systems typically will have a dedicated wire run from a base station or a supervisory distribution module to each call box.

3.6.2 Number of conductors in each wiring segment and the type and size of wire or conductor to be used.

3.6.3 The class for notification and communication circuits.

3.6.4 Circuit number or identification.

3.7 Calculations

3.7.1 Normal power to the two-way communications system shall automatically transfer to a source of backup power within 10 seconds after normal power fails. The secondary power source shall be capable of providing for the operation of the system (including annunciators) for 24 hours, and an additional two-way conversation time of 4 hours.

3.7.2 Secondary power calculation – provide calculations to verify that standby batteries, or other approved secondary power source, provides 24 hours of standby time with additional 4 hours of conversation time.

3.7.3 Voltage drop calculation – calculations shall be provided to verify that the voltage drop in the two-way communication system circuits do not exceed 15 percent. Provide voltage drop calculations for each circuit.

3.8 Attachments

3.8.1 Manufacturer's specification sheets for all equipment and materials proposed to be used shall be submitted, including the transponder (when provided) to the supervising station. Highlight on the cut sheet which device or equipment is being used, the listing information, and the application per listing.

3.8.2 When applicable, submit copies of the CSFM- and/or UL-listing sheets for all devices and equipment requiring listing.

4.0 Design and Installation

4.1 Two-way communications systems shall be designed and installed in accordance with the 2022 NFPA 72, the 2022 CEC, the 2022 CFC, the 2022 CBC, and San Jose ordinances, policies, and standards. Other standards also contain design/installation criteria for specific life safety related equipment. These other standards are referred to in 2022 NFPA 72.

4.2 Refer to the 2022 CBC, Sections 403.5.3.1, 1009.6.5, 1009.8, 1010.2.12.1, and 3008.6.6 to determine when a two-way emergency communications system is required.

4.3 SJFD will enforce the following pathway survivability requirements for two-way communications systems based on the fire-rated construction of the building:

Where the fire rating of the building is 2 hours or greater, the installation shall conform with a pathway survivability of Level 2 or 3 per 2022 NFPA 72 Section 24.3.14.4.3.

Where the fire rating of the building is at least 1 hour but less than 2 hours, the installation shall conform with a pathway survivability of Level 4 per 2022 NFPA 72 Section 24.3.14.4.4.

Where the fire rating of the building is less than 1 hour, the installation shall conform, as a minimum, with pathway survivability Level 1.

Pathway survivability requirements are further explained in 2022 NFPA 72 Sections 12.4 for the required elements. Circuit Integrity (CI) cables used to meet pathway survivability Levels 1, 2, or 3 shall be UL 2196-listed and shall be installed in accordance with their respective UL Electrical Circuit Integrity Systems FHIT No. for the required method of installation.

4.4 Two-way communications systems shall provide communication between each required location and the fire command center (FCC) or a central control point (CCP) location approved by SJFD. Where the central control point is not constantly attended (24/7/365), a two-way communication system shall have an automatic voice dial-out capability to a central monitoring location providing 24-hour service. An approved central supervising station which will provide effective means of conversation for immediately summoning assistance at all hours in case of emergency, shall monitor the two-way communications system. The central station phone dialer, cellular communicator, switches, and similar equipment shall have 28 hours of backup power. This must be confirmed with the service provider.

4.5 Two-way communications systems shall be of analog type. IP phone systems shall not be permitted.

4.6 In buildings with horizontal exits, call boxes shall also be provided in compartments or refuge areas, created by the horizontal exits, where there are no elevators or elevator landings.

4.7 Two-way communications systems shall include both audible and visible signals. A button complying with the 2022 CBC Section 11B-708, 11-B-205 and 11B-308, in the area of refuge (area of rescue assistance) and/or elevator landings shall activate both a light in the area of refuge and/or elevator landings indicating that rescue has been requested and a light at the central control point indicating that rescue is being requested. A button at the central control point shall activate both a light at the central control point and a light in the area of refuge and/or elevator landings indicating that the request has been received.

4.8 The operable part of each two-way communications system initiating device (call box) shall be not less than 3½ feet and not more than 4 feet above floor level. Each call box shall have a Braille faceplate located not less than 3½ feet nor higher than 4 feet for front reach or 4½ feet for side reach above floor level.

4.9 Each call box shall indicate its location to the master control unit (MCU) or base station at the FCC/CCP and the central monitoring service.

4.10 Directions for the use of the two-way communications system, instructions for summoning assistance via the two-way emergency communications system, and written identification, including in Braille, of the location shall be posted adjacent to each call box. See examples provided on pages 7 & 8.

4.11 There shall be no more than one two-way communications system in a building. Likewise, there shall be no more than one supervising station providing service to a building.

4.12 Signage shall comply with 2022 CBC Section 1009.9.

4.13 Two-way communications systems shall be monitored for fault conditions by the building fire alarm system for the following events:

4.13.1 Communication failure on pathways between each call box and the MCU (base station)

4.13.2 Communication failure of external phone line connection of MCU (base station) to the monitoring station

4.13.3 Failure of either primary or secondary power supply

4.13.4 Any abnormal conditions on call stations and MCU (base station)

5.0 Inspections

5.1 Field inspections shall be scheduled only after approved plans have been issued. Only the installing contractor shall schedule all tests and inspections. To schedule an inspection, call (408) 535-3555. When scheduling, please reference the building permit number, not the building plan check number. Inspections can also be scheduled online through www.SJPermits.org.

5.1.1 When scheduling an inspection, it is the contractor's responsibility to request sufficient time to complete a thorough inspection of the work performed. Inspections are booked in increments of one-half hour with a one hour minimum. This time includes travel and completion of the Record of Inspection form.

5.1.2 Cancelled inspections. Missed inspections are treated as cancelled or failed inspections.

5.1.2.1 Cancellations made 5 or more business days, with a cutoff time of 2:00 PM, prior to the scheduled inspection date, will result in no inspection time being charged. All scheduled inspection time will be credited back to available inspection time.

5.1.2.2 Cancellations made less than 5, but 2 or more business days, with a cutoff time of 2:00 PM, prior to the scheduled inspection date, will result in one-half hour of inspection time being charged. Remaining scheduled inspection time will be credited back to available inspection time.

5.1.2.3 Cancellations made less than 2 business days, with a cutoff time of 2:00 PM, prior to the scheduled inspection date, will result in the entire scheduled inspection time being forfeited and counted as used inspection time.

5.1.3 Inspections are provided as covered by the permit fees. Additional inspections shall be billed by the amount of time required.

5.2 The installing contractor shall conduct a complete test of the system and shall complete all parts of the "Record of Completion" (Figure 7.8.2(a) of NFPA 72) **prior** to the San Jose Fire Department (SJFD) inspection date.

5.3 Necessary coordination shall be made such that representatives of other contractors whose equipment are involved in the testing are present.

5.4 There shall be a minimum of two technicians. One technician will be at the two-way communication system MCU while the other will be testing the devices (call boxes). Two-way radios shall be provided and the technician at the MCU shall communicate to the SJFD inspector the devices (call boxes) that are activated on the MCU.

5.5 At the time of inspection, the contractor shall hand the following to the SJFD inspector upon his/her arrival:

5.5.1 Approved and stamped plans

5.5.2 As-built plans for field changes and/or corrections to redline comments on the approved plans**.**

5.5.3 All previous records of inspections.

5.6 After the successful completion of the tests/inspections, provide the following to the SJFD inspector:

5.6.1 Copies of the System Record of Completion and the Emergency Communications Systems Supplementary Record of Completion forms – Refer to Figure 7.8.2(a) & (b) of 2022 NFPA 72

5.7 After final completion and acceptance of the project, the contractor shall provide the following to the owner:

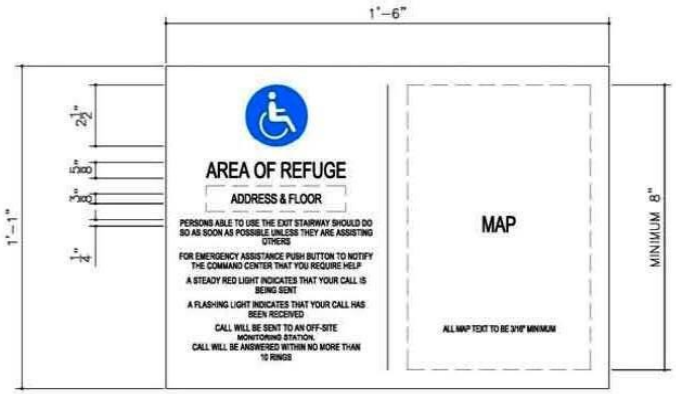
5.7.1 All literature and instructions provided by the manufacturers describing proper operation and maintenance of all devices and equipment,

5.7.2 A copy of the approved plan and as-built plan, if applicable,

5.7.3 Copies of the System Record of Completion and the Emergency Communications Systems Supplementary Record of Completion forms – Refer to Figure 7.8.2(a) & (b) of 2022 NFPA 72.

6.0 Document Revisions

6.1 This document is subject to revisions. For general information and to verify that you have the most current document, see SJFD development website, or call (408) 535-7750 and request the current version date.



SIGN TYPE – DETAIL | 1

SCALE:

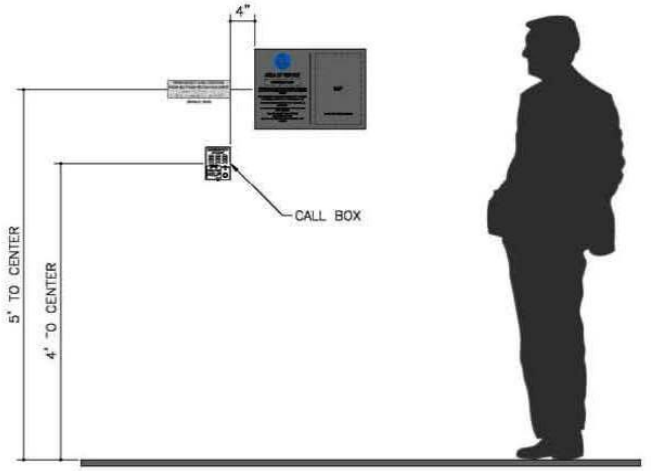
MONITORING STATION PROTOCOL

1. CALL MUST BE ANSWERED WITH IN NO MORE THEN 10 RINGS.
2. TRY AND INITIATE CONTACT WITH THE CALLER, ONCE OPERATOR HAS MADE CONTACT WITH CALLER A SECOND OPERATOR WILL CONTACT EMERGENCY SERVICES WHILE THE FIRST OPERATOR WILL STAY ON THE LINE TO INFORM CALLER AND EMERGENCY SERVICE OF STATUS.
3. IF NO RESPONSE OR HELP IS REQUESTED:

   DISPATCH THE LOCAL FIRE DEPARTMENT.
   NOTIFY PREMISES NUMBERS AS LISTED ON THE ACCOUNT. NOTIFY RESPONSIBLE PARTIES AS LISTED ON THE ACCOUNT.

SIGN TYPE – DETAIL | 2

SCALE:



ELEVATION VIEW | 3

SCALE:

SIDE VIEW | 2

SCALE:

Example 4.8a

EMERGENCY CALL STATION

PUSH BUTTON BELOW FOR HELP

LOCATION FLOOR

______________ ______________

PERSONS ABLE TO USE THE EXIT STAIRWAY DO SO AS SOON AS POSSIBLE, UNLESS THEY ARE ASSISTING OTHERS

FOR EMERGENCY ASSISTANCE
PUSH BUTTON TO NOTIFY THE COMMAND CENTER
THAT YOU REQUIRE HELP

A SOLID RED LIGHT INDICATES THAT YOUR CALL IS BEING SENT

A FLASHING RED LIGHT INDICATED THAT YOUR CALL HAS BEEN RECEIVED

AN OPERATOR WILL COME ONLINE TO ASSIST YOU WITHIN 5-10 RINGS
(NOTE: UP TO 5 RINGS FOR ONSITE RESPONSE; UP TO 10 RINGS FOR RESPONSE FROM OFF-SITE MONITORING STATION)

WAIT HERE FOR ASSISTANCE

Example 4.8b