FIRE CONSTRUCTION PERMIT SUBMITTAL CHECKLIST

SERVING THE CITIES OF LAKE STEVENS, MONROE AND SULTAN

EMERGENCY RESPONDER RADIO SYSTEM

PROJECT INFORMATION	
Site address:	**Associated Permits:**
Project Name / Tenant:	**Property Owner:**

Electronic file standards

File naming standard: Electronic plans and documents shall be named as specified in bold type under "permitting requirements". For example, the seating plan must be named "Seating Plan".

Acceptable file types: Plans, calculations, specifications and supporting documents shall be uploaded as a PDF file.

Document Orientation: All plans must be uploaded in "Landscape" format in the horizontal position. All other documents can be in "Portrait" format.

CODE EDITIONS

☐ 2021 Washington State Fire and Building Code and as applicable -Lake Stevens Municipal Code 14.84, Monroe Municipal code 15.04.110 and Sultan Municipal Code 15.05.

PERMITTING REQUIREMENTS

A Fire Construction Permit is required for the installation of or modification to in building, two-way ***Emergency responder communication coverage systems*** and related equipment required by Section 510 of the 2021 Washington State Fire Code and local code amendments. **The following information is required at time of application for the Fire Construction Permit.**

- ☐ Completed **emergency responder radio submittal checklist**. Check all checkboxes that are applicable to your project.
- ☐ **SNO911 Letter of Provisional Authorization available at www.sno911.org**
- ☐ Manufacturer's **cut sheets** for all components, cables, connectors, antennas, etc.
- ☐ System Designer and lead acceptance test personnel shall provide:
    - copies of a valid FCC-issued general radio operator's license
    - A certificate of in-building system training issued by an approved organization/ school or a certificate issued by the manufacturer of the equipment being installed.
- ☐ A pre-construction survey signal report, preferably utilizing IB Wave modeling software or equivalent.

PLANS

The following is a list of information required on all plan submittals for review of an "Emergency responders radio coverage system" permit application. The plan shall be drawn to 1/8"=1'-0" minimum scale. The applicant is required to submit all of this information so an accurate and timely review may be done:

MINIMUM DOCUMENTATION FOR PLANS

- ☐ Floor plan containing:
    - ☐ riser diagram
    - ☐ cable pathways
    - ☐ fire resistance rating of structure containing the backbone cable.
    - ☐ antenna locations
    - ☐ AC power backup type – batteries or generator
    - ☐ donor antenna location and mounting information – the antenna is required to be mounted permanently in an approved location
    - ☐ DAS system components required to be in the fire control room
    - ☐ Location of DAS remote annunciator panel – required to be adjacent to the main entry door to the building adjacent to the fire alarm annunciator
- ☐ Equipment technical specifications data sheets.
- ☐ Product certifications – Required to be listed in accordance with UL 2524.
- ☐ Battery Calculations.
- ☐ Plans shall be signed by a person holding a valid FCC GROL License and Certification of in-building system training issued by an approved organization or approved

school, or a certificate issued by the manufacturer of the equipment being installed.

Contact information and license number of the electrical installation contractor.

- ☐ Indicate if DAS is:
  - ☐ Passive
  - ☐ Active
  - ☐ Hybrid system.
- ☐ Rebroadcasting the Snohomish County 911 Public Safety frequencies shall be accomplished utilizing class "A" bi-directional amplifiers. **CLASS "B" BDA/DAS SYSTEMS ARE NOT GRANTED AUTHORIZATION TO RETRANSMIT ON THE SNOHMISH COUNTY 911 RADIO SYSTEM.**

Fire Fighter Communication System Specifications

AHJ Designated Critical Areas: emergency command center, fire pump room, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, riser room, fire alarm control panel location, and any other location identified by the Fire Code Official.

EMERGENCY RESPONDER COMMUNICATION ACCEPTANCE TEST SIGNAL STRENGTH REQUIREMENTS

The building shall be considered to have acceptable in-building, two-way emergency responder communication system coverage where signal strength measurements in 95 percent of all areas and 99 percent of areas designated as critical areas meet the following signal strength requirements:

Signal strength into the building: Shall be a minimum of -95dBm throughout the coverage area and sufficient to provide not less than a Delivered Audio Quality (DAQ) of 3.0 or an equivalent Signal-to-Interference-Plus-Noise ratio (SINR) applicable to the technology for either analog or digital signals.

Signal strength out of the building: Shall be sufficient to provide usable voice communications throughout the coverage area. The outbound signal level shall be sufficient to provide not less than a DAQ of 3.0 or an equivalent SINR applicable to the technology for either analog or digital signals.

POST INSTALLATION ACCEPTANCE TEST PROCEDURE

Upon completion of installation, the radio system shall be tested to verify that two-way coverage on each floor of the building is in accordance with the following:

1. Each floor of the building shall be divided into a grid of 20 approximately equal test areas.

2. The test shall be conducted using a calibrated portable radio of the latest brand and model used by the agency talking through the agency's radio communications system or equipment approved by the fire code official.

3. Failure of more than one test area shall result in failure of the test.

4. In the event that two of the test areas fail the test, in order to be more statistically accurate, the floor shall be permitted to be divided into 40 equal test areas. Failure of not more than two nonadjacent test areas shall not result in failure of the test. If the system fails the 40-area test,k the system shall be altered to meet the 95-percent coverage requirement.

5. A test location approximately in the center of each test area shall be selected for the test, with the radio enabled to verify two-way communications to and from the outside of the building through the public agency's radio communications system. Once the test location has been selected, that location shall represent the entire test area. Failure in the selected test location shall be considered to be a failure of that test area. Additional test locations shall not be permitted.

6. The gain values of all amplifiers shall be measured and the test measurement results shall be kept on file with the building owner so that the measurements can be verified during annual tests. In the event that the measurement results become lost, the building owner shall be required to rerun the acceptance test to reestablish the gain values.

7. As part of the installation, a spectrum analyzer or other suitable test equipment shall be utilized to ensure spurious oscillations are not being generated by the subject signal booster. This test shall be conducted at the time of installation and at subsequent annual inspections.

8. Systems incorporating Class B signal-booster devices or Class B broadband fiber remote devices shall be tested using two portable radios simultaneously conducting subjective voice quality checks. One portable radio shall be positioned not greater than 10 feet (3048 mm) from the indoor antenna. The second portable radio shall be positioned at a distance that represents the farthest distance from any indoor antenna. With both portable radios simultaneously keyed up on different frequencies within the same band, subjective audio testing shall be conducted and comply with DAQ levels as specified in Sections 510.4.1.1 and 510.4.1.2.9.

9. THE RESULTS OF THIS TEST SHALL BE PLACED IN THE DAS SYSTEM ENCLOSURE OR IN THE BUILDING ENGINEER'S OFFICE PRIOR TO THE ISSUANCE OF THE CERTIFICATE OF OCCUPANCY.

Technical Specifications and Component Installation:

1.1 The feeder and riser coaxial cables shall be rated as plenum cables. Backbone cables shall be routed through an enclosure that matches the buildings required fire resistance rating of shafts or interior exit stairways.

1.2 For systems with DAS equipment located in a room other than the Fire Control Room, a Remote Annunciator / Dedicated Annunciator and Monitoring Panel shall be installed in the Fire Control Room.

1.3 Frequencies:

Downlink frequencies for Fire – Contact www.sno911.org

Downlink frequencies for Police – Contact www.sno911.org

Uplink frequencies for Fire – Contact www.sno911.org

Uplink frequencies for Police – Contact www.sno911.org

1.4 Radio Repeater Locations:

Main Repeater Site: Contact www.sno911.org

Backup Repeater Site Location: Contact www.sno911.org

☐ **1.5** The cabinet shall be painted red and labeled (in bright yellow):

PUBLIC SAFETY COMMUNICATION SYSTEM RADIO

Serviced by: vendor name and telephone number

☐ **1.6** To maintain proper alignment with the system designed donor site, donor antennas shall be permanently affixed to the highest point on the building or where approved by the fire code official. A clearly visible sign stating "**Movement or repositioning of this antenna is prohibited without approval from the fire code official**". The antenna installation shall be in accordance with the applicable requirements of the *International Building Code* for weather protection of the building envelope.

☐ **1.7** Buildings equipped with emergency responder radio systems shall have signage near the fire alarm control panel and at the main entrance that states, "**This building is equipped with an emergency responder radio coverage system."**

☐ **1.8** Doors into rooms or areas containing emergency responder radio coverage system equipment shall be provided with approved signs stating "**Emergency Responder Radio Coverage System Equipment"**

☐ **1.9** Signage required by 1.6 thru 1.8 shall have 1" white letters on a red background that is permanent in nature. Signs are subject to approval.

☐ **2. <u>System Monitoring:</u>**

☐ 2.1 The fire alarm shall monitor all supervisory signals produced by the DAS system. The supervisory signals may be configured as a single supervisory input to the fire alarm system. The following supervisory conditions are required to be annunciated by the DAS system and monitored by the fire alarm panel:

- ☐ Loss of normal AC power
- ☐ System battery charger(s) failure
- ☐ Donor antenna malfunction
- ☐ Active RF emitting device failure
- ☐ Low battery capacity at 70% reduction of operating capacity
- ☐ Failure of critical system components
- ☐ Supervision of communications link between the fire alarm system and the in building, two-way emergency responder communication coverage system.
- ☐ Oscillation of active RF-emitting devices.

☐ **2.2** A sign will be located at the dedicated monitoring panel with the name and telephone number of the service provider.

FINAL INSPECTION CHECKLIST

- □ Confirmation of NEMA 4 on BDA, NEMA 3R or higher, IP65 waterproof cabinet or equivalent on battery system. Exception - If Listed battery systems that are contained in integrated battery cabinets.
- □ Confirmation of backup power
- □ Proper signage near fire alarm panel and on doorway to equipment
- □ Proper signage near the donor antenna
- □ Trouble/supervisory signals confirmed with central station
- □ The following documents shall be placed in the DAS system enclosure or in the building engineer's office prior to the issuance of the Certificate of Occupancy:
  - □ A certification letter stating that the emergency responder radio coverage system has been installed and tested in accordance with this code, and that the system is complete and fully functional.
  - □ The grid square diagram created as part of testing
  - □ Data sheets and/or manufacturer specifications for the emergency responder radio coverage system equipment; back up battery; and charging system (if utilized).
  - □ A diagram showing device locations and wiring schematic,
  - □ A copy of the electrical permit.