



Emergency Responder Radio Coverage

ISSUE : The intent of this memo is to provide effective emergency responder radio coverage throughout the Gresham Fire & Emergency Services response area.

CODE REFERENCE: OFC section 510 (2019) emergency responder radio coverage: NFPA 72 (2016) National Fire Alarm and Signaling Code Chapters 10, 12, & 24.

FINDINGS:

Affected buildings: Gresham Fire will apply section 510 to the bullets in the scoping section, 510.1.1.

- Any building with one or more basements, or below-grade building levels.
- Any underground building.
- Any building more than five stories in height.
- Any building 50,000 sq ft in size or larger.
- Any building that, through performance testing does not meet the requirements of section 510. This includes existing buildings.

Permit Process:

- A fire alarm permit is required through the City of Gresham Permit Center.
- An electrical permit through the City of Gresham Permit Center is required for the wiring.

Minimum Submittals and Review Criteria:

- Provide cut sheets of the equipment indicating that the equipment is commercial grade.
- State how the 12 hours of secondary power will be achieved.
 - Show battery draw calculations if batteries are proposed.
 - Document that the site has sufficient fuel on site to support the system if a generator is proposed.
- NEMA4 enclosures for signal booster components and battery back-up system
- Automatic alarming of malfunctions to the signal booster and battery systems per NFPA 72 (2016) 24.8.3. Examples below:
 - Circuit integrity per 12.6 & 10.14
 - Antenna malfunction
 - Signal booster failure
 - Loss of normal ac power
 - Failure of battery charger
 - Low battery capacity alarm
 - Must be monitored by central station, proprietary supervising station, or AHJ may approve an audible signal at a constantly attended location.
 - A dedicated panel shall be provided within the fire command room per NFPA 72 (2016) 24.13.1.2.

- Equipment must be FCC certified.
- In buildings that historically would have had to provide a firefighter communication system, high rise structures, exclusive of the antennae, the system shall have a pathway survivability of Level 2 or 3; NFPA 72 (2016) 24.3.13.
 - Pathway survivability descriptions are found in NFPA 72 sections 12.4.1, 12.4.2, 12.4.3 and 12.4.4.
 - Level 2 or 3; NFPA 72 (2019) 12.4; equates to 2 hour fire rated protection or 2 hour performance alternative approved by AHJ
 - Where separation of the in-building fire emergency control equipment occurs and where the circuits are run through junction boxes, terminal cabinets, or control equipment, and where the cable integrity is not maintained shall in addition to the pathway survivability, be protected by a 2hr rated enclosure, 2hr fire rated room or other equivalent means to provide the 2hr protection approved by the AHJ.
 - For systems employing relocation or partial evacuation a level 2 or 3 pathway survivability is required.
- Although it will be technically approved by the electrical permit, please show the type and grade of cabling.
- Must cover our specified frequencies (see below).
- Must state the qualifications of the system designer and lead installation personnel.
- Outline the proposed acceptance test procedure.

Building Final:

- Prior to the Building Final a Fire Alarm Final shall be called in to the Gresham Permit Center. The fire official is responsible for reviewing the results of the radio acceptance test and approving or presenting a notice of correction as warranted.
 - Acceptance testing of new structures that fit the criteria above for having to meet section 510; and the applicant was notified by the Fire Plan reviewer; and **NO radio coverage equipment** has been installed; the acceptance test must be performed by a third party. The findings of the third-party report should be forwarded to the Gresham Fire for review, and site test confirmation.
 - Buildings that fail the radio test will be documented on the site and the Fire Marshal final sign off will be delayed until the building meets the section 510 requirements.
 - Acceptance testing of a building that has radio equipment installed by permit. It is up to the contractor whether they want to test their own system or have a third-party contractor do the test. Once the test is complete, a final inspection shall be requested to the Gresham Permit Center. An inspector from Gresham Fire will come to the site, and spot check the radio strength data gathered during the system acceptance test.
- As part of the final inspection, the fire plans section inspector will email ComNet with the address that a radiated cable or DAS system working with our responder

frequencies has been installed. This information is important because if one of the boosters malfunction and captures a trunked radio frequency, ComNet will search the addresses in that area, which should help speed tracking down the malfunction.

Retroactive: 510.2 requires radio coverage in existing buildings meeting the requirements of OFC 510 as required by Section 1103 of the OFC.

GFES and PF&R Radio Technical Criteria:

- Frequencies used by local emergency responders
 - 770.5375 MHz through 860.8125 MHz site down link.
- Maximum propagation delay (in microseconds) in regard to analog and digital communications boosters.
 - < .75 microsecond
- Location of the radio sites and the effective radiated power of the radio sites. See table below.

Site	Lat	Lon.	ERP dBm	
Biddle Butte	45 34 50.3051N	122 12 26.4676W	51.8	
Forest Hts.	45 32 29.2488N	122 45 32.8025W	48.5	
PDX	45 35 23.1570N	122 35 32.2578W	44.7	concourse D
Walters Hill	45 29 19.0140N	122 26 09.2177W	50.2	
Goat Mt.	45 07 45.0322N	122 17 33.7402W	50.2	
Arrowood	45 26 08.4923N	122 42 45.3003W	51.7	
Lookout Point	45 29 01.9054N	122 07 46.5215W	53.6	
Mt. Scott	45 27 17.0752N	122 33 03.6490W	51.5	
Headworks	45 26 55.3650N	122 09 15.7180W	41.9	
Prune Hill	45 35 31.4279N	122 26 19.1821W	52.6	
Willaltin Tank	45 34 49.7903N	122 47 44.3458W	51.5	
Council Crest Sector	45 29 57.6730N	122 42 31.3279W	52.8	NORTH EAST / SECTOR 1
Council Crest Sector			53.8	SOUTH WEST / SECTOR 2
Corn pass	45 36 27.9724N	122 51 22.0774W	53.2	On Skyline School
PCC	45 26 24.1944N	122 43 39.7344W	49.3	
Mt. Hood	45 20 00.0373N	121 42 51.3778W	49.9	

- List of specifically approved system components