1.0 Overview

A. The fire alarm system shall be a non-coded UL listed addressable fire alarm system with a voice evacuation/ mass notification annunciation system.

B. All components shall be UL listed for use with the fire alarm voice evacuation/ mass notification annunciation system.

C. The design of the fire alarm and mass notification system shall, at a minimum, comply with the following:
   1. International Building Code
   2. International Fire Code
   3. International Mechanical Code
   4. NFPA 72 National Fire Alarm Code
   5. NFPA 70- National Electrical Code
The version/year of these standards and codes shall be the most current version adopted by OSE and the State Fire Marshal.

D. Refer to the CCU Fire Alarm and Voice Evacuation/Mass Notification Typical Riser for additional information.

E. Provide TVSS surge protection for the incoming power and for all devices that leave the building (AHU interfaces, antennas, duct mounted smoke detectors exterior strobes/horns).

F. The engineer of record shall review these standards and modify as required to meet the requirements for the specific building or site designed. All modifications shall be reviewed and approved by the CCU Fire Marshal.

G. Design plans and specifications shall be submitted to the CCU Fire Marshal prior to the project going out to bid.

H. Device labels: Embossed adhesive tape, with 3/16 inch (5 mm) white letters on black background. Use only for identification of all fire alarm notification and activation devices. Label shall include loop and device number.

I. Fire alarm and mass notification power supplies and panels shall be accessible without the use of a ladder.

2.0 Fire Alarm
A. The basis of design for the fire alarm system is Firelite.

B. The fire alarm panel shall be installed in an electrical room.

C. Use class B with a minimum pathway survivability level of 1. All cabling shall be in conduit.

D. Provide dual action fire alarm pull stations. Basis of design is FireLite model BG-12LX. Key pull stations to common key with fire alarm panel.

E. The fire alarm system shall use two dedicated phone lines for reporting to the remote receiving station at CCU Department of Public Safety Dispatch Center.

F. Test and reset keys shall be provided for all for duct mounted smoke detectors. Install the test and reset units 48” AFF and label unit or damper served.

G. Provide a recessed remote annunciator at a location approved by the CCU Fire Marshal.

NOTE:
All manufacturers and components shall be “open source” or “non-proprietary” systems where the parts, supplies, programing, software and all other portions or aspects of the system are available from multiple independent competitive dealers or suppliers on the open market. The use of non-proprietary equipment and systems shall allow certified technicians to obtain parts, program, perform maintenance or subcontract repairs competitively.

2.1 Annunciation (Fire alarm and In-building Mass notification)

A. The mass notification system shall be an Eaton Safepath with Waves over IP voice evacuation and mass notification system.

B. The mass notification system shall be connected to CCU Department of Public Safety Dispatch Center’s ALERiTY mass notification system by ethernet and a backup radio communication system.

C. The mass notification and voice evacuation panel (and booster panels) shall be installed in electrical rooms.

D. The mass notification digital communicator shall be installed in a communication room on the top floor of the building.

E. There shall be a battery booster panel for strobes and an amplifier booster panel for speakers installed, at a minimum, on every floor. Provide 25% spare capacity in the
amplifier booster panel and the battery booster panel. Calculations shall assume that the speakers are at their maximum tap settings and strobes are at their designed candela level.

F. All annunciation devices shall be white and shall be marked with “ALERT” only. Basis of design is Cooper annunciation System Sensor devices.

G. Any location that requires a strobe for fire alarm notification shall be installed as a speaker strobe. The only exception to this is at the voice evacuation and mass notification panel or the remote microphone location; do not install speakers at these locations.

H. Speakers and strobes are not required in the stairwells unless the building height requires them per the applicable building code.

I. All pathways for annunciation shall have a minimum survivability level of 1 and shall be installed in conduit. The engineer of record shall review the project specific requirements to determine if a pathway survivability greater than 1 is required.

J. Provide a remote microphone station installed in a recessed locked enclosure (with a window) at the fire alarm remote annunciator location. Enclosure shall be keyed to the campus best key system.

K. Program the mass notification and voice evacuation panel with CCU’s standard 8 pre-recorded messages.

L. All antennas installed shall be secured to the building structure to resist a 130 MPH wind load with a gust factor of 1.3.

M. All strobes must be synced.

N. All speakers shall have field selectable taps to adjust volume.

O. Speaker design and spacing shall take into consideration the acoustics of a space. Speakers should never be pointed at each other.

P. Speakers should be located near the center of rooms, not near the edges of a space.

Q. Space speakers as required for intelligibility and NFPA coverage requirements.

R. Provide voltage drop calculations that show a 1.5db or less power loss on the speaker circuits.

S. Radio communication system operating frequency shall be 5.2GHz.
2.2 Area Wide Mass Notification

A. Any projects that add outdoor space or have outdoor venues shall expand the existing wide area mass notification system installed on campus.

B. The area wide mass notification system shall be connected to CCU Department of Public Safety Dispatch Center’s ALERiTY mass notification system.

2.3 Mass Notification Risk Assessment

A. CCU has four layers of mass notification:
   1. Layer one is the in-building mass notification system.
   2. Layer two is the area wide mass notification system
   3. Layer three is text messages and emails
   4. Layer four is public broadcast measures, information posted on social media, and CCU’s website.

B. An NFPA 72 risk assessment for layer one and two of the mass notification system was performed over June-August of 2016. This assessment was done with representatives of CCU facilities, CCU public safety, CCU Fire marshal, CCU Information Technology, and CCU Emergency Management. The engineer of record shall update the risk assessment and provide this risk assessment to OSE for review and approval for each new construction or renovation project.

C. The NFPA 72 risk assessment reference CCU’s continually evolving campus Risk Assessment and Emergency Operations Plan. This plan and assessment was reviewed in relation to the mass notification system standards included in this document. Copies of a current version of this plan are available at CCU Department of Public Safety.

D. The result of the NFPA 72 risk assessment was:
   1. Pathway survivability: The in building mass notification systems at CCU do not employ relocation or partial evacuation during a fire alarm event. Pathway survivability shall be at a minimum a level 1.
   2. Location of equipment: The mass notification panel shall be located in a 1st Floor electrical room nearest to the front entrance of the building to limit access by public. Fire alarm panel shall also be installed in this room. Responders will be trained in the location of the panel and provided with access to the room in which it is located. The remote microphone shall be installed in a locked recessed enclosure near the fire alarm remote annunciator.
   3. Occupancy type: The following occupancy types were considered during the risk assessment.
      a. Student Housing
      b. Sports Venues
c. Academic Buildings
d. Facilities Buildings

4. Message priority:
   a. The in-building mass notification system is allowed to override a fire alarm evacuation notification for the brief time that the mass notification signal is broadcast. Once the mass notification signal is complete the fire alarm signal will continue.
   b. The mass notification system will only be used when there is an imminent threat to life and safety.
   c. If at any time a first responder needs to communicate with the building occupants the local microphone in the building will override all fire alarm and mass notification signals. Once the local microphone is no longer in use the building fire alarm and/or mass notification system will continue to alarm.
   d. If the building uses the mass notification system for paging or music or non-mass notification signals these signals shall not override any fire alarm, mass-notification, or local microphone signal.

5. Notification Zones: Each building on campus will be a notification zone. CCU’s head end system can be used to send mass notification signals to all buildings or just select buildings as required by CCU’s Emergency Operations Plan process for dealing with emergencies.

6. CCU’s dispatch center is located at the public safety building emergency command center. A redundant mass notification control panel is located at CCU IT building.

7. CCU Public Safety Officials will have the ability to use pre-recorded messages broadcast from the CCU Dispatch Center or custom messages dependent on the Emergency Operations Plan.

8. Refer to table 28 00 00 2.1 for the Mass Notification Risk Assessment.

3.0 Installation

A. All circuit breakers supplying power to the fire alarm voice evacuation/ mass notification annunciation system shall be painted red and locked in the on position.

B. The conduit system used for this system shall be red or shall have red covered junction boxes. In areas with exposed conduit in finished spaces, pending approval of the CCU Fire Marshal, the conduit and junction boxes can be painted to match the exposed ceiling spaces if the junction boxes are labeled “Fire Alarm”.

C. Contractor shall provide a minimum of 2% additional fire alarm/mass notification devices including but not limited to pull stations, horn/strobes, speakers, etc. at end of project.

3.1 Testing
A. The fire alarm contractor shall contract with an independent testing agency to conduct a
STI/STIPA test per NFPA 72-2013 Annex D. The testing shall be a quantitative test that
uses a signal generator and a testing device that provides a speech intelligibility score
for each Acoustically Distinguishable Space (ADS).

B. Submit a testing plan identifying the proposed ADS’s to the Architect/Engineer and CCU
Fire Marshal on a marked up floor plan for review and approval prior to testing.

C. Adjust speaker taps to improve intelligibility and audibility of the system during this test.

D. Submit all test reports to the Architect/Engineer and CCU Fire Marshal.

28 23 00 – Video Surveillance

1.0 General

A. Video camera basis of design shall be:
   1. Interior cameras: Flir IP
   2. Exterior cameras: Panasonic Business

28 32 00 – Two-Way Communication

1.0 General

A. Provide a two-way communication system at all elevator landings above the first floor.
   Basis of design is Housing Devices Inc. ADA 1000 System.

28 83 06 – Radio Enhancement System

1.0 General

A. Provide an in-building public safety radio enhancement system (RES) per IFC 510
   (2015) and install per NFPA 1 (2015) annex o. Coordinate radio frequency bandwidth
   requirements with the AHJ. Prior to installation, test radio coverage in building per NFPA
   1, annex o. If inbound/outbound radio signal strength meets the criteria of NFPA 1 annex
   o, do not install radio enhancements and provide credit to the owner.

B. The RES shall be capable of integrating into Coastal Carolina University’s fiber optic
   RES network.

C. All coaxial cabling shall be installed in conduit.
28 10 00 – Electronic Access Control and Intrusion Detection

The following is a compilation of documents which highlight Coastal Carolina University’s Electronic Access Control and Intrusion Detection standards. These standards summarize the requirements of CCU’s ITS Department and Environmental Health and Safety Department. Basis of design shall be CBORD.
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification

– Updated April 2017

Typical Card Reader Door with Electric Strike Using Hibred Cable

COLOR    TYPE
ORANGE    1
WHITE     2
BLUE      3
GRAY      4
### Cable Table

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>A</td>
<td>5388C</td>
<td>8 Conductor #18awg, Stranded, Shielded w/ drain, Color Coded</td>
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<tr>
<td></td>
<td>BELDEN 5306FE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CAROL E2038S</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Or equivalent</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>YR15950</td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
<tr>
<td>C</td>
<td>82760</td>
<td>2 Conductor #18awg, Stranded, No Shielded</td>
</tr>
<tr>
<td>D</td>
<td>CAT 5/6E – 8 Conductor Twisted Paire, 568B Network Cable</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>538AFS</td>
<td>1 - 6 Conductor #18awg, Stranded, Shielded w/ Drain (White, Green, Orange, Brown, Red, Black)</td>
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<td></td>
<td></td>
<td>1 - 4 Conductor #16awg, Stranded, Shielded w/ Drain (White, Black, Red, Green)</td>
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<td>1 - 4 Conductor #18awg, Stranded, Shielded w/ Drain (White, Black, Red, Green)</td>
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<tr>
<td></td>
<td></td>
<td>1 - 2 Conductor #18awg, Stranded, Shielded w/ Drain (Red, Black)</td>
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### Device Table

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tr>
<td>Hid Prox</td>
<td>5388C</td>
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<tr>
<td>Combo Prox / Magnetic Stripe</td>
<td>BELDEN 5306FE</td>
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<td>Dorado</td>
<td>CAROL E2038S</td>
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<td>538AFS</td>
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<td>A2005</td>
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<td>Biometric</td>
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<tr>
<td>Exit Request</td>
<td>YR15950</td>
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<tr>
<td>Rev as Part of Locking Device (Exit Bar or Lever)</td>
<td>82760</td>
<td>2 Conductor #18awg, Stranded, No Shielded</td>
</tr>
<tr>
<td>Door Strike</td>
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<tr>
<td>Exit Request PIR</td>
<td>YR15950 / 82760</td>
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<tr>
<td>Door Contact</td>
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<tr>
<td></td>
<td></td>
<td>4 Conductor #22awg, Stranded, Shielded w/ drain, Color Coded</td>
</tr>
</tbody>
</table>
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification

Update: April 2017

NEC Article 800 538AFS

(1) 4-Cond. Beldfoil 16 AWG
   White, Black
   Red, Green,
   Stranded
   Shielded

(1) 4-Cond. Beldfoil 16 AWG
   White, Black
   Red, Green,
   Stranded
   Shielded

(1) 3-Pair Beldfoil 16 AWG
   White & Green,
   Orange & Brown,
   Red & Black
   Stranded
   Shielded

(1) 2-Cond. Beldfoil 16 AWG
   Red,
   Black
   Bare Copper
   Stranded
   Shielded

LOCKING HARDWARE

Spares

Blue

REX

Spare

Orange

CARD READER

White

DOOR CONTACT

Gray

LOCKING HARDWARE

REX POWER

Blue

REX

DOOR CONTACT

Orange

CARD READER

White

Card Reader Power

SquadronTypicalDrawingsRev4 - JEL
Coastal Carolina University Design Guidelines

Fire Detection, Alarm, and Mass Notification

Updated April 2017

Using eight (8) Wires

Using Six (6) Wires

Squadron Panel
Coastal Carolina University Design Guidelines
Fire Detection, Alarm, and Mass Notification
Updated April 2017

Supervised Inputs

Double Doors

Requires Power

Passive Inferred

Wall Mount 45° Motion Detector

Requires Power

Passive Inferred

Ceiling Mount 360°

Requires Power

Glass Break Detector

Holdup / Assistance Required Button

HUB

GB

360° PIR

45° PIR

DC

Alarm Devices

Reader #1

+ - Input 1
+ - Input 2
+ - Input 3
+ - Input 4
+ - Input 5
+ - Input 6
+ - Input 7
+ - Input 8

Reader #2

+ - Input 9
+ - Input 10
+ - Input 11
+ - Input 12
+ - Input 13
+ - Input 14
+ - Input 15
+ - Input 16

Tamper (Input 5)
AC Bat +12VDC
Fail Fail In

Power Reset Comm

P1

V200

P2

Address

P3

Relay 1

NO C NC

Resistor

TERM

P8

RS-485 RS-485 +12VDC
In Out In

A B Shld A B Shld + -

P9

Relay 2

NO C NC

SquadronTypicalDrawingsRev4 - JEL