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York University Building Standards

*Note to the Designer/Architect/Engineer: These standards are basic minimum criteria to be met in preparing the final project specifications for this section, which is the responsibility of the Designer*

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## 1.0 GENERAL

### 1.1 Guiding Principles

- .1 The public announcement system is a stand alone (independent) emergency communication tool

### 1.2 Scope of Work

- .1 This standard defines minimum functional and technical requirements for a public announcement system (PAS) that interfaces with the existing Command intercom based campus wide public announcement system with multiple input modes

### 1.3 Related York University Standards

- .1 York University Network and Communications Services Facilities Standard (latest iteration)

### 1.4 Performance Standards References

- .1 Comply with all applicable municipal, provincial, federal and trade standards in this specification, unless more stringent requirements are given herein.
- .2 NFPA 72 -2010: A New Era in Emergency Communications
- .3 Underwriter laboratory UL – 1333 Vertical (Riser) Fire Rating
- .4 National Building Code of Canada (2010)
- .5 Ontario Electrical Safety Code, 25<sup>th</sup> Edition 2012

### 1.5 Submissions

- .1 For system installers submit three copies (CD or on USB key) of shop drawings following contract award and prior to proceeding with installation. Shop drawing submission shall include floor plans indicating device location (speaker, horns, strobes, equipment, etc.), amplifier and battery calculations, data sheets for equipment. Submit to PA System engineer for review and acceptance
- .2 Submit three copies (CD or on USB key) of the as built diagrams for installed building Public Announcement System denoting the location of indoor and out door speakers, indoor

- and outdoor strobe lights, wiring, location of control equipment and other system elements.
- .3 Submit one copy of As Built drawings to PA System engineer for review and approval
- .4 Submit one copy of As Built drawings of PAS As Built drawings to Manager, Planning and Architectural Design Department, CSBO
- .5 Submit one copy of PAS As built drawings to Manager, Infrastructure Operations, UIT
- .6 As built drawings shall be submitted using AutoCad format (please consult York University Project Representative for details of AutoCad version to use)

#### 1.6 Standard Warranties and Extended Warranties

- .1 The contractor shall guarantee that all provided and installed materials and equipment will be free from defects, workmanship and will remain so for a period of one year from the date of final system acceptance.
- .2 Commend specific hardware shall have a two-year manufacturer's warranty
- .3 Amplification shall have a one-year manufacturer's warranty
- .4 The contractor shall provide the York University project representative all equipment warranty documents.
- .5 The contractor shall certify and provide sign-off that PA system equipment and materials conforms to York University Building Standard Section 27 51 16

## 2.0 Materials (Products)

### 2.1 System General Functional Requirements

- .1 The Public Annunciation System shall meet, or exceed the following functional requirements:
  - .1 The system shall be capable of operating indoor and outdoor. Outdoor installations shall be water and weather resistant. Outdoor components shall be suitable for operating below freezing conditions at a minimum operating of -20°C
  - .2 PA system shall be capable of integration with existing classroom technology on campus
  - .3 PA system must permit network zones annunciation, capable of isolating zones (groupings of buildings categorized as villages by York University's Security Services) as well as all building system annunciation

- .4 PA System needs to operate on an emergency power for 15 minutes of actual use at 100% output capacity. Further, the PAS must also permit a 2-hour quiescent (or dormant) stand-by back up power capacity. This uninterrupted emergency power should be independent of other existing emergency power supplies available on campus.
- .5 System needs to be connected to York University Security Services Control Centre (at William Small) as well as the Security Services alternate Security Control Centre (at Bennett Centre Parking Structure) including back-up control centres).
- .6 PA system must have the capability to store a number of pre-recorded messages.
- .7 PA system must have the ability to access PA functions remotely (at building, from Security Control Centre and alternate Centre and by telephone either land line or cellular telephone)
- .8 System must include indoor and outdoor visual (Strobe Light) auditory (speaker) capability.
- .9 System must be capable of suppressing existing sound systems (such as in Classroom/Lecture Hall technology) (where integration with existing audio system is possible) to a specified area of broadcast.
- .10 System performance shall provide sufficient sound pressure level (dBA) of messages for all floor areas outfitted with PAS devices
- .11 Outdoor PA system components must be built to withstand environmental conditions, must be water/weather proof for duty outdoors or in damp locations (see Item 1)
- .12 System components that are located in public areas must have vandal-proof or vandal-resistant characteristics in their construction and installation.
- .13 PA System shall be stand alone and shall not be integrated with existing fire alarm or fire annunciation or fire prevention alert systems
- .14 System architecture shall be modular and scalable, such that new buildings, new zones can be brought on line as required
- .15 PA system shall employ existing York University network infrastructure. All network switches, network drops, routers, etc., shall be supplied, programmed and installed by UIT
- .16 PA system expansion shall integrate, and be based on the existing Commend Public Annunciation system, features and selected interface components must form an integrated PA system.

## 2.2 System Description

- .1 The University Public Address System is a dedicated stand alone (separate) analog to digital line intercom system based on Commend GE 800 (or newer iteration) IP Intercom Server.
- .2 Public Announcement System hardware consists of a stand alone PA communication network comprised of (at building): IP intercom servers, amplifiers, indoor and outdoor speakers, indoor and outdoor strobe lights, volume controls, at building telephone interface and related equipment, equipment cabinets for servers, UPS for servers, and power supplies for strobe lights, wiring and other related at building equipment. At the Security Control Centre (and its alternate site) the system includes IP intercom server, system control module, microphone, and other system access equipment (hardware and firmware) including a graphical user interface (GUI).
- .3 PA System control server and control equipment and firmware shall be located at the Security Services Security Control Centre (located at William Small Building) with a complete alternate set up site located at the Security Services Alternate (or Standby) Security Control Centre located at the Bennett Centre for Student Services Parking Structure.
- .4 PA System shall be capable of addressing (issuing pre formatted, or live messages designated Security Services campus zones (Villages). The PA system shall be capable of addressing the following pre defined addressable zones:
  - .1 entire campus (all building indoor and out door speakers and strobe lights) also known as “all call” to all hardwired zones and buildings
  - .2 a specific campus zone, or groupings of buildings known by York University Security Services as “Villages”
  - .3 an individual building all indoor and out door speakers and strobe lights
- .5 The PA System shall be accessible (issue announcements) from the following sites/modalities:
  - .1 via Security Control Centre and alternate Security Control Centre
  - .2 at the building telephone access point located next to the building’s fire system annunciation panel
  - .3 through a security protocol via any telephone or cellular telephone

- .6 Access to zones or buildings shall be via a control panel through a series of pre set codes or through a graphical user interface (GUI)
- .7 PAS is designed to provide continuous electrical supervision for the complete and entire system (i.e. contact switches controls, master control station(s), audio, data, strobe lights, busses, main and UPS etc.,) Such that if a strobe light, speaker, or amplifier is removed (or not functioning) from the System, this will create a trouble signal
- .8 Noise filters and surge protectors shall be provided for each building equipment interface cabinet local building system amplifier to insure protection from input primary AC power surges and to insure noise glitches are not induced into the low voltage data circuits
- .9 Wire types as specified in section 3.1
- .10 PA System amplification and processing shall consist of control equipment, volume limiter(s) and/or compressor(s), power amplifier(s) to process, adjust, equalize, isolate, filter and amplify each audio channel for each building indoor and outdoor speakers in the system. System amplifier shall also have the following features:
  - .1 overload and output short circuit protection
  - .2 output: 70 volt (8 ohms output with separate step up transformer to 70 volt is acceptable), peak power, as defined by PA system integrator and based on total building speaker installation power requirement assessment
- .11 PA System indoor and outdoor strobe lights system shall be connected to power supplies and linked to the PA system buildings' IP Intercom Server via dry contact relays and be activated during PA system use.
- .12 Additional PA Performance Criteria requirements related to National Building Code of Canada:
  - .1 PA System shall have a minimum sound pressure level of 65dBA, with at least 10dBA above ambient, and a maximum of 110dBA. The audibility level shall be taken while a tone signal is being broadcast over the speakers
- .13 PA System Supervision: The PA system shall be fully supervised at the primary and back up head ends. System Supervision shall be achieved through the existing COMWIN system control. At a minimum system supervision shall monitor the status of deployed (in the field) IP Servers, IP amplifiers, speakers, power supplies and strobe lights

### 2.3 System Performance

- .1 PA system audio input minimum performance requirements: the signal level of each audio input channel at each input point shall be a minimum of zero (0) decibels (dBm), measured +0.10 dBm across 150 Ohms, balanced
- .2 PA system audio output minimum performance requirements: the audio signal level at each indoor and outdoor speaker shall be a minimum of +0.25 Watt(W) and a maximum of +4W, 600 Ohms balanced, frequency response range of 50 Hz to 12 KHz, on a 25 or 70 Volt audio distribution line. Each indoor and outdoor speaker audio signal shall be determined based on typical (and most severe condition) ambient noise level, speaker coverage area and speaker location.
- .3 PAS System minimum audio performance parameters at each indoor and outdoor speaker shall be:
  - .1 Cross modulation: - 46 dB
  - .2 Hum Modulation: - 55 dB
  - .3 Isolation (outlet-outlet): 24 dB
- .4 PAS performance criteria requirements excerpt from the National Building Code of Canada

## 2.4 Acceptable Products

- .1 The York University Public Announcement System is based on the Commend intercom system as such any new building or major renovation shall adopt a Commend intercom Public Announcement system that is entirely integrated within the existing PA system infrastructure.
- .2 PA System minimum building level hardware requirements include but are not limited to the following items:
  - .1 Commend GE 800 Digital IP-Intercom Server
  - .2 Commend License: L8-ICX interface onboard
  - .3 Commend L8-NET-LAN-4 License: 4 LAN Connections via G8-NET
  - .4 Commend G8-GED-4B Connection of 5 Digital Subscriber Boards – B level Firmware
  - .5 Commend G8A-K G8 Installation Board with terminal strip screw connectors
  - .6 Commend L8-GED-4P License: Upgrade G8-GED-4B to G8-GED-4P (1D and 3 B)
  - .7 Commend G8-IP-4B G8 IP Subscriber Board – 4IP subscriber Feature Level B
  - .8 Commend AF 50I 50 watts Commend Amplifier, IP version amplifier Status License 1 (1 License required per amplifier)

- .9 Commend L-AF-LM License: AF 50I Status Monitoring License
- .10 Commend PA70W24V 70W primary switch-mode power supply adapter for AF Series Amps, with high-efficiency output. Primary: 110-240V AC; Secondary 240V DC
- .11 Commend G8-16E, GE800 interface with 16 inputs
- .12 Commend EE320AR Wall-mounted master station digital/2 wire with DSP, 6 digital-alphanumeric display and handset function, red colour
- .13 Viking VE-9x12 (Black) or equivalent telephone enclosure of the same or higher quality (with no text) to contain at building system access telephone
- .14 18 AWG Shielded Twisted pair Cable (as per York specifications – Section 27 51 16)
- .15 16 AWG twisted pair cable (as per York specifications – Section 27 51 16)
- .16 CAT6 Network cable (as per York specifications – Section 27 51 16)
- .17 Dedicated (where space is not available in existing UIT Telecom room racks) equipment rack for PAS shall be capable of accommodating system components including (but not limited to): digital IP server, system amplifier, UPS. System rack shall be enclosed type, steel construction with internal mounting rails, wire and cable entrances with smooth edges protected by rubber edging, with four adjustable leveling feet
- .18 Uninterrupted Power Supply UPS and suitably to the PAS Digital IP Intercom Server to accommodate system standby power requirement
- .19 1000VA step-down transformer (rack mounted) from 208VAC to 110VAC to power the control equipment in the telecom rooms<sup>1</sup>
- .20 A rack mounted power bar shall be provided to plug in the control equipment to the transformer
- .21 Bogen BOG –S86 T725PG8U 8” Indoor speakers (equivalent or higher quality and performance). The number and distribution of indoor speakers to be determined by the contractor undertaking design build installation
- .22 Bogen Indoor Speaker (8” white finish 4 watt capacity) with metal speaker box to be used for installation on exposed concrete ceilings, part # S86T725CC
- .23 Bogen Flange Mounted Reentrant Horn Loudspeaker Model FMH15T for outdoor application (equivalent or higher quality and performance). The number and distribution of outdoor

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<sup>1</sup> Note that York University UIT Department is in the process of upgrading all Keele campus telecom and data rooms from 110VAC to 208VAC.

- speakers to be determined by the contractor undertaking design build installation
- .24 Bogen BBSM6 Surface Mount Speaker Enclosure for outdoor speakers (equivalent or higher quality and performance) off white, heavy duty water and weather resistant heavy gauge steel enclosure with single knockout on back (including accessories adapter ring and grille)
  - .25 SECO Strobe Light model SL-126-A24Q/B with blue lens or Potter SL-5A Series conical Indoor/outdoor 12V/24V DC strobe light with blue lens including trim plate SP-SL1-B for interior use
  - .26 Federal Signal Corporation Streamline Low Profile Mini Strobe Model LP6-012/048B with blue lens for exterior applications, or equipment that is ULC rated and is of equivalent or higher quality and performance
  - .27 Altronix FireSwitch model 108 10 amp power supply for internal and external strobe lights
  - .28 Indoor speaker mounting frame, one frame per speaker to be used when mounting speakers on suspended T-bar ceilings. Example McBride Loudspeaker Source product # MC100
  - .29 vandal resistant Cage, to be used only in special installations such as gymnasiums. Example McBride product #HC-1
  - .30 TOA Projection Speaker model PJ-304 6 Watt projection type speaker to be used in special indoor circumstances and only after review and approval from PA system engineer

### 3.0 EXECUTION

#### 3.1 Installation

- .1 Indoor speakers and mounting shall be self contained and ceiling mounted and shall match the colour of ceiling tiles or painted ceiling. In ceilings where ceiling mounted speakers are difficult to install (such as in ceilings with a ceiling height higher than 3.05 meters (10 feet) efforts shall be made to address the negative visual impact of wall-mounted speakers where the installation of these type of speakers may be necessary
- .2 Placement of indoor speakers shall take into consideration ambient noise levels, sound distribution, physical layout of space to be covered by the speaker, amplification and other parameters - maximum distance between indoor speaker cannot exceed 7.62 meters (25 feet) device to device

- distance
- .3 Indoor speakers are generally installed in:
    - .1 building corridors, including corridors within suites
    - .2 indoor building open spaces such as atria, and common areas
    - .3 cafeterias and lounges
    - .4 public areas of congregation
    - .5 daycare facilities
    - .6 large open office concept spaces
    - .7 classroom, lecture halls, theatres, cinemas, gymnasia, dance studios, visual and other performance studios with a seating capacity of 75 or over
    - .8 laboratories with a seating capacity of 50 or over
    - .8 Library, study areas, student common rooms (such as Junior Common Rooms) and studios
    - .9 All building entrances/exits (installation to take place outside the entrances/ exits) including elevator lobbies

Indoor strobe lights shall be installed in the following locations:

- .1 corridors
- .2 corridor intersections
- .3 public areas of congregation
- .4 lecture halls with a seating capacity of over 75
- .5 carpentry, some visual art studios, set design, test laboratory, machinery and other areas where ambient noise levels can be expected to be high
- .6 laboratories with a seating capacity of 50

Generally, the PA system will not be installed in:

- 1. Individual offices
  - 2. Classrooms, lecture halls, lecture theatres and laboratories with a seating capacity of less than 75
  - 3. Stairwells, mechanical, electrical rooms and other individual rooms
  - 4. Elevators
  - 5. Washrooms
- .4 Indoor strobe lights shall be installed at the end of corridors and at corridor intersection and where a corridor changes direction (such as L or T shaped corridors)
  - .5 vandal-proof, high strength baffle for indoor and out door speaker installations
  - .6 speaker and mounting shall be self-contained

- .7 Where conditions permit, indoor speakers shall be installed recessed in ceiling tiles of drop ceilings, or flush on exposed ceilings. The use of exposed conduit shall be minimized where possible.
- .8 Exterior speakers shall be wall mounted and encased in a water and weather resistant metal vandal proof housing with compatible metal baffle.
- .9 Exterior speakers shall be located near building entrances
- .10 Exterior strobe lights shall be located near building entrances and PAS speakers
- .11 For interior Commend equipment interconnections, microphone intercom cabling and other network cabling, provide CAT6 cable that is FT6 plenum rated and yellow in colour
- .12 For interior speaker cabling, line level audio and microphone cable for inside racks and conduits. In addition to this, provide:
  - .1 shielded, twisted pair minimum 22 AWG, stranded conductors and 24 AWG drain wire with overall jacket
  - .2 speaker level wire to be rated either for 70 or 25 Volts cable riser rated, 18 AWG stranded pair minimum, cable must be UL-1333 listed
  - .3 cabling shall be riser, plenum rated
- .13 Install a back up battery supply or UPS system to be connected to the buildings' PA system to permit normal operation of this system (as if there were no AC power failure). In the event of AC power failure or during input power fluctuations for a minimum of 2 hours operation is required for the PA system.
- .14 The UPS shall be connected to all active PA system components including (but not limited to): System amplifier, Digital IP Intercom Server, all control centre equipment
- .15 PA System equipment including Commend IP Intercom Server, Amplifier, and UPS and other relevant building PA level control equipment shall be located in a secure Telecommunications room and space within the Telecomm room to be assigned by York University's UIT
- .16 Install all equipment in accordance with manufacturers instructions and industry accepted best practices
- .17 Provide strobe light power supplies with AC power connections to closest 120VAC circuit with adequate spare capacity and include back-up batteries to power the unit during power failure. Strobe light power supplies shall not be connected to the telecom UPS
- .18 Provide labels for all control equipment identifying each piece of equipment in the telecom room (i.e. PAS server,

PAS power supplies, PAS IP amplifier, etc.) Including IP addresses for any networked devices

### 3.2 Coordination

- .1 Coordinate work with York's University Information Technology, Campus Services Business and Operations (CSBO) Project Representative, Maintenance Department (CSBO), external electrical contractor, and any other internal or external trades or contractors (i.e., PA System Integrator)
- .2 Electrical contractor is required to conduct a building assessment, review of this York University standard, York University's Network and Communications Services Facilities Standard and other PA system technical and functional requirements in order to determine amplification requirements, number and placement of indoor and outdoor speakers, number and placement of indoor strobe lights, cabling requirements and layout

### 3.3 System Acceptance Testing (Commissioning)

- .1 Speaker and Amplification Testing
  - .1 System audibility and intelligibility testing shall be based on performance criteria outlined in this standard (see section 2.3 System performance)
  - .2 Contractor shall submit all testing results to the PA System engineer for review and approval
  - .3 Contractor shall conduct a test (using approved test equipment) of each installed indoor and outdoor speaker to ensure speakers conform to PA system performance requirements, and manufacturers' performance specifications
  - .4 Contractor shall conduct a test (using approved test equipment) of the building amplification system once it is connected to indoor and outdoor speakers. The system amplification test shall ensure that overall system amplification meets the PA system performance requirements and manufacturers' specifications
  - .5 Contractor shall adjust and correct any audio defects such as unwanted aural effects, signal distortion, inadequate amplification, noise pulses, glitches, audio hum, poling noise, etc until all system errors inefficiencies are corrected

- .6 A report of the field-testing of the indoor and outdoor speakers and amplification shall be provided to the York University Project Representative as proof of field test
- .7 The audibility level shall be taken while a pre-determined audio file is being broadcast over the speakers
- .2 Strobe Light Testing
  - .1 Contractor shall undertake a test of indoor and outdoor strobe lights to ensure their functionality and synchronization to PA system
  - .2 Contractor shall address all strobe light system deficiencies
  - .3 A report of the field-testing of the indoor and outdoor strobe lights shall be provided to the York University Project Representative
- .3 System Comment IP Intercom Testing
  - .1 Following the speakers, amplification and strobe light testing, the contractor shall undertake a building PA system test of all relevant components with integration to the University Command Intercom Based Public Announcement System
  - .2 The Building PA test shall establish connectivity and functionality of the installed building PA components and integration within the University Public Announcement System
  - .3 Deficiencies and errors in establishing building level PA to University level PA integration shall be addressed by the contractor
  - .4 A report of the building PA system test shall be provided to the York University Project Representative
- .4 Public Announcement System Acceptance Testing
  - .1 Following the Speaker and amplification, strobe light and building level to university level PA system integration the contractor shall conduct a PA system user acceptance test
  - .2 Test parameters for the user acceptance test shall include at a minimum the following required elements:
    - .1 test integration of building within the University PA system zone set up. This feature shall be

tested using the Graphical User Interface, code controlled module, at the building control telephone, and via telephone. Test shall establish capability to address the building as follows:

- .1 as a stand alone building within the PA system, all indoor speakers, all indoor strobe lights, all outdoor speakers and all outdoor strobe lights
- .2 as part of a global all building entire campus annunciation, via all modalities
- .3 as part of a group of buildings (zones or villages) via all system modalities
- .2 Test capability to issue pre formatted messages, via all system modalities
- .3 Test capability to issue live messages, via all system modalities
- .4 Test system amplification for indoor and outdoor speakers
- .5 Test shall verify that the total PA system meets all the requirements of this standard
- .6 System testing shall be conducted in the presence of the York University Project Representative, Manager, Emergency Preparedness Program, representative from UIT and other York University stakeholders as required
- .7 The acceptance test shall be performed on a “go-no-go” basis
- .8 Only those operator adjustments required to show proof of performance shall be permitted
- .9 Test shall demonstrate and verify that the PA system installed in a specific building complies with all requirements of this standard under normal operating conditions
- .10 The system shall be rated by the York University representative as either acceptable, or unacceptable, at the conclusion of the test
- .11 Failure of any part of the system that precludes completion of the system testing, and which cannot be repaired within 4 hours, shall be cause for termination of the test of the system.
- .12 Repeated failures that require more than 8 hours of repairs shall cause the entire system to be considered unacceptable

- .13 Rescheduling of the user acceptance test shall be arranged with the York University Project representative

**End of Section**