

## SECTION 274116 INTEGRATED AUDIO VISUAL SYSTEMS AND EQUIPMENT

### 1. GENERAL

#### 1.1 SUMMARY

##### A. System Summary

1. The audiovisual systems within this project are intended to provide the audiovisual capabilities required for effective communication located in spaces planned within the Long-Term Care, Domiciliary and Nielson buildings.
2. The systems include the following.
  - a. Paging and BGM (Background Music) system
  - b. IPTV/Hospitality TV
    - 1) Resident Room TVs
    - 2) Household TVs
    - 3) Digital Signage
    - 4) IPTV for AV-enabled spaces
  - c. Chapel
  - d. Theater
  - e. Classroom & Multi-Purpose Room, Typical
  - f. Pub
  - g. Restorative Space, Typical
  - h. Main Dining Room
  - i. Fitness Room
  - j. Staff Lounge (Neilson Bldg only)
3. Processing, network and power supply equipment in support of Communications, Security, Audiovisual, Digital Signage, IPTV and Paging/Background Music and Nurse Call systems shall be housed in vertical equipment cabinets and wall mounted devices within the local proximity IT IDF or Main Server room, unless a local AV equipment cabinet is shown on plan sheet. Coordinate equipment location with the IT room with all Divisions 27 and 28.

#### 1.2 SYSTEM DESCRIPTION

##### A. Paging and BGM

1. The paging system shall use a series of independent zones to allow flexibility in paging scanners. A separate zone in the "plaza area" will be required for special events.
2. Multiple types of loudspeakers products shall be used. Refer to plans for locations and types. Loudspeaker types must provide uniform coverage in corridors, public restrooms, staff areas, meeting spaces, amenities spaces, resident household dining, resident household corridors and theater.

3. Paging system shall include audio digital signal processor, capable of custom software configuration to support flexible zoning of paging, VoIP interfacing, background music sources, priority of paging over background music sources, contact closure tie to building fire alarm system and system equalization and limiting.
4. The system shall be able to route a BGM source to any or all zones and shall be configured to do so via the head end software configuration.
5. Connections to the speakers shall use mixture of typical loudspeaker cabling and standard category cabling collocated with the IT cable in the IT cable tray.
6. One paging station shall be provided, located at each building entrance lobby information desk, with paging zoning possible to:
  - a. Common corridor zones only (no paging within resident households).
  - b. Emergency only condition, to all Zones.
  - c. Other specific zones, as directed by the Owner.
7. Support for use of VoIP telephones for making pages via VoIP interface to Paging system digital signal processor. Coordinate VoIP phone numbers with Owner's IT administrator. Support of a minimum of 4 VoIP lines.
8. Computer running the paging management software.
  - a. Management software shall be used to schedule music, paging, adjust grouping of zones.
9. There will be two distributed voice amplification systems within the Long Term Care and Domiciliary buildings, including the Fire Alarm and Paging/Background Music (section 27 41 16) systems. The Fire Alarm system, including amplification of pre-recorded and live paging microphone announcements via distributed NFPA 72 and UL compliant fire alarm speaker/strobe devices, will perform as the only means of providing audible life-safety announcements. The Paging/Background Music system is not intended to support life-safety emergencies and is not intended meet NFPA 72 and UL compliance intended for life safety announcements. A low-voltage contact closure from the Fire Alarm system panel will be connected to the Paging/Background Music system audio DSP (located in main IT room), which will cause the Paging/Background Music system to audibly mute upon closure by the Fire Alarm system.
10. Paging system is not intended as the primary means of mass notification during an emergency event, however under NFPA 72, the Owner may request permission from the local Authority Having Jurisdiction to authorize using the Paging system as alternate to fire visual/speaker devices. Should this condition be authorized, then the design and features of the Paging must meet voice notification system conditions listed under NFPA 72.
11. Paging system shall include wired contact closure tie to the fire alarm system. Contact closure shall support automated emergency muting of background music, however, should the Owner direct, the system shall also support emergency paging during fire alarm event in support of mass notification.
12. Paging Zones located within resident Households shall not be used for daily paging, but rather will be only used as backup solution in event of emergency, and should other means of staff-to-staff or staff-to-residents communication systems have failed.

B. IPTV/Hospitality TV

1. Currently, the Owner's campus of buildings and residents are supported by a coaxial CATV service provider.
2. For this project, for new and renovated buildings, the Owner has directed an IPTV-Hospitality TV solution. This IPTV solution will support resident room TVs, resident common area TVs, digital signage TVs and all amenities TVs (Pub, Hair salon, etc.) and AV-enabled spaces e.g. Theater and meeting rooms.
3. The TV channel content source can be coaxial CATV service provider or Internet Service Provider.
4. Provide IPTV processor headend, capable of custom software configuration and input of both CATV service provider input of TV channel content, as well as input of local Owner content channels supporting hospitality features and also digital signage features.
5. Provide one IT-networked digital signage media player for each Digital Signage display (see plan drawings for locations). Media player must support Owner updates, content slides creation and schedule via owner-accessible online application. Media player output shall be input source to the IPTV system, from within the main IT Server room).
6. Provide all IT network Category 6 (or better) cabling in support of IPTV, RJ45 wall plate terminations behind the TV location, Category 6 patch cords, and RJ45 patch bay mounted within IT equipment cabinets (coordinated with Owner IT administrator).within local IT IDF Room.
7. For each resident room, provide one hospitality-type TV capable of supporting IPTV. Image size 42" diagonal, minimum 1080p resolution, with integral stereo loudspeakers, smart TV capability, IT ethernet port, and spare HDMI input for local resident source, USB input and integral software player for resident USB storage device, and with IR remote control and wall mount bracket assembly.
8. For each Household den and living room provide the following audiovisual system solution supporting the following:
  - a) Provide one AV system switcher, capable of supporting remote control via RS232 or Ethernet, a least four HDMI 1.4/2.x inputs, with stereo audio de-embed of video inputs. Inputs support IPTV Tuner, PC NUC for software conferencing, Blu-ray DVD and Auxiliary user HDMI source.
  - b) Provide software-configured button controller supporting selection of video system inputs, volume control, TV channel selection and Blu-ray DVD player functions.
  - c) Provide large-screen TV with HDMI inputs, Image size 70" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.
  - d) The den and living room TVs are also intended to support remote software-based video/audio conferencing for use by residents, as managed by the Staff Also include A/V soundbar which includes integral stereo loudspeakers, integral web conferencing video camera, integral digital digital microphone array and USB3.0 connection to Owner-

provided PC NUC computer with software conferencing application (e.g. WebEx, Skype, etc.). PC NUC should include wireless keyboard and mouse.

- e) Provide one Bluray DVD player.
- f) Provide one IPTV Tuner
- g) Provide assistive listening system, with IR emitter and eight IR receivers with inductive neckloops and stereo muff headphones.
- h) Provide AV equipment cabinet, located within associated furniture credenza. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.

9. For each Household dining room and for all Digital Signage locations, provide one hospitality-type TV capable of supporting IPTV. Image size 55" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and spare HDMI input for local resident source, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.

For Digital Signage, coordinate orientation of TV as portrait or landscape orientation. Assume landscape orientation, unless otherwise directed by Owner. Owner must consider orientation of produced content on digital signage media players.

10. For each household and common barber/beauty salon, provide one hospitality-type TV capable of supporting IPTV. Image size 42" diagonal, minimum 1080p resolution, with integral stereo loudspeakers, smart TV capability, IT ethernet port, and spare HDMI input for local resident source, USB input and integral software player for local USB storage device, and with IR remote control and wall mount bracket assembly.

Coordinate location of TV and IPTV wall plate drop within the barber/beauty salon with Owner and Architect.

11. Provide IPTV tuner for the Theater and each/all meeting spaces with integrated AV systems. Coordinate with the Owner and AV Design-BUILDER.
12. Coordinate providing electrical receptacle supporting each IPTV location with Division 27 – Electrical.

#### C. Chapel

1. Provide AV equipment cabinet, located within associated Storage Room. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.
2. Provide voice and music audio mixing, processing and amplification system. System must include sufficient inputs in support of at least two wireless microphones, two wired microphones and two stereo line-level audio inputs. A mixer/amplifier with local system equalization is acceptable. System must also support both amplified (distributed loudspeakers) and assistive listening.
3. Provide two wireless microphones, each with head-worn microphone transmitters.

4. Provide assistive listening system, with IR emitter transmitter and eight IR receivers, each with inductive neck-loops and stereo muff headphones.
5. Future AV connectivity is shown on AV drawings in support of AV camera live streaming application. Coordinate with Owner, if this application is required.
6. Future AV connectivity is shown on AV drawings in support of portable large video displays on carts for display of content during services. Content would originate from portable mobile or laptop computer device with HDMI output.

D. Theater

1. Provide AV equipment cabinet, located within Theater. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.
2. Provide AV Surround Sound Receiver, pro-consumer-grade, with multiple HDMI inputs, integral multi-channel simulated and actual surround sound processing, with HDMI video output, auxiliary analog audio output in support of assistive listening system, integral 5.1 (or 7.1) surround sound audio amplifiers. Receiver must support at least four HDMI 1.4/2.x inputs, with integral stereo and surround audio de-embed of video inputs. Inputs support IPTV Tuner, Auxiliary Gaming device input, Blu-ray DVD and Auxiliary user HDMI source.
3. Provide assistive listening system, with IR emitter transmitter and eight IR receivers, each with inductive neck loops and stereo muff headphones.
4. Provide one Blu-ray DVD player.
5. Provide one IPTV Tuner

E. Classrooms & Multi-Purpose Rooms, Typical

1. For each Classroom provide the following audiovisual system solution supporting the following:
  - a. Provide one AV system presentation switcher, capable of supporting remote control via RS232 or Ethernet, with mix of at least eight HDMI 1.4/2.x and/or HDBaseT inputs and mix of HDMI and/or HDBaseT outputs. AV system presentation matrix switcher shall also include integral stereo and mono audio mixer/audio DSP with integral stereo audio de-embed of video inputs. Inputs support Portable Lectern AV source (via HDBaseT), wireless video sharing receiver, IPTV Tuner, PC NUC for software conferencing, Blu-ray DVD and Auxiliary user HDMI source. Outputs will support local video image projection, IPTV encoder and audio feed to local distributed ceiling loudspeakers.
  - b. Provide all required HDBaseT signal extender transmitters for lectern floor box and HDBaseT scaling receiver for video projector. Extend RS232 remote control via HDBaseT extender.
  - b. Provide software-configured button controller supporting selection of video system inputs, volume control, TV channel selection and Blu-ray DVD player functions.
  - c. Provide large-screen TV with HDMI inputs, Image size 84" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.

- d. Support remote software-based video/audio conferencing for use by residents, as managed by the Staff Also include A/V soundbar which includes integral stereo loudspeakers, integral web conferencing video camera, integral digital microphone array and USB3.0 connection to Owner-provided PC NUC computer with software conferencing application (e.g. WebEx, Skype, etc.). PC NUC should include wireless keyboard and mouse.
  - e. Provide one Bluray DVD player.
  - f. Provide one IPTV Tuner
  - g. Provide one wireless video sharing receiver
  - h. Provide assistive listening system, with IR emitter and eight IR receivers with inductive neck loops and stereo muff headphones.
  - i. Provide AV equipment cabinet, located within associated furniture credenza. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.
- F. Pub
- 1. The Pub is intended a multi-zone, multi-purpose environment. The Pub zones are divided into two Pub/Bar zones, one interior dining/meeting/social space and the exterior patio.
  - 2. Provide one AV system matrix switcher, capable of supporting remote control via RS232 or Ethernet, a least eight input HDMI 1.4/2.x inputs and eight HDBaseT outputs, with stereo audio de-embed of video inputs. Inputs support four IPTV Tuners, HDBaseT wall plate HDMI source from the interior dining/meeting/social space. Outputs include four TVs in the Pub, and two TVs in the interior dining/meeting/social space.
  - 3. Stereo audio outputs from the four six video displays should be summed to mono and then feed an audio digital signal processor for volume control and zone routing. Processor should also support local inputs for microphone and line-level stereo audio sources from the interior dining/meeting/social space and the exterior patio.
  - 4. For the interior dining/meeting/social space and the exterior patio (within weather proof wall box) provide one two-microphone plus stereo audio input wall plate supporting live musician and other events.
  - 5. Provide software-configured touch screen controller supporting selection of video system inputs and outputs, volume control for each zone, TV channel selection.
  - 6. Within the pub, provide total of four (two each side) large-screen TV with HDMI inputs, Image size 55" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.
  - 7. Within the interior dining/meeting/social space provide total of two large-screen TV with HDMI inputs, Image size 55" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.
  - 8. Exterior patio should include two weather-resistant loudspeakers.
  - 9. Provide four IPTV Tuners on rack mounted shelves.
  - 10. For the interior dining/meeting/social space, provide assistive listening system, with IR emitter and eight IR receivers with inductive neckloops and stereo muff headphones.
  - 11. Provide AV equipment cabinet, located within the Pantry. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.

G. Restorative Space, Typical

1. Provide AV equipment cabinet, castered, located within Restorative space. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.
2. Provide voice and music audio mixing, processing and amplification system. System must include sufficient inputs in support of at least one wireless microphone, and one stereo line-level audio inputs. A mixer/amplifier with local system equalization is acceptable. System must also support both amplified (distributed loudspeakers) and assistive listening.
3. Provide one wireless microphones, each with headworn microphone transmitters.
4. Provide assistive listening system, with IR emitter transmitter and eight IR receivers, each with inductive neckloops and stereo muff headphones.
5. Future AV connectivity is shown on AV drawings in support of portable large video displays on carts for display of content during services. Content would originate from portable mobile or laptop computer device with HDMI output.

H. Main Dining Hall

1. During typical use as the Main Dining Hall, audiovisual technologies will be limited to include Background music & Paging and distributed Digital Signage TVs and with distributed loudspeakers.
2. Periodically, the Main Dining Room will also support special events and social functions. Presentation of video content will be supported with ceiling mounted video projector and motorized projection screen. A portable lectern will be supported by an AV/IT/Electrical floor box e.g. Wiremold RFB9, with AV connectivity for video, audio and control. Voice amplification of wireless and wired microphones is also required.
3. Provide one AV system presentation matrix switcher, capable of supporting remote control via RS232 or Ethernet, with mix of at least eight HDMI 1.4/2.x and/or HDBaseT inputs and mix of HDMI and/or HDBaseT outputs. AV system presentation matrix switcher shall also include integral stereo and mono audio mixer/audio DSP with integral stereo audio de-embed of video inputs. Inputs support Portable Lectern AV source (via HDBaseT), wireless video sharing receiver, IPTV Tuner, PC NUC for software conferencing, Bluray DVD and Auxiliary user HDMI source. Outputs will support local video image projection, IPTV encoder and audio feed to local distributed ceiling loudspeakers.
4. Provide all required HDBaseT signal extender transmitters for lectern floor box and HDBaseT scaling receiver for video projector. Extend RS232 remote control via HDBaseT extender.
5. Provide software-configured touch panel controller, located recessed in wall within the Main Dining Room and software-configured remote control processor supporting selection of video system inputs, volume control, motorized projection screen raise-lower-stop functions, video projection power on, power off and mute functions, IPTV channel selection and Bluray DVD player functions.
6. Within the dining/meeting/social space provide total of two large-screen TV with HDMI inputs, Image size 55" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote

control wall mount bracket assembly. These local TVs will also be controlled by the local AV control system for automated IPTV channel selection and explicit power on and power off.

7. Provide motorized projection screen, tab-tensioned, 16:9 aspect ratio, high contrast gray fabric, 100" diagonal image size. Including optional low voltage control interface supporting RS232, and with local low-voltage wall push-button controller. Including conduit path from projection screen low voltage controlled to AV equipment cabinet location. Remotely controlled by AV control system.
8. Provide one pendant hung video projector, with HDMI 1.4/2.x inputs, minimum 1080p resolution, minimum 5000 ANSI lumen brightness, Laser lamp, IT ethernet and RS232 ports, with IR remote control, with pendant hung structural mounting assembly.
9. Owner IT will provide PC to support remote software-based video/audio conferencing for use during presentations, as managed by the Staff. PC computer with software conferencing application (e.g. WebEx, Skype, etc.). PC should include wireless keyboard and mouse.
10. Provide one wide-angle conferencing video camera, with integral audio microphone with ambient noise cancelling capability, extend via USB extender to PC NUC, mounted at approximately 96" above finished floor facing presenter and projected image.
11. Provide AV USB bridging interface for sharing presented video+audio content with remote participants and also for send and receive audio with local Audio DSP.
12. Provide one wireless video sharing receiver.
13. Provide one Bluray DVD player, rack mounted in AV equipment cabinet, remote controlled.
14. Provide one IPTV Tuner, rack mounted in AV equipment cabinet, remote controlled.
15. Provide assistive listening system, with IR emitter and eight IR receivers with inductive neck loops and stereo muff headphones.
16. Provide AV equipment cabinet, located within AV equipment closet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.

I. Fitness Room(s)

1. The Fitness Center will include two IPTVs, stereo recessed ceiling loudspeakers, one wall Bluetooth + 3.5mm analog stereo audio wall plate receiver, audio mixer/amp and simple button controller.
2. Provide one stereo audio mixer/amp, with analog stereo line level input and 50Wx2 stereo output.
3. Provide software-configured button remote controller supporting volume control functions.
4. Provide total of two large-screen TV with HDMI inputs, Image size 55" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.
5. AV equipment shall be mounted in same AV equipment cabinet as Main Dining Room. All user system controls must be accessible from front of AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.

J. Staff Lounge (Neilson Bldg)

1. Provide one AV system presentation switcher, capable of supporting remote control via RS232 or Ethernet, with mix of at least eight HDMI 1.4/2.x and/or HDBaseT inputs and mix of HDMI and/or HDBaseT outputs. AV system presentation matrix switcher shall also include integral stereo and mono audio mixer/audio DSP with integral stereo audio



de-embed of video inputs. Inputs support wall plate AV source (via HDBaseT), wireless video sharing receiver, IPTV Tuner, PC NUC for software conferencing, Blu-ray DVD and Auxiliary user HDMI source. Outputs will support local video image displays, and audio feed to local distributed ceiling loudspeakers.

2. Provide all required HDBaseT signal extender transmitters for lectern floor box and HDBaseT scaling receiver for each video display. Extend RS232 remote control via HDBaseT extender.
3. Provide software-configured button controller supporting selection of video system inputs, volume control, TV channel selection and Blu-ray DVD player functions.
4. Provide two large-screen TV with HDMI inputs, Image size 55" diagonal minimum, minimum 1080p resolution, smart TV capability, IT ethernet port, and two spare HDMI inputs for local resident sources, USB input and integral software player for resident USB storage device, and with IR remote control wall mount bracket assembly.
5. Support remote software-based video/audio conferencing for use by residents, as managed by the Staff. Also include A/V soundbar which includes integral stereo loudspeakers, integral web conferencing video camera, integral digital microphone array and USB3.0 connection to Owner-provided PC NUC computer with software conferencing application (e.g. WebEx, Skype, etc.). PC NUC should include wireless keyboard and mouse.
6. Provide one Blu-ray DVD player.
7. Provide two IPTV Tuners
8. Provide one wireless video sharing receiver
9. Provide software-configured touch panel controller, located recessed in wall within the Staff Lounge and software-configured remote control processor supporting selection of video system inputs, volume control, video display power on, power off and mute functions, IPTV channel selection and Blu-ray DVD player functions.
10. Provide assistive listening system, with IR emitter and eight IR receivers with inductive neckloops and stereo muff headphones.
11. Provide AV equipment cabinet. Cabinet should include AC power line/surge protection conditioning and AC power distribution.

### 1.3 RELATED WORK

- A. Provide in accordance with Section 26 05 00 – Common Work Results for Electrical
- B. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

### 1.4 CONDITIONS AND REQUIREMENTS

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

### 1.5 STANDARDS

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

## 1.6 DEFINITIONS

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

## 1.7 SUBMITTALS

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual System

- 1. Provide product data for:

- a. Visual display equipment

- 1) Displays
    - 2) Projectors
    - 3) Display Mounts
    - 4) AVoIP encoders and Decoders

- b. Audio Equipment

- 1) Loudspeakers
    - 2) Control Panels
    - 3) Audio Amplifiers
    - 4) Audio Mixers and processors
    - 5) Signal conversion and transmission
      - a) DVI/HDMI and UTP Category cable converters
      - b) All cable types required for video signal transmission
    - 6) Safety certifications (UL, TUV, CE etc.)
    - 7) Paging System processing and head end
    - 8) Paging system admin phones and software

- c. Miscellaneous

- 1) Equipment Racks and accessories
    - 2) Wall plates & Floor Boxes
      - a) Jack and outlet configuration
      - b) Materials
      - c) Finishes [for selection by Architect].
      - d) Dimensions
    - 3) Safety certifications (UL, TUV, CE etc.)
    - 4) Control panels and processors

- B. Drawings & Documentation

- 1. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

C. Software Documentation

1. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems.

1.8 INSTALLATION AND COMMISSIONING

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

1.9 PERFORMANCE TEST

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

1.10 EQUIPMENT NAMEPLATES

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

1.11 QUALITY ASSURANCE

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

1.12 DELIVER STORAGE AND HANDLING

- A. Provide in accordance with Section 27 41 00, General Conditions and Requirements for Audiovisual Systems

2. PRODUCTS

2.1 ALL ELECTRONIC PRODUCTS

- A. Shall be capable of operating continuously for 12 hours over the external ambient temperature range of +10°C to +65°C (20% to 95% humidity, non-condensing) without permanent damage.

2.2 MISCELLANEOUS

- A. A 20A rack mount power conditioner with 6 switched and 2 always on receptacles shall be located in the equipment rack

- B. Audiovisual equipment racks and cabinets. Sizes to be verified by Design-Builder based on equipment shown in drawings.

## 2.3 OWNER-PROVED EQUIPMENT

- A. None

## 2.4 WIRE AND CABLE

- A. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems

## 3. EXECUTION

### 3.1 MOUNTING HEIGHTS

- A. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems
- B. Coordinate locations of the following with mounting heights as indicated on drawings.
  - 1. Technical wall plates
    - a. AV input/output connections
    - b. Flat panel display panel connections
    - c. Annotation panel connections
  - 2. Pull boxes
- C. Install all technical panels plumb.
- D. Install equipment racks in location shown on drawings
- E. Arrange for adequate ventilation and access.

### 3.2 CABLE SUPPORT

- A. Supporting method in accordance with Section 26 05 00
- B. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems
  - 1. Individual runs throughout building – Support cable at 600mm on center and 100mm at any change in direction. Support from building structure. Cables on top of ceiling tiles will be rejected. Cable supported by ceiling grid support wires will be rejected.
  - 2. Cable Bundles – Where multiple cable combine support at 300mm on center and 100mm at any change in direction. Support from building structure. Cables on top of ceiling tiles will be rejected. Cable supported by ceiling grid support wires will be rejected.

### 3.3 CABLE SEPARATION

#### A. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems

1. Cable separation of cables for runs greater than 7.5 m.
  - a. Microphone Level – 300mm from all other circuits.
  - b. Line Level and Control – 300 mm from any circuit with signal of 20dB or greater than Line Level and Control cables.
  - c. Speaker level circuits – 300mm from other circuits.
  - d. Video and Data – 300 mm from any circuit with signal of 20dB or greater than Video and Data.
  - e. AC Power Circuits – 300mm from all other circuits.

### 3.4 RACK CABLING

#### A. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems

1. Neatly train and lace cables.
2. Route Cables from components to lacing bars installed on rear rack rail.
3. Provide services loops for each cable.
4. Cable separation of cables for runs within Equipment rack.
  - a. Microphone Level – 50mm from all other circuits.
  - b. Line Level and Control – 50 mm from any circuit with signal of 20dB or greater than Line Level and Control cables.
  - c. Speaker level circuits – 50mm from other circuits.
  - d. Video and Data – 50 mm from any circuit with signal of 20dB or greater than Video and Data.
  - e. AC Power Circuits – 50mm from all other circuits.

### 3.5 APPROVED WIRE TERMINATION MEANS

#### A. Section 27 41 00 – General Conditions and Requirements of Audiovisual systems

1. Solder Connections – For connectors utilizing Solder Cups
2. Terminal strip Connectors – For termination of blunt cut cables, cable to be tinned prior to termination
3. Multi Pin connectors – Utilize connector manufacturers crimper
4. Crimp Cap Terminations – For Loudspeaker circuits at individual devices. Distribution cable termination to utilize terminal strip connectors.

END OF SECTION 27 41 16