RFP 962-21P
Spring Valley Nursing Simulation Lab General Contractor

Addendum 002
Issued October 11, 2021

Please see attached video prepared by Hord Coplan Macht regarding the design of the nursing lab.

https://vimeo.com/hordcoplanmacht/cmc

As well as A/V drawings and specifications for reference only.

COLORADO MOUNTAIN COLLEGE - SPRING VALLEY

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AVS02	AUDIOVISUAL SYSTEMS SY02	T-003	TECHNOLOGY INFRASTRUCTURE LEGENDS AND SCHEDULES
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AVS04	AUDIOVISUAL SYSTEMS SY04, SY05, SY06	T-121	OVERALL TECHNOLOGY INFRASTRUCTURE REFLECTED CEILING PLAN
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AVS08	AUDIOVISUAL SYSTEMS SY10	T-500	TECHNOLOGY INFRASTRUCTURE ELEVATIONS
		T-501	TECHNOLOGY INFRASTRUCTURE ELEVATIONS
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CONTRACTOR RESPONSIBILITY MATRIX

ITEM / TASK	FURNISH	INSTALL
CONDUIT, WALL BOXES, CEILING BOXES, FLOOR BOXES, AND OTHER CABLE PATHWAYS REQUIRED TO SUPPORT AV SYSTEMS.	OT	OT
PROJECTION SCREENS - CASE	OT	OT
PROJECTION SCREENS - ROLLER/FABRIC	OT	OT
IN-WALL BLOCKING, CEILING SUPPORT STRUCTURE, AND OTHER STRUCTURAL SUPPORT FOR AV EQUIPMENT.	OT	OT
AV EQUIPMENT	AVC	AVC
AV CABLING AND TERMINATIONS	AVC	AVC
AV CONTROL SYSTEM AND DSP SOFTWARE DEVELOPMENT	AVC	AVC
AV EQUIPMENT CONFIGURATION, TESTING, COMMISSIONING, TRAINING, AND PROJECT ACTIVATION	AVC	AVC
TV DISTRIBUTION INTRA-BUILDING CABLING/DISTRIBUTION	OT	OT
STRUCTURED CABLING (FOR BUILDING NETWORK) AND TERMINATIONS	OT	OT
STRUCTURED CABLING (FOR AV NETWORK) AND TERMINATIONS	AVC	AVC
MOUNTS, EQUIPMENT RACKS, AND INSTALLATION MATERIALS	AVC	AVC
LECTERN / AV OPERATOR CONSOLE CONTAINING AV EQUIPMENT	AVC	AVC
CREDENZA / OTHER FURNITURE CONTAINING AV EQUIPMENT	AVC	AVC
SITE MILL-WORK	OT	OT
CABLE MANAGEMENT AND BOXES FOR AV EQUIPT. IN CONFERENCE TABLES/FURNITURE	AVC	AVC
MODIFICATIONS TO CONFERENCE TABLES/FURNITURE FOR AV EQUIPMENT	OT	OT
COMPUTERS AND OTHER OWNER-FURNISHED EQUIPMENT	O	AVC

RESPONSIBLE PARTIES:

AVC AUDIOVISUAL CONTRACTOR
C CONSULTANT
O OWNER
OT OTHER TRADES

NOTES:

THIS MATRIX IS PROVIDED AS A CONVENIENCE TO THE CONTRACTOR AND TO DRAW PARTICULAR ATTENTION TO ITEMS THAT REQUIRE SPECIFIC COORDINATION FROM MULTIPLE PARTIES. THIS IS NOT AN ALL-INCLUSIVE LIST. CONTRACTOR SHALL REFERENCE THE AUDIOVISUAL SPECIFICATION FOR COMPLETE REQUIREMENTS. IF THERE ARE ANY DISCREPANCIES BETWEEN THIS AND THE SPECIFICATION, THE SPECIFICATION SHALL TAKE PRECEDENCE.

CROSS-REFERENCE LEGEND

IN DETAIL REFERENCE

(#)

CROSS DETAIL REFERENCE

REFERENCE NUMBER
DETAIL / SHEET NUMBER

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

No. Date Revision

Project Name
NURSING RENOVATION

Project Number
221170.00

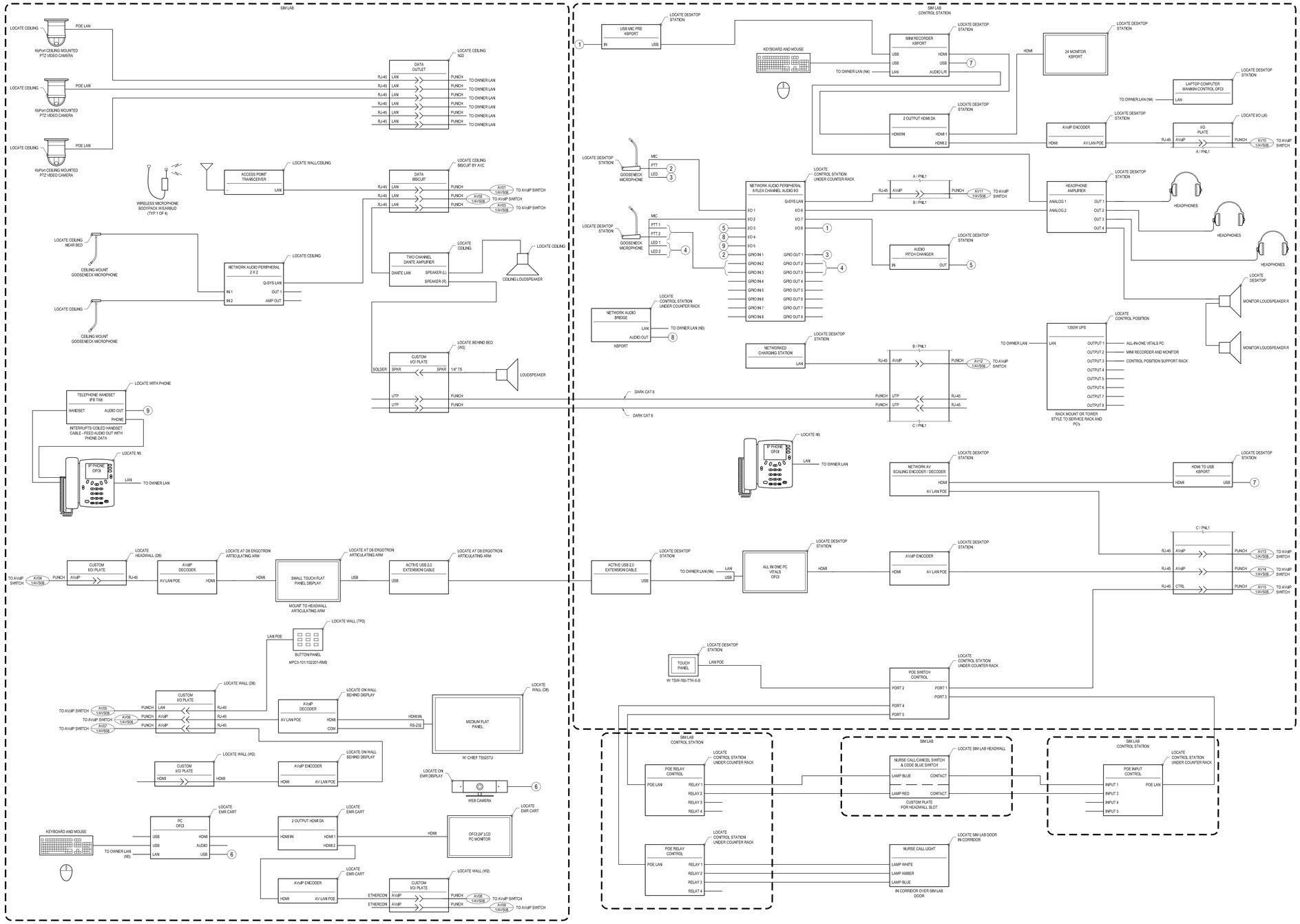
Date (YYYY/MM/DD)
10-01-2021

Drawn By NV5
Checked By NV5

Drawing
AUDIOVISUAL SYSTEMS COVER SHEET

AVS00

CONTRACT DOCUMENTS



1 AVS01 SY01 - HIGH FIDELITY ICU SIM LAB AND CONTROL STATION - QTY. 2 - ROOM NUMBERS 042A, 042B, 042F
SCALE: NTS

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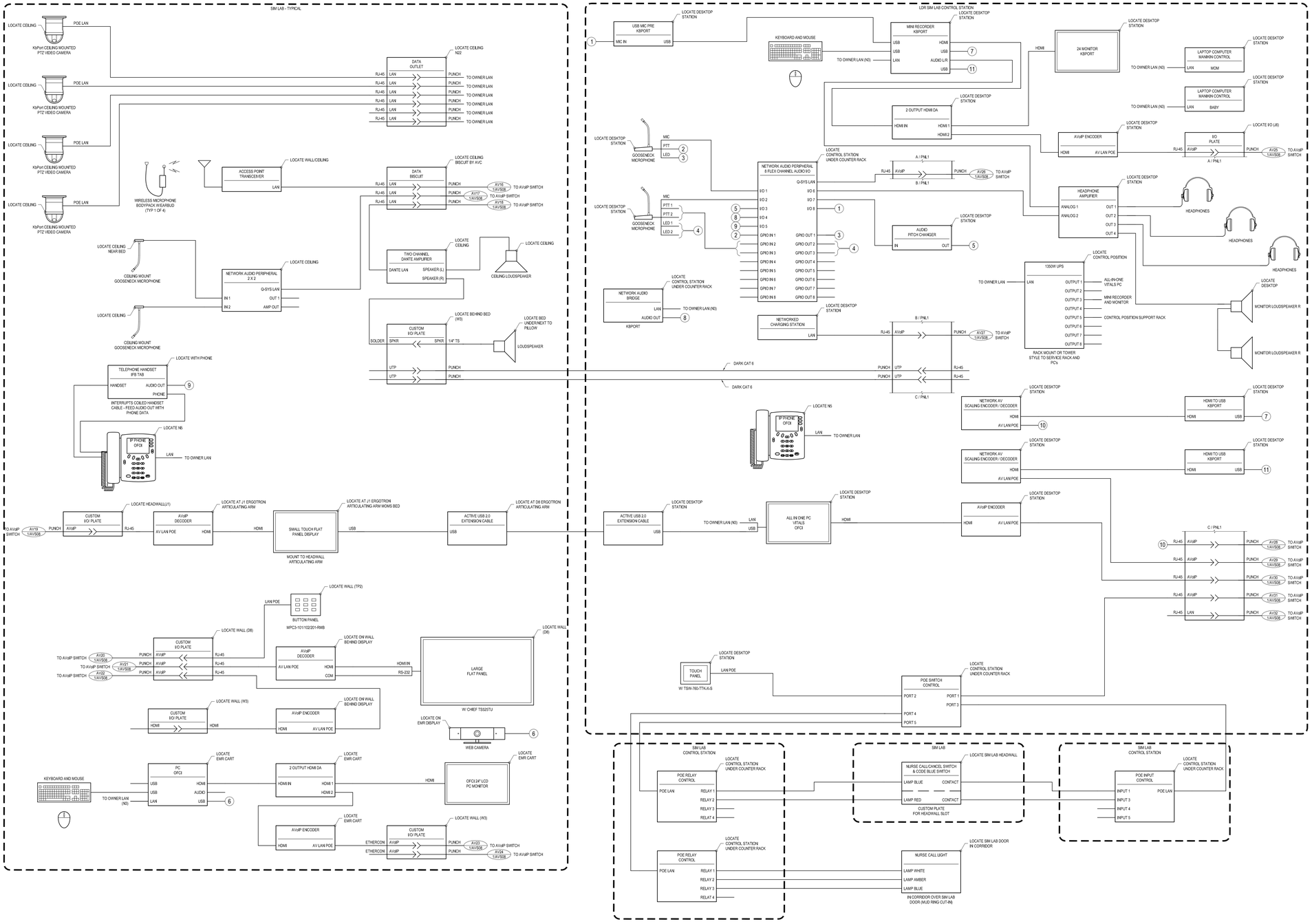
Drawing
AUDIOVISUAL SYSTEMS SY01

AVS01

CONTRACT DOCUMENTS



1 / AVS02 SY02 - HIGH FIDELITY OR SIMULATION LAB AND CONTROL STATION - QTY. 1 - ROOM NUMBERS 042D, 042E
SCALE: NTS

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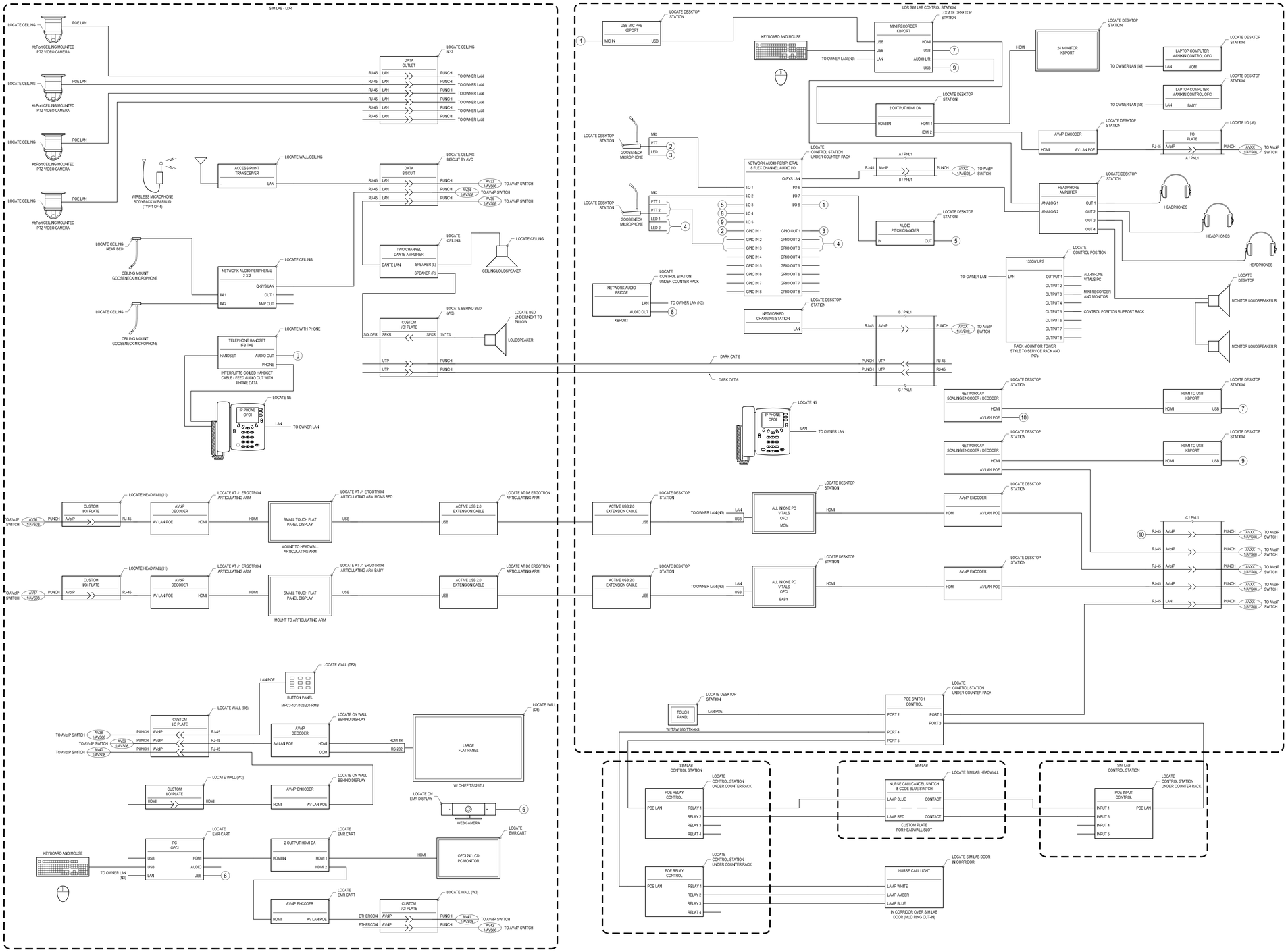
Drawing
AUDIOVISUAL SYSTEMS SY02

AVS02

CONTRACT DOCUMENTS



1 AVS03 SY03 - HIGH FIDELITY BIRTHING SIM AND CONTROL STATION - QTY. 1 - ROOM NUMBERS 042C, 042E
SCALE: NTS

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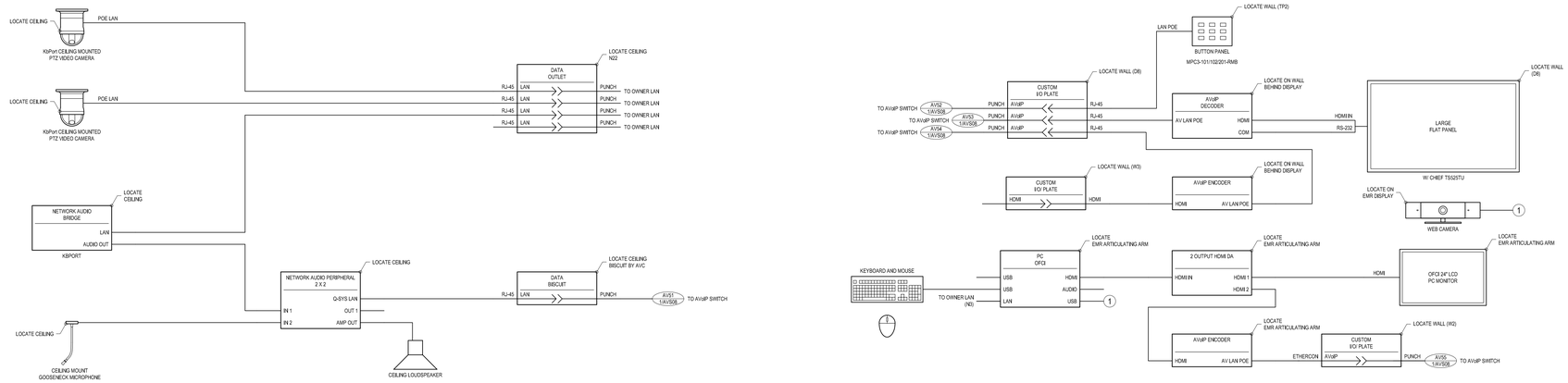
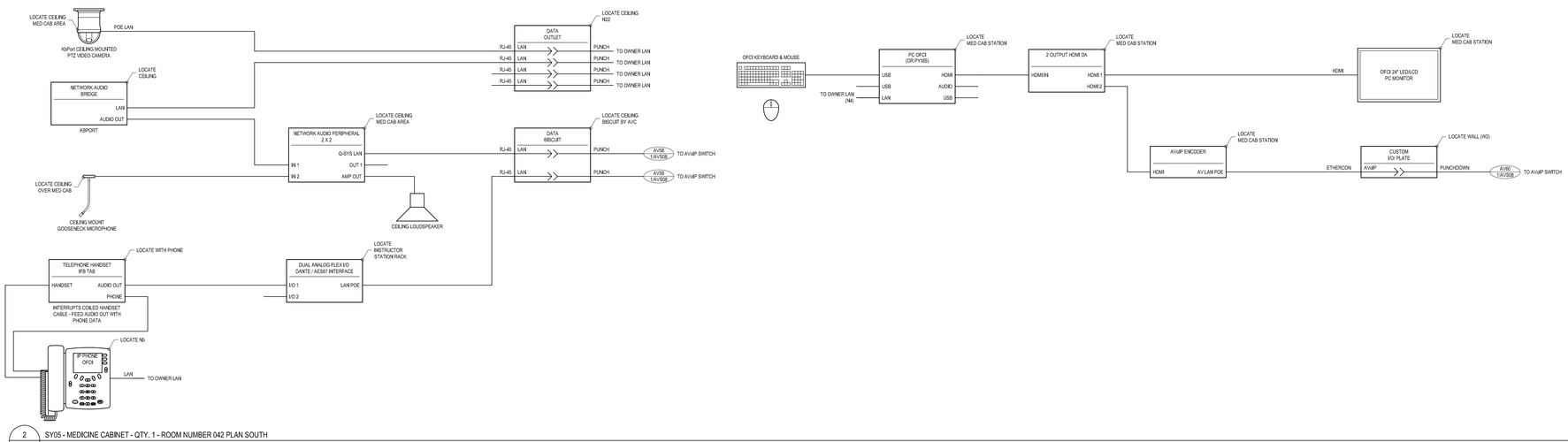
Drawing
AUDIOVISUAL SYSTEMS SY03

AVS03

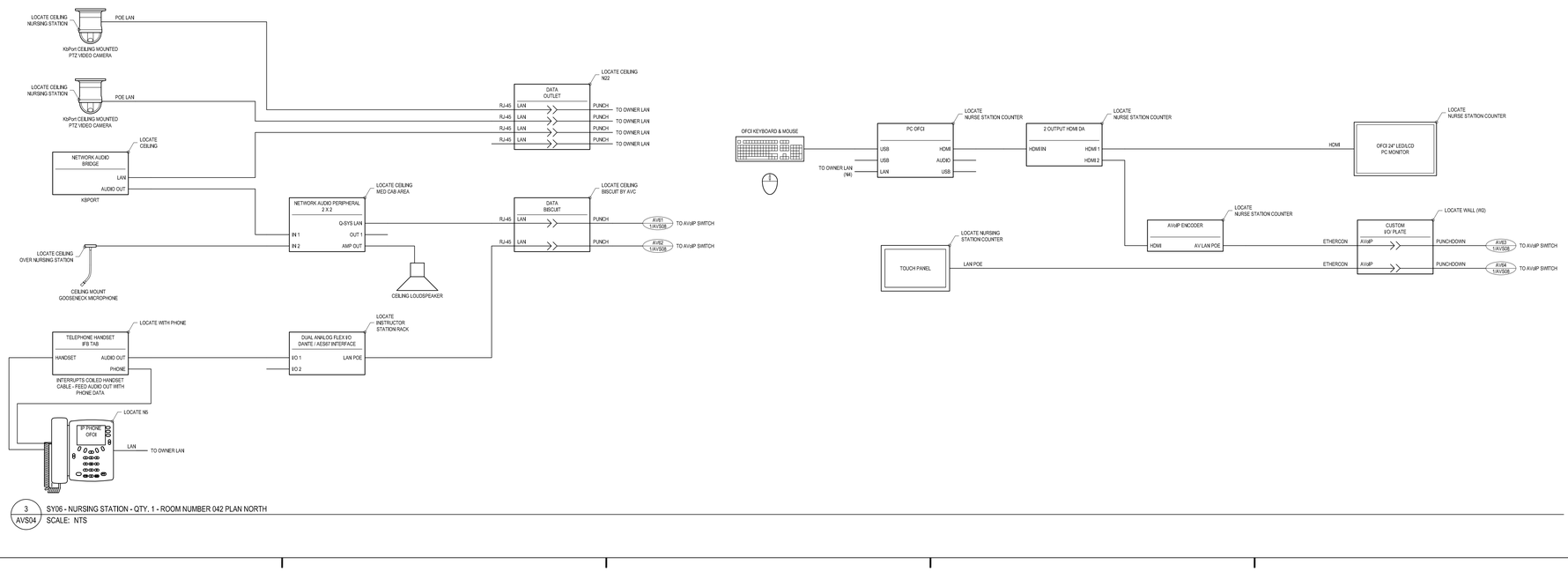
CONTRACT DOCUMENTS



1 AVS04 SY04 - TYPICAL PRACTICE - QTY. 2 - ROOM NUMBERS 041, 043
SCALE: NTS



2 AVS04 SY05 - MEDICINE CABINET - QTY. 1 - ROOM NUMBER 042 PLAN SOUTH
SCALE: NTS



3 AVS04 SY06 - NURSING STATION - QTY. 1 - ROOM NUMBER 042 PLAN NORTH
SCALE: NTS

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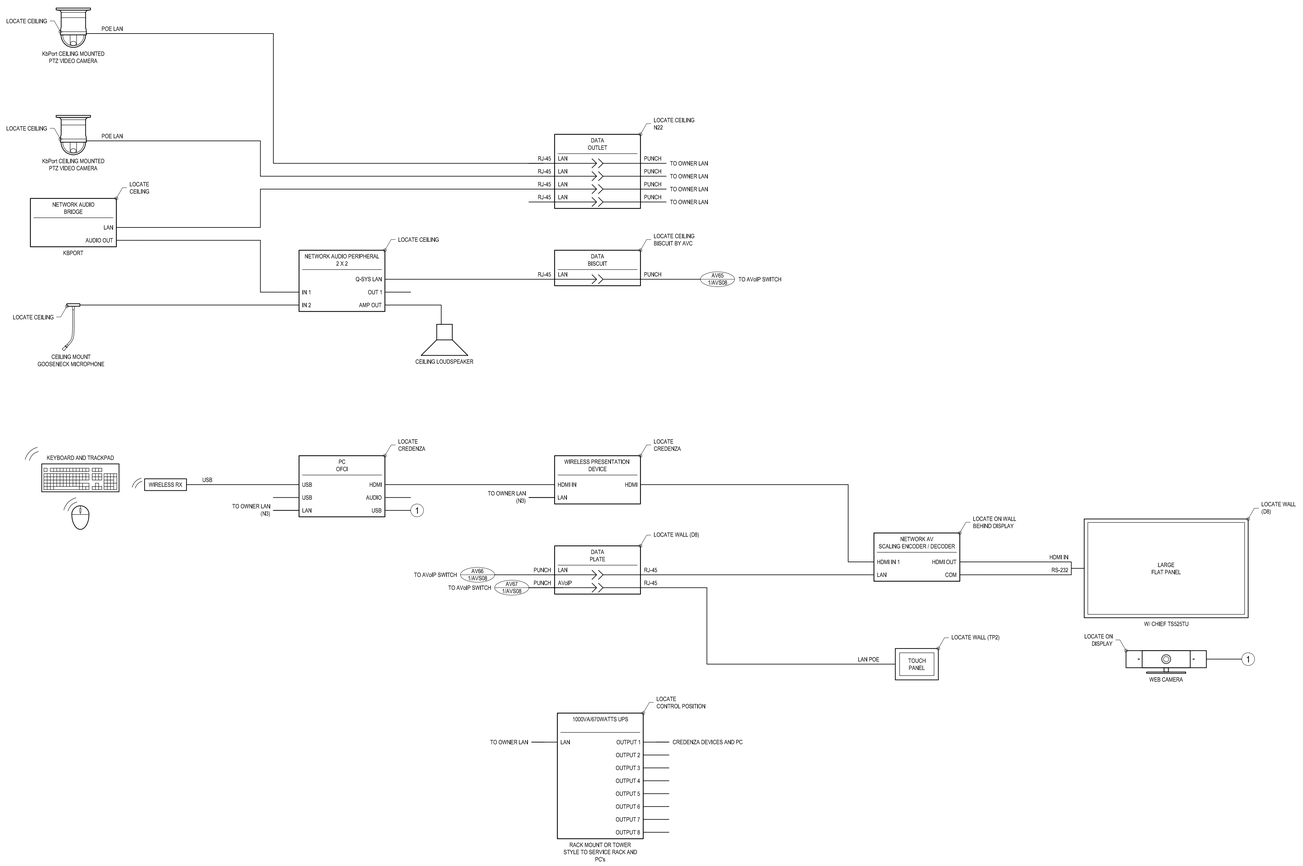
Drawing
AUDIOVISUAL SYSTEMS SY04, SY05, SY06

AVS04

CONTRACT DOCUMENTS



1 / AVS05 SY07 - TYPICAL GROUP STUDY - QTY. 2 - ROOM NUMBERS 045, 046
SCALE: NTS

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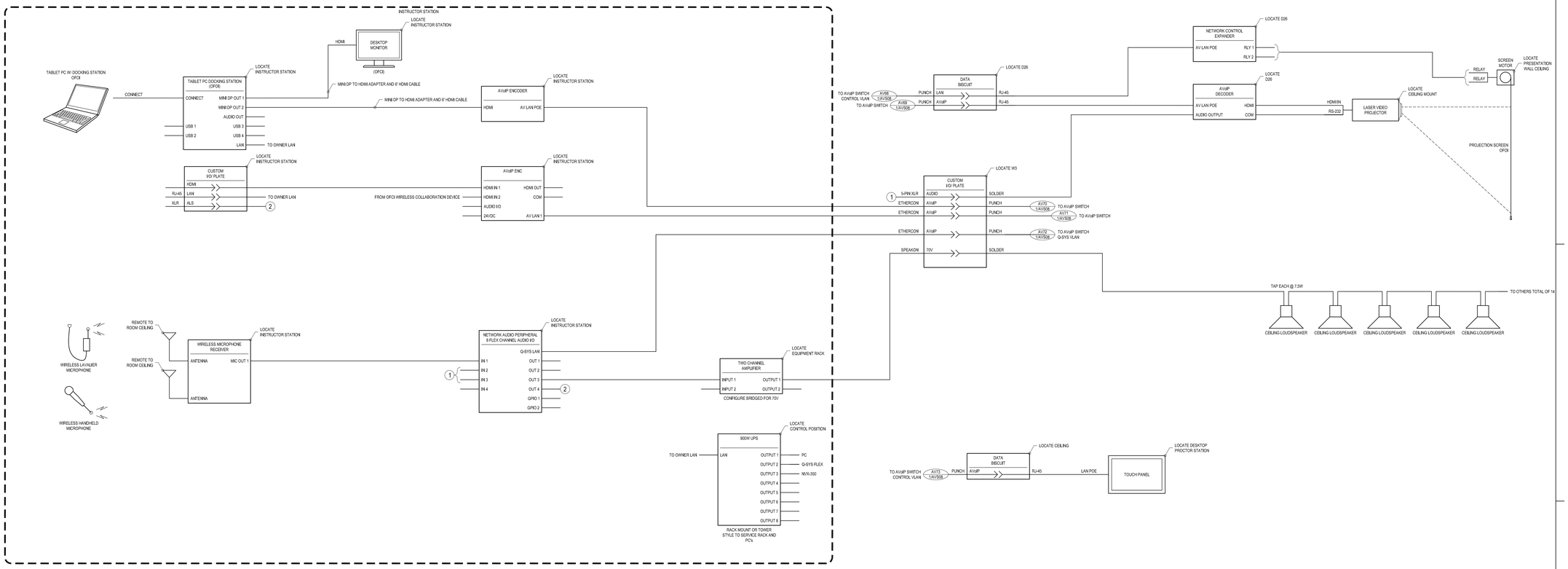
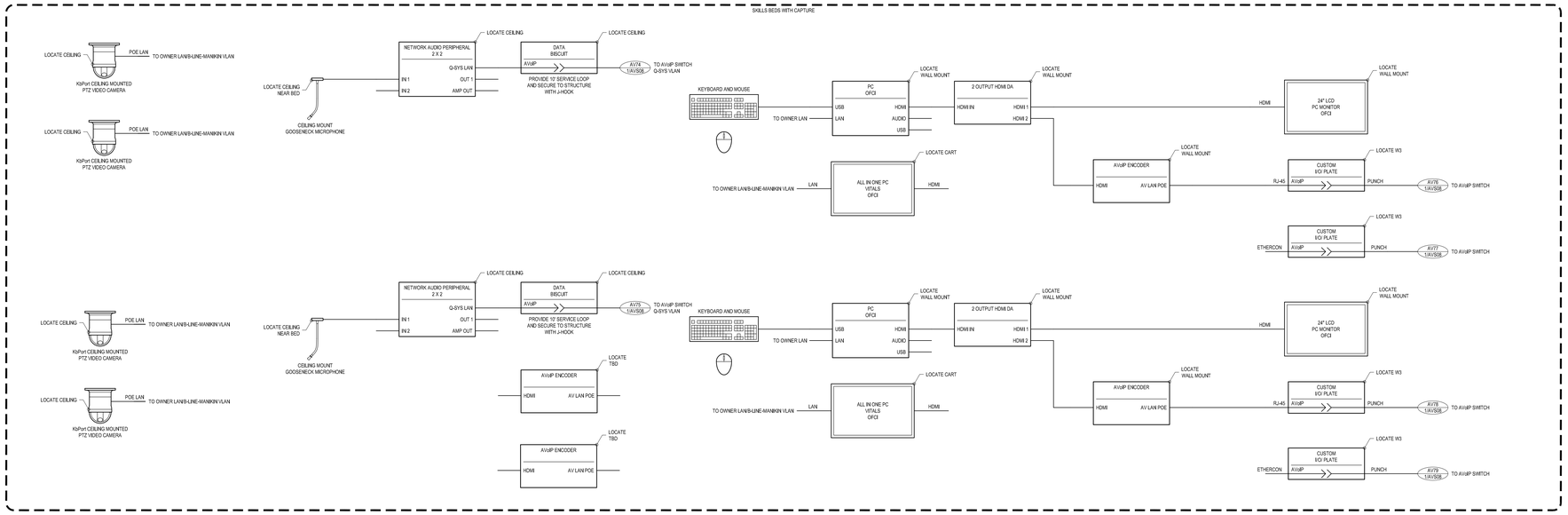
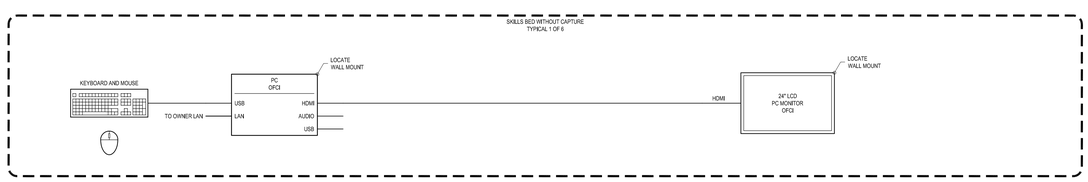
Drawing
AUDIOVISUAL SYSTEMS SY07

AVS05

CONTRACT DOCUMENTS







1 AVS06 SY08 - NURSING SKILLS LAB - QTY. 1 - ROOM NUMBER 049
SCALE: NTS

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AUDIOVISUAL SYSTEMS SY08

AVS06

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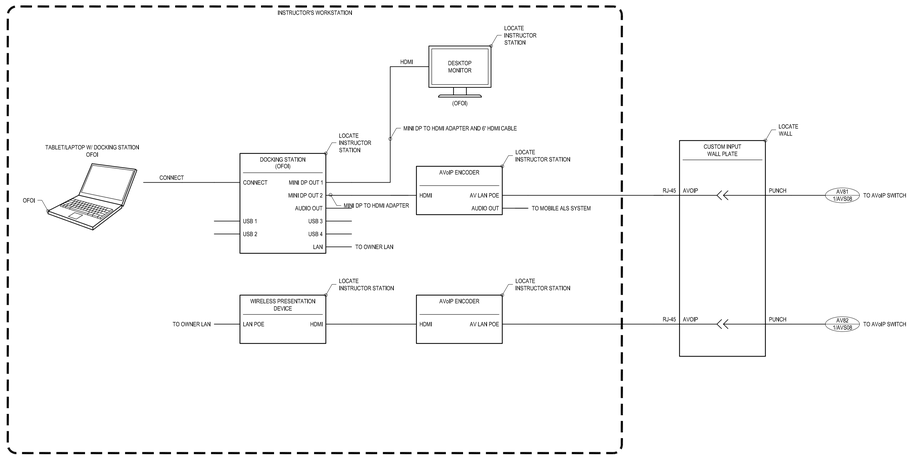

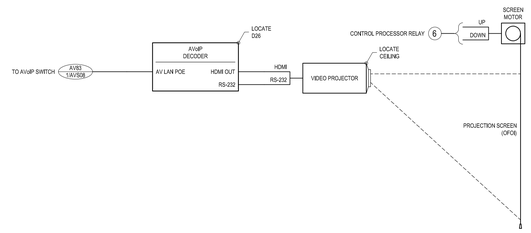

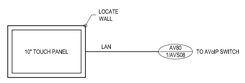

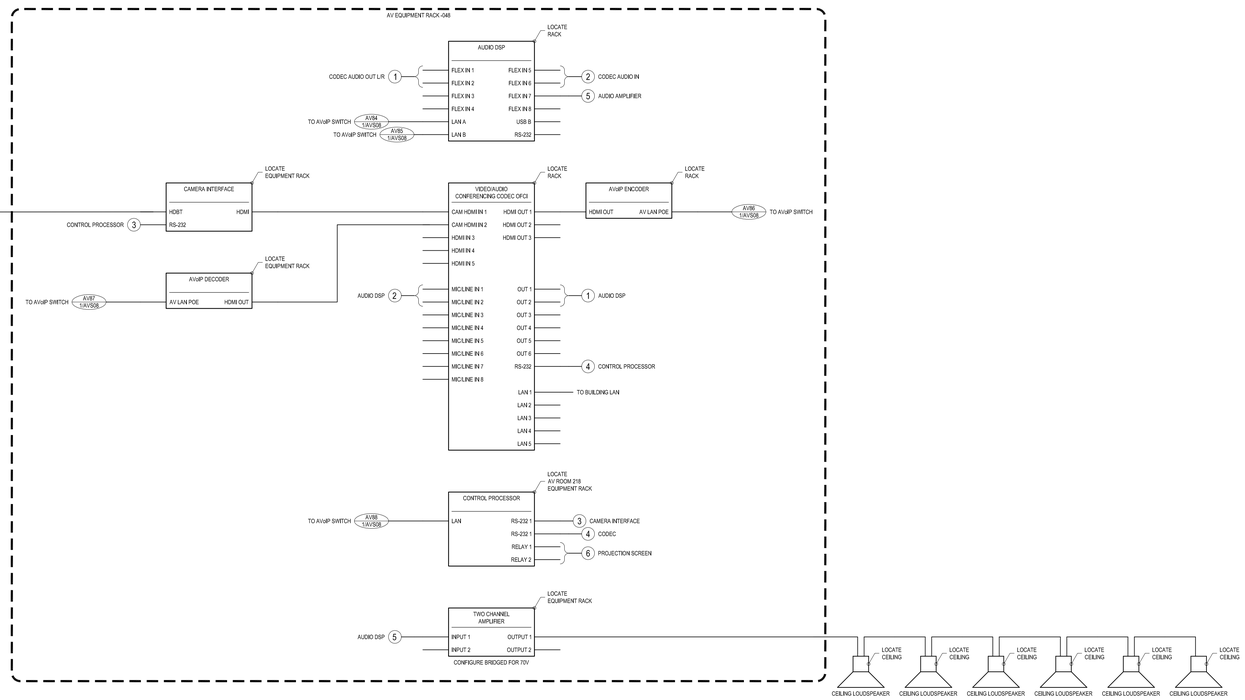

1 AVS07 SY09 - GENERAL PURPOSE CLASSROOM - QTY 1 - ROOM NUMBER 044
SCALE: NTS

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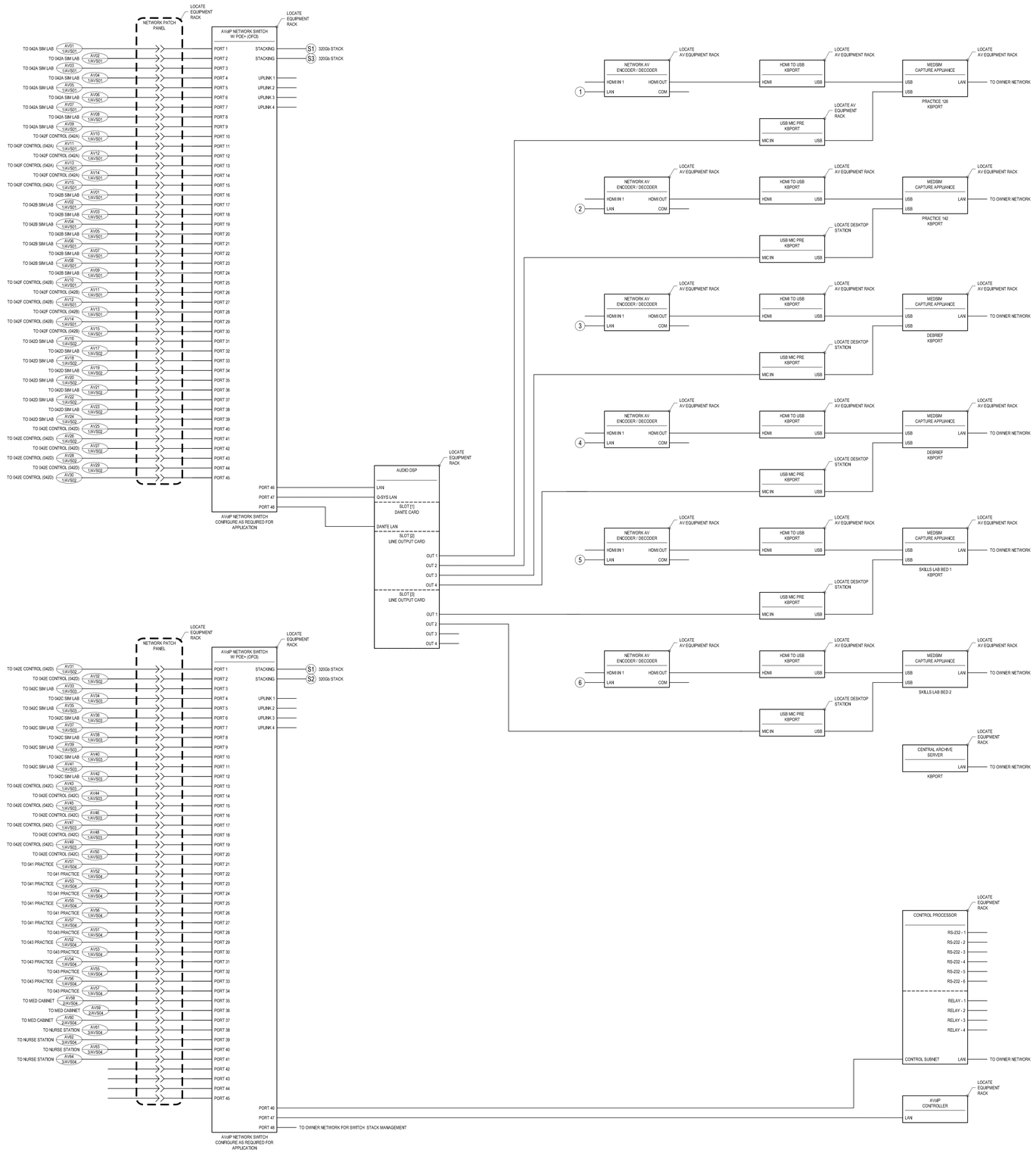
Drawing
AUDIOVISUAL SYSTEMS SY09

AVS07

CONTRACT DOCUMENTS



1 AVS08 SY10 - AV/IT EQUIPMENT ROOM - QTY. 1 - ROOM NUMBER 048
SCALE: NTS

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Drawing
AUDIOVISUAL SYSTEMS SY10

AVS08

CONTRACT DOCUMENTS

Colorado Mountain College

Spring Valley - Nursing

Audiovisual Systems

10/08/2021

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SECTION 4 – APPENDICES

SECTION 1 – BIDDING REQUIREMENTS AND CONDITIONS OF THE CONTRACT

PART 1 - GENERAL

1.1 GENERAL

A. Invitation: Colorado Mountain College Invites Bids for a Single Prime Contract for Audiovisual Systems in the Nursing Program at the Spring Valley location.

B. Medical Simulation software is being handled with a separate contract directly through Colorado Mountain College.

C. Project Number:

1. NV5 Project number 3570

D. Project name: Colorado Mountain College, Spring Valley

E. Project Substantial Completion Date and/or Schedule:

1. Project shall be substantially complete with fully operational systems by April 30th, 2022
2. As indicated within the documentation accompanying this specification

1.2 INSTRUCTIONS TO BIDDERS

A. As indicated within documentation accompanying this specification.

1.3 START OF CONSTRUCTION

A. Work shall not begin until Contractor has received written Notice to Proceed.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION 1

SECTION 2 – GENERAL CONDITIONS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The General Conditions, Requirements, and Special Provisions, of any larger body of specifications, of which this Specification may be a part, are hereby made a part of this Specification.

1.2 THE SPECIFICATION

A. The "Specification" is defined as the body of documentation provided to the Contractor with the Request for Quotation, as well as all addenda to said documentation. Throughout this document, words such as "herein" refer to the entire Specification, and not just this written document.

B. The Specification includes, but is not limited to:

1. This written specification document.
2. All drawings, as listed in the List of Drawings.
3. Additions and/or modifications as detailed in written addenda.
4. Additions and/or modifications as detailed in drawing additions or reissues.

C. The purpose of the Specification is to provide sufficient detail for the Bidder to understand the functional requirements of the systems, the installation and performance standards that must be met, and the required scope of work, in order to generate and submit a complete and accurate bid.

1.3 DEFINITION OF TERMS

A. Within this section of the specification, the following definitions shall apply:

1. The term "Owner" is used to indicate Colorado Mountain College.
2. The term "Architect" is used to indicate Hord Coplan Macht.
3. The term "Consultant" is used to indicate: NV5. 2650 18th Street Suite 202, Denver, CO 80211.
4. The term "Bidder" is used to indicate that entity generating the bid response.
5. The term "Contractor" is used to indicate the successful Bidder to whom the Owner has awarded the contract.
6. The term "Furnish" is used to indicate the responsibility to procure and ship or deliver the item to the job site, freight prepaid, for receipt, staging and installation by others.
7. The term "Install" or "Installation" is used to indicate the responsibility of receiving the item at the job site, assuring adequate storage, unpacking or uncrating the item, physically securing the item, configuring and testing the item, or otherwise making ready the item for its intended use by following the instructions and approved methods of the manufacturer and any additional requirements described herein.
8. The term "Provide" is used to indicate the responsibility to both "Furnish" and "Install."
9. The term "Provided by Others" shall refer to material and work, which is related to this contract, but has been provided by parties other than the AV Contractor. An example might be in reference to a projection screen installed during building construction but requiring interface to the AV control system.
10. The terms "NIC" and "Not In Contract" are equivalent to "Provided by Others."
11. The term "OFCI" (Owner Furnished Contractor Installed) shall refer to equipment that will be furnished by the Owner for installation by the Contractor. The Contractor shall be responsible for

coordinating with the Owner in regard to the specific requirements of the equipment as applicable to meet the functional requirements of the systems as specified. The Contractor shall be responsible for installing and integrating this equipment as required to produce a fully-functioning system. This may include the installation and configuration of software, PCI cards or other components within or attached to OFCI computers that are required by the AV systems.

12. The term "Contractor Selected" refers to ancillary items where no specific manufacturer and/or model number has been listed as the basis of design in the Bidding Equipment List. The Contractor shall select a product that meets the performance and functional requirements of the system, and submit the product as part of the line item pricing, Shop Drawings and Bill of Materials submittal process as defined herein.
13. The term "Installation Materials" shall reference installed cable, loose cable, terminations, signal extenders, cable management, voice/data/video patch cords, adapters, I/O panels, cable dressing, lacing bars, copper bus bars, labels, rack shelves, rack mounts, power supplies and adapters, power strips/distribution and other materials as needed to install the systems defined herein.
14. The term "Substantial Completion" is used to indicate the stage in the progress of the work where the systems are determined to be sufficiently complete in accordance with the Specification so that the Owner can utilize the systems for their intended use.
15. The term "Final Acceptance" is used to indicate the point in which all contract requirements have been met by the Contractor after Substantial Completion has been achieved. This includes, but is not limited to, the correction and acceptance of any remaining punch-list items, approval and delivery of all Final Documents, and user training as specified.
16. The term "shall" is mandatory; the term "will" is informative; and the term "should" is advisory.

1.4 SCOPE OF WORK

A. The Contractor shall provide complete, turnkey audiovisual systems performing all of the services and functions as described herein, together with all other apparatus, cable, materials, labor, tools, transportation, and any other resources necessary to provide a complete system.

B. Specifically, the work shall include, but is not limited to:

1. Coordination
   a. Communicating and coordinating directly with the Consultant, Owner, Architect and other trades complying with all requirements as defined under this Scope of Work and elsewhere, to fulfill all requirements of this specification.
   b. Scheduling installation operations in sequence required in order to obtain best completion results.
   c. Coordinating installation of different components to assure maximum accessibility for required maintenance, service, and repair.
   d. Verifying required cable lengths for all bulk cable or manufactured cable assemblies prior to ordering as outlined in 'Installation Practices'.
   e. Verifying the accuracy of Master Quote or other quotation numbers prior to ordering.
      1) Where given, Master Quote numbers or other quotation numbers have been provided as a convenience to Bidders and are intended to be used for bidding purposes only.
      2) Bidding Equipment List subsystem sections, where a Master Quote has been provided, may only show a small number of items to help convey the design intent of the subsystem. Refer to the Master Quote for the expanded list of subsystem components.
      3) A Master Quote may not be inclusive of all components or accessory items necessary to provide for a complete, functioning and properly integrated subsystem. The Bidder shall include all miscellaneous materials that may be required to complete the subsystem.
      4) Where discrepancies between a Master Quote and the Bidding Equipment List exist, the Master Quote shall rule.

2. Documentation
    a. Generating and submitting Shop Drawings as required for approvals and As-Built drawings as specified herein.
    b. Generating and Submitting “Progress Reports” as defined herein.
    c. Documenting the completed installed systems as defined herein.
3. Design Verification and Acceptance
    a. Verifying the accuracy of the system designs documented in the Specification and acceptance of responsibility. Any issues, discrepancies substitutions, or exceptions to the Specification by the Contractor shall be communicated to the Consultant prior to the purchase of any equipment or materials by way of the Shop Drawings Submittal process. Upon approval of the Contractor’s Shop Drawing Submittal by the Owner's designated representative, or if the Contractor fails to submit Shop Drawings, the Contractor shall assume all responsibility for supplying such materials and taking such actions as to satisfy the full intentions of the Specification without claim for additional compensation. This shall include providing any incidental equipment, Installation Materials and labor needed in order to result in a complete and operable system, even if such equipment, materials or labor are not listed in this Specification. Exceptions include Owner-requested changes, unexpected field issues due to work by other trades, or schedule changes initiated by others.
4. Cabling, Equipment, and Installation
    a. Providing all cable in conduits for the specified systems. Place pull string in all conduits after cable installation is complete to allow for future cable installation.
    b. Providing station cables for connection of IP-enabled audiovisual equipment to associated data network outlets, including but not limited to presenter’s computers, production computers, laptop connections, control system processors, codecs, and displays. This applies to all equipment installed by the Contractor, including Owner-Furnished (OFCI) items. Coordinate station cable requirements with the greater building-wide structured cabling system.
    c. Coordinating and providing cable labels as stipulated by the Owner and/or specified herein.
    d. Furnishing and/or installing all equipment as specified.
    e. Installing Owner furnished equipment as specified.
    f. Providing speakers as complete assemblies with back boxes, grilles, tile bridges, wall mounts, hanging hardware and other installation hardware as required.
    g. Coordinating with the Architect and Owner on final color selection, and/or the painting of any exposed loudspeakers and any/all exposed system components to match the room’s aesthetics and finishes.
    h. Coordinating with local entities as necessary (manufacturer, Owner, SBE, FCC, etc.) to determine final channel selection for all wireless devices and resolve conflicts where they may occur.
    i. Providing to the Owner, upon completion, all accessories and ancillary items included with the manufacturer’s equipment but not used for the physical installation of the device. This shall include all user manuals, remote controls, batteries, tools, installation hardware, carrying cases, protective covers, loose cables, etc. Batteries shall be provided for all battery-operated devices, even if not included by the manufacturer.
    j. Furnishing all lifts, ladders, scaffolding or other resources as needed for proper safe installation. Coordinating with other trades as needed.
    k. Interconnecting all components, both internal and external to rack cabinets.
    l. Ensuring that all cabling, equipment, and terminations are installed in accordance with accepted industry standards, approved Shop Drawings, manufacturer’s recommendations and as stipulated herein.
    m. Providing cable management hardware as required including; that required internal to rack cabinets; that required between pieces of equipment not housed in rack cabinets; and that

required to extend cabling from rack cabinets and equipment to the greater facility cabling infrastructure.

n. Providing equipment mounting hardware as required including; that required for mounting equipment behind flat panel displays; that required to mount equipment within equipment racks; that required for other locations where equipment will be housed.

o. Providing custom cover plates, wall plates, I/O connection plates, floor box insert plates as required. Coordinate with the Architect and/or Owner on the final selection of finishes.

p. Ensuring that all equipment, with the exception of portable equipment, is firmly fastened or attached in place. A safety factor of at least four shall be utilized for all brackets, fasteners and attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.

q. Ensuring that all equipment mounting styles and locations comply with the 2010 ADA Standards for Accessible Design.

r. Providing a list of all Owner Furnished Contractor Installed equipment to the Owner including a date when all equipment must be received to ensure the installation is completed on time.

s. Providing any/all patching, caulking, fire stopping, and painting required to restore damaged finishes during installation.

5. Furniture
   a. Providing audiovisual lecterns and technical furniture as specified.
   b. Coordinating with the Consultant, Architect and Owner on the final selection of all technical furniture including design details (make/model), available options, dimensions, cable management needs, color, and finish. Furniture must comply with CMC standards.
   c. Coordinating with furniture manufacturer or others who are providing all necessary furniture/millwork modifications (“cut-outs” or other) as required allowing for a neat and professional installation of integrated technology system components. This includes, but is not limited to: integrated table/lectern “cubbies”, table-top microphones, cable management grommets, etc., and providing manufacturers’ cutout templates to others when requested.
   d. Coordinating with the furniture manufacturer, Owner, and Architect on cable management, thermal management, and equipment installation requirements in all spaces so equipped and as outlined in ‘Installation Practices’. Providing manufacturer’s product cut sheets and/or equipment samples where they may be needed to assist in the design by Others towards integrating such equipment into furniture systems or architectural features.
6. Coordination with Owner’s Network
   a. Securing from Owner private IP addresses for use by Ethernet equipped audiovisual devices. No Ethernet equipped device shall be connected to Owner’s network without the express permission of Owner. This shall include, but is not limited to configuration parameters such as DHCP, IP addresses, subnet information, VLAN setup and authorization.
   b. Confirming with the Consultant that coordination with the Owner regarding Ethernet equipped audiovisual devices as outlined in ‘Submittals – Software’.
7. Network Electronics for Audiovisual Systems
   a. Furnishing all network electronics supporting audiovisual devices including but not limited to network switches, SFP/QSFP modules and transceivers, stacking modules and cables, power supplies and cables, console cables, licensing for hardware, and support.
   b. Furnishing all copper patch panels including but not limited to rack mounted and wall mounted patch frames, keystone jacks, prefabricated patch cables, horizontal and vertical cable management hardware, and labeling.
8. Programming and Software
   a. Developing and installing all custom control system programming code as required and/or as specified herein.

b. Developing and installing all custom DSP programming code as required and/or as specified herein.

c. Providing Control System design submittals and two Control System design revisions as outlined in 'Submittals – Software'.

d. Providing centralized media control systems including GUI (Graphical User Interface) and code development in order to satisfy the guidelines outlined herein.

e. Developing Control System help-desk and system administrator functionality as defined herein.

f. Coordinating with the Electrical Contractor and/or others on the control system interfaces to mechanical systems including motorized screens, as specified.

g. Coordinating with the Electrical Contractor and/or others on the low voltage control system interfaces to facility lighting where specified.

h. Providing the executable (uncompiled) programming control code as defined herein.

i. Developing and installing all custom software for DSP devices as required to optimize system performance.

j. Configuring all installed components including the assignment of device host name, configuration of network settings, configuration of user and administrative access names and passcodes, and configuration of all settings required for proper operation within the specified system.

k. Installing, configuring, and testing all manufacturer provided software applications included with the specified equipment.

l. Coordinating Audio DSP settings with Consultant for the purposes of integrating any necessary recalls into the control software.

m. Coordinating with Consultant to communicate any conditions or circumstances that do not satisfy the functionality described herein.

n. Loading and testing any control programming code updates prior to Substantial Completion and during the Warranty period.

9. Testing, Training, Acceptance, and Warranty

a. Ensuring that all individual components function as intended by this Specification.

b. Ensuring that the entire audiovisual systems function as intended by this Specification.

c. Testing, adjusting, and fine-tuning the completed systems and components.

d. Coordinating and participating in a Systems Performance Verification review with the Owner and/or Consultant.

e. Coordinating and conducting an acceptance walk-through and sign-off session with the Owner and/or Consultant.

f. Providing "sign-off" documents for each space and/or space type as defined herein.

g. Conducting training in systems operation for the Owner's designated representative(s).

h. Providing a warranty service contract as defined herein.

C. Work Excluded: Work not included under this contract unless noted otherwise shall be:

1. Providing conduit, power receptacles, junction boxes, cable raceways, electrical back-boxes, and floor boxes.

2. Providing lighting fixtures, lighting dimming systems, lighting controllers, and lighting system low voltage AV interfaces at the dimmer side.

3. Providing millwork except where otherwise specified herein.

4. Providing recessed wall boxes for video cameras.

5. Providing blocking as required to support wall-mounted audiovisual components.

6. Providing window treatments and motorized shade system low voltage AV interfaces at the controller side.

7. Providing telecommunications structured cabling systems, including horizontal and backbone cabling and termination, voice and data face plates, associated racks and cabinets, raceway, and cable management.

1.5 SITE CONDITIONS

A. Conflicts: The Bidder shall be responsible for investigating any potential conflicts with site-related or union-related issues regarding use of personnel, scheduling, access to the site, storage of tools and equipment on-site, and other areas of potential conflict. If these issues impact the Bidder's Bid Response, the impacts on cost and schedule should be clearly noted in the Bid Response

B. Coordination: In the interest of a coordinated and professional project, the Contractor shall:

1. Coordinate his/her work with that of other trades. The Contractor should anticipate attending weekly project coordination meetings with the Owner, Architect, General Contractor, Consultant or other trades as required.

2. Afford other trades reasonable opportunity for installation work and for storage of materials.

3. Staff the job to keep pace with other Trades.

C. Equipment Delivery and Storage: Costs of all shipping to the site, and of all unusual storage requirements, shall be borne by the Contractor. It shall be the responsibility of the Contractor to make appropriate arrangements, and to coordinate with the authorized personnel at the site, for the proper acceptance, handling, protections, and storage of equipment so delivered.

D. Refuse / Cleaning Up:

1. The Contractor shall keep the site and building free of all debris and clutter, to the satisfaction of the Owner or site manager. On a daily basis, the Contractor shall remove refuse and rubbish related to the specified work from the site and shall leave the relevant areas and equipment clean and in an operational state. The Contractor shall be responsible for repairing any damage caused to the premises by the Contractor's installation activities, at no cost to the Owner.

2. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

3. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

E. Use of Site:

1. Contractor shall adhere to the Owner's instructions regarding non-smoking, noise, signs, advertisements, and fires.

2. The Contractor shall confine operations at the site to areas permitted by the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

F. Cutting and Patching:

1. The Contractor shall be responsible for cutting, fitting or patching as required to complete the Work or to make its parts fit together properly.

2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

G. Access to Work: The Contractor shall provide the Owner and Consultant access to the Work in preparation and progress wherever located.

1.6 JOB CONDITIONS

A. Space Conditions:

1. Architectural reference drawings provided to the Contractor for bidding purposes may not reflect construction site as-built conditions. It shall be the responsibility of the Contractor to field-verify all site conditions relevant to his/her work.

2. The Contractor shall verify dimensions of equipment, equipment arrangements, space availability (including any millwork or cabinetry provided by others) and provide systems that work within the constraints of the space available. The Contractor shall notify the Consultant of any situation where space constraints are a problem, prior to the submission of shop drawings or the ordering or purchase of equipment. The Contractor shall bear the expense of providing alternate equipment, which will work within the available space, if space availability problems are discovered after shop drawings are submitted and approved.

3. If new or changed space condition issues are identified by the Contractor or others after the approval of shop drawings, the Contractor shall provide a proposed solution for the identified issue. The proposed solution shall include any potential impact to cost and/or schedule. Proposed solutions will be reviewed and approved by the Owner, Architect and/or Consultant, or alternate solutions will be recommended.

4. Drawings indicate locations of equipment and components. Changes in the location, and offsets of same to accommodate building conditions, and coordination with the work of other trades shall be made prior to initial installation, without additional cost to the Owner.

5. The Contractor shall ensure during installation that access is provided to equipment and components requiring operation, service or maintenance within the life of the system.

6. It shall be the responsibility of the Contractor to identify any condition where the recommended environmental and/or electrical operating parameters for specified equipment/products cannot be assured. Should such condition exist, it shall further be the responsibility of the Contractor to notify the Architect and Consultant of any such condition.

B. Conduit and Cabling Pathways

1. The Contractor shall review and verify all conduit, boxes, and other cabling pathways as indicated in the infrastructure Reference Drawings and provided by others. This review shall include the drawings as well as as-built conditions on site.

2. The Contractor shall notify the Consultant, General Contractor, and Architect of any deficiencies, issues, or incorrect installations on site that may impact the installation of the audiovisual systems cabling or equipment as specified.

3. Failure to perform this review will result in a revised cabling approach to be designed, proposed, and implemented by the Contractor, with any additional costs borne by the Contractor.

1.7 POST-AWARD REQUEST FOR INFORMATION

A. All requests for information (RFIs) shall be communicated by way of the enclosed Request For Information Form (APPENDIX D). RFI forms may be submitted per the method indicated in the documentation supporting this specification. .

B. All RFIs shall identify the issue and provide a proposed solution. The proposed solution shall include any potential impact to cost and/or schedule. Proposed solutions will be reviewed and approved by the Owner, Architect and/or Consultant, or alternate solutions will be recommended.

C. The Contractor shall receive written response within 5 working days of receipt of the RFI by the Owner/Consultant.

1.8 LAWS AND REGULATIONS

A. All equipment, cabling, materials, and installation methodology shall conform to the requirements of the National Board of Fire Underwriters, the current published edition of the National Electrical Code, and all other applicable laws and regulations. The Contractor shall obtain and pay for any additional permits and inspections required by all legal authorities and agencies having jurisdiction over the Contractor's work.

1.9 QUALITY ASSURANCE

A. Unless otherwise stated, all equipment for this installation will be new, less than one year from the date of manufacture, and without blemish or defect.

1. All electrical, electronic and optical equipment provided by the Contractor shall be a product of companies regularly engaged in the manufacture of electrical, electronic or optical equipment.

2. All equipment must be purchased from a manufacturer-approved distributer or reseller. Purchase of equipment from a non-approved reseller is prohibited.

3. The equipment shall be the latest model or type offered which meets the applicable specifications at the time of the submittal. Discontinued items replaced by newer models or versions are prohibited from use in the project. It shall be the Contractor's responsibility to provide the Consultant with information regarding discontinued products listed in the specification. If a product listed is discontinued prior to installation, the Contractor shall submit a substitution request.

   a. Request shall include name of material, product or equipment to be substituted and a complete description of proposed substitution including drawings, performance and test data and other information necessary to demonstrate that the substitution will meet all intentions of this Specification or required for a complete evaluation.

   b. Contractor shall assume and bear all responsibility for coordinating and/or performing related changes in the Work necessitated by such substitution. This includes, but is not limited to, changes to other related audiovisual components, Installation Materials, architectural integration details, software programming, and required infrastructure.

   c. The Contractor shall receive written response within 5 working days of receipt of the Substitution Request by the Owner/Consultant.

4. Where applicable, all equipment must have the manufacturer's latest firmware version installed prior to Testing and Systems Performance Verification.

B. Quality of workmanship and fabrication of all equipment and components, which are custom fabricated shall be comparable to professional equipment produced by specialized manufacturers of the trade involved and shall be verified by observation. Only firms having 10 years' experience in all aspects of the fabrication and installation of similar systems shall be allowed to perform the work.

C. The work specified herein, and in each of the allied sections, shall be accomplished by a single Audiovisual Contractor experienced in the design, fabrication, installation, checkout and warranty contract management of systems such as those described in each section.

1. The Audiovisual Contractor shall have complete responsibility for the systems described herein and shall be the single contract point for the Architect, the Consultant and/or the Owner with respect to all work specified herein.

2. The Contractor shall maintain the same project manager and field supervisor throughout the installation, and where practical, maintain the same installers.

D. The Contractor shall supply and install any incidental equipment needed in order to result in a complete and operable system without claim for additional payment, even if such equipment is not listed in this Specification.

E. All work related to this Specification shall be completed in a professional manner by fully qualified workers.

1.10 RELIABILITY

A. General: The systems are designed to provide professional quality operation over a period of several years without the need for continual maintenance. Equipment that has a high failure rate is not acceptable for installation as part of the systems.

B. Warranty: The Bidder shall make known, in writing, at time of Bid any exceptions that might exist between conditions described herein and Bidders policy of warranty. After acceptance of bid, all conditions and requirements of warranty described herein shall apply.

1. The Contractor shall guarantee all equipment, materials, and labor for a period of 1 year from the date of Substantial Completion.
2. Bidders shall maintain permanent fabrication, service and support facilities within (100) miles of the Project site during the Work and Warranty period.
3. During the warranty period, within 24 hours of notification, the Contractor shall answer all service calls and requests for information.
4. During the warranty period, within 96 hours of original notification, the Contractor shall provide emergency service to restore operation of the system, replacing defective materials, repairing faulty workmanship, making temporary repairs, and providing loaner equipment as necessary, all at no charge.
5. The Contractor shall notify the Owner before any service call whether such call is or is not covered under warranty. The Owner may be billed for non-warranty calls. The Contractor shall notify the Owner of any service call or work to be performed for which charges may be incurred before such work commences.
6. Improper functioning, for warranty purposes, means failure of the system to meet the intentions of the specification because of internal defects. It does not include Owner caused malfunctions such as re-adjustment of the controls, re-tuning of the system, or injury to the system beyond normal wear. Nor does the warranty cover paint, exterior finishes, fuses, lamps (including projection lamps) or associated labor, unless the damage or failure results from defective materials or workmanship covered by the warranty.
7. The Contractor shall take such actions at the time of installation to ensure that all equipment is installed in accordance with the manufacturer recommended environmental and electrical operating conditions and requirements. After installation, the Contractor shall be responsible for the repair or replacement of said equipment that the Contractor installs which fails due to environmental or electrical conditions, even if not covered by the manufacturer's warranty. The Contractor shall not be held responsible for damages due to changes in environmental conditions, which occur after the date of Substantial Completion.
8. Unless otherwise directed, the Contractor shall activate all manufacturer warranties in the Owner's name. The start date of the warranties shall be the date of Substantial Completion.
9. If the Contractor has modified certain components, the manufacturer warranty may be void. In this case, the Contractor is responsible for providing warranty coverage equal to that of the manufacturer.
10. Certain subsystems and system components may require installation by authorized representatives in order for the complete manufacturer warranty to apply. If this pertains to any subsystem or component for this project, it is the Contractor's responsibility to make arrangements for the complete manufacturer warranty to apply. These arrangements are to be at no additional cost to the Owner.
11. As part of the Bid Response, the Contractor shall provide the Owner with a proposal to extend the Warranty to cover Year 2, Year 3, and Year 4 of operation. These offerings are to include all parts and all labor; all conditions and restrictions listed above apply.

1.11 PROTECTION OF PERSONS AND PROPERTY

A. Safety Precautions and Programs: The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. This requirement applies continuously 24 hours per day during construction of the Project.

B. Safety of Persons and Property: The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

1. employees on the Work and other persons who may be affected thereby;

2. The Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors and vendors.

1.12 OFF-SITE STORED MATERIALS

A. Summary: This Section specifies administrative and procedural requirements for handling requests for approval of partial payments for certain materials stored off-site.

B. Prior Approval: Contractor shall obtain Owner's approval before making any arrangements to obtain a Certificate for Payment for Materials stored off-site. Materials shall be suitable for storage and be properly packaged as necessary.

C. Storage Site: Contractor shall furnish and maintain a suitable storage site, approved in advance by Owner.

D. Storage Conditions:

1. Material shall be stored above grade, properly protected at all times against weather, hot, cold, moisture, and other hazards as material may require. All protection shall be provided by Contractor, at his/her own expense, and maintained throughout storage period.

2. Material shall not be commingled with other similar material, but be stored by itself and plainly labeled: "Property of Colorado Mountain College".

E. Bill of Sale:

1. Request for Certification for Partial Payment for materials stored off-site under approved conditions shall be accompanied by a Bill of Sale, properly identifying material and transferring ownership of materials to Owner.

2. Bill of Sale shall be accompanied with:

a. Inventory of stored material.

b. Description of storage site by street number and city, or by a legal description of the premises.

F. Insurance: Contractor shall take out and maintain fire, all perils, theft, vandalism and extended coverage insurance on off-site stored material and in-transit materials, in amount of 100% of value thereof, under same conditions as for material stored on site of the project. Owner shall be named beneficiary under the policy, as trustee for all concerned.

G. Responsibility:

1. Contractor agrees that, in accepting partial payment for off-site stored materials, he is in no way relieved of responsibility for safe storage of material and its safe transportation to, and installation in, the Work, or for furnishing and installing materials in strict accordance with Contract Documents.

2. Contractor agrees that acceptance by Owner of a Bill of Sale for Material does not imply acceptance or rejection up until time Contractor's work is completed and finally accepted.

3. Contractor agrees that usual guarantees covering his/her work under Contract Documents are in no way impaired as a result of partial payment and acceptance of the Bill of Sale.

1.13 SUBMISSION FOR PUBLICATION

A. Prior written consent from the Owner is required before submitting any information about this project for publication or award. This shall include, but not be limited to, photographs, descriptions, drawings, renderings, equipment lists, or any other information regarding the project. If written consent is provided by the Owner, any submission for publication or award must properly credit the Owner, Architect, and Consultant.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION 2

SECTION 3 – DESIGN AND PERFORMANCE REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT OVERVIEW

A. Colorado Mountain College is currently renovating campus space to support the new nursing facility on the Spring Valley campus. The new spaces will include audiovisual enabled teaching and learning spaces supporting the nursing program. Spaces in the building include high fidelity simulation labs, practice rooms and debrief rooms, all of which shall include audiovisual technologies.

B. Colorado Mountain College is seeking a turn-key job to be provided by one vendor to supply equipment, labor, installation materials, control systems programming, audio DSP programming, testing, training, and follow-up support for the audiovisual systems as described in this Specification. The medical simulation software and supporting hardware, not included in this AV systems package, is being provided under a separate contract.

1.2 GENERAL FOR ALL SYSTEMS

A. The following are applicable to all systems unless noted otherwise.

1. System type (i.e. SY01) refers to a system signal flow for a particular space/system. X / AVSXX indicates the sheet and the detail that the system can be found within the signal flow drawings.

2. Control System

a. The audiovisual control system touch panel or push-button panel associated with each system shall provide control of components within the audiovisual system. Control requirements are dependent upon the functionality of the space. Control may include, but is not limited to, the following capabilities:

1) Power the system on/off

2) Control of source device selection

3) Control of video routing to displays and other devices

a) The last video source routed to a display will be the audio source utilized within the space. Coordinate final configuration with the Owner.

b) On touch-panel control systems, this includes secure technician level access to configure or reconfigure default routing.

c) The Contractor shall develop an easy to use interface on the touch panel that provides control of the routing assignments of the instructor's source content to all or select displays within the space.

4) Control of audio including volume up/down/mute

a) On touch-panel control systems, this includes secure technician level access to controllable aspects to the audiovisual system's DSP settings if applicable.

5) Control room lighting by recalling presets within the lighting control system provided by others.

a) Coordinate with the Architect regarding spaces that will include this capability

6) Include a button to reset the system to its default video routes and audio levels without having to shut down and restart the system. This is for spaces with touch panel control only.

b. Any other operations that the control system can control not explicitly noted.

c. See Section 3.2 Control System Software Design & Development for further requirements.

d. If required, a utilities section within the user interface shall provide any user with control of additional parameters of the audiovisual system that may not need to be accessed on a regular basis.

e. All audiovisual control systems shall include secondary analogous control of the audiovisual system. This shall be enabled through an app and/or web interface on an Owner-provided tablet or other mobile device. See Section 3.2 Control System Software Design & Development for further requirements.

3. Connections to network outlets located outside of a rack mounted patch panel shall utilize patch cables that match the Owner's patch cable requirements for connection to the facility LAN. Reference Division 27 Communications specifications.

4. The Contractor shall coordinate with the Architect and/or Owner on the color and/or finish of the touch panel, push-button panel, flip-top control system, flip-top cable enclosure, exposed equipment racks, equipment rack cabinets, instructor stations, credenzas, loudspeakers and ceiling-mounted microphones.

5. The Contractor shall coordinate the cut-outs with the furniture supplier/Architect/Owner on the location of the flip-top cable enclosures, touch panel controllers, microphones, or any other ancillary audiovisual devices that may be located on the surface of a table, instructor's station, or presentation station. This applies to all Contractor supplied furniture or furniture supplied by others that requires integration of audiovisual components. See Section 2 1.4 Scope of Work and Section 3 3.1 Installation Practices for further requirements.

6. Any cables connected to a floor or wall box shall be wrapped in a flexible sheath and shall be color coded. Coordinate colors with the Owner.

7. The Contractor shall coordinate the length of any premade cable assemblies.

8. The Contractor shall be required to coordinate the location of any ceiling-mounted video cameras with the Owner prior to final installation.

9. The Contractor shall provide wire-ties, hooks, raceway or cable channels as necessary within Owner provided furniture to ensure a complete and neat installation. For example, cables shall not be seen hanging or draped under a table.

10. The Contractor shall provide mounts or mounting solutions for devices that are located behind flat panel displays, under tables, within plenum boxes or other locations that may house audiovisual equipment within the audiovisual system.

11. All instructor's stations, credenzas, and equipment racks provided by the Contractor shall all have locking doors to limit access. All locks shall be keyed identically. Coordinate requirements with the Owner.

12. Manufacturer Assistance

a. The Contractor shall utilize any manufacturer assistance for programming, configuring or commissioning any of the systems within the facility as required to provide fully functional systems as indicated within this specification.

b. The Contractor shall coordinate with KbPort for all connections and functionality between the AV system and the KbPort system to facility a cohesive complete system.

1.3 SYSTEMS DESCRIPTIONS

A. SY01 – High Fidelity ICU Simulation Lab and Control Station 042A, 042B, 042F: The Simulation Patient Labs and Control Station will support the use of actors/confederates as well as medical manikins. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as video sources from the high-fidelity manikins. These spaces shall also include direct view capabilities via one way mirror (provided by others). The spaces shall include the following:

1. A charting station with dedicated computer with keyboard, mouse (OFCI) and monitor shall be wall mounted on a track mounted articulating arm system within the room. A USB webcam shall be mounted to the top of the monitor and connected to the EMR computer for use with a soft codec. This computer shall be used for electronic health records (EHR), telemedicine, and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system via umbilical to the wall.

2. Display Devices shall include:
   a. A touch enabled flat panel display that shall be mounted at the headwall of the associated patient bed for viewing the manikin's physiological (vitals) data. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PC in the control room. Additionally, a USB connection between the display and the Vitals PC shall be provided to enable touch control and ancillary medical device use.
      1) Default source shall be the Vitals PC in the control room.
      2) Set up audio on FPD to always hear the incoming audio associated with the Vitals PC.
   b. A large wall mounted flat panel display for viewing manikin vitals, EMR information, or in room debrief via playback from the medical simulation system.
   c. Set up audio on FPD to always hear the incoming audio associated with the source.

3. Sound/Audio system:
   a. Two ceiling microphones shall pick up general audio above the bed and above the EMR station for capture via the medical simulation capture system.
   b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
   c. A ceiling recessed loudspeaker shall provide general talk-back and instruction from the control room.
   d. A small cube loudspeaker by the pillow next to the manikin shall provide manikin voice by the operator.
      1) This is sourced from the single button push-to-talk (PTT) microphone in the control room.
   e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
   f. One wall-mounted phone (OFOI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
      1) The phones will only be programmed to make internal calls. All phone programming shall be provided by others. Coordination will be required.
      2) The audio cable shall share the VoIP data pathway to the cable basket
      3) The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.

4. Control:
   a. A wall mounted control panel shall control specific aspects of the large flat panel display:
      1) In-room source routing, such as Vitals Display (from the Vitals PC), the Electronic Medical Records computer, and any auxiliary inputs in the room.
      2) Large Flat Panel Display volume and power.
      3) Limited volume control of the Ceiling Loudspeaker.

5. Capture:
   a. Three PTZ video cameras (Kb Port) shall be ceiling/wall mounted to provide views of the procedures and the participants. Kb Port shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.

b. Audio configuration:
   1) The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
      a) Routing and mixing shall be established via DSP and Creston control to assign the microphones to the appropriate appliance.
      b) Route and mix ceiling microphones to the simulation capture audio interface for the associated room and the audio monitor for the associated control station only. This is a permanent route.
      c) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system (simulation capture audio interface).
   2) The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
      a) Routing and mixing shall be established via the DSP and Crestron control to assign the microphones to the appropriate appliance.
      b) Route and mix with ceiling microphones to simulation capture audio interface for the associated room and the audio monitor for the associated control station.
      c) Balance levels between wired and wireless mics.
      d) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the simulation system.
c. The medical simulation system shall facilitate the capturing of the video during simulations.

6. Nurse Call: These rooms shall have a simulated hospital style nurse-call system. Each bed location shall have an illuminated Code Blue and an illuminated staff call button.
   a. Patient Call:
      1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
      2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
      3) Cancel at the bedside switch utilizing the staff call button.
   b. Staff Call:
      1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
      2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
      3) Initiate and cancel at the bedside switch.
   c. Code Blue:
      1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
      2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
      3) Initiate and cancel at the bedside switch.
   d. Nurse Call:
      1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.

2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.

3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

7. Control Station:
   a. A computer (Kb Port) shall be located at the control station. This computer shall be connected to the facility LAN.
      1) This computer shall provide control and configuration of the medical simulation capture system and cameras.
      2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.
      3) The operator shall be able to select any camera for control through on-screen camera controls.
      4) Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).
      5) The manikin Vitals computer is a source in the system for both capture and display.
         a) The default routing of the Vitals PC shall be to the touch enabled flat panel display at the headwall and the high-resolution input of the simulation capture device.
         b) Default routing shall be restored on shutdown and/or startup.
   b. Sound/Audio:
      1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants (confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).
         a) Additional routing to the Nurse Station, the Medicine Cabinet, the practice rooms and Debrief shall be provided.
         b) Default routing shall be restored on shutdown and/or startup.
      2) An additional (single button) microphone shall be provided for the manikin's voice. An audio pitch changer shall be associated with this microphone.
         a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.
      3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.
      4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.
   c. Control:
      1) A touch panel located at the operator's station shall control specific aspects of the audiovisual system, such as, but not limited to:
         a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.
         b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.

c) Source routing to the Vitals display in the room.
d) The default source for the Vitals display shall be the Vitals PC in the control room.
e) Source routing to the Large display in the room.
f) Source routing to the High-Resolution input of the simulation capture device.
g) Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.
h) System and device power.
i) Loudspeaker volumes (limited).
j) Push to Talk Microphone button 1 destination selection for paging.
k) Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.
l) Additional routing to the Nurse Station, the Medicine Cabinet, the Practice Rooms and Debrief shall be provided.
m) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician
n) Changes made to the capture interface shall be reflected in the audio monitor for the associated control station.
o) A page for each of the Practice Rooms, the Nurse Station and the Medicine Cabinet for controlling the appropriate functions for those areas listed above.
p) A page for the Nurse Call visual indication, initiation and cancellation. This page shall be displayed when nurse call is initiated if not already being displayed.
q) All initial levels and default routes shall be restored as shutdown/startup.

d. An equipment rack shall be located at the operator's station and house all local audiovisual devices. Equipment racks shall be located in the rack room and house audiovisual equipment that does not need to be accessed on a regular basis by the users.
e. The medical simulation capture head end (located within the IDF/AV room) shall facilitate the capturing of the interactions.

8. Mock-up System in coordination with KbPort:
   a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
   d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the three cameras in the system. This includes capture of facial expressions as well as body language from the participants.

B. SY02 – High Fidelity OR Simulation Lab + Control Station 042D, 042E: The Simulation Labs and Control Station will support the use of actors/confederates as well as medical manikins. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as video sources from the high-fidelity manikins. This space shall also include live view capabilities via a wall mounted camera connected via HDBaseT to a monitor in the control room. The spaces shall include the following:

1. A charting station with dedicated computer with keyboard, mouse (OFCI) and monitor shall be located within the room on the counter. A USB webcam shall be mounted to the top of the monitor and connected to the EMR computer for use with a soft codec (WebEx). This computer shall be used for electronic health records (EHR), telemedicine, and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system via umbilical to the wall.

2. Display Devices shall include:
   a. A touch enabled flat panel display that shall be mounted at the headwall of the associated patient bed for viewing the manikin's physiological (vitals) data. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PC in the control room. Additionally, a USB connection between the display and the Vitals PC shall be provided to enable touch control and ancillary medical device use.
      1) Default source shall be the Vitals PC in the control room.
      2) Set up audio on FPD to always hear the incoming audio associated with the Vitals PC.
   b. A large wall mounted flat panel display for viewing manikin vitals, EMR information, or in room debrief via playback from the medical simulation system.

3. Sound/Audio system:
   a. Two ceiling microphones shall pick up general audio above the bed for capture via the medical simulation capture system.
   b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
   c. A ceiling recessed loudspeaker shall provide general talk-back and instruction from the control room.
   d. A small cube loudspeaker by the pillow next to the manikin shall provide manikin voice by the operator.
      1) This is sourced from the single button push-to-talk (PTT) microphone in the control room.
   e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
   f. One wall-mounted phone (OFOI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
      1) The phones will only be programmed to make internal calls. All phone programming shall be provided by others. Coordination will be required.
      2) The audio cable shall share the VoIP data pathway to the cable basket
      3) The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.

4. Control:
   a. A wall mounted control panel shall control specific aspects of the large flat panel display:
      1) In-room source routing, such as Vitals Display (from the Vitals PC), the Electronic Medical Records computer, and any auxiliary inputs in the room.
      2) Large Flat Panel Display volume and power.
      3) Limited volume control of the Ceiling Loudspeaker.

5. Capture:
   a. Three PTZ video cameras (KbPort) shall be ceiling/wall mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   b. Audio configuration:

1) The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
    a) Routing and mixing shall be established via DSP and Creston control to assign the microphones to the appropriate appliance.
    b) Route and mix ceiling microphones to the simulation capture audio interface for the associated room and the audio monitor for the associated control station only. This is a permanent route.
    c) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system (simulation capture audio interface).
2) The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
    a) Routing and mixing shall be established via the DSP and Crestron control to assign the microphones to the appropriate appliance.
    b) Route and mix with ceiling microphones to simulation capture audio interface for the associated room and the audio monitor for the associated control station.
    c) Balance levels between wired and wireless mics.
    d) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the simulation system.

c. The medical simulation system shall facilitate the capturing of the video during simulations.

6. Live View
    a. A digital PTZ camera shall be located on the wall, with input from the Owner, providing the best overall room view.
    b. The Contractor shall be required to provide a mud-rind and mount suitable for a low-voltage device in the wall for camera at the location in coordination the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling (for power) and an HDMI cable from an AMX DX transmitted down the wall to the mud-ring and mounting the camera.
    c. The transmitted will transport the video via the appropriate category cable to a receiver and display in the control room. A power over HDBT supply will be required.
7. Nurse Call: These rooms shall have a simulated hospital style nurse-call system. Each bed location shall have an illuminated Code Blue and an illuminated staff call button.
    a. Patient Call:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
        3) Cancel at the bedside switch utilizing the staff call button.
    b. Staff Call:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
        2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
        3) Initiate and cancel at the bedside switch.
    c. Code Blue:
        1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.

2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.

3) Initiate and cancel at the bedside switch.

d. Nurse Call:

1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.

2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.

3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

8. Control Station:

a. A computer (KbPort) shall be located at the control station. This computer shall be connected to the facility LAN.

1) This computer shall provide control and configuration of the medical simulation capture system and cameras.

2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.

3) The operator shall be able to select any camera for control through on-screen camera controls.

4) Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).

5) The manikin Vitals computer is a source in the system for both capture and display.

a) The default routing of the Vitals PC shall be to the touch enabled flat panel display at the headwall and the high-resolution input of the simulation capture device.

b) Default routing shall be restored on shutdown and/or startup.

b. Sound/Audio:

1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants (confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).

a) Additional routing to the Nurse Station, the Medicine Cabinet, the practice rooms and Debrief shall be provided.

b) Default routing shall be restored on shutdown and/or startup.

2) An additional (single button) microphone shall be provided for the manikin's voice. An audio pitch changer shall be associated with this microphone.

a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.

3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.

4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.

c. Control:

1) A touch panel located at the operator's station shall control specific aspects of the audiovisual system, such as, but not limited to:
   a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.
   b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.
   c) Source routing to the Vitals display in the room.
   d) The default source for the Vitals display shall be the Vitals PC in the control room.
   e) Source routing to the Large display in the room.
   f) Source routing to the high-resolution input of the simulation capture device.
   g) Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.
   h) System and device power.
   i) Loudspeaker volumes (limited).
   j) Push to Talk Microphone button 1 destination selection for paging.
   k) Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.
   l) Additional routing to the Nurse Station, the Medicine Cabinet, the practice rooms and Debrief shall be provided.
   m) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician
   n) Changes made to the capture interface shall be reflected in the audio monitor for the associated control station.
   o) All initial levels and default routes shall be restored as shutdown/startup.

d. Live View:
   1) A digital PTZ camera (KbPort) shall be located in the simulation room to provide real time viewing of the activities in the room,
   2) A monitor shall be provided to view this camera at the control position and mounted to the three-arm desktop mount.
   3) An HDBT extension systems shall provide connection between the camera and monitor of the interactions.

9. Mock-up System in coordination with KbPort:
   a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
   d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the three cameras in the system. This includes capture of facial expressions as well as body language from the participants.

C. SY03 – High Fidelity Birthing Simulation Lab AND Control Station 042C, 042E The Simulation Labs and Control Station will support the use of actors/confederates as well as medical manikins. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as video sources from the high-fidelity manikins. This space shall also include live view capabilities via a wall mounted camera connected via HDBaseT to a monitor in the control room. Note that for Labor and Delivery scenarios, the infant bassinet, the vitals monitor for the infant and the infant manikin shall be portable and rolled in as needed. The spaces shall include the following:

1. A charting station with dedicated computer with keyboard, mouse (OFCI) and monitor shall be located within the room on the counter. A USB webcam shall be mounted to the top of the monitor and connected to the EMR computer for use with a soft codec (WebEx). This computer shall be used for electronic health records (EHR), telemedicine, and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system via umbilical to the wall.
2. Display Devices shall include:
   a. A touch enabled flat panel display shall be mounted at the headwall of each of the two patient beds for viewing the manikin's physiological (vitals) data. Display data shall be provided over the AVoIP distribution system from the manikin vitals all-in-one PC in the control room. Additionally, a USB connection between the display and the Vitals PC shall be provided to enable touch control and ancillary medical device use.
      1) Default source shall be the Vitals PC in the control room.
      2) Set up audio on FPD to always hear the incoming audio associated with the Vitals PC.
   b. A large wall mounted flat panel display for viewing manikin vitals, EMR information, or in room debrief via playback from the medical simulation system.
3. Sound/Audio system:
   a. Two ceiling microphones shall pick up general audio above the bed for capture via the medical simulation capture system.
   b. A wireless microphone system shall provide targeted audio capture of key participants as well as targeted talkback capability from the control room to a participant(s) within the simulation scenario, utilizing a small earphone.
   c. A ceiling recessed loudspeaker shall provide general talk-back and instruction from the control room.
   d. A small cube loudspeaker by the pillow next to the manikin shall provide manikin voice by the operator.
      1) This is sourced from the single button push-to-talk (PTT) microphone in the control room.
   e. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
   f. One wall-mounted phone (OFOI) for communication scenarios to other departments shall be included. Audio from this phone shall be tapped and then routed to the appropriate encoder for capture.
      1) The phones will only be programmed to make internal calls. All phone programming shall be provided by others. Coordination will be required.
      2) The audio cable shall share the VoIP data pathway to the cable basket
      3) The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
4. Control:
   a. A wall mounted control panel shall control specific aspects of the large flat panel display:
      1) In-room source routing, such as Vitals Display (from the Vitals PC), the Electronic Medical Records computer, and any auxiliary inputs in the room.
      2) Large Flat Panel Display volume and power.

3) Limited volume control of the Ceiling Loudspeaker.

5. Capture:
   a. Four PTZ video cameras (Kb Port) shall be ceiling/wall mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
   b. Audio configuration:
      1) The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
         a) Routing and mixing shall be established via DSP and Creston control to assign the microphones to the appropriate appliance.
         b) Route and mix ceiling microphones to the simulation capture audio interface for the associated room and the audio monitor for the associated control station only. This is a permanent route.
         c) Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system (simulation capture audio interface).
      2) The wireless microphone system shall provide enhanced audio capture of the participants, as well as a talkback channel.
         a) Routing and mixing shall be established via the DSP and Crestron control to assign the microphones to the appropriate appliance.
         b) Route and mix with ceiling microphones to simulation capture audio interface for the associated room and the audio monitor for the associated control station.
         c) Balance levels between wired and wireless mics.
         d) Do not utilize echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the simulation system.
   c. The medical simulation system shall facilitate the capturing of the video during simulations.
6. Live View
   a. A digital PTZ camera shall be located on the wall, with input from the Owner, providing the best overall room view.
   b. The ontractor shall be required to provide a mud-rind and mount suitable for a low-voltage device in the wall for camera at the location in coordination the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling (for power) and an HDMI cable from an AMX DX transmitted down the wall to the mud-ring and mounting the camera.
   c. The transmitted will transport the video via the appropriate category cable to a receiver and display in the control room. A power over HDBT supply will be required.
7. Nurse Call: These rooms shall have a simulated hospital style nurse-call system. Each bed location shall have an illuminated Code Blue and an illuminated staff call button.
   a. Patient Call:
      1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
      2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
      3) Cancel at the bedside switch utilizing the staff call button.
   b. Staff Call:
      1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.

2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
3) Initiate and cancel at the bedside switch.

c. Code Blue:
1) Initiate and cancel from each room's associated control room touch panel with visual feedback of activation at the touch panel.
2) Visual indication at associated bedside (lights staff call lamp at switch), over door in hallway and at the nurse station enunciator (control) panel.
3) Initiate and cancel at the bedside switch.

d. Nurse Call:
1) When a code blue is initiated, the only way to cancel the call is to press the button in the lab or cancel on the control panel. Trying to initiate another call shall not cancel the code blue. Another call shall not be able to be made until the code blue is cancelled. If another call has been initiated, pressing code blue will cancel that call and engage the code blue call immediately.
2) When a staff call is initiated, it can be cancelled at the button in the room or on the control room or by initiating a code blue.
3) When a patient call is initiated from the control room, it can be cancelled by pressing the staff call button in the room, cancelling in the control room or pressing the code blue button.

8. Control Station:
a. A computer (OFCI) shall be located at the control station. This computer shall be connected to the facility LAN.
1) This computer shall provide control and configuration of the medical simulation capture system and cameras.
2) The users shall be able to connect to the medical simulation capture system allowing the users to control recording of scenarios (such as start/stop), annotate events and the like and to configure scenarios prior to beginning the session.
3) The operator shall be able to select any camera for control through on-screen camera controls.
4) Additional computers shall be located at the control station to operate the manikin (OFOI) and supply the manikin vitals (OFCI).
5) The manikin Vitals computer is a source in the system for both capture and display.
a) The default routing of the Vitals PC shall be to the touch enabled flat panel display at the headwall and the high-resolution input of the simulation capture device.
b) Default routing shall be restored on shutdown and/or startup.
6) This control station shall also be able to control activities in practice 137.
a) This operation shall be available as a separate startup panel.
b) This shall be available up initial startup of the system as a choice of room to control.
c) All functionality shall be as follows, with the exception of no manikin associated functionality.

b. Sound/Audio:
1) A dual-zone paging microphone shall provide the capability to page into the Sim Room overhead (button 1, default routing) and to speak to simulation participants (confederates) via the talkback channel (in the wireless microphone system via button 2, default permanent routing).
a) Additional routing to the Nurse Station, the Medicine Cabinet, the practice rooms and Debrief shall be provided.
b) Default routing shall be restored on shutdown and/or startup.

2) An additional (single button) microphone shall be provided for the manikin's voice. An audio pitch changer shall be associated with this microphone.
   a) The pitch changer shall be routed to be looped into the manikin voice pathway as the default permanent routing. The pitch change shall be enabled and disabled via the push button on the device itself.
3) For audio monitoring, headphones and counter-top loudspeakers shall be provided and connect to a two-input headphone amp with volume controls. A monitoring selector switch in the headphone amp shall provide choice of control PC audio, or DSP audio (live) from the associated space. Audio levels shall be balanced to match.
4) Note, the push-to-talk (PTT) microphones shall not be routed to the capture system.

c. Control:
   1) A touch panel located at the operator's station shall control specific aspects of the audiovisual system, such as, but not limited to:
      a) A page for choosing the simulation capture appliance that will receive the room audio and hi-resolution video.
      b) A subpage for the wireless microphones shall be provided for muting the individual wireless mics. Muting shall affect the feed to the simulation capture audio device and the control room monitor. A separate button shall allow the unmuting of the associated microphone in the control room feed. A mute indicator for each mic shall be shown on the main routing page to confirm whether a mic is muted, or not, to the recording. The default state at shutdown/startup shall be un-muted.
      c) Source routing to the Vitals display in the room.
      d) The default source for the Vitals display shall be the Vitals PC in the control room.
      e) Source routing to the Large display in the room.
      f) Source routing to the high-resolution input of the simulation capture device.
      g) Default source for the high-resolution input of the simulation capture device shall be the Vitals PC at Startup/Shutdown.
      h) System and device power.
      i) Loudspeaker volumes (limited).
      j) Push to Talk Microphone button 1 destination selection for paging.
      k) Default routing shall be to the ceiling loudspeaker in the associated room at startup/shutdown.
      l) Additional routing to the simulation corridor and nurse station shall be provided.
      m) Audio source levels going to the simulation capture audio interface in a subpage accessible only be the technician
      n) Changes made to the capture interface shall be reflected in the audio monitor for the associated control station.
      o) All initial levels and default routes shall be restored as shutdown/startup.

d. Live View:
   1) A digital PTZ camera (KbPort) shall be located in the simulation room to provide real time viewing of the activities in the room,
   2) A monitor shall be provided to view this camera at the control position and mounted to the three-arm desktop mount.
   3) An HDBT extension systems shall provide connection between the camera and monitor of the interactions.

e. An equipment rack shall be located at the operator's station and house all local audiovisual devices. Equipment racks shall be located in the rack room and house audiovisual equipment that does not need to be accessed on a regular basis by the users.

f. The medical simulation capture head end (located within the IDF/AV room) shall facilitate the capturing of the interactions.

9. Mock-up System in coordination with KbPort:
    a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras
    c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
    d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the three cameras in the system. This includes capture of facial expressions as well as body language from the participants.

D. SY04 – Practice 041, 043: The Practice room will support the use of actors as well as medical manikins. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as video sources from the high-fidelity manikins. The spaces shall include the following:
    1. A charting station with dedicated computer with keyboard, mouse (OFCI) and monitor shall be wall mounted on a track mounted articulating arm system. A USB webcam shall be mounted to the top of the monitor and connected to the EMR computer for use with a soft codec. This computer shall be used for electronic health records (EHR), telemedicine, accessing other data as necessary, and configuring the medical simulation system to capture the scenario.. This charting station shall be connected to the AVoIP distribution system via umbilical to the wall.
    2. Display Devices shall include:
        A. A large wall mounted flat panel display for viewing manikin vitals, EMR information, or in room debrief via playback from the medical simulation system.
    3. Sound/Audio system:
        a. A ceiling microphones shall pick up general audio above the bed for capture via the medical simulation capture system.
        b. A ceiling recessed loudspeaker shall provide general talk-back.
        c. The audio shall be processed through the room's main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.
    4. Control:
        a. A wall mounted control panel shall control specific aspects of the large flat panel display:
            1). In-room source routing, the Electronic Medical Records computer, and any auxiliary inputs in the room.
            2). Large Flat Panel Display volume and power.
            3). Limited volume control of the Ceiling Loudspeaker.
    5. Capture:
        a. Two PTZ video cameras (KbPort) shall be ceiling/wall mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
        b. Audio configuration:
            1). The ceiling microphone shall pick up general audio in the room for capture via the medical simulation capture system.

a). Routing and mixing shall be established via DSP and Creston control to assign the microphones to the appropriate appliance.

b). Route and mix ceiling microphones to the simulation capture audio interface for the associated room and the audio monitor for the associated control station only. This is a permanent route.

c). Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system (simulation capture audio interface).

c. The medical simulation system shall facilitate the capturing of the video during simulations.

1). The capture devices for these spaces shall be shared with the Medicine Cabinet or Nurse Station areas as needed and scheduling allows.

6. Control Station:
   a. Full control functionality shall be available at any Control Station for the High-Fidelity Sim Labs.
   b. Capture only functionality shall be available from any enabled PC, such as the Debrief PC or an office PC.
7. Mock-up System in coordination with KbPort:
   a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
   d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

E. SY05 – Medicine Cabinet 042 Plan South: The medicine cabinet will support the simulation of pharmaceutical dosing and dispensing as well as the documentation involved. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as video sources charting station. The spaces shall include the following:
   1. A Pyxis cart (or other device) with integral computer with keyboard, mouse and monitor (OFCI) shall be located within the space. This station shall be used for simulation medication dispensing and documentation. The Pyxis cart (or local logging PC) shall be connected to the AVoIP distribution system via umbilical to the wall.
   2. Sound/Audio system:
      a. One ceiling microphone shall pick up general audio above the cart for capture via the medical simulation capture system.
      b. A ceiling recessed loudspeaker shall provide general talk-back.
      c. The audio shall be processed through the main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.

3. Capture:
    a. One PTZ video camera (Kb Port) shall be ceiling/wall mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
    b. Audio configuration:
        1). The ceiling microphone shall pick up general audio in the room for capture via the medical simulation capture system.
            a). Routing and mixing shall be established via DSP and Crestron control to assign the microphones to the appropriate appliance.
            b). Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system.
    c. The medical simulation system shall facilitate the capturing of the video during simulations utilizing a capture device associated with either practice room, or the debrief based on schedule and availability or piggy back on a high fidelity session.
4. Control Station:
    a. Full control functionality shall be available at any Control Station for the High-Fidelity Sim Labs
        1). See the control language for the control station for specific controls that shall be available in association with this system
        2). Capture only functionality shall be available from any enabled PC, such as the Debrief PC or an office PC
5. Mock-up System in coordination with KbPort:
    a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras
    c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
    d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

F. SY06 – Nurse Station 042 Plan North; The Nurse Station shall support the simulation of nursing duties outside of the patient labs. During a simulation exercise, the video and audio signals shall be fed to the capture system for viewing and archiving. The capture system shall address the acquisition, storage, playback and management of audio and video from multiple microphones and video cameras as well as video sources from the charting station. The spaces shall include the following:
    1. A charting station with dedicated computer with keyboard, mouse (OFCI) and monitor shall be located within the space. This computer shall be used for electronic health records (EHR) and to access other data as necessary. This charting station shall be connected to the AVoIP distribution system via umbilical to the wall.
        a. This computer shall be a source available to the Nursing Station simulation capture device high-resolution input.
    2. Sound/Audio system:

a. Two ceiling microphones shall pick up general audio above the bed for capture via the medical simulation capture system.
    1). Two microphones shall be located around the Nursing Station.
b. A ceiling recessed loudspeaker shall provide general talk-back.
c. The audio shall be processed through the main audio DSP system, and the appropriate mix shall be sent to the capture system audio encoders.

3. Capture:
    a. Two PTZ video cameras (Kb Port) shall be ceiling/wall mounted to provide views of the procedures and the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
    b. Audio configuration:
        1). The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
            a). Routing and mixing shall be established via DSP and Crestron control to assign the microphones to the appropriate appliance.
            b). Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system.
    c. The medical simulation system shall facilitate the capturing of the video during simulations utilizing a capture device associated with either practice room, or the debrief based on schedule and availability or piggy back on a high fidelity session.
4. Control Station:
    a. Full control functionality shall be available at any Control Station for the High-Fidelity Sim Labs
        1). See the control language for the control station for specific controls that shall be available in association with this system
        2). Capture only functionality shall be available from any enabled PC, such as the Debrief PC or an office PC
5. Mock-up System in coordination with KbPort:
    a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras
    c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
    d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

G. SY07 – Group Study Room 045, 046: The Group Study room can be used as traditional group study room for group collaborations, meetings and to debrief simulation scenarios previously captured by the medical simulation capture system. The ability to view live scenarios in progress. This system shall include the following:

1. The presentation display shall be a large format wall-mounted flat panel display.
2. Source devices shall include:
    a. Dedicated hi-performance computer with wireless keyboard and mouse (OFCI). This shall be utilized to access the medical simulation capture system and start and stop scenario or debrief capture in other spaces.
    b. A webcam appliance shall be mounted to the monitor and connected to the AVoIP distribution system for use with WebEx.
    c. Digital auxiliary inputs for portable video sources shall be located in a cable cubby in one table via a wall box. Contractor shall provide cubby and adapters for all DisplayPort connectivity.
3. Control
    a. One (1) wired wall mounted button panel control system shall be provided for control of the audiovisual system.
4. Capture:
    a. Two PTZ video cameras (KbPort) shall be ceiling/wall mounted to provide views the participants. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include sixteen feet (16') of coiled service loop to allow for adjustments to the camera location.
    b. Audio configuration:
        1). The ceiling microphones shall pick up general audio in the room for capture via the medical simulation capture system.
            a). Routing and mixing shall be established via DSP and Crestron control to assign the microphones to the appropriate appliance.
            b). Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system.
    c. The medical simulation system shall facilitate the capturing of the video during simulations.
        1). The capture device for these spaces shall be shared with the Medicine Cabinet or Nurse Station areas as needed and scheduling allows.
5. Equipment Rack and Furnishings
    a. A small rack shall house local audiovisual equipment:
        1. The Contractor shall coordinate the style and finish of this furniture with the Owner and architect.
6. Equipment will be located within the equipment racks in the AV room.
7. Mock-up System in coordination with KbPort:
    a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall assist KbPort when necessary with the coordination of the final location of the cameras with the Owner. The Contractor shall assist with temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
    b. During this review, the Owner shall be able to view the outputs of these cameras
    c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.

d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the cameras in the system. This includes capture of facial expressions as well as body language from the participants.

H. SY08 – Nursing Skills Lab 049: The Skills Lab shall accommodate capture and instruction enhanced by audiovisual presentation featuring a projection system. The audiovisual system shall support the display of auxiliary source devices as well as display of an instructor's laptop. The system will also facilitate the capture of activities at each of two (2) patient beds total. This system shall include the following:

1. Display System
   a. One ceiling mounted video projector shall display onto a motorized projection screen.
      1). The screen is being provided by others under a separate contract.
2. Source devices for the instructor shall include:
   a. A dedicated tablet PC with docking station (OFOI). This shall be utilized for presentation and to access the medical simulation capture system for setup of recordings, Start and Stop, and playback.
   b. Digital auxiliary inputs for laptop/document camera and/or portable video sources located at the lectern.
3. Capture
   a. Two (2) PTZ cameras shall be ceiling/wall mounted at each bed per Owner instruction (4 per skills lab). The cameras shall be utilized as follows:
      1). Capture demonstrations and exercises.
      2). Display live demonstrations through the projection system via the capture system.
   b. The Contractor shall coordinate the final location of the cameras with the Owner and Consultant. Each video camera location shall include 16 feet (16') of coiled service loop to allow for adjustments to the camera location.
   c. A simulation capture system shall be provided.
      1). This system shall be able to capture video and audio from the selected cameras and microphones in separate or concurrent sessions.
      2). This system shall automatically upload the completed capture file to a storage server upon completion of the session.
4. Audio
   a. A distributed system of ceiling-mounted loudspeakers shall provide speech and program audio reinforcement. Coordinate the finish color of the loudspeakers with the Owner and Architect.
   b. Wireless microphone system to include a hand-held transmitter and a belt pack transmitter with lavaliere and head-worn microphone.
   c. Audio outputs at the lectern shall be available for the connection of a portable hearing assist system.
   d. A ceiling microphone shall pick up audio at each indicated bed in the room for capture via the medical simulation capture system. Two beds per Skill lab, 4 mics total
      1). Routing and mixing shall be established via DSP and Crestron control to assign the microphones to the appropriate simulation capture system input
   e. Utilize medium noise reduction. Do not utilize gates or echo canceling. The microphone should be equalized for optimum clarity during record. Add peak stop and soft compression to obtain the best levels without overloading the system.
5. Control
   a. Control of the audiovisual system shall be through a touch-panel at the lectern.
   b. Control system shall provide, including but not limited to, the following capabilities:
      1). Control of display power
      2). Control of matrix routing

3). Control of preset room configurations
4). Control of source device playback
5). Control of audio room volume
6). Control of independent microphone volumes
7). Control of camera, both PTZ and preset creation/recall
8). Control of switching between room cameras

6. Equipment Rack and Furnishings
   a. A small rack shall house local audiovisual equipment:
      1). The Contractor shall coordinate the style and finish of this furniture with the Owner and architect.
7. Equipment will be located within the equipment racks in the AV room
8. Mock-up System:
   a. Prior to the final installation of wall-mounted displays and cameras within this space, the Contractor shall coordinate the final location of the cameras with the Owner. The Contractor shall provide a temporary installation of the camera locations within the space using the specified cameras on tripods or other means that can allow the cameras to be easily relocated at the direction of the Owner.
   b. During this review, the Owner shall be able to view the outputs of these cameras
   c. The final location of the cameras may be on the ceiling, wall, or a combination of both. If the camera(s) shall be mounted on the wall, the Contractor shall be required to provide a mud-ring and mount suitable for a low-voltage device in the wall for the camera at the location(s) as directed by the Owner. This will entail fishing a network patch cable from the data drop located in the ceiling and down the wall to the mud-ring and mounting the camera.
   d. The emphasis on this review will be the ability to capture the interaction between the standardized patient/manikin and the student with the three cameras in the system. This includes capture of facial expressions as well as body language from the participants.
      1). Once the Owner has provided final direction on the camera location within one of the spaces, the Contractor shall use this direction as a template for the camera locations in the remaining spaces.

I. SY09 – General Purpose Classroom 044: The General Classroom shall accommodate instruction enhanced by audiovisual presentation featuring a projection system. The audiovisual system shall support the display of auxiliary source devices as well as display of an instructor's laptop. The system will also facilitate audio and videoconferencing. This system shall include the following:
   1. Display System
      a. One ceiling mounted video projector shall display onto a motorized projection screen.
         1). The screen is being provided and installed under a separate contract.
   2. Source devices for the instructor shall include:
      a. One tablet PC with docking station (OFOI) located on instructor station.
         1). Contractor shall coordinate location with Owner and architectural drawings for teaching table location.
         2). Tablet PC, docking station, and Desktop Monitor are OFOI
   9. Audio and Videoconference
      a. One (1) PTZ camera shall be wall mounted on the rear wall capturing the front of the classroom.
      b. One (1) microphone array shall be ceiling mounted to capture audio within the room.
      c. A video/audio conferencing CODEC is OFCI
   3. Audio System
      a. Ceiling mounted loudspeakers for program audio playback.

b. A portable ADA assisted listening system shall be accommodated via an audio output connection at the teaching table.

4. Control
   a. There shall be one location of operation for this room:
      1). Wired button panel located on the wall near the teaching table.
   b. Control system shall provide, including but not limited to, the following capabilities:
      1). Control of display power
      2). Control of matrix routing
      3). Control of preset room configurations
      4). Control of source device playback
      5). Control of audio room volume
      6). Control of CODEC to make and receive calls.
      7). Control of camera pan, tilt, zoom and preset recalls.

J. SY10 - IT Room 048: The IT Room is the central processing hub for the medical simulation capture system. This space shall provide the appropriate technologies to facilitate the processing, switching, and control for the medical capture system to fulfill the system described herein.

The audiovisual system shall include the following:

1. Capture (Kb Port)
   a. The medical simulation capture hardware shall be utilized in controlling, capturing, storing, and viewing the simulations.
   b. Video capture servers shall digitize the audio and video streams for transport over the network and archive them on network attached storage for later review. The archived video files will have associated descriptive text information to allow for easy searching. The archived video will then be available for review and debriefing after the recording is complete. All access to the stored files will be through secure internet protocols and will be accessible only by authenticated users through a secure web interface. Additionally, authorized personnel will be able to observe the encounter in real-time on any computer in the LAN with the proper credentials. These servers shall be able to connect to the facility LAN and medical simulation VLAN.
2. Audiovisual Transport and Processing
   a. Audiovisual system control processors.
   b. Audiovisual IP transport system.
   c. Audio DSP system.
3. The hallways shall be split into four separate zones for paging
   a. Audiovisual transport data switches
      1). The Contractor shall provide the necessary data switched for the AV transport system (AVoIP).
      2). The Contractor shall be required to coordinate with the video transport manufacturer.
      3). The Contractor shall coordinate with the Owner to provide a management connection from this switch stack to the facility network.
4. DATA for local audiovisual support
   a. Data switches (OFOI)
      1). The Contractor shall provide patch cables per the Owners specification for all local AV and Capture equipment requiring connection to the facility LAN
      2). The Contractor and Medical Simulation manufacturer shall be required to coordinate with the Owner to configure the switches in coordination with Audiovisual and Capture system needs.

1.4 SUBMITTALS

A. General:

1. The Consultant shall review the Submittals and Shop Drawings listed below. Submittal and Shop Drawing approval shall be based on conformance to the Specification and adherence to the design intent of the Specification. The Consultant's approval of the Contractor's Submittal shall not constitute a certification of accuracy or completeness in regard to equipment, quantities, installation techniques and details, control system software programming, audio DSP software programming, equipment interoperability, safety factors, scheduling, coordination with other trades, or any other aspects of the work which are the responsibility of the Contractor. The Consultant shall perform no more than two reviews per submittal listed below. The Contractor shall be responsible for providing any incidental equipment, Installation Materials and labor needed in order to result in complete and operable systems, even if such equipment, materials or labor are not listed in this Specification.
2. The Contractor shall maintain a Master Set of this entire Specification, including all drawings and addenda, at the site at all times during the installation. Any deviations from the Specification made during the installation shall be marked on this Master Set. The Master Set along with all relevant support documentation shall be provided as part of the As Built submittal in the format outlined under Final Documentation.

B. Submittal Format:

1. All documents, configuration files and drawings shall be submitted in the following format:
   a. Electronically in PDF format.
   b. Executable configuration file (where applicable).
   c. Other formats may be acceptable upon prior approval by the Consultant and/or Owner.
   d. All .PDF files shall be submitted at the documents' native scale. For example, a PDF created from a drawing whose native format was standard 'E' size (42"x30") shall be created at 42"x30" (full size) to ensure that there is no loss of resolution should the file be viewed or printed at a later date by the Owner.

C. Schedule:

1. The Contractor shall obtain from the Owner, Architect, or Consultant a project master timeline schedule showing projected dates when the relevant areas will be available to the Contractor for the on-site installation.
2. Within 15 days of notification of contract award, the Contractor shall provide a schedule of major project milestones to the Owner, Architect, or Consultant. The schedule shall show the following milestones, but may include others as required for overall site-work coordination:
   a. Shop Drawings and Submittals
   b. Order and receipt of materials
   c. In-shop testing to validate software functionality prior to on-site installation.
   d. Delivery of materials to the work site for installation by Others
   e. Delivery of major system components to the work site
   f. Receipt of Owner furnished equipment for installation by the Contractor
   g. Control systems GUI requirements meeting with Owner
   h. Development and submittal of control system GUI submittals
   i. Control System Control Surfaces / GUI Prototype Submittal review meeting with Owner
   j. Development and submittal of DSP submittals
   k. 50% completion of work by area
   l. 95% completion of work by area
   m. Installation of control system code
   n. 100% completion of work by area

o. Testing and debugging on-site
p. Final punch list
q. Submittal of Final Documentation
r. Training

3. If the Contractor feels that he will have any problems with meeting the scheduled project milestone deadlines, he must inform the Owner, Architect, and Consultant at the earliest possible opportunity.

D. Progress Reports

1. Contractor shall submit a brief Progress Report via e-mail to the Consultant. The Progress Reports should be concise, utilizing bullet points or other efficient format.
2. The reports shall be submitted by noon on Fridays to scnesbitt@coloradomtn.edu at the following intervals:
   a. After contract award, while working off-site: every two weeks
   b. While working on-site: every week.
3. Progress Reports shall list the following information in three sections:
   a. Progress: List the tasks accomplished since the previous report. This is to include both completed tasks and work-in-progress.
   b. Work Planned: List the tasks scheduled for the time period extending until the next report. This section should also include both completed tasks and work-in-progress.
   c. Issues. List any factors that are delaying progress or have the potential to delay progress that involve the Owner, Architect and/or Consultant.
      1) Provide a proposed solution for each issue listed. The proposed solution shall include any potential impact to cost and/or schedule. Proposed solutions will be reviewed and approved by the Owner, Architect and/or Consultant, or alternate solutions will be recommended.
      2) For equipment related issues, include a manufacturer's service ticket number, service log number, or similar means of documenting communications between the Contractor and manufacturer.

E. Shop Drawings

1. The Contractor must receive written approval from the Owner or an authorized representative of the Owner, in writing, prior to purchasing, fabricating or installing any equipment or materials. Approval to proceed will be given based upon Shop Drawings.
2. The Shop Drawings shall indicate complete details of work to be performed.
3. The Contractor shall provide one electronic copy (two copies, if printed) of the Shop Drawings each to the Owner and to the Consultant for review and approval.
   a. Drawings shall include a title block naming the Project, Consultant, and Contractor, shall include a drawing title, drawing number, revision number if applicable and date.
   b. Unless otherwise agreed to in writing, Contractor shall meet with the Owner and Owner's designated representative to review the Shop Drawing submittal. The Contractor shall be prepared to review the functional capabilities and characteristics of the systems for compliance with Owner requirements.
4. The Shop Drawings listed below are required of the Contractor. Submit all Shop Drawings complete as a single submission. Isolated items will not be accepted, except with prior approval.
   a. System Signal Flow – Complete functional system signal flow drawings of all systems described herein and meeting the functions indicated in the Specification. System Signal Flow drawings to illustrate and identify each major component indicating signal flow; signal type and equipment interconnectivity; all used and unused input/output connections for all devices; connector types; specific manufacturer and model number labels for each

component; device host name labels for each component connecting to any IP network; physical location callout indicating the components physical location (i.e. equipment rack #, lectern, wall mounted, etc.); cable fan-outs; wire/cable tags; 70 volt loudspeaker tap settings; amplifier/loudspeaker zone assignments; and other details as needed to accurately document the signal interconnectivity of the systems.

b. IP Network Diagram – Complete functional network diagram of all network components required to support the systems described herein and meeting the functions indicated by this Specification. Network Diagram to illustrate and identify each major component including all switch accessories, uplink ports noted with bandwidth capacity, stacking cable connections noted with backplane bandwidth capacity, power supplies noted with PoE capacities per switch or switch stack, and other details as needed to accurately document the signal interconnectivity of the systems.

c. Cabling Schedule – Document complete wire run information, including the cable type, cable marker identifier, and origination and destination location and connector types for each cable. Wire run information shall be conveyed:

1) Within the System Signal Flow drawings, and/or

2) A separate list containing all wire run information

d. Examples representative of the Contractor's final cable marking technique for each cable type.

e. Loudspeaker Layouts – Scaled ceiling and/or floor plan drawings showing loudspeaker locations, including coverage patterns for ceiling-mounted loudspeakers. Loudspeaker zone groups shall be identified such that they are relatable to the System Signal Flow drawings.

f. Loudspeaker Mounting Details – Scaled drawings of complete loudspeaker mounting details, hardware and support surfaces, including details on all load requirements, safety factors, safety cables and structural materials.

g. Microphone Layouts - Scaled ceiling and/or floor plan drawings showing microphone locations and orientation within tables or fixed in ceilings and planned position of steerable microphone lobes if applicable.

h. Structural Anchorage – If required by the Authority Having Jurisdiction, provide structural calculations, drawings and details for the anchorage of equipment racks, loudspeaker rigging hardware, and all other mounts or hardware that attach to structure. The design shall be reviewed and approved by a Structural Engineer registered in the state in which the installation work is performed.

i. Panels – Scaled drawings of interconnect panels, control surfaces, and other custom interfaces.

j. Peripheral Equipment – Scaled drawings of mounting arrangements of any peripheral equipment, which may be included in this Specification.

k. Equipment Rack Layouts – Fully detailed rack drawings indicating equipment orientation within the equipment rack.

l. Technical Furniture – Scaled drawings of all technical furniture indicating the furniture dimensions, materials, finishes, equipment locations and orientation within the furniture, cable management accommodations, and all other details necessary to convey the physical and functional aspects of the furniture as it will be installed in each individual room space.

m. Others, as may be required by the Architect, Consultant or Owner.

1) Inquire with the Architect and Consultant whether submissions of finishes/materials which will be visible to the public are required and submit accordingly.

2) Typical sample items of interest include: receptacles and controls with associated trim plate and each type of loudspeaker baffle and/or grille.

5. Approval: The Contractor shall receive written response indicating approval to proceed, or changes required to the Shop Drawings submittal, within 10 working days of receipt of the submittal by the Owner/Consultant.

6. Modifications: The Contractor shall be responsible for updating the Shop Drawing package throughout the course of the project to document any Owner-requested changes, approved product changes, changes due to field conditions, or any other changes to the approved Shop Drawing package. Drawing modifications may be reviewed by the Consultant as-required, and the Contractor shall make current Shop Drawings available to the Consultant within seven calendar days of request.

F. Bill of Materials

1. The Contractor shall submit a comprehensive Bill of Materials concurrently with the Shop Drawing submittal.

2. The Bill of Materials shall be submitted electronically in Microsoft Excel format, unless an alternate format is approved in writing by the Consultant, Architect, or Owner.

3. The Bill of Materials shall be organized by room or system type, with a separate spreadsheet tab for each.

4. The Bill of Materials submittal shall contain at a minimum the following fields for each item: Quantity, Make, Model, Description, Color/Finish (if applicable). Items that are Owner Furnished should be identified as such. Additional columns may be added for notes or other supplemental information as needed.

G. Owner Furnished Contractor Installed Equipment

1. The Contractor shall submit a comprehensive list of all equipment that shall be provided by the Owner for installation by the Contractor. This list shall be reviewed with the Owner during the Shop Drawing Submittal review meeting.

H. Product Cut Sheets: Unless otherwise agreed to in writing, the Contractor shall prepare a package of product cut sheets for review with the Owner at the time of the Shop Drawings review meeting. The package shall include manufacturer's cut sheets for all user interfaces, all exposed items not mounted in equipment racks, and all items requiring color or finish selection. The Product Cut Sheets package is not a formal submittal to be reviewed by the Consultant, and is not a means for proposing product substitutions. Requested substitutions shall be submitted via a 'Substitution Request Form' (Appendix D) including drawings, performance and test data, and other information necessary to demonstrate that the substitution will meet all intentions of the Specification.

I. Cabling: The Contractor shall submit specifications for each cable type to be used for the project.

1. The Contractor shall receive written approval from the Owner or an authorized representative of the Owner, in writing, prior to purchasing or installing any cabling.

2. The Contractor shall verify colors for all cabling that will be exposed or visible as part of the Submittal process.

J. Wireless Frequency Table: The Contractor shall submit a table of wireless devices including wireless microphones and intercom transceivers. Each device shall be listed individually along with the manufacturer recommended frequency setting per the location of the installation.

K. Network Coordination

1. The Contractor shall provide a private wired control network that shall function independently of the Owner's network.
   a. The Contractor shall coordinate with the Owner and verify which system components, if any, shall be connected to the Owner's network.

2. The Contractor shall work with the Owner's IT department to identify all PoE, VLAN, firewall and other networking requirements to provide a fully functioning AV system. The Contractor shall generate a schedule of all AV components that will be connected to the building LAN and submit it to the Owner's IT department for implementation.

3. The Contractor shall, as required, obtain from the Owner's IT department blocks of static IP addresses sufficient for current system implementation as well as future system growth.

4. The Contractor shall develop a device host naming scheme in coordination with the Owner's IT department to be assigned to each IP enabled device.
5. The IP Addressing schedule shall list, at minimum, for each connected device:
   a. Product make and model
   b. LAN port connection location
   c. VLAN Assignment – If applicable
   d. Assigned Static or DHCP Reserved IP address
   e. Product MAC address
   f. Device Host Name
6. The IP Addressing schedule shall be submitted electronically in Microsoft Excel .xls format, compatible with Windows 10 or newer operating systems, unless an alternate format is approved in writing by the Consultant or Owner.
7. Approval: The Contractor shall receive written response indicating approval to proceed, or changes required to the IP Addressing Schedule, within 10 working days of receipt of the submittal by the Owner/Consultant.

L. Software: The Contractor shall secure from the Owner or Owner's Representative, in writing, approval for all customized software applications prior to installation, including but not limited to:

1. Audio Digital Signal Processing (DSP):
   a. The Contractor's Audio DSP submittal shall communicate the internal signal flow, preliminary setup and the configuration of the Audio DSP processors that is required to meet the AV systems functional and performance requirements. Final level settings and internal preset configurations shall be the Contractor's responsibility during system setup and commissioning.
   b. Format: The preferred Audio DSP Systems submittal is the manufacturer's DSP software configuration files. If requested, the submittal may be provided in the form of signal flow drawings.
   c. Audio DSP Software Configuration File Submittal Format:
      1) Provide the manufacturer's software configuration files, custom designed for each unique system type, compatible with Windows 10 or newer operating systems.
      2) DSP configuration files shall include custom labeling of all internal DSP device inputs and outputs provided with labeling capability. Labeling of the external hardware interface points shall match the externally connected devices as shown in the signal flow drawings.
      3) The Contractor shall provide one copy of the electronic files to the Owner and one to the Consultant for review.
   d. Audio DSP Signal Flow Drawing Submittal Format:
      1) Provide block diagram signal flow drawings, custom designed for each unique system type and include at minimum the following information:
         a) The audio DSP manufacturer make and model.
         b) The system names and/or locations (room names) that will be served by the audio DSP device.
         c) The names of all internal DSP components.
         d) The names of all internal inputs and outputs.
         e) The names of all external input and output connections.
         f) Show interconnectivity between the internal components and I/O's (indicating DSP internal signal flow).
      2) DSP signal flow submittals may be sized to match the AV signal flow drawings, in the form of JPEG image files (maximum 1920x1080 pixels) or PDF files.

3) The Contractor shall provide one copy each of the submittal to the Owner and to the Consultant for review.

e. The Contractor shall receive written response indicating approval to proceed, or changes required to the DSP submittal, within 10 working days of receipt of the submittal by the Owner/Consultant.

2. Control System Control Surfaces / GUI Prototype submittal
   a. The intent of the Control System Control Surfaces / GUI Prototype Submittal is to create a base level collaboration process whereby the Programmer can solicit direction from the Owner and Consultant towards a mutually agreeable design. Unless otherwise agreed to in writing the Contractor shall meet with the Owner and Owner's designated representative to review the Control System Control Surfaces / GUI Prototype Submittal. The Contractor shall be prepared to review the functional capabilities as well as the aesthetic characteristics of the control surfaces for compliance with Owner preferences and standards.
   b. Where Owner control surface or GUI standards are lacking, the Contractor shall provide:
      1) Preliminary control surface layouts for all pushbutton panels, touch sensitive panels, PC based controllers or other control surfaces. The Programmer should make the preliminary layouts with a monochrome, basic, wireframe style to clearly demonstrate the functionality of control surface. The layouts should illustrate all pushbuttons, labels, bar graphs, timers, video windows, etc. for each control panel and each system page. The Programmer should include suggestions for color schemes and graphic styles where applicable. The touch panel control surface submittal shall be created utilizing a collaborative, browser based application allowing for live review and comment by the Owner and Consultant, such as InVision or Moqups (UX design software).
      2) JPEG images (or PDF format file) of the finished look of all interface elements including but not limited to menu bars, buttons, down/up states of buttons, labels, bar graphs, timers, video windows, etc.
      3) A sample touch panel page as a separate file, or in a PDF format so that all parties understand the finished aesthetic.
   c. Where Owner control surface or GUI standards are made available, the Contractor shall provide:
      1) Preliminary control surface layouts for all pushbutton panels, touch sensitive panels, PC based controllers or other control surfaces. The Programmer shall develop the preliminary layouts utilizing the Owner's standards. The layouts should illustrate all pushbuttons, labels, bar graphs, timers, video windows, etc. for each control panel and each system page. The touch panel control surface submittal shall be created utilizing UX design software for live review and comment by the Owner and Consultant.
   d. The Contractor shall receive written response indicating approval to proceed, or changes required to the control surfaces layouts, within 10 working days of receipt of the submittal by the Owner/Consultant.
3. Control System Control Surfaces/GUI Submittal
   a. The Contractor shall generate a revised control surfaces layout submittal to include the additions, changes or revisions generated by the prototype submittal review as well as to integrate the graphic style into the design. The form and quantity of the submittal shall be as complete as possible and ready to be programmed unless otherwise directed. The touch panel control surface submittal shall be created utilizing UX design software for live review and comment by the Owner and Consultant.
   b. If the revised control surfaces submittal reflects those additions, changes or revisions called for in the prototype submittal review, the Contractor shall receive written approval to proceed within 10 working days of receipt of the submittal by the Owner/Consultant.
4. Post-Integration Control Surfaces Adjustments
   a. If so requested by the Owner or Owner's representative, and within 90 days of Substantial Completion, the Contractor shall be prepared to make one visit to the site to make final minor

adjustments to the control system code or programming without additional compensation. This could include, but may not be limited to, renaming or changing the size or location of buttons, page flip calls, or adjustments to code to provide a fully functioning system. If engraved control system panels require modification at a cost to the Owner, such cost information must be submitted to the Owner for approval prior to any work being performed.

b. The Contractor shall be responsible for ensuring that any changes to the control system or control surfaces that are made post integration are appended to the Final System Documentation.

M. Cable Testing

1. The Contractor shall secure from the Owner or Owner's Representative, in writing, approval for all cable test reports prior to Final Testing and System Performance Verification. Test reports shall include testing of all systems cabling and shall include:
   a. Loudspeaker line testing:
      1) Low impedance loudspeaker lines:
         a) Impedance at 1000Hz.
         b) Polarity of installed loudspeakers.
      2) 70 volt loudspeaker lines:
         a) Watts load at 1000Hz.
         b) Polarity of installed loudspeakers.
   b. Analog audio microphone and line level cable testing:
      1) Continuity of each conductor.
      2) Signal loss.
      3) Signal polarity.
      4) Shielding.
   c. UTP, STP, F/UTP and S/FTP cable testing:
      1) Category 5, 5e and 5e+ cables:
         a) ANSI/TIA-568.2-D Category 5e Permalink test.
         b) ANSI/TIA-568.2-D Category 5e Channel test.
      2) Category 6 and 6+cables:
         a) ANSI/TIA-568.2-D Category 6 Permalink test.
         b) ANSI/TIA-568.2-D Category 6 Channel test.
      3) Category 6a and 7a cables:
         a) ANSI/TIA-568.2-D Category 6a Permalink test.
         b) ANSI/TIA-568.2-D Category 6a Channel test.
      4) Shield test (required for shielded cables only).
      5) Nominal Velocity of Propagation test.
      6) Testing to be performed using a Fluke DSX-5000, or equal.
   d. 2K HDMI and Digital Signal cable testing:
      1) Wire test function.
      2) Testing to be performed using a Quantum Data 780a, or equal.
   e. 4K HDMI and Digital Signal cable testing:
      1) Wire test function.
      2) Testing to be performed using a Quantum Data 780b, or equal.
   f. Digital video coaxial cable testing:
      1) EDH, CRC & Jitter tests
      2) Eye pattern measurement

N. Preliminary As-Built Drawing Submittal

1. Upon completion of the work, and prior to Final Testing and System Performance Verification, the Contractor shall condense the Master Set along with any Shop Drawings into a single “As Built” drawing set. Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.

O. Final Documentation Submittals

1. Within 30 calendar days following Substantial Completion, the Contractor shall prepare and submit a Final Documentation set to the Consultant. The Final Documentation Submittal shall include any and all adjustments or changes identified during the Preliminary As-Built Drawing Submittal review. All documentation shall list the Owner, Project Name, Consultant, and Contractor. Any documentation appended and reissued during the Warranty period shall also include this information.

2. Format: All documents and drawings shall be submitted in the following format:
   a. Electronically in PDF format, submitted on indexed and searchable CDROMs.
   b. Other formats may be acceptable upon prior approval by the Consultant and/or Owner.
   c. All .PDF files shall be submitted at the documents’ native scale. For example, a PDF created from a drawing whose native format was standard ‘E’ size (42”x30”) shall be created at 42”x30” (full size) to ensure that there is no loss of resolution should the file be viewed or printed at a later date by the Owner.

3. Printed submittals
   a. If requested, provide (2) printed copies of all documents and drawings. The documentation shall be bound in three ring binders with covers and spines listing the Owner, Project Name, Consultant, and Contractor.

4. Documentation: The Final Documentation Submittal shall include:
   a. As-Built Drawings: The as-built drawings must reflect all changes to the system(s) made after the original bid documentation.
      1) The size of the as-built drawings shall be identical to the original drawings provided to Contractor.
      2) As-Built drawings shall conform to all of the requirements listed under “Submittals / Shop Drawings” listed above.
      3) Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.
      4) The Contractor shall include any additional drawings which are necessary to properly document the as-built systems, but not included in the bid documents, including:
         a) Rack elevations
         b) Custom panel details
         c) Patch bay layouts
         d) Cable pull lists
      5) Submission of digital As-Built drawings files, which are generated by the Contractor based on drawing files provided by the Consultant under separate agreement, shall be subject to submission by the Contractor as defined under said agreement.
   b. A schedule of IP and MAC Addresses for all Ethernet enabled AV devices, organized by room name and number.
   c. A complete cable testing schedule.
   d. A listing of each supplied item with manufacturer, model number and serial number, organized by room name and number.
   e. Operator's manuals for each piece of equipment supplied by the Contractor.
   f. Quick Reference Guides

1) The Contractor shall develop system operating instructions for the operations of all contractor-fabricated devices and installed equipment items as part of the work. These operating instructions shall include detailed descriptions of how to operate the system as a whole. Component manuals are not acceptable to meet this requirement unless approved by the Owner and Consultant.
2) Quick Reference Guides shall be one page (front and back as necessary) heat-laminated cards or tents providing simplified instructions for operation of all major system functions.
3) Content of the quick reference guide shall focus on the controls and must include high quality graphics / photos of the controls themselves with explanations and step by step instructions.
4) Pages shall be appropriately sized for the content required. (Half or other sized pages are appropriate for simple rooms.)
5) Described functions shall include as a minimum:
   a) Power on/off
   b) Source selection
   c) Volume control
   d) Connection of auxiliary sources
   e) Other functions as appropriate for the system, such as lighting and shade control.
   f) Coordinate with the Owner and the Audiovisual Consultant regarding additional content desired. For example, the Owner may wish to include instructions for contacting local support personnel.

g. Software
1) Where custom software is developed by the Contractor as part of this project, the system source code, passwords, and any associated related files, referenced files, and development software (and all relevant documentation and license) used to compile, develop, and build, etc. the executable code must be provided. The source code should be well documented in accordance with industry software engineering practices.
2) The software developer shall retain intellectual property rights; the Owner shall have a license for perpetuity for use as it applies solely to this project, including the right to modify/enhance. The software code may not be sold or used, in part or in whole, in any other project or application other than that intended by this specification, in part or in whole, by the Owner or any other party.
3) If a Subcontractor is used to write the software, the Contractor shall include, as part of the Final Documentation submittal, a signed letter on Subcontractor letterhead, granting the Owner ownership, use, and modification rights of the code and documentation as defined herein. The software shall be provided to the Owner on CD-ROM, inserted into a plastic sleeve appropriate for each media type, and included in the binders.
4) The Owner may supply the Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents and business information and plans that have been authored or pre-owned by the Owner. All such intellectual property shall remain the exclusive property of the Owner and shall not be used by the Contractor for any purposes other than those associated with delivery of the systems specified herein.

h. Warranty Statement: A statement on the Contractor's letterhead listing the official start and end dates for the Contractor's warranty on all equipment, materials, and labor used in the project. The start date shall correspond with the established Substantial Completion date, and the end date shall be based on the timeframe of warranty coverage purchased by the Owner as part of the contract.

5. Delivery
a. If the Final Documentation submittal is determined by the Consultant to be complete and accurate, the Consultant will approve the submittal and forward the Final Documentation package to the Owner.

b. If the Final Documentation Submittal is determined by the Consultant to not be complete and/or inaccurate, the Consultant will return the package to the Contractor with a written listing of the required modifications. Upon completion of all of the required modifications, the Contractor shall resubmit the Final Documentation to the Consultant for approval. The Final Documentation Submittal, and therefore the project, shall not be considered to be complete until all required documentation modifications have been made and approved by the Consultant on behalf of the Owner.

1.5 TESTING AND SYSTEMS PERFORMANCE VERIFICATION

A. Final Tests

1. System Performance Verification Scheduling
   a. Upon approval of the Contractor's test report and receipt of the "Systems Performance Verification Request" form, the Contractor shall assist the Consultant in final system tests. The Contractor shall allow two (2) days to perform the tests at a time that is mutually acceptable to the Contractor and Consultant. The Contractor's representatives assisting in the performance of these tests shall be thoroughly familiar with the details of the system and shall include the field supervisor responsible for installing, testing, control system programming, audio DSP programming, and commissioning the system.
2. System Performance Verification
   a. All control system, DSP and device programming shall be completed and in working order prior to the System Performance Verification.
   b. A physical inventory shall be taken of all equipment on site and justified against the Contractor's Bill of Materials submittal and the original Bidding Equipment Lists.
   c. The Consultant shall require tests completed by the Contractor which demonstrate the operation of all system components and to determine that the systems meet the criteria as outlined in 'Performance Standards'.
   d. The Contractor shall supply test equipment to be used during the System Performance Verification. The test equipment shall be present, in working order and connected prior to the System Performance Verification.
      1) Video Test Equipment
         a) Computer video signal generator(s) capable of outputting all signal types included in the system design. (Extron VTG 400DVI & Marshall Electronics V-SG4K-HDI or equivalent)
         b) Digital discs including both program content and test signals. DVD and Blu-Ray discs are both required.
         c) Adapters and interconnect cabling as necessary to complete testing.
      2) Audio Test Equipment
         a) Analog Audio Signal Generator, Impedance Meter and Line Analyzer: NTi MR-PRO (or equivalent).
         b) Condenser microphone: Shure SM86 (or equivalent).
         c) Active speaker: Fostex 6301NE (or equivalent).
         d) Digital Audio Signal Analyzer: NTi DL1 (or equivalent).
         e) Hardware-based Acoustic Analyzer: NTi AL1 or NTi XL2 (or equivalent).
         f) Software-based Acoustic Analyzer: Smaart with reference microphones and all necessary accessories (or equivalent).
         g) Compact Discs (CD's) including both program content and test signals.
         h) Media as necessary to test all playback and recording functions of the system. I.E. compact flash card, MP3 Player, USB media.
         i) Adapters and interconnect cabling as necessary to complete testing.
      3) Video and Audio Teleconferencing:

a) Contractor shall coordinate a test call with a far-end site scheduled for the time the Consultant is performing the Systems Performance Verification.

e. Contractor shall have tools available on the day of the System Performance Verification for system inspection and adjustments.

f. Contractor shall coordinate with Owner so that all spaces are unlocked and available for inspection.

g. Preliminary As-Built documentation shall be available for reference and inspection.

3. Punch List Report and Correction

a. Following the completion of the Systems Performance Verification, the Owner and/or Consultant will issue a punch list report to the Contractor, identifying omissions, adjustments, and corrections to the work necessary to meet the requirements of the Specification.

b. The Contractor shall correct all punch list items resulting in fully functional systems that meet all requirements of the Specification and can be utilized by the Owner as-intended.

1.6 SUBSTANTIAL COMPLETION

A. The project shall be deemed substantially complete by the Consultant and/or Owner at the stage in the progress of the work where the systems are sufficiently complete in accordance with the Specification so that the Owner can utilize the systems for their intended use.

1.7 TRAINING

A. The Contractor shall provide a total of fifteen (15) hours of on-site training for the Owner's staff at a time that is mutually agreeable for the Owner and Contractor.

1. The Contractor should anticipate ten sessions of 90-minutes each.

2. The Owner may choose to have the sessions spread out over a maximum of three (3) different days.

3. Address in the training the general configuration of the system, basic functionality, correct operation procedures, routine maintenance and upkeep.

4. The Owner shall be permitted to video record the Contractor-provided training sessions for the future use of training faculty and staff.

1.8 FINAL ACCEPTANCE

A. Final Acceptance shall be granted by the Owner based on the successful completion of the following activities:

1. All items required to obtain Substantial Completion have been achieved.

2. Any punch list corrections not required to obtain Substantial Completion have been completed by the Contractor and accepted by the Owner and/or Consultant.

3. The Contractor's Final Documentation Submittals have been reviewed by the Consultant and deemed to be complete, and have been delivered to the Owner.

4. The Contractor has provided all required training for the Owner as defined herein.

5. Any remaining items required by the Specification, but not listed above, have been completed by the Contractor.

PART 2 - PRODUCTS

2.1 APPROVED CABLING

A. The following table lists cabling products and types that have been pre-approved for use. This is not an all-inclusive list of the cabling products and types required to complete this project. The Contractor

shall reference the cabling products in this table as a baseline of performance for each cable category. The Bidder or Contractor may submit cable part numbers, models and manufacturer's product other than those listed in this table for consideration and approval per the substitution procedures defined in this Specification.

Type/Application	Description	Manufacturer	Model No.	Comment
Microphone or Line Level Audio	22 AWG STP	Belden	9451	or equal
Microphone or Line Level Audio – Multi Pair (2)	22 AWG STP	Belden	1814R	or equal
Microphone or Line Level Audio – Multi Pair (4)	22 AWG STP	Belden	1815R	or equal
Microphone or Line Level Audio – Multi Pair (8)	22 AWG STP	Belden	1817R	or equal
Microphone or Line Level Audio – Multi Pair (12)	22 AWG STP	Belden	1818R	or equal
Microphone or Line Level Audio – Multi Pair (16)	22 AWG STP	Belden	1819R	or equal
Microphone or Line Level Audio – Multi Pair (24)	22 AWG STP	Belden	1821R	or equal
Microphone or Line Level Audio – Multi Pair (32)	22 AWG STP	Belden	1823R	or equal
Audio – Coax - Digital	19 AWG Coax	Belden	1694F	or equal
Audio Line – Digital Ready – Single Pair	24 AWG STP	Belden	1800B	or equal
Digital Audio – CAT6	23 AWG UTP	Belden	4812	or equal
Loudspeaker or LV Power Supply, 10 AWG	10 AWG UTP	Belden	5T00UP	or equal
Loudspeaker or LV Power Supply, 12 AWG	12 AWG UTP	Belden	5000UE	or equal
Loudspeaker or LV Power Supply, 14 AWG	14 AWG UTP	Belden	5100UE	or equal
Loudspeaker or LV Power Supply, 16 AWG	16 AWG UTP	Belden	5200UE	or equal
Loudspeaker or LV Power Supply, 18 AWG	18 AWG UTP	Belden	5300UE	or equal
Digital Video (Up to 6GHz)	20 AWG Coax	Belden	1505A	or equal
Digital Video (Up to 12GHz)	18 AWG Coax	Belden	4694R	or equal
HDBaseT Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Belden	1212F	or equal
HDBaseT Unshielded CAT6A	4-Pair CAT6A U/UTP 625 MHz	Belden	10GX12	or equal
4K Ultra-High-Definition Media Cable, Shielded	4-Pair F/UTP	Belden	2183R	or equal
USB Extension Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Belden	1212F	or equal
Control (RS-232/422)	2-Pair 24 AWG Stranded TC	Belden	8102	or equal
Control (RS-232/422)	3-Pair 24 AWG Stranded TC	Belden	8103	or equal
Control (RS-232/422)	4-Pair 24 AWG Stranded TC	Belden	8104	or equal
Ethernet Control Unshielded CAT5e	4-Pair CAT 5e U/UTP 200 MHz	Belden	1583A	or equal
Fiber Optic Cable, Multi-mode	2 Strand MM OM4 Fiber Riser Cable	Belden	FI4D002R9	or equal
Fiber Optic Cable, Multi-mode	6 Strand MM OM4 Fiber Riser Cable	Belden	FI4D006R9	or equal
Fiber Optic Cable, Multi-mode	12 Strand MM OM4 Fiber Riser Cable	Belden	FI4D012R9	or equal

Type/Application	Description	Manufacturer	Model No.	Comment
Fiber Optic Cable, Multimode	24 Strand MM OM4 Fiber Riser Cable	Belden	FI4D024R9	or equal
Fiber Optic Cable, Multimode	2 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D002P9	or equal
Fiber Optic Cable, Multimode	6 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D006P9	or equal
Fiber Optic Cable, Multimode	12 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D012P9	or equal
Fiber Optic Cable, Multimode	24 Strand MM OM4 Fiber Plenum Cable	Belden	FI4D024P9	or equal
SMPTE 311M HDTV Cable	1 Channel SMTE 311M HDTV Fiber Cable	Belden	7804R	or equal
SMPTE 311M HDTV Cable	3 Channel SMPTE 311M HDTV Fiber Cable	Belden	7824R	or equal
AMX DXLink Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Belden	1212F	or equal
AMX DXLink Unshielded CAT6A	4-Pair CAT6A U/UTP 625 MHz	Belden	10GX12	or equal
AMX AXLink Cable	22AWG Shielded Pair 18AWG Power Pair	Belden	1502R	or equal
Crestron DM 4K Ultra Cable Shielded CAT7a	4-Pair 7a S/FTP 1000 MHz	Crestron	DM-CBL-ULTRA-NP	or equal
Crestron DM 4K Ultra Cable Shielded CAT7a	4-Pair 7a S/FTP 1000 MHz, Low Smoke	Crestron	DM-CBL-ULTRA-LSZH	or equal
Crestron DM 8G+ Shielded CAT5e+	4-Pair CAT5e+ F/UTP 350 MHz	Crestron	DM-CBL-8G-NP	or equal
Crestron Fiber Optic Cable, Multimode	8G Multimode Fiber Optic Cable, 50/125 x4	Crestron	CRESFIBER-8G-NP	or equal
Crestron Fiber Optic Cable, Singlemode	8G Singlemode Fiber Optic Cable, x2 zip-cord construction plenum/non-plenum	Crestron	CRESFIBER-8G-SM-P	or equal
Crestron (Cresnet) Cable	2-18 AWG UTP with 2-22 AWG STP	Crestron	CRESNET-NP	or equal
Extron XTP/DTP Shielded CAT6+	4-Pair CAT6+ SF/UTP 475 MHz	Extron	XTP DTP 24	No Known Equal
Wireless Microphone Antenna Extension	RG213/U	Belden	8267	or equal
Ampetronic Hearing Loop Copper Foil Tape	18mm x 0.25mm Single Conductor	Ampetronic	FB 1.8	No Known Equal
Ampetronic Hearing Loop Direct Burial Cable	1.0mm dia. (18 AWG) Single Conductor, Buriable	Ampetronic	DBC 1.0	No Known Equal
Ampetronic Hearing Loop Direct Burial Cable	2.5mm dia. (10 AWG) Single Conductor, Buriable	Ampetronic	DBC 2.5	No Known Equal
Williams Sound Hearing Loop Copper Foil Tape	0.75 in. x 0.010 in. Single Conductor	Williams Sound	PLW F	or equal
Williams Sound Hearing Loop Cable	18 AWG Single Conductor	Williams Sound	PLW 037	or equal
Williams Sound Hearing Loop Cable	14 AWG Single Conductor	Williams Sound	PLW 014	or equal

B. Environmental Suitability: The cabling listed above is all Indoor rated (non-plenum). The Contractor is responsible for providing equivalent cabling that is appropriate for the environment in which it is installed.

1. All cables running below slab on grade or in an outdoor setting shall be Outdoor rated.
2. All cables being installed within a plenum environment must be Plenum rated.

C. All connections between mobile equipment and connection panels must be prefabricated, stage-grade cabling.

2.2 EQUIPMENT

A. Bidding Equipment List

1. Bidding Equipment Lists are provided to the Contractor for use in preparing the bid response. These lists include major system components and peripherals, but should not be considered to be all inclusive. The complete equipment package bid response will take into account this document, all drawings, written addenda, any or all drawing additions or reissues, as well as implied system operability.
2. Bidding Equipment Lists are included as an Appendix in this specification.

B. Connectors, Adapters and Assemblies

1. Field terminated connectors shall be compatible and approved for use for a specific cable type and application by the cable and equipment manufacturer.
2. Connectors shall be manufactured by Neutrik, Switchcraft, AMP, Amphenol, Kings, Canare, Crestron, Extron, or equal.
3. Manufacturer constructed cable adapters and assemblies shall be provided by Crestron or Extron, or be of equal quality and durability.

C. Panels, Plates and Keypads

1. The Contractor shall provide a cover panel for all junction boxes which comprise the audiovisual infrastructure (wall, floor and ceiling). This includes pull boxes, splice boxes and unused or abandoned junction box locations.
2. Custom Fabricated Panels and Plates
   a. Submit custom panel designs per Submittal requirements prior to fabrication or purchase.
   b. Custom panels and plates shall be machined aluminum, nominal thickness 0.125”, with beveled edges and a brushed, anodized finish. Confirm with the Architect required finish color for each panel location. Use of the pull-box manufacturer’s construction cover shall not be permitted.
   c. All panel connectors shall be labeled with engraved lettering, minimum 0.10” letter height, and provided with contrasting paint fill.
   d. Panels and plates for non-gang pull boxes shall extend past the height and width of the pull box by a minimum of one-half inch on each side.
   e. Cable access holes in cover plates shall not capture the cables and shall have a protective grommet to prevent cable damage.
3. Manufactured I/O Panels, Control Panels, Keypads and Plates
   a. Submit proposed panel designs per Submittal requirements prior to purchase.
   b. Panel functionality shall be as defined in the Specification.
   c. Coordinate color and style with the Architect and/or Consultant.
4. Abandonment Cover Plates at Future Use, Unused or Abandoned Audiovisual Junction Box Locations
   a. Submit proposed abandonment plate selections per Submittal requirements prior to fabrication or purchase.
   b. Contactor shall coordinate with the Architect and/or Consultant regarding the style, finish and paint color of abandonment cover plates.

c. Cover plates for standard gang junction boxes shall match the manufacturer style and color of architectural cover plates used elsewhere on the project.

d. For non-standard gang junction box locations provide the box manufacturer's paintable abandonment finish plate.

e. At non-standard gang sized junction box locations where a manufacturer's abandonment finish plate is not available, a custom, paintable abandonment plate shall be provided. Custom abandonment plates shall be sized to extend past the height and width of the box by a minimum of one-half inch on each side to mask any gap between the box edge and wallboard.

D. AV Rack Accessories

1. Provide manufacturers' rack mount adapters where available.
2. Where manufacturers' rack mount adapters are not available, provide Middle Atlantic Products RSH4S-series custom rack shelf adapters, with –C clamping option as appropriate, or equal.
3. Blank rack panels: Flanged steel with black textured powder coat finish, Middle Atlantic Products, SB-series, or equal.
4. Vented rack panels: Middle Atlantic Products black powder coat finish VT-series, or equal.
5. Rack screws, lacer bars and accessories: Middle Atlantic Products, or equal.
6. Rack Drawers: Middle Atlantic Products, black textured powder coat finish, TD-series, or equal.
7. Rack ID Panel: Include single space (1 RU) rack ID panel, Panelcrafters, Inc. Part# NV5-RHIM-RJ-RevH at the top of each equipment rack, or group of racks per the Bidding Equipment Lists. Panel shall be digitally printed with logo and contact information for Consultant and Contractor.
8. Confirm with the Owner any requirements for security-type rack rail screws, prior to rack fabrication and assembly. Rack rail security screws shall be Middle Atlantic Products, approved style and installation/removal tool type, or equal.
9. Where locking doors are provided, confirm with the Owner any requirements for keying and, if requested, provide locks keyed alike at no additional cost, if available.

E. AV Rack Power Distribution Equipment

1. Where the Technical Power supply to the rack is IG (isolated ground), provide a power distribution system within the rack that maintains the integrity of the IG system.
2. Where 20A power is specified, ensure that all power distribution products are rated for 20A.
3. Vertical power strips: Middle Atlantic Products PDT-series, or equal.
4. Rack rail power strips: Middle Atlantic Products PD-series, or equal.
5. Provide a sufficient number of AC convenience outlets to accommodate all installed equipment plus an extra 20% spare capacity.

PART 3 - EXECUTION

3.1 INSTALLATION PRACTICES

A. General

1. All equipment shall be installed in accordance with this Specification, approved Shop Drawings, and manufacturer's recommendations.
2. All equipment with the exception of portable equipment shall be firmly fastened or attached in place. A safety factor of at least five shall be utilized for all brackets, fasteners and attachments. Provide safety retention cables for overhead equipment such as loudspeakers, projectors, etc.

3. In the installation of equipment and cable, consideration shall be given not only to operational efficiency, but also to overall aesthetic factors.
4. The Contractor shall ensure that all equipment is installed such that proper cooling and ventilation is provided.
5. All equipment shall be installed in a manner, which prevents hum, RF/EMI/EMF interference, and mechanical vibration based noises (e.g. fan mounts, etc.)
6. All equipment that includes keyed locks shall be keyed alike, per equipment category. This includes, but is not limited to equipment racks, lecterns, other technical furniture, security mechanisms, etc. The Contractor shall coordinate with the Owner on keying preferences before ordering equipment.
7. All equipment shall be protected from construction dust and debris until the date of Substantial Completion.
8. All equipment shall be protected from theft, damage, or vandalism until the date of Substantial Completion.
9. Any equipment designed for use by end-users in the facilities must be installed with theft deterrence/protection mountings and fasteners. Any tools required to mount/un-mount this equipment must be furnished to the Owner at the date of Final Acceptance.

B. Seismic Restraints:

1. All hanging or free-standing equipment and cabinets furnished including but not limited to racks, loudspeakers, projection screens, and flat panel displays shall be secured to substantial building structures. The equipment described shall resist seismic acceleration in any direction up to a limit of the greater of 1.0 G or the limit prescribed by the local governing codes.
2. Maintain electrical isolation between the equipment racks and building steel.
3. Loudspeaker hanging details, rack bracing, and other seismic restraints are not shown on the contract drawings; it shall be the Audiovisual Contractor responsibility to develop these drawings.
4. Submit loudspeaker mounting (rigging) drawings to the Architect for review after they have been stamped and signed by a licensed structural engineer engaged in regular practice in the Project's State.

C. Furniture

1. The Contractor shall ensure that equipment or mounting hardware is compatible with and suitable for installation in furniture specified by the Architect, Consultant, or Furniture Supplier. It shall further be the Contractor’s responsibility to ensure that such coordination with the Architect, Consultant, or Furniture Supplier occurs. The Contractor shall exchange with and follow such Shop Drawings as to ensure that dimensions and structural supports are adequate for the installation of specified equipment. In addition, the Contractor shall confirm that the furniture accommodates the audiovisual equipment’s’ environmental and electrical operating parameters. It is the Contractor’s responsibility that the request and delivery of such critical coordination information is satisfactorily executed. In as much as the Contractor has control over the delivery of such information, he shall deliver it as requested by the Architect, Consultant, or Furniture Supplier.

D. Equipment Racks and Equipment Rack Cable Management

1. Racks shall be installed in such a way so as to permit access to all equipment for service.
2. Racks are considered complete components and should be completely assembled and tested at the Contractors facility prior to onsite installation.
3. All equipment in racks shall be fitted with vent panels and/or fans as required to provide ventilation and cooling according to equipment manufacturer’s recommendations.
4. Unused front facing rack spaces shall be fitted with blank rack panels.
5. Adjacent racks shall be bolted together with appropriate ganging hardware.

6. Use rear and mid rails for intermediate terminations. Maintain accessibility to the rear of the equipment.
7. Mid rails must be used to support equipment weighing more than 50 pounds.
8. As a general practice, all power cables, control cables, and high-level cables shall be dressed to the left rear of an equipment rack. Audio and video cables shall be dressed to the right rear of the rack. Audio, video and control cables shall be bundled separately and spaced not less than three (3) inches apart.
9. Internal equipment rack cabling shall be supported by lacing strips, support brackets, or other cable management systems as required to ensure that all cabling is supported in both the vertical and horizontal planes within the rack.
10. With the exception of ganged equipment rack assemblies, cabling routed between equipment racks or pieces of equipment exterior to equipment racks, or extending to the greater facility cabling infrastructure, shall be completely protected, end-to-end, by a raceway, wire-way, or duct appropriately sized for the cable run.
11. Cabling between rolling pieces of equipment not housed in rack cabinets or a rolling equipment rack and any device to which it is connected, shall be protected by a split-loom corrugated tubing wrap or other such flexible cable management system appropriately sized for the cable run.
12. Any controls not to be adjusted by the user and accessible from the front of the equipment rack must be furnished with security panels.
13. Devices installed behind flat panel displays shall be mounted near the edge of the displays for easy physical access and for easy visual verification of indicator lights.

E. Video Displays

1. Turn off or disable all eco, green or energy saving modes on all flat panel and projector displays where displays are to be controlled by an external control system
2. Video settings should be adjusted on all flat panel displays to optimize color and contrast. Settings should be identical between multiple displays within the same room, area, or room type. Any dynamic contrast modes within flat panel displays shall be disabled.

F. Video Cameras

1. Configure all video cameras with proper output resolution, network settings, physical positioning and white balancing. White balancing of cameras shall occur after the camera is installed, the room finishing is complete with the room lighting and shades properly set.
2. Program no less than four presets for all PTZ cameras.
3. Prior to installation, the Contractor shall work in close coordination with the Owner to determine the optimal locations for all video cameras to ensure that the camera positions meet the requirements of the Owner for the field of view.
4. If so requested by the Owner or Owner's representative, and within 90 days of Substantial Completion, the Contractor shall be prepared to make one visit to the site to make adjustments to the locations of the video cameras within accessible ceilings without additional compensation. If camera placement is required in an inaccessible ceiling or wall and will incur a cost to the Owner for finishing, painting, cable pathways, mounting, etc., such cost information must be submitted to the Owner for approval prior to any work being performed.
5. The Contractor shall be responsible for modifying and reissuing any items within the Final Documentation package that have been impacted by post integration camera adjustments.

G. Cabling

1. All cabling and termination shall be executed in adherence to standard industry practices and as outlined in:

a. AV Installation Handbook: Best Practices for Quality Audiovisual Systems: AVIXA/InfoComm International, latest edition.

b. Philip Giddings - Audio Systems Design and Installation: Boston Focal Press, latest edition.

c. Kenneth T. Deschler - Cable System Design and Installation: McGraw-Hill, Inc. latest edition.

2. Cable Length Verification: Cable lengths where given in the Specification, for bulk or manufactured cable assemblies, have been provided to assist the Contractor in the bidding process. Cable run lengths, where specified, are end-point-to-end-point estimates and include consideration for tails. Estimates may be based upon cable tray systems; raceways, conduit runs, and furniture layouts indicated on construction drawings and may vary from the actual installed cable pathways. It is responsibility of the Contractor to field verify required cable lengths for bulk cable or manufactured cable assemblies prior to ordering.

3. Cable Installation

a. Non-contiguous cable support mechanisms such as hangers, rings, and hooks shall not be spaced farther than four (4) feet apart. All manufactured raceways used for cables shall be installed according to the raceway manufacturer's specifications

b. Cable runs shall be supported with devices designed for this purpose and are to be installed independent of any other structural component.

c. Cables routed vertically up walls, or between floors as vertical riser, shall be supported with clamps or other mechanisms. These supports shall occur at least three times per floor.

d. The Contractor shall maintain, or where not already existing, provide through penetration fire stop systems to prevent the spread of fire through openings made in fire-rated walls or floors to accommodate penetrating items such as conduit, cables or other pathway. Fire stop shall restore floor and wall to the original fire rated integrity. The fire stop systems and products shall have been tested in accordance with the procedures of U.L. and material shall be U.L. classified as materials for use in through-penetration fire stops.

e. The fire stop system shall comply with the NEC and with NFPA 101-Life Safety Code (latest edition) and shall be made available for inspection by the local inspection authorities prior to cable system acceptance. The Contractor shall be responsible for verifying the fire rating of all walls and floors affected by his/her work.

f. Cables shall not be exposed to paint, paint remover, water, or any liquids which may degrade the performance of the cable, void the manufacturer's warranty, alter the flame and/or smoke characteristics of the cable, or obscure the flame rating designations printed on the jacket. Cables exposed to paint, paint remover, water, or any liquid shall be replaced by the Contractor.

g. Cable pulling tension may not exceed manufacturer recommendations. Where cable-pulling lubricant is used, the lubricant must be compatible (non-damaging) with the conduit and cable sleeve materials and must not harden over time to prevent future pulls.

h. Cable stapling of any recognized media type shall not be permitted.

i. Cables shall be dressed in conveniently sized bundles and either laced or banded. Lacing or banding shall not be so tight as to deform cable bundles.

j. Cabling installed with a bend radius less than that recommended by the cabling manufacturer is not acceptable.

k. Cables and bundles terminating at equipment or connector panels shall be supported so as not to put strain on connections or connectors.

l. All cabling between mobile equipment and connection panels must be prefabricated, tactical cabling.

m. All cabling between network ports, jacks, patch panels and equipment must utilize prefabricated CAT6a, or better as required by the application, patch cables of appropriate length.

n. All cables, with the exception of video or pulse cables, which must be cut to an electrical length, shall be cut to the length dictated by the run. No splices shall be permitted in any pull boxes without prior approval of the Consultant.

o. Cabling for equipment mounted in drawers or on slides shall be provided with a service loop of appropriate length. A cable management support for the service loop shall be provided to prevent the service loop travel from interfering with the operation of the drawer or slide or snagging on adjacent cabling.

p. Microphone level, line level, loudspeaker level, and video lines shall be run in separate conduits, trough, raceway divider, and cable bundles. Low voltage DC and control may be run along with any but microphone or line level audio runs.

4. Termination

a. All termination components must meet or exceed all specifications for given media type and application as described in this document and system drawings.

b. Crimp on connectors shall be installed only on the appropriate size cable using the manufacturer recommended crimp tool and die set.

c. Connections to electronic devices providing screw terminals shall be terminated using the appropriate gauge insulated spade or ring crimp terminal connector and crimp tool.

d. All mechanical solder-on connectors shall be attached to cable ends using rosin core solder.

e. Audio signal cable shields shall be protected with the appropriate gauge Teflon or heat-shrinkable tubing. The jacket end of each audio cable shall be fitted with the appropriate gauge heat shrinkable tubing to provide additional protection to the base of the shield or shield foil. This also applies to the inside of mechanical connectors and cables that terminate at partitioned barrier strips.

5. Analog Audio Microphone and Line Level Systems

a. General

1) All analog audio microphone and line level cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. The cabling system shall be tested, verified and documented.

b. Test for continuity of each conductor, polarity, signal loss and proper shield grounding and integrity.

c. Testing to be performed using an NTi MR-PRO Audio Generator and Impedance Meter, or equal.

6. Analog Audio Loudspeaker Line Level Systems

a. General

1) All analog audio loudspeaker line level cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. The cabling system shall be tested, verified and documented.

b. Test for continuity, polarity, impedance, signal loss and (if required) proper shield grounding and integrity.

c. Low impedance loudspeaker lines:

1) Test impedance at 1000Hz.

2) Test polarity of installed loudspeakers.

d. 70 volt loudspeaker lines:

1) Test watts load at 1000Hz.

2) Test polarity of installed loudspeakers.

e. Testing to be performed using an NTi MR-PRO Audio Generator and Impedance Meter, or equal.

7. Category Cabling and Connectors for AV Systems

a. General

1) All category cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. Cables shall be bundled in groups of 24 cables maximum. The category cabling system shall be tested, verified and documented to meet the ANSI/TIA-568.2-D Standard, including all applicable Addenda.

b. Digital Media Distribution Systems

1) AV Contractor provided signal distribution equipment that requires RJ-45 style connectors at room boundary wall panel or floor box panel connections, with the exception of those connecting a piece of AV equipment to the Owner's LAN, shall be color-coded Neutrik EtherCON CatX rated shielded panel connectors and DM compliant shielded CatX rated inline connectors in the appropriate color-coded Neutrik EtherCON connector carrier and specified to keep the CatX rating of the signal cable. Manufacturer approved RJ45 cable connectors shall be used at all manufacturer equipment connections. All wires within the cable must be connected and shielded.

2) Each digital AV over RJ-45 receptacle, permanently installed cable, equipment cord, patch cord and patch panel will be of a color or have markings that are non-standard with the voice/data system, and be plainly and permanently labeled "AV ONLY".

c. Category Cabling Systems Installation and Testing

1) Where indicated, the Contractor will be required to provide a dedicated system of category cabling to support the transmission of digital AV signals. Depending upon the application, the cabling system topology may be point-to-point or be comprised of a system of work area outlets terminated at patch panels.

2) The Contractor shall test, verify and document the length, wire map and transmission performance of each Channel Link (Permanent Link + Station Cables) using a Fluke DSX-5000 Cable Analyzer System, including DSX-5000 Versiv Mainframe and Remote, LinkWare PC Software, CAT 6A/Class EA Permanent Link Adaptors and CAT 6A/Class EA Channel Adapters. This tester shall be used during testing of this project. Included features shall include the ability to integrate with labeling and cable management software, which yields downloadable 606-A cable IDs, ensuring data accuracy. Channel tests are the only acceptable test format for testing Category cabling. Link tests will not be sufficient.

3) All category cable Channel and Permanent Links shall be tested to prove compliance with the current industry standard, ANSI/TIA-568.2-D and any subsequent addenda. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-C including applicable Technical Service Bulletins and amendments. The appropriate level III tester shall be used to verify each individual type of category cabling systems.

4) Category 5, 5e and 5e+ testing of channel, permanent link and twisted pair cables shall be performed using the recommended test equipment specifically designed to test cables for all ANSI/TIA-568.2-D Category 5e parameters from 1 – 100 MHz. Testers shall be loaded with the most recent test values per the above referenced standard. The Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.

5) Category 6 and 6+ testing of channel, permanent link and twisted pair cables shall be performed using the recommended test equipment specifically designed to test cables for all ANSI/TIA-568.2-D Category 6 parameters from 1 – 250 MHz. Testers shall be loaded with the most recent test values per the above referenced standard. The

Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.

6) Category 6A and 7a testing of channel, permanent link and twisted pair cables shall be performed using the recommended test equipment specifically designed to test cables for all ANSI/TIA-568.2-D Category 6A parameters from 1 – 500 MHz. Testers shall be loaded with the most recent test values per the above referenced standard. The Contractor may be required to provide documentation (or demonstration) that the testers used are properly programmed as described above.

8. Digital Video Cable Installation and Testing:
   a. General
      1) All digital video cabling installed by the Contractor to support AV Systems connectivity shall meet the equipment manufacturer's specifications for cable and connector types, installation methods and routing, separation distance from adjacent services, maximum number of disconnect points and maximum overall cable run lengths required to meet the systems design performance criteria. The cabling system shall be tested, verified and documented.
   b. When issues (such as cable length) compromise specifications or the integrity of the AV system, active cable equalization, twisted pair extenders, or fiber-optic extenders shall be employed as appropriate.
      1) When using twisted pair extenders, the type of cable used and its shielding must comply with the extender manufacturer's recommendations for optimum performance.
      2) When using products that draw power from the +5V line, the system must be configured to ensure that source power is not overdrawn.
   c. The bend radius of each cable shall not be less than the minimum recommended by the cable manufacturer.
      1) System interconnects shall not exceed the minimum required for system functionality.
      2) Cable splices, joiners, and gender changers shall not be used.
   d. Test for continuity of each conductor, signal loss and proper shield grounding and integrity.
   e. Perform EDH, CRC & Jitter tests.
   f. Perform Eye Pattern Measurement test.
   g. Testing to be performed using a Phabrix SxE, or equal.

H. Labels / Wire Markers
   1. For cable labeling, reference ANSI/INFOCOMM Standard F501.01:2015, Cable Labeling for Audiovisual Systems (CLAS)
   2. Except where otherwise indicated, all rack-mounted equipment, switches, controls, and interface panels shall be clearly labeled.
      a. Panels and plates shall be a minimum 1/8" thick anodized aluminum etched and epoxy filled unless otherwise specified.
      b. Rack mounted equipment shall be labeled with engraved and filled plastic laminate. Where appropriate, the function of, or the input, output, or loudspeaker(s), served by each device shall be indicated. Other methods of labeling rack mounted equipment may be accepted pending prior approval by the Consultant and/or Owner.
      c. All cables shall be permanently identified at each end by machine printed cable markers.
         1) Every cable shall have a unique tag number identifier for each cable. The Contractor shall include this unique tag number on the As-Built signal flow documentation.
         2) Cable markers shall be placed two (2) inches from where the cable exits the strain relief of the connector, but never within a cable bundle.

Colorado Mountain College
Spring Valley Nursing

Audiovisual Systems
Bidding Equipment List

Number : **042A,042B, 042F**
Type : **SY01**
Name : **HIGH FIDELITY ICU SIM LAB AND CONTROL STATION**
Rm Qty : **2**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
SIM LAB					
1	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	3	G
2	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
3	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-
4	Contractor Select	Contractor Select	Earbud for MXW1 Transceiver back channel audio	4	-
5	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
6	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
7	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
8	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
9	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - pair	1	-
10	LG	50UL3G-B	50" Professional LED Direct-Lit Display w/Built-In Speakers, 3840x2160 Native (Latest Model)	1	-
11	Chief	TS525TU	Large THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	1	-
12	Viewsonic	TD2430	24" Interactive LCD Monitor, 1920x1080 Native, 10-Point Capacitive Multi-Touch, Internal Speakers	1	-
13	Ergotron	45-353-026	LX Sit-Stand Wall Mount Arm	1	D
14	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	2	-
15	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
16	Vaddio	440-1005-020	Active USB 2.0 Extension Cable - 65ft	1	-
17	Huddly	IQ	Intelligent Collaboration Camera w/2m USB3.0 Cable and Mount	1	-
18	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
19	Owner Furnished	Computer Station	EMR Computer Station (OFCI)	1	A
20	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	1	A
21	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
22	Ergotron	SV41-6300-0	StyleView® Cart with LCD Pivot Documentation Medical Cart	1	-
23	Crestron	MPC3-201-x	3-Series Media Presentation Controller 201	1	D
24	Crestron	MPC3-101/102/201-RMB	Retrofit Mounting Bracket for MPC3-201	1	-
25	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
26	Cornell	L-103	Dome Corridor Lights - THREE Bulb 24 Volt DC - White Cover w/Blue & Amber Filters (Blue Amber White)	1	-
27	E-Switch	PV6H240SS-341	Illuminated Anti-Vandal Switch w/ Blue LED Ring, Raised actuator. SPST, NO, Momentary closed 48V 2A, 16mm Dia.	1	-
28	E-Switch	PV6H240SS-311	Illuminated Anti-Vandal Switch, w/ Red LED Ring, Raised Actuator, SPST-NO, Momentary 48V 2A 16mm Dia	1	-

Colorado Mountain College
Spring Valley Nursing

Audiovisual Systems
Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **042A,042B, 042F**					
Type : **SY01**					
Name : **HIGH FIDELITY ICU SIM LAB AND CONTROL STATION**					
Rm Qty : **2**					
Control Station					
29	KbPort - Shure	X2U	Microphone to USB Adapter	1	G
30	KbPort	FusionHD Recorder (mini)	Mini Recorder, 24" Monitor & Keyboard / Mouse Combo	1	G
31	KbPort - Magwell	SKU 32060	USB Capture HDMI Gen 2	1	G
32	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
33	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control) (OFCI)	1	A
34	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
35	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
36	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
37	KbPort - Axis	C8033	Network Audio Bridge	1	G
38	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
39	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
40	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
41	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
42	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
43	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
44	M-Audio	AV 42	4" 2-Way Powered Desktop Studio Speakers (Pair)	1	-
45	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
46	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
47	Crestron	CEN-SWPOE-5	(5) Port Gigabit Unmanaged PoE Switch	1	-
48	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	2	-
49	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
50	Contractor Select	Contractor Select	Power supply for Switch Lamps and Nurse call Lamps	1	-
51	Middle Atlantic	HRF-1214	12ru Half Rack System	1	-
52	Middle Atlantic	HR-UMS1-11.5	1 RU UMS Half Rack Shelf, 11.5 Inches Deep by 10 Inches Wide	lot	-
53	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
54	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
55	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-

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Audiovisual Systems
Bidding Equipment List

Number : **042A,042B, 042F**
Type : **SY01**
Name : **HIGH FIDELITY ICU SIM LAB AND CONTROL STATION**
Rm Qty : **2**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
56			Installation Materials as Defined in AV Systems Specification	Lot	
57			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
58			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
59			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
60			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
61			Control System Accessories as Needed	Lot	
62			Power Supplies and Power Distribution as Needed	Lot	
63			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems
Bidding Equipment List

Number : **042D, 042E**
Type : **SY02**
Name : **HIGH FIDELITY OR SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
SIM LAB					
1	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	4	G
2	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
3	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-
4	Contractor Select	Contractor Select	Earbud for MXW1 Transceiver back channel audio	4	-
5	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
6	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
7	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
8	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
9	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - pair	1	-
10	LG	50UL3G-B	50" Professional LED Direct-Lit Display w/Built-In Speakers, 3840x2160 Native (Latest Model)	1	-
11	Chief	TS525TU	Large THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	1	-
12	Viewsonic	TD2430	24" Interactive LCD Monitor, 1920x1080 Native, 10-Point Capacitive Multi-Touch, Internal Speakers	1	-
13	Ergotron	45-353-026	LX Sit-Stand Wall Mount Arm	1	D

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Audiovisual Systems
Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **042D, 042E**					
Type : **SY02**					
Name : **HIGH FIDELITY OR SIM LAB AND CONTROL STATION**					
Rm Qty : **1**					
14	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
15	Owner Furnished	Owner Furnished	Cart for Manikin Vitals All-In-One for Baby (OFCI)	1	A
16	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	2	-
17	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
18	Vaddio	440-1005-020	Active USB 2.0 Extension Cable - 65ft	1	-
19	Huddly	IQ	Intelligent Collaboration Camera w/2m USB3.0 Cable and Mount	1	-
20	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
21	Owner Furnished	Computer Station	EMR Computer Station (OFCI)	1	A
22	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	1	A
23	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
24	Ergotron	SV41-6300-0	StyleView® Cart with LCD Pivot Documentation Medical Cart	1	-
25	Crestron	MPC3-201-x	3-Series Media Presentation Controller 201	1	D
26	Crestron	MPC3-101/102/201-RMB	Retrofit Mounting Bracket for MPC3-201	1	-
27	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
28	Cornell	L-103	Dome Corridor Lights - THREE Bulb 24 Volt DC - White Cover w/Blue & Amber Filters (Blue Amber White)	1	-
29	E-Switch	PV6H240SS-341	Illuminated Anti-Vandal Switch w/ Blue LED Ring, Raised actuator. SPST, NO, Momentary closed 48V 2A, 16mm Dia.	1	-
30	E-Switch	PV6H240SS-311	Illuminated Anti-Vandal Switch, w/ Red LED Ring, Raised Actuator, SPST-NO, Momentary 48V 2A 16mm Dia	1	-

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Audiovisual Systems
Bidding Equipment List

Number : **042D, 042E**
Type : **SY02**
Name : **HIGH FIDELITY OR SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Control Station					
31	KbPort - Shure	X2U	Microphone to USB Adapter	1	G
32	KbPort	FusionHD Recorder (mini)	Mini Recorder, 24" Monitor & Keyboard / Mouse Combo	1	G
33	KbPort - Magwell	SKU 32060	USB Capture HDMI Gen 2	2	G
34	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
35	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control) (OFCI)	2	A
36	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
37	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
38	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	2	-
39	KbPort - Axis	C8033	Network Audio Bridge	1	G
40	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
41	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
42	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
43	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
44	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
45	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
46	M-Audio	AV 42	4" 2-Way Powered Desktop Studio Speakers (Pair)	1	-
47	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
48	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
49	Crestron	CEN-SWPOE-5	(5) Port Gigabit Unmanaged PoE Switch	1	-
50	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	2	-
51	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
52	Contractor Select	Contractor Select	Power supply for Switch Lamps and Nurse call Lamps	1	-
53	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
54	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
55	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
56	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-

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Audiovisual Systems
Bidding Equipment List

Number : **042D, 042E**
Type : **SY02**
Name : **HIGH FIDELITY OR SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
57			Installation Materials as Defined in AV Systems Specification	Lot	
58			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
59			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
60			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
61			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
62			Control System Accessories as Needed	Lot	
63			Power Supplies and Power Distribution as Needed	Lot	
64			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems
Bidding Equipment List

Number : **042C, 042E**
Type : **SY03**
Name : **HIGH FIDELITY BIRTHING SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
SIM LAB					
1	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	4	G
2	Axis	M3046-V	128 deg. FOV Fixed High Resolution Network Color Dome Camera. HDMI Output	1	-
3	Crestron	HD-EXT4-C-B_SYSTEM	4K HDMI over HDBaseT Extender (Pair) w/ Analog Audio	1	-
4	Shure	MXWAPT4	4-Ch. Access Point Transceiver	1	-
5	Shure	MXW1/O	Bodypack Transmitter w/ Omnidirectional Microphone and 4-Pin Mini Connector (TA4M)	4	-
6	Contractor Select	Contractor Select	Earbud for MXW1 Transceiver back channel audio	4	-
7	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
8	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
9	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
10	Stewart Audio	AV8-2-LZ-D	2-Channel Dante™ Subcompact PoE+ 2 x 8W Amplifier, Plenum Rated	1	-
11	Bose	Acoustimass FreeSpace 3	Satellite Loudspeaker - White 040143 - pair	1	-
12	LG	50UL3G-B	50" Professional LED Direct-Lit Display w/Built-In Speakers, 3840x2160 Native (Latest Model)	1	-
13	Chief	TS525TU	Large THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	1	-
14	Viewsonic	TD2430	24" Interactive LCD Monitor, 1920x1080 Native, 10-Point Capacitive Multi-Touch, Internal Speakers	2	-
15	Ergotron	45-353-026	LX Sit-Stand Wall Mount Arm	2	D

Number : **042C, 042E**
Type : **SY03**
Name : **HIGH FIDELITY BIRTHING SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
16	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	1	A
17	Owner Furnished	Owner Furnished	Cart for Manikin Vitals All-In-One for Baby (OFCI)	1	A
18	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	3	-
19	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
20	Vaddio	440-1005-020	Active USB 2.0 Extension Cable - 65ft	2	-
21	Huddly	IQ	Intelligent Collaboration Camera w/2m USB3.0 Cable and Mount	1	-
22	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
23	Owner Furnished	Computer Station	EMR Computer Station (OFCI)	1	A
24	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	1	A
25	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
26	Ergotron	SV41-6300-0	StyleView® Cart with LCD Pivot Documentation Medical Cart	1	-
27	Crestron	MPC3-201-x	3-Series Media Presentation Controller 201	1	D
28	Crestron	MPC3-101/102/201-RMB	Retrofit Mounting Bracket for MPC3-201	1	-
29	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
30	Cornell	L-103	Dome Corridor Lights - THREE Bulb 24 Volt DC - White Cover w/Blue & Amber Filters (Blue Amber White)	1	-
31	E-Switch	PV6H240SS-341	Illuminated Anti-Vandal Switch w/ Blue LED Ring, Raised actuator. SPST, NO, Momentary closed 48V 2A, 16mm Dia.	1	-
32	E-Switch	PV6H240SS-311	Illuminated Anti-Vandal Switch, w/ Red LED Ring, Raised Actuator, SPST-NO, Momentary 48V 2A 16mm Dia	1	-

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Audiovisual Systems
Bidding Equipment List

Number : **042C, 042E**
Type : **SY03**
Name : **HIGH FIDELITY BIRTHING SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Control Station					
33	KbPort - Shure	X2U	Microphone to USB Adapter	1	G
34	KbPort	FusionHD Recorder (mini)	Mini Recorder, 24" Monitor & Keyboard / Mouse Combo	1	G
35	KbPort - Magwell	SKU 32060	USB Capture HDMI Gen 2	2	G
36	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
37	Owner Furnished	Laptop (Manikin)	Owner Furnished Laptop (Manikin Control) (OFCI)	2	A
38	Owner Furnished	Workstation - 1 Output (Manikin)	Owner Furnished All-In-One PC (Manikin Vitals) (OFCI)	2	A
39	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
40	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	2	-
41	KbPort - Axis	C8033	Network Audio Bridge	1	G
42	Clock Audio	DMB1 - D44	Desk PTT Paging Microphone (D44) - Single Zone - Moment or Latch - w/Feedback	1	-
43	Clock Audio	DMB2 - D44	Desk PTT Paging Microphone (D44) - Two Zone - Moment or Latch - w/Feedback	1	-
44	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
45	Mooer	Micro Pitch Box	Harmony Detune Pitch Shift Effects Pedal	1	-
46	Rolls	HA243	4 Channel Studiophile Headphone Amplifier w/ 2 Inputs	1	-
47	JVC	HA-V570	Supra-Aural Monitor Headphones with In-cord Volume Control	3	-
48	M-Audio	AV 42	4" 2-Way Powered Desktop Studio Speakers (Pair)	1	-
49	Shure	MXWNCS4	Wireless Microphone Charging Station	1	-
50	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
51	Crestron	CEN-SWPOE-5	(5) Port Gigabit Unmanaged PoE Switch	1	-
52	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	2	-
53	Crestron	CEN-IO-DIGIN-104	Wired Ethernet Module with 4 Digital Inputs	1	-
54	Contractor Select	Contractor Select	Power supply for Switch Lamps and Nurse call Lamps	1	-
55	Middle Atlantic	BRK12-22	BRK Series 12RU, 22"D Black Laminate rack	1	D
56	MinuteMan	ED1500RTXL2U	UPS with power conditioning 2U 1500VA/1350W 120 VAC Rack/Wall/Tower mountable	1	-
57	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
58	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-

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Audiovisual Systems
Bidding Equipment List

Number : **042C, 042E**
Type : **SY03**
Name : **HIGH FIDELITY BIRTHING SIM LAB AND CONTROL STATION**
Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
59			Installation Materials as Defined in AV Systems Specification	Lot	
60			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
61			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
62			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
63			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
64			Control System Accessories as Needed	Lot	
65			Power Supplies and Power Distribution as Needed	Lot	
66			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Audiovisual Systems

Bidding Equipment List

Number : **041, 043**

Type : **SY04**

Name : **PRACTICE**

Rm Qty : **2**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
SIM LAB					
1	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	2	G
2	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	1	D
3	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
4	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
5	KbPort - Axis	C8033	Network Audio Bridge	1	G
6	LG	50UL3G-B	50" Professional LED Direct-Lit Display w/Built-In Speakers, 3840x2160 Native (Latest Model)	1	-
7	Chief	TS525TU	Large THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	1	-
8	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	1	-
9	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	3	-
10	Huddly	IQ	Intelligent Collaboration Camera w/2m USB3.0 Cable and Mount	1	-
11	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
12	Owner Furnished	Computer Station	EMR Computer Station (OFCI)	1	A
13	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	1	A
14	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
15	Ergotron	45-247-026	LX Wall Mount System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	1	-
16	Crestron	MPC3-201-x	3-Series Media Presentation Controller 201	1	D
17	Crestron	MPC3-101/102/201-RMB	Retrofit Mounting Bracket for MPC3-201	1	-
Rack, Panels, Misc.					
18			Installation Materials as Defined in AV Systems Specification	Lot	
19			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
20			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
21			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
22			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
23			Control System Accessories as Needed	Lot	
24			Power Supplies and Power Distribution as Needed	Lot	
25			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Bidding Equipment List

Number : **042 South**

Type : **SY05**

Name : **MEDICINE CABINET**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
SIM					
1	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	1	G
2	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	1	D
3	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
4	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
5	KbPort - Axis	C8033	Network Audio Bridge	1	G
6	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
7	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
8	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	H
9	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
10	Owner Furnished	Computer Station	EMR Computer Station (OFCI)	1	A
11	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	1	A
12	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
Rack, Panels, Misc.					
13			Installation Materials as Defined in AV Systems Specification	Lot	
14			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
15			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
16			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
17			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
18			Control System Accessories as Needed	Lot	
19			Power Supplies and Power Distribution as Needed	Lot	
20			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Bidding Equipment List

Number : **042 North**

Type : **SY06**

Name : **NURSE STATION**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
SIM					
1	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	2	G
2	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	1	D
3	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
4	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
5	KbPort - Axis	C8033	Network Audio Bridge	1	G
6	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	1	-
7	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
8	Owner Furnished	Computer Station	EMR Computer Station (OFCI)	1	A
9	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	1	A
10	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	1	-
11	JK Audio	QuickTap IFB	Telephone Handset IFB Tap	1	-
12	QSC Audio	D2FLEXio	Dual Analog Flex I/O Dante/AES67 Interface, PoE	1	H
13	Crestron	TS-1070-x-S	10" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
Rack, Panels, Misc.					
14			Installation Materials as Defined in AV Systems Specification	Lot	
15			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
16			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
17			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
18			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
19			Control System Accessories as Needed	Lot	
20			Power Supplies and Power Distribution as Needed	Lot	
21			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	
End of System					

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Audiovisual Systems

Bidding Equipment List

Number : **045, 046**

Type : **SY07**

Name : **GROUP STUDY ROOM**

Rm Qty : **2**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	LG	50UL3G-B	50" Professional LED Direct-Lit Display w/Built-In Speakers, 3840x2160 Native (Latest Model)	1	-
2	Chief	TS525TU	Large THINSTALL Dual Swing Arm Wall Display Mount - 25" Extension	1	-
Source Devices					
3	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	1	A
4	Logitech	MK320	Wireless Keyboard/Mouse Package	1	-
5	Crestron	AM-3200	AirMedia Presentation Gateway	1	-
Video Capture, Streaming and Conferencing					
6	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	2	G
7	KbPort - Axis	C8033	Network Audio Bridge	1	G
8	Huddly	IQ	Intelligent Collaboration Camera w/2m USB3.0 Cable and Mount	1	-
Signal Processing, Routing, and Distribution					
9	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
Sound Reinforcement System					
10	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	1	D
11	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	1	-
12	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	1	D
Control System					
13	Crestron	TSW-770-x-S	7" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D

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Bidding Equipment List

Number : **045, 046**

Type : **SY07**

Name : **GROUP STUDY ROOM**

Rm Qty : **2**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
14	Middle Atlantic	C3C1D2MSTxxxxxxx	Pre-Configured moderno Style, 1 Bay, 10” D, 32” H, w/TLAM woodkit, 10" Lever Lock plate	1	D
15	Middle Atlantic	C3-SHELFKIT	C3 Wood Shelves and Shelf Mount Kit 1 Bay	1	-
16	APC	SMT1000RM2UC	Uninterruptible Power Supply, 1000VA/670watts, Rack-mountable	1	-
17			Installation Materials as Defined in AV Systems Specification	Lot	
18			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
19			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
20			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
21			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
22			Control System Accessories as Needed	Lot	
23			Power Supplies and Power Distribution as Needed	Lot	
24			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Bidding Equipment List

Number : **49**

Type : **SY08**

Name : **NURSING SKILLS LAB**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	Sony	VPL-FHZ75	6,500 ANSI Lumen, LCD, Laser Light Source, 1920x1200, Lens Included	1	-
2	Chief	Projector Ceiling Mount	Contractor Selected Projector Ceiling Mount	1	-
Source Devices					
3	Owner Furnished	Tablet with Dock	Owner Furnished Tablet with Docking Station (OFOI)	1	B
4	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
5	Extron	HDMI Ultra/6	Cable, 6ft. HDMI M to HDMI M	2	-
6	Liberty AV	AR-MDP4K-HDF	4K Mini DisplayPort to HDMI Cable Adapter 5" Long	2	-
7	Owner Furnished	Workstation - 1 Output	Owner Furnished All-In-One PC (Manakin Vitals) (OFCI) (OFCI)	2	A
8	Owner Furnished	Workstation - 1 Output	Owner Furnished PC w/1 Output (OFCI)	8	A
9	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	8	A
10	Owner Furnished	KM	USB Keyboard & Mouse (OFCI)	8	A
11	Extron	DA2 HD 4K	1x2 HDMI 4k Distribution Amplifier	2	-
12	Ergotron	45-358-026	LX Wall Mount Sit/Stand System, Track Mount, Keyboard Arm, LCD Arm, CPU Holder	8	-
Video Capture, Streaming and Conferencing					
13	KbPort - Lumens	VC-A50P	Full HD 60fps IP PTZ Camera	4	G
14	Shure	MX202x/C	Hanging Mini-Condenser Cardioid Mic, w/Cable, In-Line Preamp	2	D
15	QSC Audio	Q-SYS I/O-22	2 In x 2 Out Audio Expansion Device	2	-
Signal Processing, Routing, and Distribution					
16	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	5	-
17	Crestron	DM-NVX-350	DM 4K60 4:4:4 HDR Network AV Encoder/Decoder	1	-
18	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	1	-
Speech Reinforcement System/Audio Conferencing					
19	QSC Audio	Q-SYS I/O-8 FLEX	Network 8 Flex Channel Audio I/O Expansion Device w/GPIO, 1x RS232 and USB, PoE+	1	-
20	Shure	QLXD124/85	Wireless Digital Microphone Single Channel Combo System w/ Handheld and Lavalier Mic	1	-
Sound Reinforcement System					
21	QSC Audio	AC-C6T	6" 2-Way Ceiling Speaker, Weather-Resistant, w/70V/100V transformer & 8Ohm Bypass	14	D
22	QSC Audio	SPA2-60	2-CH, 60W per @4ohm, 60W per @8ohm, Amplifier	1	-

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Bidding Equipment List

Number : **49**

Type : **SY08**

Name : **NURSING SKILLS LAB**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Control System					
23	Crestron	TS-770-x-S	7" Tabletop PoE+ Touch Screen w/ HTML5, Intercom, and Room Scheduling	1	D
24	Crestron	CEN-IO-RY-104	Wired Ethernet Module with 4 Relay Ports	1	-
Rack, Panels, Misc.					
25	Middle Atlantic	PTRK-1426MDK	PTRK-Series 14RU, 28"D, Rolling Rack w/Locking Front and Back Doors	1	-
26	MinuteMan	ED1000RTXL2U	UPS with power conditioning 2U 1000VA/900W 120 VAC Rack/Wall/Tower mountable	1	-
27	MinuteMan	SNMP-NV6	Remote Power Management Adapter	1	-
28	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	1	-
29	Middle Atlantic	PD-915R-PL	Horizontal Power Distribution, (8) Rear, (1) Front Outlets, 15A, Surge	1	-
30	Middle Atlantic	D2LK	Drawer, 2RU, 14-1/2"D	1	-
31			Installation Materials as Defined in AV Systems Specification	Lot	
32			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
33			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
34			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
35			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
36			Control System Accessories as Needed	Lot	
37			Power Supplies and Power Distribution as Needed	Lot	
38			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System

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Bidding Equipment List

Number : **44**

Type : **SY09**

Name : **GENERAL PURPOSE CLASSROOM**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Display Devices					
1	Sony	VPL-FHZ75	6,500 ANSI Lumen, LCD, Laser Light Source, 1920x1200, Lens Included	1	-
2	Chief	Projector Ceiling Mount	Contractor Selected Projector Ceiling Mount	1	-
Source Devices					
3	Owner Furnished	Tablet with Dock	Owner Furnished Tablet with Docking Station (OFOI)	1	B
4	Owner Furnished	24" Monitor	24" LCD Monitor, 1920x1080 Native (OFCI)	1	A
5	Extron	HDMI Ultra/6	Cable, 6ft. HDMI M to HDMI M	2	-
6	Liberty AV	AR-MDP4K-HDF	4K Mini DisplayPort to HDMI Cable Adapter 5" Long	2	-
7	Crestron	AM-3200	AirMedia Presentation Gateway	1	-
Video Capture, Streaming and Conferencing					
8	Vaddio	RoboShot 20 UHD OneLink HDMI	UHD PTZ Camera - 12x Optical / 20x Digital Zoom - 74 Deg. FOV - HD-SDI/Network/HDBT/HDMI Outputs PoE++ - 2160p/30 Native	1	-
9	Cisco	CS-CODEC-PRO-K9	Cisco Webex Codec Pro (Only), (6) HDMI In, (2) HDMI Out. (OFCI)	1	A
Signal Processing, Routing, and Distribution					
10	QSC Audio	Core 8 Flex	8 Flex I/O Audio DSP with VOIP, AES67, DANTE, USB and QSYS	1	-
11	Crestron	DM-NVX-E30	DM 4K60 4:4:4 HDR Network AV Encoder, PoE+	2	-
12	Crestron	DM-NVX-363	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67 and Dante Audio, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	1	-
13	Crestron	DM-NVX-D30	DM 4K60 4:4:4 HDR Network AV Decoder, PoE+	2	-
Speech Reinforcement System/Audio Conferencing					
14	Sennheiser	TeamConnect Ceiling 2	Ceiling Microphone Array, Dante	1	D
15	Sennheiser	SL CM EB US	Extension Brackets for TeamConnect Ceiling 2, for 2'x2' Ceiling Tile Mounting	1	-
Sound Reinforcement System					
16	QSC Audio	SPA2-60	2-CH, 60W per @4ohm, 60W per @8ohm, Amplifier	1	-
17	QSC Audio	AD-C6T-x	6.5" 2-Way Ceiling Loudspeaker, w/ 70V/100V Transformer & 8Ohm Bypass	6	D
Control System					
18	Crestron	TSW-1070-x-S	10" Wall Mounted PoE+ Landscape Touch Screen w/ HTML5 and Room Scheduling	1	D
19	Crestron	CP4	4-Series Integrated Controller, (3) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN	1	-

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Bidding Equipment List

Number : **44**

Type : **SY09**

Name : **GENERAL PURPOSE CLASSROOM**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
20			Installation Materials as Defined in AV Systems Specification	Lot	
21			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
22			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
23			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
24			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
25			Control System Accessories as Needed	Lot	
26			Power Supplies and Power Distribution as Needed	Lot	
27			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

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Bidding Equipment List

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Number : **48**					
Type : **SY10**					
Name : **AV IT EQUIPMENT ROOM**					
Rm Qty : **1**					
Video Capture, Streaming and Conferencing					
1	KbPort	Skills Recorder	Rack Mount Recorder	6	G
2	KbPort - Magwell	SKU 32060	USB Capture HDMI Gen 2	6	G
3	KbPort	Central Server	Central Server 16TB w/Simplicity Software Suite	1	G
4	KbPort	KVM	8-Port KVM	1	G
5	KbPort	Pc	Windows Remote Troubleshooting Computer	1	G
Signal Processing, Routing, and Distribution					
6	QSC Audio	Q-SYS CORE 510i	Audio DSP Frame Core w/8 I/O Card Slots Support 128 x 128 Ch., 256 x 256 Q-SYS Channels, 16 Configurable GPIO, 64 AEC Processors	1	-
7	QSC Audio	Q-SYS CDN64	64x64 Dante Audio Bridge Card	1	-
8	QSC Audio	Q-SYS COL4	4-Channel Line Output Card	2	-
9	Crestron	DM-NVX-360	DM NVX 4K60 4:4:4 HDR Network AV Scaling Encoder/Decoder w/ HDR, HDCP 2.3, AES67, Video Wall Processing, USB and KVM Routing, and Optional Fiber Connectivity	6	-
Sound Reinforcement System					
10	KbPort	SSC	Simplicity Sound Control	1	G
11	KbPort - Shure	X2U	Microphone to USB Adapter	6	G
Control System					
12	Crestron	AV4	4-Series Integrated Controller, (6) RS-232, (8) I/O, (8) IR, (8) Relay, Cresnet, LAN	1	-
13	Crestron	DM-XIO-DIR-80	DigitalMedia XiO Director – Virtual Switching Appliance for 80 Endpoints	1	-
14	Cisco	C9300L-48PF-4X-E	Cisco Catalyst 9300L 48 Port Full PoE+, 1100w, 4x10G Uplink, Stackable, Managed Network Switch (OFCI)	3	A
15	Cisco	STACK-T1-1M	C9300 Network Stack Cable - 1meter (OFCI)	3	A
16	Cisco	C9300L-DNA-E-48-5Y	Cisco Digital Network Architecture Essentials - Term License (5 years) - 48 Ports (OFCI)	3	A

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Bidding Equipment List

Number : **48**

Type : **SY10**

Name : **AV IT EQUIPMENT ROOM**

Rm Qty : **1**

ID	Manufacturer	Model	Item / Description	Unit Qty	Bidding Notes
Rack, Panels, Misc.					
17	Middle Atlantic	BGR-4532	BGR-Series 45RU, 32"D Equipment Rack	1	-
18	Middle Atlantic	BGR-RR45	BGR-Series 45RU, Rear Rack Rail Kit	1	-
19	Middle Atlantic	BGR-552FT-FC	BGR-Series Fan top, 552 CFM, w/Controller	1	-
20	Middle Atlantic	BSPN-45-32	BGR-Series 45RU, 32"D Side Panels (Pair)	1	-
21	Middle Atlantic	PDT-1220C-NS	Vertical Power Distribution Strip, (12) Outlet, 20A	2	-
22	Contractor Select	48-Port Data Patch Panel	Contractor Selected 48-Port Data Patch Panel	2	-
23	Contractor Select	Horizontal Cable Manager	Horizontal Cable Manager - Size as Needed for Capacity	4	-
24	MinuteMan	ED2000RTXL2U	UPS with power conditioning 2U 2000VA/1800W 120 VAC Rack/Wall/Tower mountable	4	-
25	MinuteMan	SNMP-NV6	Remote Power Management Adapter	4	-
26	MinuteMan	E BRKT RAIL	Rack mount kit for UPS	4	-
27			Installation Materials as Defined in AV Systems Specification	Lot	
28			Custom Wall/Floor Box and Decorator-Style Plates as Needed	Lot	
29			Pre-Made Loose Cabling and Field Cabling as Needed	Lot	
30			Rack Panels, Vents, Mounts, Shelves, Other Equipment Rack Materials as Needed	Lot	
31			Wall, Ceiling Mounts and Mounting Hardware as Needed	Lot	
32			Control System Accessories as Needed	Lot	
33			Power Supplies and Power Distribution as Needed	Lot	
34			Cable Terminations, Cable Dressing, Labels, Ties, Cable Management as Needed	Lot	

End of System