ADDENDUM NO.: 3

Description: Furnish, Deliver, and Install AV Equipment

Project: CCNY Aronow Theater

BID Due Date: September 25, 2025 at 2:30 PM

Specifics of the Addendum: The purpose of Addendum No. 3 is to respond to Requests for Information.

Q1. Please provide an overview of the phasing schedule, specifically regarding the Theater, Dressing Rooms, Lobby, and Existing Academic System.
A1. Construction is already in progress. The awarded Audio-Visual Contractor "AVC" will coordinate the phasing with the GC working on this project.

Q2. We added the extension columns based on the elevations provided in the bid set. Could you kindly confirm the exact heights required at the following locations:
a) Control Room – for the new projector (we have suggested CMS0406W)
b) b) Lobby – for the ceiling-mounted 98" display (we have suggested CMS1012W)
A2. Per AV drawings exact pipe length will need to field verified. For purposes of bidding use the above sizes.

Q3. We observed a discrepancy between the BOM and the audiovisual equipment detail page:
- BOM lists QSC Ceiling (AD-C6T-ZB) and Pendant (AD-P.HALO) speakers.
- Equipment detail page lists JBL Ceiling (Control 26CT) and Pendant (Control 67HT) speakers.

Could you kindly confirm which speaker models should be considered?
A3. See updated drawing TA-701, attached to the addendum.

Q4. Upon reviewing the BOM, we identified that certain equipment models have been discontinued. Below are our suggested alternatives. Please confirm if these replacements are acceptable or advise if you have preferred alternatives.

Existing (Drawing)	Suggested Replacement	Notes
QSC CORE 510i	QSC Server Core X10	
QSC CIML4-HP (2)	QSC QIO ML4i (2)	Core X10 does not support card options
QSC COL4	QSC QIO L4o	Core X10 does not support card options
QSC CDN64	QSC SLDAN-64-P	Core X10 does not support card options

A4. See attached update. Bidders shall propose replacements for any specified item that has been discontinued. Information on proposed products should be submitted with the Bid.

Q5. The BOM specifies two projector lenses. As the ET-D75LR8 has been discontinued, we have included the ET-D3LET80 as an alternative in our quotation. Please confirm if this substitution is acceptable.
A5. Bidders shall propose replacements for any specified item that has been discontinued. Information on proposed products should be submitted with the Bid.

Q6. The plans and flow sketches show 2 [wireless microphone] antennas, while the BOM includes only 1. Could you please confirm the correct quantity?
A6. See updated specification for quantities.

Q7. The BOM includes 2 units of the Whirlwind Direct2 (2-channel active direct box), but these are not shown in the flow sketches. Could you please confirm their intended use and locations?
A7. They are portable accessories. Some portable accessories are not shown in drawings such as mics, stands, DI boxes, etc.

Q8. Both the BOM and flow sketches mention the Vaddio AV Bridge (999-9595-000). Could you clarify its intended use, given that the design already includes a QSC camera? We also observed that the flow sketches may show incorrect connections, as the bridge does not have the number of HDMI inputs depicted. Please confirm.
A8. See updated TA-801, specification and BOM.

Q9. The flow sketches show one HDMI decoder connected to the DSP for audio embedding. Could you please clarify its intended purpose, considering the QSC ecosystem is already in use?
A9. See updated TA-801, specification and BOM.

Q10. The flow sketches show 1 stage monitor, while the BOM lists 3. Could you please confirm the correct quantity?
A10. Typical of 8. See updated specification and BOM.

Q11. Regarding the Lobby, the flow sketches show a 65” display, while the plans and BOM indicate a 98” display. Could you please confirm the correct size?
A11. 98”.

Q12. The BOM specifies a BrightSign XD5 player in generic terms for the lobby. We suggest using the BrightSign XD235. Please confirm if this model is acceptable or recommend an alternative.
A12. Brightsign is not included in the BOM. Signage hardware is incomplete.

Q13. After reviewing the BOM and flow sketches, we noticed mismatches in the listed quantities. Could you please confirm which quantities we should consider for re- installation and integration with the new system?

Make & Model	Qty in Sketches	Qty in BOM	Notes
TOA HS1500WT	2	4	
Biamp Tesira SIC-4	7	5	
Beyerdynamic RM 31 RC	0	1	
Crestron DM-RMC-4KZ-100-C	0	1	
Crestron DM-RMC-4KZ-100-SC	1	1	We assume this refers to DM-RMC-4KZ-SCALER-C. Please confirm.
Crestron DM-TX-4KZ-302-C	0	1	
BrightSign XD5	0	1	Please confirm the exact model number.
Shure QLXD4=-G50	15	4	
Crestron HD-TXC-101-C-E	1	0	

Make & Model	Qty in Sketches	Qty in BOM	Notes
Crestron HD-TX-101-C-E	3	0	
Network Switch (TBD)	1	0	
Magewell USB Capture HDMI Gen 2	1	0	
Crestron HD-RXC-101-C-E	1	0	
Crestron HD-RX-101-C-E	1	0	
Shure MX418/C	1	0	
Biamp Tesira SEC-2	2	0	
TOA HS-1200WT	4	0	

A13. This was a functional existing system, uninstalled and stored for later install and should be installed as is. Once awarded the AVC will have an opportunity to confirm the BOM against the hardware.

Q14. The BOM and flow sketches indicate a Lumens Digital Optics VC-TR1 camera, whereas the plans and device details page specify a Vaddio RoboSHOT 40. Could you kindly confirm the correct camera model to be considered?
A14. See response to A13.

Q15. Some of the QSC products have been discontinued and one is end of life. Can you please share this info with Cerami and advise what replacements should be quoted? It is not a simple swap from 1 product to a replacement, it may require a re-design of the system. The changes affect the pricing.
A15. Bidders shall propose and price replacements for any specified item that has been discontinued. Information on proposed products should be submitted with the Bid.

Q16. Per QSC, the Core 510i is EOL and some of its cards are no longer available. That said, this may need to get redesigned. ServerCoreX10 would be the replacement, but it's a server-based Core, not card based like the 510, so it's a bit different in terms of designing. The 510 is still available to order, but we're running low on stock.
A16. See updated specification and BOM.

Q17. The CDN64 and CIML4-HP are no longer available. We can use software Dante instead of the CDN64 and the non-HP version of the input card if both are acceptable. Instead of the CDN64, you can use the SLDAN-64-P; and instead of the CIML4-HP, you can use the CIML4.
A17. Bidders shall propose replacements for any specified item that has been discontinued. Information on proposed products should be submitted with the Bid.

Q18. Where is the existing AV equipment currently located/stored? Has any of it already been removed/demo'ed, or is demolition part of this project?
A18. Existing AV equipment have already been removed and stored in the library located on the 1st floor in the same building as the Aronow Theater.

Q19. What is included in the existing system (equipment, cabling, patch panels)? If the new system will be installed in the same rooms, are the old cable runs still intact and usable? Are patch cables and labeling still in place, or is that the contractor's responsibility?
A19. New cabling shall be installed by the awarded AVC.

Q20. Can DASNY provide site photos or diagrams showing current site conditions? Are rough-ins or cabling already in place? Will the contractor be responsible for moving any equipment onsite?
A20. No cabling is in place. All new cabling is required for a functional system

Q21. Some materials in the spec (DSP, server-based platform) appear to be discontinued. Should we propose current-generation replacements? If so, are there specific functions (e.g., GPIO for projector screen control) from the original spec that must be maintained?
A21. Bidders shall propose replacements for any specified item that has been discontinued. Information on proposed products should be submitted with the Bid.

Q22. The existing system uses Crestron, while the new design calls for QSC. Can you confirm whether multiple touch panels are required in both systems? Where are the touch panels for the old system located, and where are the new ones planned?
A22. As per the BOM and drawings there are two disparate systems (academic (existing), performance (new). See drawings for touch panel locations.

Q23. Are custom umbilical cords required for all connections?
A23. Depends where needed, yes

Q24. Would it be possible to schedule a site walkthrough prior to the bid submission deadline? We'd like the opportunity to better understand the space and bring our subcontractor along to review site conditions with us.
A24. The Site Visit was previously held on Monday, September 8, 2025, at 1:00 PM. Information from that site visit was previously posted in an Addendum. The awarded AVC will have an opportunity to visit the site to field verify after the award has been made.

Q25. Sheet TA-801 shows 2 ceiling speakers in the control room being fed directly from the Yamaha TF5 digital mixer. Should the output of the mixer instead be feeding an amplifier which feeds the ceiling speakers? If so, can you specify the make and model of this amplifier?
A25. See updated TA-802, specification and BOM.

Q26. Sheet TA-801 shows an HDBT output of the Q-SYS NC-20X60 camera connecting to a rack mounted device labeled as "QUICK LINK". This camera doesn't appear to have an HDBaseT output. Would you be able to provide clarification on exactly how this camera will connect to the Vaddio AV Bridge?
A26. See updated TA-801.

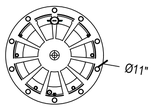
Q27. Where is all of the existing equipment that was already uninstalled from the Theater currently being stored, and where will the AV contractor be transporting this equipment from?
A27. That equipment is stored in the library located on the 1st floor in the same building as the Aronow Theater and the AV contractor will be transporting them.

Q28. If any of the equipment from the existing Academic System is missing, how should this be handled?
A28. The academic system was functional at time of removal. Depending on non-functional equipment this will be handled on a case-by-case basis.

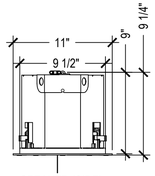
Q29. Is the AV contractor to provide and install all new cabling for the reinstallation of the academic system?
A29. Yes.

Q30. Please provide photos of the back of the existing AV rack in its current state.
A30. No photos available as the rack is currently in storage.

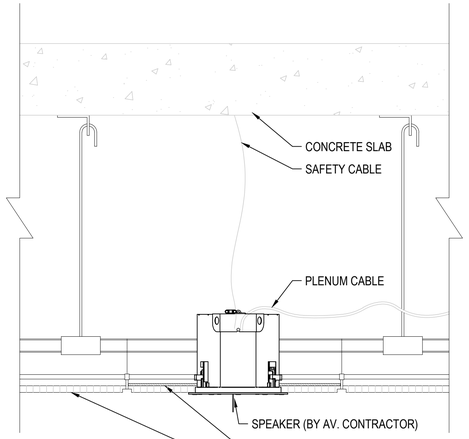
All other terms and conditions of the original Invitation for Bids shall remain the same.



SPEAKER (PLAN)



SPEAKER (SIDE)



SPEAKER ASSEMBLY WITH PLASTER RING

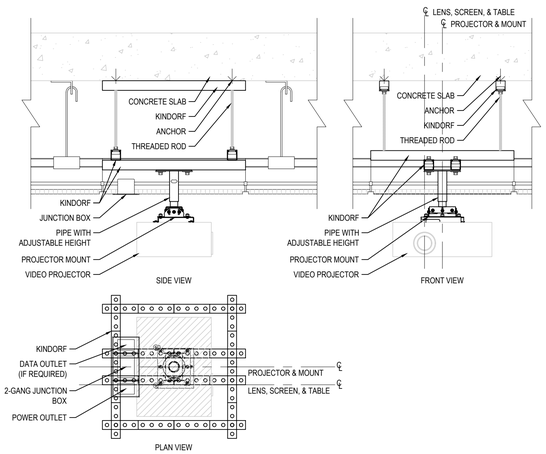
AN OPTIONAL PLASTER RING CAN BE USED IF A CONVENTIONAL CEILING TILE IS NOT BEING USED. THE WINGS ON THE PLASTER RING ARE ATTACHED TO THE BUILDING STRUCTURE VIA THE HOLES PROVIDED. THE PLASTER IS APPLIED OVER THE BRACKET.

IMPORTANT: CONNECT A SAFETY CABLE TO THE REAR OF THE SPEAKER CAN.

NOTE: THE INSTALLATION OF THIS PRODUCT MUST BE CARRIED OUT IN CONFORMITY WITH LOCAL BUILDING CODES AND STANDARDS. IF NECESSARY CONSULT YOUR LOCAL SAFETY STANDARDS OFFICER BEFORE INSTALLING ANY PRODUCT. ALTERNATIVELY, CHECK ANY LAWS OR BYLAWS. MANUFACTURER WILL NOT BE HELD RESPONSIBLE FOR ANY DAMAGES CAUSED BY THE IMPROPER INSTALLATION OF LOUDSPEAKER.

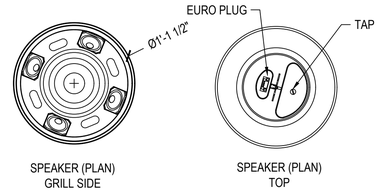
1 CEILING SPEAKER
QSYS AD-C6T-ZB

1-1/2" = 1'-0"



3 PROJECTOR
CEILING PIPE MOUNT

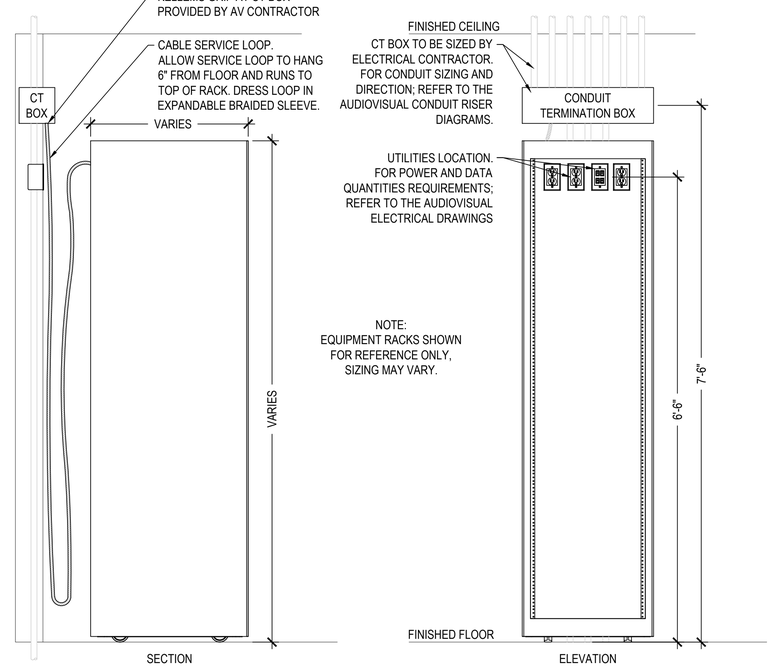
1" = 1'-0"



NOTES:
1) ALL SPEAKERS IN A ZONE SHALL BE HUNG SO THAT BOTTOM OF SPEAKER HOUSING IS AT SAME ELEVATION.
2) SPEAKER HEIGHT SHALL BE ADJUSTED IF NECESSARY.
3) WIRING SHALL BE TIGHT TO SLAB.
4) THIS DETAIL IS NON-SEISMIC.

2 PENDANT SPEAKER
QSYS-AD-P.HALO

1-1/2" = 1'-0"



4 EQUIPMENT RACK
CONDUIT TERMINATION

1" = 1'-0"

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STAGE LIGHTING - HMBA
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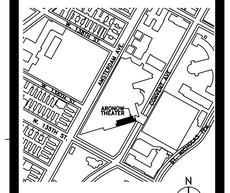
TELEPHONE # 212-874-0214

Project Key



REVISIONS

Rev No	Description	Date:
	Bulletin # 3	2/28/2025
3	ADDENDUM # 3	9/16/2025

Client
THE CITY UNIVERSITY OF NEW YORK
THE CITY COLLEGE OF NEW YORK
555 W 57TH STREET, 10TH FL
NEW YORK, NY 10019

Project Title
ARONOW THEATER RENOVATION
IN NORTH ACADEMIC CENTER
160 CONVENT AVENUE
NEW YORK, NY 10031

Drawing Title
AUDIOVISUAL EQUIPMENT DETAILS

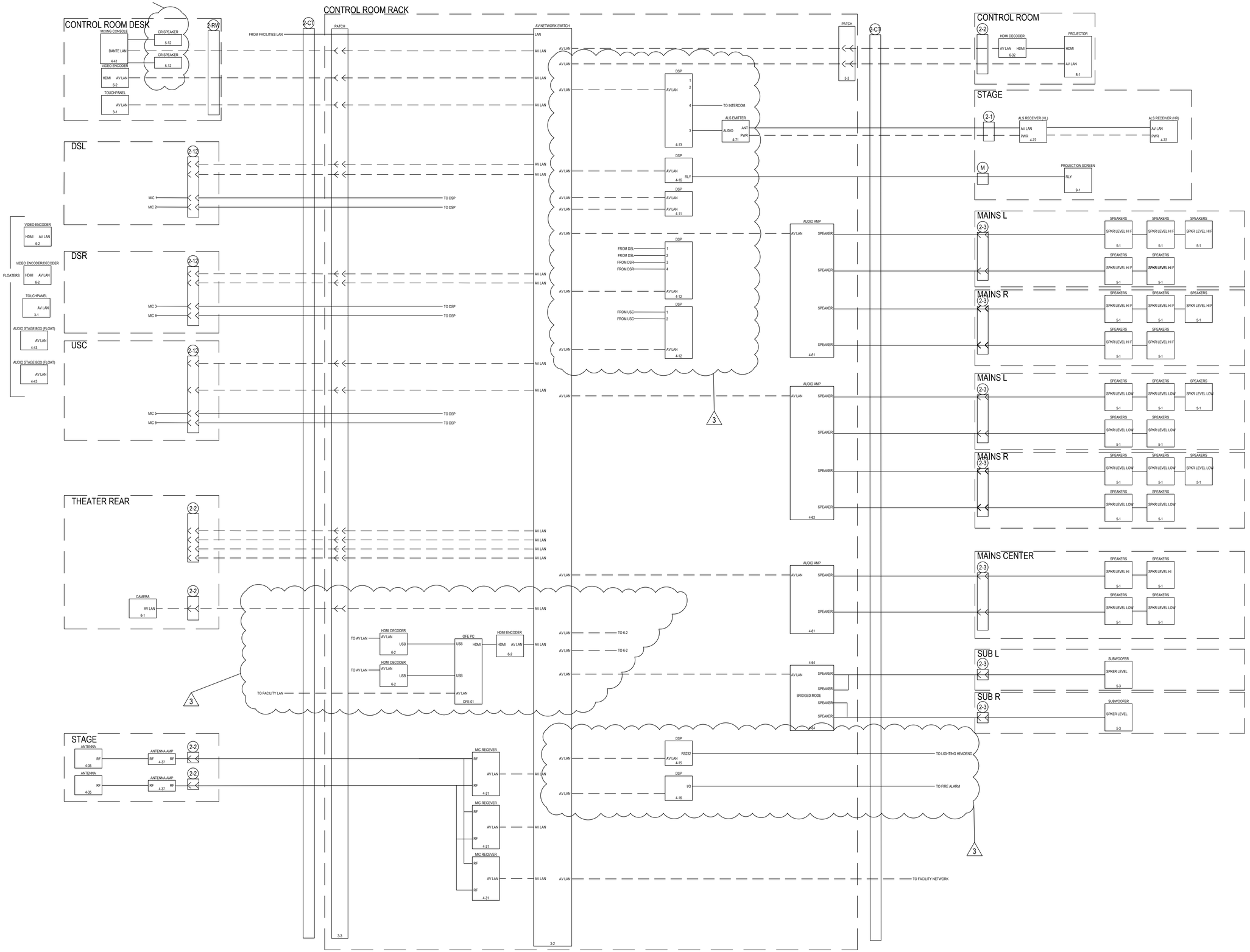
Phase
ISSUED FOR CONSTRUCTION

Professional Seal & Signature

Date: 06/15/2024
DASNY Project No: 3378509999
Consultant Project No: 1704
Scale: AS NOTED
Drawn By: TK
Checked By: SA

TA-701

Drawing Number | *Drawing* 1 *of* 96



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STAGE LIGHTING - HMBA
173 WEST 81ST STREET, SUITE 2, NEW YORK, NY 10024
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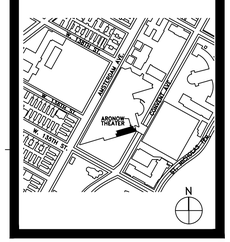
Project Key



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3	ADDENDUM # 3	9/16/2025

Client
THE CITY UNIVERSITY OF NEW YORK
THE CITY COLLEGE OF NEW YORK
555 W 57TH STREET, 10TH FL
NEW YORK, NY 10019

Project Title
ARONOW THEATER RENOVATION
IN NORTH ACADEMIC CENTER
160 CONVENT AVENUE
NEW YORK, NY 10031

Drawing Title
AUDIOVISUAL SYSTEM FLOW DIAGRAM - PERFORMANCE SYSTEM

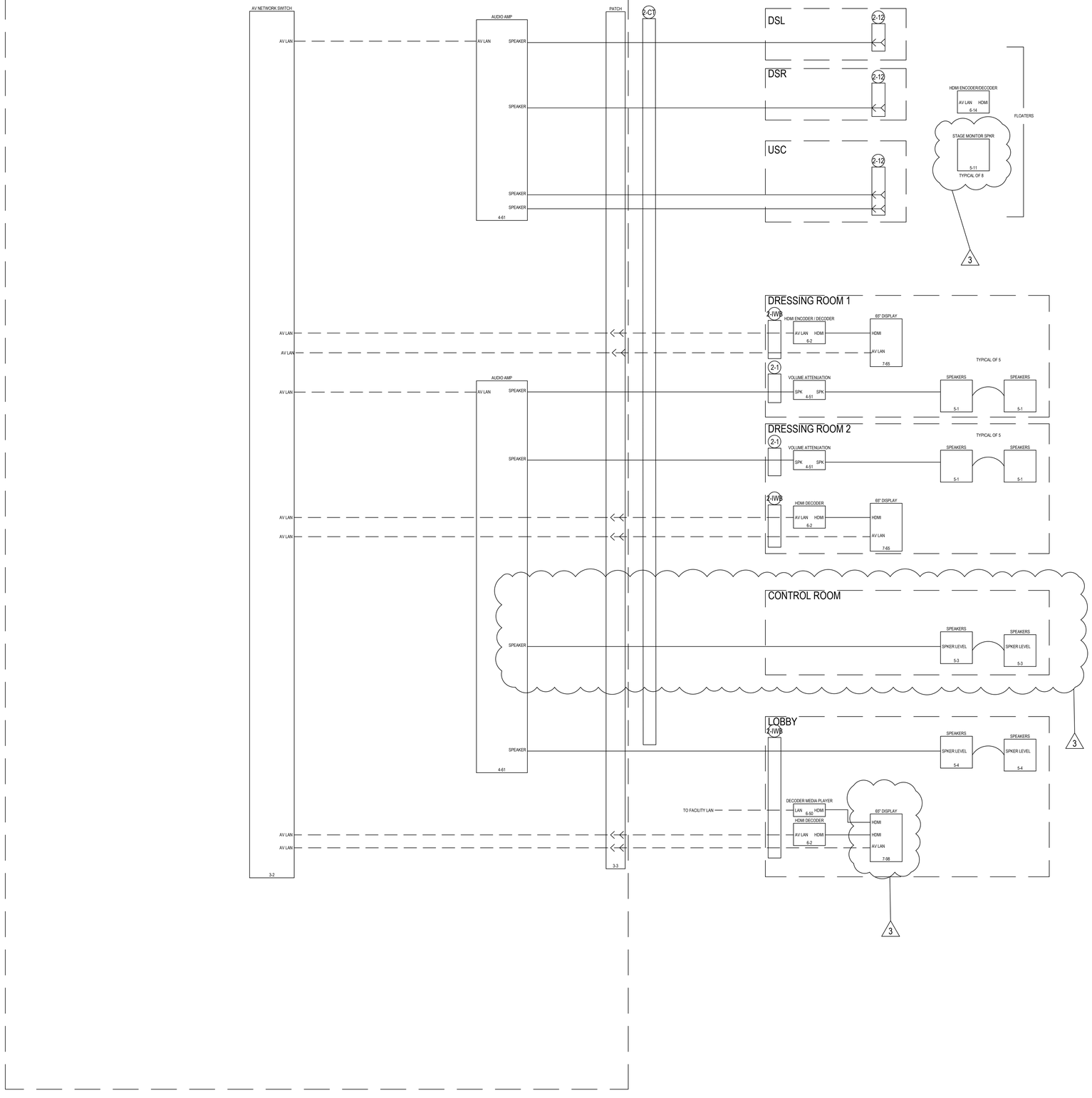
Phase
ISSUED FOR CONSTRUCTION

Professional Seal & Signature

Date: 06/15/2024
DASNY Project No: 3378509999
Consultant Project No: 1704
Scale: N.T.S.
Drawn By: TK
Checked By: SA

TA-801

Drawing Number



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STAGE LIGHTING - HMBA
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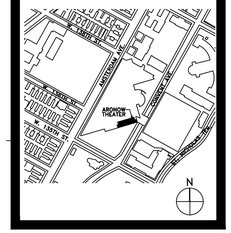
TELEPHONE # 212-874-0214

Project Key



REVISIONS

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3	*ADDENDUM # 3*	*9/16/2025*

Client

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NEW YORK, NY 10019

Project Title

ARONOW THEATER RENOVATION
IN NORTH ACADEMIC CENTER
160 CONVENT AVENUE
NEW YORK, NY 10031

Drawing Title

AUDIOVISUAL SYSTEM FLOW DIAGRAM PERFORMANCE SYSTEM (CONT)

Phase

ISSUED FOR CONSTRUCTION

Professional Seal & Signature

Date: 06/15/2024
DASNY Project No: 3378509999
Consultant Project No: 1704
Scale: N.T.S.
Drawn By: TK
Checked By: SA

TA-802

Drawing Number | *Drawing* 1 *of* 9

SECTION 27 41 16 - AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

B. Section includes the following:

1. Audiovisual equipment/systems and related control systems & programming.

C. General Conditions

1. The General Conditions, Requirements, and Special Provisions, of the larger body of specifications, of which this specification is a part, are hereby made a part of this specification. In the event that any clauses or provisions of the larger body of specification conflict with the letter or intent of this specification, the Contractor shall immediately notify the Consultant for clarification and direction.

D. The Specification

1. 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.

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

1. This written specification document.
2. The attached Audiovisual Systems Equipment List
3. All drawings, as listed in the List of Drawings or indicated on the drawing package cover page.
4. Additions and/or modifications as detailed in written addenda.

F. Additions and/or modifications as detailed in drawing additions or reissues.

1.3 RELATED SECTION

Section 01 91 13 -	*General Commissioning Requirements*
Section 26 05 00 -	*Common Work Results for Electrical*
Section 26 05 06.03 -	*Electrical Service*
Section 26 05 13.26 -	*Medium-Voltage Cables (15 kV)*
Section 26 05 19 -	*Low-Voltage Electrical Power Conductors and Cables*
Section 26 05 26 -	*Grounding and Bonding for Electrical Systems*
Section 26 05 29 -	*Hangers and Supports for Electrical Systems*
Section 26 05 33 -	*Raceway and Boxes for Electrical Systems*
Section 26 05 33.23 -	*Surface Raceways for Electrical Systems*
Section 26 05 36 -	*Cable Trays for Electrical Systems*
Section 26 09 23 -	*Lighting Control Devices*
Section 26 28 16 -	*Enclosed Switches and Circuit Breakers*

1.4 RELATED LEED SECTIONS

A. Construction and Demolition Waste Management and Disposal – Section 017419
B. Sustainable Design Requirements - Section 018113.
C. Construction Indoor Air Quality Management – Section 018119

1.5 SUSTAINABLE DESIGN REQUIREMENTS

A. The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED v4 Silver Certification. Refer to Section 018113 (Sustainable Design Requirements) for the project's target certification level and specific certification requirements. The Contractor shall ensure that the requirements related to the project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's sustainability goals and LEED certification.

B. USGBC is working on the LEEDv4.1 rating system which is currently in beta. USGBC provides the option of upgrading individual v4 credits to v4.1. The project will be pursuing the v4.1. of select credits, such as the material credits as noted in Section 018113.

1.6 LEED SUBMITTALS

A. For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's LEED requirements, as specified in Section 018113 (Sustainable Design Requirements). For installed products and materials of this Section complete the appropriate LEED reporting forms.

B. LEED Product Submittal Form: Include the cover form in each product submittal including product description, cost, LEED attribute, etc.

1.7 Definition of Terms

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

B. The term "Owner" is used to indicate CCNY Aronow Theater.

C. The term "Architect" is used to indicate Heritage Architecture.

D. The term "General Contactor" or "Construction Manager" is the entity responsible for fitout of the interior spaces and coordination of all subcontractors.

E. The term "Consultant" is used to indicate: Cerami & Associates.

F. The term "Bidder" is used to indicate that entity generating the bid response.

G. The term "Contractor" is used to indicate the successful Bidder to whom the Owner has awarded the contract.

H. 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.

I. 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, or otherwise making ready the item for its intended use by following the instructions and

approved methods of the manufacturer and those contained herein.

J. The term “Provide” is used to indicate the responsibility to both “Furnish” and “Install”.

K. 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.

L. The terms “NIC” and “Not in Contract” are equivalent to “Provided by Others”.

M. The term “OFE” or “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 installing and integrating this equipment as detailed herein.

N. The term “Installation Materials” shall reference installed cable, loose cable, terminations, cable management, voice/data/video patch cords, adapters, I/O panels, cable dressing, lacing bars, copper bus bars, labels, rack shelves, rack mounts, power strips/distribution and other materials as needed to install the systems defined herein.

O. The term “shall” be mandatory; the term “will” is informative; and the term “should” is advisory.

1.8 Bidder Qualifications

A. Contractor Qualification Requirements: Bidder shall submit on or before the date of the Pre-Bid Meeting evidence of his/her qualifications to perform the work specified. Contractor qualifications shall be the most current information available but not more than one year old. Submit one copy of documentation to both Owner and Consultant for review and approval. Transmit documentation to be received no later than the scheduled time of Pre-Bid Meeting. Materials shall include:

B. Corporate Profile

1. Location of Corporate Headquarters
2. Number of offices and locations
3. Location of office assigned to this project

C. Corporate History

1. How Many years in this business?
2. Under what former names have your organization operated
3. Date(s) of incorporation
4. State of incorporation
5. Officers names and addresses

D. Litigation Experiences Within the Last 5 Years

1. Project Related:
    a. Nature of Litigation
    b. Plaintiff or Defendant
    c. Outcome
2. Non-Project Related
    a. Nature of Litigation
    b. Plaintiff or Defendant
    c. Outcome

E. Number and Type of Full-Time Staff

1. Total number of employees
2. Number of design staff
3. Number of installation staff
4. Number of project management staff
5. Number of software programming staff

F. Identify key personnel that will be assigned to this project including:

1. Project Executive
2. Project Manager
3. Systems Designer
4. Crew Chief/Superintendent/Lead Technician
5. Systems Programmer
6. Commissioning Agent
7. Trainer

G. For everyone listed above provide a resume that includes:

1. Office Location
2. Percentage of individual's time that will be allocated to this project
3. Work History
4. Previous Project Experience
5. Length of Employment
6. Certifications: CTS, CTS-D, CTS-I, RCDD, PMP, Certified Control System Programmer, Certified DSP Programmer, video projection manufacturer specific certification, other.

H. The contractor's lead installer shall hold a current CTS-I (Certified Technology Specialist – Installation) certification from AVIXA, and/or a current EST-L2 (Electronic Systems Technician) certification from NSCA. The Contractor shall submit the name of the lead installer and certification expiration dates.

I. Due to the potential complexity of the control system, a manufacturer certified software programmer shall be required to author the programming components of this project. The Contractor shall include in the bid response, the name of the manufacturer certified person or entity that will provide programming for the remote-control system. The resume shall include a listing of years of experience and include a statement of manufacturer authorization, certification type, date of certification and the certificate number.

J. The project will utilize digital media systems from one of several approved manufacturers. The Contractor shall provide documentation listing project team member(s), named in Section 1.4.F above, who will work on the project and who are manufacturer certified for all systems included in these Specifications with active certification. The documentation shall include a listing of years of experience and include a statement of manufacturer authorization, certification type, date of certification and the certificate number.

K. The project will utilize Digital Signage and Video Distribution System products from one of several approved manufacturers. The Contractor shall provide documentation listing project team member(s), named in Section 1.4.F above, who will work on the project and who are manufacturer certified for all systems included in these specifications with active certification. The documentation shall include a listing of years of experience and include a statement of manufacturer authorization, certification type, date of certification and the certificate number.

1.9 Resources

A. A manufacturers' line card for products in which the Contractor is an authorized Distributor or Dealer. Include date initially authorized.

B. A list of any manufacturers specialized technical certifications or designations held by the Contractor.

C. A list of manufacturers for whom the Contractor is an authorized service center.

D. A list of computer software and/or systems owned by the Contractor, which will be used to communicate, measure, draw, and/or document the project.

E. A list of system test equipment owned and used by the Contractor, including manufacturer, model number and, where applicable, latest software revision.

1.10 References

A. Include three projects of:

1. Similar scope and scale.
2. Similar technology applications
3. Provide project cost for each

B. Include three project references, including:

1. Contact name
2. Institution name
3. Phone number
4. E-mail address

C. List any past projects where Contractor has worked with the Owner, Consultant, Architects, or Construction Manager who are part of this project team.

1. Site Conditions
2. Labor and Physical Access

D. 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.

1.11 Equipment Delivery and Storage

A. Costs of all shipping to the site, and of all 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.

1.12 Refuse

A. The Contractor shall keep the site and building free of all debris and clutter, to the satisfaction of the Owner or Construction Manager. Daily, the Contractor shall remove refuse and rubbish related to the specified work from the site and building 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 site and building by the Contractor's installation activities, at no cost to the Owner.

1.13 Scope of Work

A. General: Provide audio visual systems design, engineering, and installation within all phases and

spaces of the project, as defined by the related documents. Systems shall include all devices, equipment, installation, programming, and commissioning in accordance with requirements of the contract documents and drawings.

B. The work detailed within the contract documents has been specified to meet certain requirements for performance, appearance, and costs. It shall be the responsibility of the Contractor to implement the guidelines and requirements contained in the contract documents and translate them into a complete design package containing all elements necessary for a complete, operational, and functionally integrated Audiovisual System(s).

C. The Contractor shall provide complete, turnkey multimedia systems performing all 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 and working system.

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

1. Communicating and coordinating with the Owner, Consultant, Architect, and other trades complying with all requirements as defined under this Scope of Work and elsewhere, to fulfill all requirements of this specification.
2. Generating and submitting Shop Drawings as required for approvals and As-Built drawings as specified herein.
3. Providing all cable and pull strings in conduits for the specified systems.
4. Furnishing and/or installing all equipment as specified.
5. Installing Owner supplied equipment as specified.
6. Take delivery of all Owner supplied components and equipment, excluding Room PCs, at Contractor's staging facility for integration into AV equipment racks.
7. From the initial point of delivery Contractor shall be responsible for storing, integrating and maintaining as part of the system warranty all Owner supplied components.
8. Prior to installation Contractor shall test and verify all functions of Owner supplied components and equipment previously used in existing Owner's facility. Contractor shall provide a summary report of existing Owner supplied equipment and document any defects or service issues that would prevent existing equipment from reuse as part of this work.
9. Coordinate video conference endpoint provisioning with the Owner's network and the Owner's existing video conference bridge system or outsourced video conference bridging service.
10. Furnishing all lifts, ladders, scaffolding or other resources as needed for proper safe installation. Coordinating with other trades as needed.
11. Interconnecting all components, both internal and external to rack cabinets.
12. Providing patch cables for connection of all IP-enabled audiovisual equipment to associated data network outlets, including but not limited to Owner supplied Room computers, production computers, laptop connections, control system processors, codecs, and projectors. This applies to all equipment installed by the Contractor, including Owner-Furnished (OFCI) items. Coordinate patch cable requirements with the greater building-wide structured cabling system.
13. Contractor shall coordinate and secure, from the Owner, the IP configuration parameters such as DHCP, IP addresses, subnet information, VLAN setup & authorization, and the like for use by Ethernet equipped system components. The Contractor shall coordinate the installation and configuration of these devices with the Owner's IT department and/or designated representative.
14. Secure, from the Owner, private IP addresses for use by Ethernet equipped control system processors.
15. 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.
16. Verify that all audiovisual equipment rack locations are provided with adequate clearance,

ventilation and cable management systems to ensure all equipment is operating within manufacturer published tolerances.

17. Coordinating and providing cable labels as stipulated by the owner and/or specified herein.
18. Providing cable management hardware as required including in areas audiovisual rack cabinets; between pieces of equipment not housed in rack cabinets; and as required to extend cabling from rack cabinets and equipment to the greater facility cabling infrastructure.
19. Providing custom cover plates, wall plates, I/O connection plates, floor box insert plates as required for a complete and working system. Final selection of finishes shall be coordinated with the Architect and/or Owner.
20. 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, finish, and the like.
21. 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.
22. Coordinating with the furniture manufacturer, Owner, and Architect on cable management needs and equipment installation requirements in all spaces so equipped and as outlined in 'Installation Practices'.
23. Coordinate 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.
24. Insuring 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.
25. Verifying and providing all projector lenses as required.
26. Providing all projector mounts, including guy wires, clamps, or support assemblies back to structural members. Obstructions vary from room to room; Contractor must pay close attention to this issue on a room-by-room basis.
27. Mounting / aligning the projectors so that digital keystone correction is not required. Optical lens shift shall be employed, only if necessary, to align the image with the image area. Where possible all projectors mounted below the ceiling shall be mounted and adjusted to be perpendicular to the screen surface.
28. Coordinating with the Construction Manager on the audiovisual control system connection to the projection screens, as required.
29. Adjusting motorized projection screen limits as required optimizing the amount of black drop in conjunction with the projection system and field conditions. Refer to the drawings for specified dimensions.
30. Providing speakers as complete assemblies with back boxes, grilles, tile bridges, wall mounts, hanging hardware and other installation hardware as required.
31. 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.
32. Providing control system design submittals and up to two control system design revisions.
33. Developing and installing all custom control programming code as required and/or as specified herein.
34. Providing control system interfaces to motorized screens, as specified.
35. Providing low voltage control system interfaces to facility lighting and share systems where specified.

36. Providing the executable (uncompiled) programming control code as defined herein.
37. Developing and installing all custom software for DSP devices as required to optimize system performance.
38. Generating and Submitting "Progress Reports" as defined herein.
39. Ensuring that all individual components function as intended by this Specification.
40. Ensuring that the entire multimedia systems function as intended by this Specification.
41. Providing any/all patching, caulking, fire stopping, and painting required to restore damaged finishes during installation.
42. 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, etc.
43. Testing, adjusting, and fine-tuning the completed systems and components.
44. Coordinating and conducting an acceptance walk-through and sign-off session with the Owner and Consultant.
45. Documenting the completed installed systems as defined herein.
46. Conducting training in systems operation for the Owner's designated representative(s).
47. Providing "sign-off" documents for each space and/or space type as defined herein.
48. Verifying required cable lengths for all bulk cable or manufactured cable assemblies prior to ordering as outlined in 'Installation Practices.'
49. Verify AV related infrastructure requirements including conduit, power and data as shown on design drawings is sufficient to meet all AV systems requirements. A written report confirming infrastructure requirements is required from the Contractor within 30 days of award of bid.
50. Verifying all display mounting conditions including width, height and depth of all recesses or architectural cutouts required for displays and other flush mounted equipment.
51. Verifying the accuracy of the manufacturer master quotes where indicated on the audiovisual equipment list or other manufacturer quotation numbers prior to ordering. Where given, master quote numbers or other quotation numbers have been provided for bidding purposes only.
52. Providing a minimum one (1)-year warranty service contract.
53. Providing onsite support staffing as outlined in this Specification.
54. The Contractor shall act as the primary point of responsibility and contact in resolving all audiovisual system defects including those involving Owner Furnished Contractor Installed (OF/CI) equipment.
55. Provide pricing for alternates listed in the audiovisual systems equipment List accompanying this specification.

1.14 Related Documents

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. Refer to AV Design Drawings as listed on Dwg. TA-000

C. Refer to AV Equipment list provided as part of this specification

1.15 Related Work

A. Audiovisual Contractor shall coordinate with Electrical Contractor on raceway/junction box locations for audio visual equipment and routing of audio, video, control, and power cables/raceway from equipment, terminal and pull boxes to system equipment racks.

B. Coordinate work of this section with installation of wall and ceiling finishes.

1.16 Work Excluded

A. Work not included under this contract shall be:

1. Providing conduit, power receptacles, junction boxes, cable raceways, electrical back-boxes, floor boxes, lighting fixtures, lighting dimming systems, or millwork except where otherwise specified herein.
2. Installation of wall or ceiling mounted projection screens.
3. With the exception of audiovisual network switches and interconnections as indicated in the audiovisual systems equipment list and system drawings the data and voice network is provided by Others under separate contract for this building.

1.17 Schedule

A. Project Milestones

1. The Contractor shall obtain from the Owner, Architect, Construction Manager 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, and Consultant. The schedule shall show the following milestones, but may include others as required for overall site-work coordination:

    a. Equipment Cut Sheet Submittals (Owner's manuals not allowed)
    b. Shop Drawings.
    c. Initial Touch Panel layouts
    d. Completion of AV Equipment IP list for Owner coordination
    e. Required date for Owner meeting to review digital signage content
    f. Required date for receipt of Owner furnished digital signage content
    g. Delivery of materials to the work site for installation by Others.
    h. Delivery of major system components to the work site.
    i. Required date for receipt of Owner furnished equipment and PCs
    j. Required network turn-on date for Audiovisual Connectivity
    k. 50% completion of work by floor and by floor area.
    l. 95% completion of work by floor and by floor area.
    m. Completion of room run sheets (required prior to move-in).
    n. Final punch list.
    o. Training Sessions.
    p. Submittal of Final Documentation / As-Builts.

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.

1.18 Job Conditions

A. Coordination

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

    a. Coordinate his/her work with that of other trades. The Contractor should anticipate attending project coordination meetings with the Owner, Architect, Construction Manager, Consultant, or other trades as required. These meetings shall be separate from weekly construction coordination meetings required by the General Contractor.
    b. Afford other trades reasonable opportunity for installation work and for storage of materials.
    c. Staff the job to keep pace with other trades.

d. Submit a Project "Audiovisual Status Report" to the Consultant team, listing the following information in four sections: Schedule, Progress, Work Planned and Issues. The "Schedule" section shall list the status of all project milestones and track impacts to approved milestone dates. The "Progress" section shall list the tasks accomplished since the previous report; this is to include both completed tasks and work-in-progress. The "Work Planned" section shall 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. The "Issues" section shall list any factors that are delaying progress or have the potential to delay progress that involve the Owner, Architect and/or Consultant. The Status Reports should be concise, utilizing bullet points or another efficient format. Status Report available upon request. The Progress Reports should be submitted at the following intervals:

e. After contract award, while working off-site: every two weeks

f. While working on-site: every week.

g. After on-site work has started the Status Report shall list the state of each room or space with audiovisual equipment and indicate the current status of items:

1) Cable Pull
2) Mount/Speaker/Backbox Installation
3) Room Ready
4) Display Installation
5) Furniture Installation
6) Rack Installation
7) Field Equipment Installation
8) Programming
9) Commissioning
10) Ready for Consultant Testing
11) Punch List Completion

1.19 Site Conditions

A. 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 work.

B. 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 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 equipment is ordered.

C. 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.

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

E. 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.

1.20 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.

B. The Contractor shall comply with all the legal regulations, including OSHA safety regulations and regulations of municipal, city, local, and other government agencies having jurisdiction concerning the work of the Contractor. The Contractor shall give all notices and comply with all laws, ordinances, codes, rules, and regulations bearing on the conduct of the work. If the Contractor performs any work which is contrary to such laws, ordinances, codes, rules, and regulations, it shall make all changes to comply therewith and bear all costs arising therefrom.

C. The Contractor shall warrant that it and its subcontractors are licensed by the State and as required by local ordinances.

1.21 Quality Assurance

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

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

C. 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.

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

1.22 Reliability

A. General

1. 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 these systems.

1.23 Warranty

A. The Contractor shall act as the primary point of responsibility and contact in resolving all audiovisual system defects including those involving Owner Furnished Contractor Installed (OF/CI) equipment.

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

C. The Contractor shall guarantee all equipment, materials, and labor for a period of **2 years** from the date of final acceptance.

D. During the warranty period, within 4 hours of notification, the Contractor shall answer all service calls and requests for information.

E. During the warranty period, within 24 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.

F. 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.

G. 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.

H. 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 system acceptance.

I. 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 final acceptance.

J. 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.

K. Certain subsystems and system components may require installation by authorized representatives 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.

L. As part of the bid response, the Contractor shall provide the Owner with a proposal to extend the Warranty to cover Year 2 and Year 3 of operation. These offerings are to include all parts and all labor; all conditions and restrictions listed above apply.

1.24 Alternate Equipment

A. All bids shall be submitted based on the specified equipment. The Bidder may propose alternate equipment. However, all such proposals shall be submitted separately and will be identified as "alternates" with equipment costs shown separate and apart from the costs of the equipment "as specified".

B. Proposals for alternate equipment will receive careful and equitable consideration if the differences do not depart from the overall intent of the design and operation of the system and are in the best interests of the Owner. All proposed alternate equipment shall work with the existing infrastructure.

C. All such proposals for alternate equipment shall be accompanied by full technical information, "cuts" and specifications for the equipment so proposed. The Bidder shall identify the substantive differences between the alternate and the specified equipment.

D. Owner and Consultant approval in writing is required before an alternate can be considered

approved for use. It is at the discretion of the Owner and Consultant to determine if proposed alternates are considered acceptable and approved for this scope of work.

1.25 Exceptions and Proposed Modifications

A. Should the Bidder have recommendations, which will enhance the performance of the system, or reduce costs without loss of performance, reliability and durability, such recommendations shall be included with the bid submission. All suggestions that are of value to the Owner will be taken into consideration in the evaluation of the bid returns. All such proposals shall be made as "alternates", with the appropriate cost modifications shown separate and apart from the costs of the system "as specified". Pricing shall be on a line-item basis.

B. Any and all exceptions to these Specifications and related drawings must be made with the bid submission. In the absence of exceptions, these Specifications and related drawings shall be binding in letter and intent on the successful Bidder. It will further be assumed that the Bidder has examined the design and Specifications in detail and is prepared to take full responsibility for the performance of the complete installation as designed and specified.

1.26 Deviations

A. For deviations in equipment or hardware after contract award, the Bidder shall provide a written statement describing why such deviations are requested. The Bidder shall also provide the manufacturer's specifications and warranty information on proposed substitutions. The Contractor shall be responsible for repaying any additional expenses incurred by other trades, the Consultant, the Architect, and/or the Owner, as a result of instituting such deviations without prior approval.

1.27 Review and Interpretation during Bidding

A. Notify the Architect and Consultant of any omissions, discrepancies, or ambiguities in the documents so a clarification may be issued. Notify Architect, Owner, and Consultant if exception is taken to any statement, indication or criterion in the contract documents.

B. Obtain all other contract documents, including architectural, structural, mechanical, and electrical, and check to ensure there are no conflicts with work of this section. Notify the Architect and Consultant of all such conflicts, with any suggested alteration to resolve conflicts.

C. Submit all above notification in writing to the Architect and Consultant no less than 14 days prior to bid opening date. Lack of notification shall be understood to indicate acceptance of all requirements of the contract documents, and any future clams shall be rejected.

D. Interpretations or correction to the contract documents shall be issued by Addendum. Interpretations or corrections given by any other method shall not be binding.

PART 2 - PRODUCTS

2.1 System Descriptions

A. Refer to the attached Audiovisual Systems Equipment List for the following:

1. Type and quantity of spaces with audiovisual systems
2. Description and quantities of audiovisual equipment within each space
3. Notes detailing special audiovisual equipment considerations or coordination requirements
4. List of existing Owner furnished equipment

B. Control System Hardware and Control

1. Provide remote control of systems with an integrated master controller, which provides ports for IR/serial, RS-232/422/485, Ethernet, relay closures and input and output control card frames and rack mounted, of all dedicated audiovisual components.
2. When a choice of control protocols is available for a piece of equipment, the most secure and flexible one shall be used; i.e. RS-232 control, where available, shall be used in place of either infra-red or relay control.
3. All equipment utilizing a "toggled" power command are not to be powered on and off from the control system.
4. System shall be programmed (via the automation gateway) to switch to the Room's Codec (in-room conference system) unless a Guest Device is connected. Upon sensing video from a Guest device, the system shall switch to that device as an input (showing its video on both room displays) and shall switch all USB peripherals (camera, audio components, etc.) to the Guest Device. When the Guest Device is disconnected, the system shall automatically switch back to the Room's Codec (showing video from its output #1 on Display #1 and output #2 on Display #2) and route all USB peripherals to it.

C. Existing Owner Furnished Equipment

1. Contractor shall survey locations of existing equipment within 30 days of award of bid to confirm existing conditions and provide written confirmation of any conditions that would impact base scope pricing submitted at time of bid.
2. Contractor shall demount, disassemble, label, and pack existing Owner Furnished Equipment as indicated in the equipment list.
3. Contractor shall coordinate the schedule for demounting existing Owner furnished equipment with the Owner and General Contractor to provide complete and working systems per the established project schedule.
4. Contractor shall transport existing Owner Furnished Equipment either to the project site for installation/mounting or to the Contractor's facility to install in equipment racks as necessary.
5. Contractor shall test, rack/mount, terminate and commission all existing Owner Furnished Equipment as part of a complete and working system.
6. Contractor shall provide a list of non-functioning or in need of repair existing Owner furnished equipment with cost for replacement or repair for Owner evaluation.
7. Contractor shall deliver all equipment marked "spare", "Hold as spare" or "possible reuse" on the existing equipment list to the project site for storage in an Owner designated area.

D. New Owner Furnished Equipment

1. Contractor shall take receipt of all new Owner Furnished computers and CATV receivers at the project site and install as indicated in Audiovisual drawing package system flow diagrams.

PART 3 - EXECUTION

3.1 Submittals

A. General

1. 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. Software

1. The Contractor shall secure from the Owner or Owner's Representative, in writing, approval for all control surface layouts, audio DSP device configurations, or other customized software product applications prior to installation.

C. Preliminary Control Surfaces Submittal

1. Prior to creation of the preliminary control surface submittal the Contractor shall coordinate a meeting among Contractor, Consultant and Owner to discuss overall programming intent and specific requirements or concerns that the Owners or consultant has related to the control surface look, operation and capabilities. If requested, the Contractor shall incorporate the Owner's corporate logo, corporate colors, etc.
2. The intent of the preliminary control surfaces submittal is to create a base level collaboration tool whereby the contractor? can solicit direction from the Owner and Consultant towards a mutually agreeable design. Based upon the equipment lists and control system functionality provided in the Audiovisual Systems Specification and in combination with the system topology illustrated on the signal flow drawings, the Contractor shall generate preliminary control surface layouts for all pushbutton panels, touch sensitive panels, PC based controllers or other control surfaces. The Contractor should endeavor to make the preliminary layouts as complete as possible. The layouts should illustrate all pushbuttons, labels, bar graphs, timers, video windows, etc. for each control panel and each system page. The Contractor should include suggestions for color schemes and graphics where applicable.
3. 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.

D. Revised Preliminary Control Surfaces Submittal

1. If changes are required to the preliminary control surfaces submittal, the contractor shall generate a revised preliminary control surfaces submittal to include the additions, changes or revisions generated by the preliminary submittal review. The form and quantity of the submittal shall be identical to the preliminary submittal unless otherwise directed. If the revised control surfaces submittal reflects those additions, changes or revisions called for in the preliminary submittal review, the contractor shall receive written approval to proceed within 10 working days of receipt of the submittal by the Owner/Consultant.
2. The Contractor shall respond with the updated control surface submittal capturing all required changes indicated in the Owner/Consultant response within 10 working days of receipt of the response.

E. A minimum of two control surface revisions shall be provided.

3.2 Post-Integration Adjustments

A. If requested by the Owner or Consultant, and within 90 days of system acceptance as outlined in 'System Acceptance', the Contractor shall be prepared to make two visits 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 insuring that any changes to the control system or control surfaces that occur post integration are appended to the Final System Documentation.

3.3 Shop Drawings

A. The Contractor must receive written approval from the Owner prior to fabricating or installing any materials. Approval will be given based upon shop drawings. The shop drawings shall indicate complete details of work to be performed. The Contractor shall submit electronic copies of shop drawings to the Owner and Consultant for review and approval. Drawings shall include a title block naming the project, Owner and Consultant, and, shall include a drawing title, drawing number, revision number if applicable and date.

B. The shop drawings listed below are required of the Contractor. Provide electronic files and up to (1) paper set if requested by Owner or Consultant. Submit all Shop Drawings complete as a single submission. Isolated items will not be accepted, except with prior written approval.

1. System Signal Flow: Complete functional system signal flow of all systems described herein and meeting the functions indicated in the Specification.
2. Cabling Schedule: A list containing the cable type, cable marker identifier, and origination and destination location and connector types for each cable.
3. Examples representative of the Contractor's final cable marking technique for each cable type.
4. 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.
5. Projector Mounting Details: Scaled drawings of complete projector mounting details, hardware and support surfaces, including details on all load requirements, safety factors, and structural materials.
6. Structural Anchorage: Provide structural calculations, drawings and details for the anchorage of equipment racks, loudspeaker rigging hardware, the projector rail-mount system, and all other mounts or hardware that attach to structure. The design shall be reviewed and approved by a Structural Engineer licensed in the project state.
7. Optical Systems: Scaled drawings to verify that the proposed projection devices, lenses and related optical systems will provide the desired image size. The Contractor shall be responsible for field verification of the on-site conditions if required.
8. Panels: Scaled drawings of interconnect panels, control surfaces, and other custom interfaces.
9. Peripheral Equipment: Scaled drawings of mounting arrangements of any peripheral equipment, which may be included in this Specification.
10. Equipment Rack Layouts: Fully detailed rack drawings indicating equipment orientation within the equipment rack.
11. Technical Furniture: Scaled drawings of all technical furniture indicating dimensions, materials, finishes, equipment locations and orientation, cable management accommodations, and all other details necessary to convey the physical and functional aspects of the furniture.
12. Others, as may be required by the Architect, Consultant or Owner.
13. Labels / Wire Markers

C. Except where otherwise indicated, all rack-mounted equipment, switches, controls, and interface panels shall be clearly labeled.

D. Panels and plates shall be a minimum 1/8" thick anodized aluminum etched and epoxy filled unless otherwise specified.

E. 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 written approval by Owner.

F. All cables shall be permanently identified at each end by machine printed cable markers and protected by the appropriate size clear shrink tubing. 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. Each cable marker shall include, in addition to the unique tag number identifier, the name of the origination and destination equipment termination at each cable end (see example below). 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.

3.4 Identification Panel

A. An identification panel shall be installed within the equipment rack including Contractor and Consultant contact information. The panel shall be mounted in the top rack space.

3.5 Control system Requirements

A. Control System User Interface

1. All panels are to have the time and date as icons, in the same position on every page.
2. All panels are to have a title, indicating the piece of equipment and/or functionality being controlled.
3. No individual component shall be programmed to function atypically.
4. Devices similar in nature shall be programmed to operate with a common format.
5. Pages for source equipment shall conform to the following guidelines:

    a. Transport controls should be on the main device page.
    b. The primary transport controls, <Play>, <Stop> and <Pause> should be larger than the other transport controls.
    c. Buttons shall include both graphic images and text.
    d. A button shall be included for a pathway to device specific controls, including menus and advanced device functions.
    e. A button shall be included for a pathway to recording functionality. This shall include a single-bus control for the recording source.
    f. Final programming shall include capability to remotely control all functions of the audiovisual system. Individual device controls shall provide full manufacturer's functionality.
    g. Provide control capability for every function available on every piece of equipment being controlled by the system. Define and provide "macro" commands for the most used functions.
    h. Provide control panel layouts that are consistent from page to page. Whenever the same button appears on more than one page, it will be in the same position on each page.
    i. Functions used during a general presentation shall be accessible with a minimal amount of button presses/page flips.
    j. All power functions, or other destructive commands, activated by the users through the user interface shall be intercepted in the programming. The user shall be provided with the opportunity to cancel out the command prior to any actions being initiated and without disturbing the current operating model.
    k. Where feasible, multi-level access to controls should be implemented. All software shall provide multiple levels of password protection. Initially three levels of security will be established and specific rights to program areas shall be assigned by user:

        1) Level 1 shall allow user to operate the system, without a password. Control shall be limited to basic functionality directly affecting the space in which the control is located.
        2) Level 2 shall be password protected and allow user to modify system parameters and features listed in level 1.
        3) Level 3 shall be password protected, and allow a technician access to set-up

functions, source selection, etc.

B. Control System Hardware

1. Provide remote control of systems with an integrated master controller, which provides ports for IR/serial, RS-232/422/485, Ethernet, relay closures and input and output control card frames and rack mounted, of all dedicated audiovisual components.
2. Provide all required network equipment, including, but not limited to, routers, hubs, gateways, media converters, etc., for integration of the networked AV Control system with the Owner's existing LAN and control system.
3. When a choice of control protocols is available for a piece of equipment, the most secure and flexible one shall be used; i.e. RS-232 control, where available, shall be used in place of either infra-red or relay control.
4. All equipment utilizing a "toggled" power command are not to be powered on and off from the control system.

C. Additional Control System Surfaces

1. Port all completed touchpanel interfaces to web browser based control.
2. Port all completed touchpanel interfaces to be fully mobile device compatible on Apple iOS or Android™ mobile devices.

3.6 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 or a published safe working limit 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 insure that all equipment is installed such that proper cooling and ventilation is insured.
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. Projectors, lenses, and mirrors shall be solidly mounted and braced so that there will be no observable movement in the image induced by motor vibration or other mechanical operations.
7. All equipment shall be protected from construction dust and debris until final acceptance of the system.
8. All equipment shall be protected from theft until final acceptance of the system.
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 Owner acceptance.
10. The Contractor shall be obligated to protect completed work and uncompleted work against damage or loss until the Owner has given final acceptance. Should the need arise to repair work or replace items the Contractor shall do so at no cost to the Owner.

B. 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.

2. 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. 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, it shall deliver it as requested by the Architect, Consultant, or furniture supplier.

C. 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. Adjacent racks shall be bolted together with appropriate ganging hardware.
5. 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.
6. 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.
7. 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.
8. 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.
9. Any controls not to be adjusted by the user and accessible from the front of the equipment rack must be furnished with security panels.

3.7 Cabling

A. Cabling Types

1. Refer to the Audiovisual drawing package for minimum audiovisual low-voltage cabling requirements.
2. Coordinate UTP cable types with Information Technology (IT) requirements and submit UTP cable for approval by Owner and Consultant.

B. Cable Installation

1. 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
2. Cable runs shall be supported with devices designed for this purpose and are to be installed independent of any other structural component.
3. 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.
4. 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 and shall be waterproof. 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.

5. 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 work.
6. 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.
7. Cable stapling of any recognized media type shall not be permitted.
8. 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.
9. Cabling installed with a bend radius less than that recommended by the cabling manufacturer is not acceptable.
10. Cables and bundles terminating at equipment or connector panels shall be supported so as not to put strain on connections or connectors.
11. 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.
12. 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.
13. Where indicated on the Audiovisual Drawing Set 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 signal types other than microphone or line level runs.

C. Termination

1. All termination components must meet or exceed all specifications for given media type and application as described in this document and system drawings.
2. Crimp on connectors shall be installed only on the appropriate size cable using the manufacturer recommended crimp tool and die set.
3. Connections to electronic devices providing screw terminals shall be terminated using the appropriate gauge insulated spade or ring crimp terminal connector and crimp tool.
4. All mechanical solder-on connectors shall be attached to cable ends using rosin core solder.
5. 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.

D. AV Over UTP Cabling System

1. In some areas, analog video, audio, and control signals will be transmitted over a dedicated system of unshielded twisted pair (UTP) cabling utilizing specialized electronics. UTP transceivers located in the presentation spaces will connect to similar devices in the equipment racks via a cabling scheme comprised of RJ-45 receptacles, permanently installed cabling, equipment cords, and patch cords and patch panels.

2. Each AV over UTP port 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 - NOT DATA).
3. To eliminate the problem of skew caused by the varying pair lengths inherent with CAT-5e/6 UTP cabling, a specialized skew-free UTP bulk cable, patch cables, and equipment cords are specified.
4. The Contractor shall test, verify and document the length and wire map of each Permanent Link cable run, each patch panel to transceiver cable segment, and each patch and equipment cord using a Fluke model 620 LAN Cable Meter or equivalent.

3.8 Grounding

A. General

1. To avoid system noise, data errors, safety hazards, and equipment damage, all devices and cabling shall be installed using a consistent grounding scheme. All devices shall be grounded and all ground conductors shall follow a star topology. The grounding system topology should be such that each equipment rack and each piece of signal bearing equipment is connected so that there is never more than a single path to ground. This section offers guidelines for grounding and shielding methodology. Grounding and shielding methodology may need to be augmented or modified for certain pieces of equipment or interconnections in order to meet the requirements of other sections of this specification. The Contractor shall be responsible for making necessary alterations in accordance with industry practices and such that the Performance Standards detailed in 'Performance Standards' are met.
2. Under no circumstances shall an AC neutral conductor be used to ground equipment.
3. Refer to the International Communications Industries Association, Inc. (InfoComm International) Basics of Audio and Visual Systems Design handbook, Section 10, Technical Power and Grounding Systems for additional guidelines.

B. Interconnection

1. All connectors used on system I/O panels shall be electrically isolated from the panel and provide a pass through (uninterrupted) ground connection.
2. Microphone cable shields shall be connected to the microphone frame and grounded only at the preamplifier input connector.
3. All audio interconnections with cable lengths greater than 10 feet shall use balanced (symmetrical) signaling.
4. All audio signal cable shields shall be grounded only at the input connection of each device. Signal cable shields, both connected to devices and floating, shall be protected by the appropriate gauge heat shrinkable tubing. Shields at the output connector shall be folded back over the cable jacket and covered with heat-shrinkable tubing. Do not cut off unused shields.
5. Coaxial video and RF shields shall be connected at both ends.

C. Pull Strings

1. A nylon pull string shall be left in every conduit. In the event additional cables are pulled in after the initial cable pull, a nylon pull string shall be pulled with the added cable.

3.9 Performance Standards

A. Audio

1. Polarity

a. Absolute signal polarity will be maintained throughout the signal chain such that a positive signal at the input produces a corresponding positive excursion at the

loudspeakers.

2. Electronics

   a. The audio system electronics shall deliver the following minimum performance standards as measured from all source inputs for microphones, audio tape machines, video tape machines, etc., through all mixers, audio distribution amplifiers, routers, etc., to all audio signal destinations.

      1) Frequency Response: ±0.5dB, 20-20,000 Hz.
      2) Hum and Noise: -70 dBu, 20-20,000 Hz, un-weighted.
      3) Distortion: 0.1% THD, 20-20,000 Hz

3. Speech Signal

   a. The system shall provide a speech signal in the audience seating area that meets or exceeds the following requirements:

      1) Frequency response within +/- 3 dB from 500 Hz to 15,000 Hz.
      2) Overall SPL variance of +/- 3 dB.
      3) Measured Alcons of 10% or lower.
      4) Maximum average SPL of 85 dB (flat), with 10 dB of undistorted headroom available.

4. Music Signal

   a. The system shall provide a music signal in the audience seating area that meets or exceeds the following requirements:

      1) Frequency response within +/- 3 dB from 200 Hz to 17,000 Hz.
      2) Overall SPL variance of +/- 3 dB.
      3) Maximum average SPL of 90 dB (flat), with 10 dB of undistorted headroom available.

B. Optical

   1. All video projection systems shall meet the following performance standards:

      a. The total averaged light output from a video projector, in ANSI lumens, shall be tested by the Contractor and certified to be within ±15% of that specified by the projector manufacturer.

3.10 System Setup and Tuning

A. Optimization

   1. The Contractor shall install, configure, adjust, program, and calibrate all components in order to optimize the performance of all individual subsystems and the system as a whole.

3.11 Preliminary Tests and Submittals

A. General

   1. Once the system is installed, the Contractor shall complete the following preliminary tests and prepare a written test report for the Consultant. The test report will list the results of each of the tests described in this section and certify that the installation is complete

B. Audio

   1. Prior to the termination of audio amplifiers to speakers, the Contractor shall measure the resistance of the speaker line with reference to ground to determine that no short circuits or

paths to ground exist in the line. The Contractor shall connect the speaker to the cable and measure the impedance of each speaker line using a 1,000Hz signal applied to the line. The Contractor shall submit a list to the Consultant, by cable number, of the impedance of each speaker line. This test shall be performed with the amplifier disconnected from the speaker line and the speaker connected to the speaker line.

2. Verify all loudspeakers are working.
3. Verify that all microphones are working and operational with no perceived feedback from loudspeaker system.
4. Verify that the system meets all Performance Standards as outlined in 'Performance Standards'.
5. Verify that all equipment, panels, and cables are labeled correctly.
6. Verify each item of equipment is functioning as intended.
7. Verify the installation is the same as specified.

C. Video

1. To establish that the facility cabling and terminations meet industry standard specifications, a video test signal shall be applied to each input cable and passed through the system switching and distribution networks with the results measured at each system output.
2. In addition, the Contractor shall:

    a. Verify each item of equipment is functioning as intended.
    b. Verify the installation is the same as specified.

D. Computer Video Display Devices

1. The Contractor shall use a computer-video test generator to establish that computer video capable displays such as flat panel, and projection devices are in good working order and optimally adjusted. The computer-video test generator shall be capable of outputting test signals on HDMI, DVI-I, DisplayPort, 5 BNC connectors, 9-pin TTL connector, 15-pin HD VGA connector, or 15-pin D Macintosh connector. The computer-video test generator shall offer the following test patterns:

    a. Test Patterns

        1) Dots 12x16, Alternating pixels
        2) Vertical/Horizontal Crosshair
        3) Crosshatch 12x16
        4) Crosshatch 24x32
        5) Flat Field
        6) Checkerboard 100% (IRE) White
        7) Checkerboard 56% (IRE) White
        8) Checkerboard 14% (IRE) White
        9) 8 Level Split Gray Scale
        10) 8 Vertical Color Bar
        11) 16 Color Bar
        12) SMPTE and PLUGE Color Bar

E. Control

1. Upon completion of installation, the Contractor shall test each function of each control station, push-button panel, touch screen panel, computer control interface, and all components connected to or interfaced to the Control System to verify proper operation and that each switch and indicator operates as intended.

3.12 Final Tests

A. Upon approval of the Contractor's test report, and at a time that is mutually acceptable to the Contractor Owner and Consultant, the Contractor shall assist the Consultant in final system tests and adjustments. 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 the system.

B. To demonstrate the good working order of all playback devices in the system the Contractor shall make available high quality source materials for all audio and video media types represented in the system. To demonstrate the good working order of all computer-video displays the Contractor shall make available the computer-video signal generator described in 'Performance Standards - Preliminary Tests and Submittals - Computer Video Display Devices'. In addition, the Contractor shall make available a computer graphics signal generator or portable computer with the ability to output all video formats natively supported by the Audiovisual system specified. The portable computer shall be capable of displaying spreadsheets, graphs, charts, pictures and text of varying sizes and fonts to effectively demonstrate the systems computer display imaging capabilities.

C. The Contractor shall:

1. Load source material into all input sources and the laptop computer.
2. Switch randomly between all sources and demonstrate that all functions of the control system are working properly and tracking correctly.
3. Demonstrate that the displays have been optimized for all sources.
4. Demonstrate that the system meets the criteria as outlined in 'Performance Standards'.

3.13 Final Documentation

A. Upon completion of the work, the Contractor shall condense the master set along with any shop drawings into a single As Built document set. Any markings or deviations, which cannot be made clear on drawings, shall be accompanied by attached documentation, photos, or written addenda.

B. All documents and drawings must be submitted electronically in their native AutoCAD and PDF format. Further, all PDF drawings must be submitted at their native scale. For example, a PDF created from a drawing whose native format was standard 'E' size (42-inch x 30-inch) shall be created at 42-inch x 30-inch (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. Final submission of digital As Built drawings files shall be subject to submission by the Contractor as defined under said agreement.

3.14 Preliminary Final Documentation Submittal

A. Prior to Final Tests and project punch-listing, the Contractor shall prepare and submit one (1) copy of the documentation listed below to the Consultant and owner for review. The package shall include all the documentation listed below and be in the exact form and format intended for delivery to the Owner.

B. The documentation shall be in electronic format AutoCAD and PDF file format copies and organized as follows:

1. A cover and spine listing the Owner, Consultant, and Contractor.
2. A listing of each supplied item with manufacturer, model number and serial number.
3. Operator's manuals for each piece of equipment supplied by the Contractor.
4. A complete set of as-built drawings. The as-built drawings must reflect all changes to the system(s) made after the original bid documentation. The size of the as-built drawings shall be identical to the original drawings provided to Contractor, folded and inserted into the binders in plastic sleeves. Alternative formats may be acceptable upon prior approval by the Consultant

and Owner.

3.15 Final Documentation Submittal

A. Following successful completion of Final Tests and punch-listing, the Contractor shall prepare and submit to the Consultant and Owner electronic copies of the documentation listed under the Preliminary Final Documentation Submittal. The Final Documentation Submittal will include any and all adjustments or changes identified during the Preliminary Final Documentation Submittal review.

B. The documentation shall contain PDF file-format copies for items 1 through 4 in Section A above and include detailed digital photographs showing the front views of all equipment racks. The photographs shall accurately reflect equipment front-panel settings at the time of project sign-off. All photographs must be properly exposed and focused, clearly showing the final settings for every device's push buttons, rotary controls, slider controls, or indicators. Subject areas must be free from glare as a result of flashes or other ambient lighting. Subject areas shall fill the image frame in a suitable manner. For large equipment racks, multiple exposures may be required, each indicating a separate portion of the rack. NOTE: All digital images shall be comprised of at least 1600 x 1200 viewable pixels, 24-bit color depth, JPEG file format.

3.16 Software

A. Where custom software is developed as part of this project, the system source code 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 to the Owner only. The source code should be well documented in accordance with industry software engineering practices.

B. 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.

C. 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 as part of the Final Document Submittal.

D. Copies of all manufacturer software required to program, compile, load and adjust audiovisual hardware settings or programming shall be provided.

E. Copies of the current firmware and/or hotfix versions for all equipment with programmable firmware.

3.17 Delivery & Approval

A. Unless otherwise arranged, The Contractor shall prepare and submit one complete set of the Final Documentation to the Consultant for review at the time of Final Tests. The package shall include all the documentation listed above and be in the exact form and format intended for delivery to the Owner.

B. 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.

C. If the Final Documentation submittal is determined by the Consultant and/or Owner to not be complete and/or accurate, the Consultant will return the package to the Contractor with a written

listing of the required modifications. Upon completion of all the required modifications, the Contractor shall resubmit the Final Documentation to the Consultant and Owner for approval. The Final Documentation submittal shall not be considered complete until all required modifications have been made and approved by the Consultant and Owner.

3.18 Training

A. The Contractor shall provide a minimum of 12 hours of on-site training for (but not limited to) the Owner's staff at a time that is mutually agreeable for the Owner and Contractor.

B. Contractor shall provide 2 additional hours for system walk thus etc. at the request of the Owner and/or Consultant.

C. The Owner may choose to have the sessions spread out over a period of time and vary the staff being trained and the level of training. Final acceptance and/or final payment for the system shall not be delayed due to scheduling delays beyond the control of the Contractor. Contractor should also be available for requested additional training.

D. As part of user training Contractor shall provide single page laminated room use cards for all rooms and tailored to each specific room type. Room card shall include:

E. Simple instructions for basic user functions (system on, off, media, making VTC & ATC calls).

F. Help desk contact information.

G. Room type capabilities (presentation, VTC, ATC, etc.)

H. Electronic version of the room use cards shall be provided to the Owner prior to move-in to allow for Owner formatting and review.

I. Onsite Support Staff

J. The staff member provided shall be familiar with the installation and operation of the system specified and shall have been onsite with the installation team at least two weeks prior to Owner move-in.

3.19 System Acceptance

A. Upon successful completion of Final Tests, Documentation and Training, the AV Contractor shall notify the General Contractor, in writing, that the System is complete.

B. The General Contractor will notify the Consultant the AV System is complete and ready for inspection.

C. The Consultant will generate a punch list of omissions, adjustments and corrections within fifteen (15) business days of notification of system completion and will respond, in writing, to the General Contractor.

D. The AV Contractor shall address all punch list items and notify the General Contractor of completion of all punch list items within five (5) business days. The General Contractor will provide a final notification, in writing, to the Consultant.

E. The Consultant will confirm, in writing, that the work has been completed in accordance with the requirements of the contract documents.

F. Training, reference section 3.18, shall occur within ten (10) days of acceptance of the final notification by the Consultant.

G. The Warranty shall commence on the day after Training is complete.

END OF SECTION 274116

Trinity Consultants | CERAMI Longman Lindsey

DASNY CCNY Aronow Theater - ADDENDUM #3

September 16, 2025

Summary Sheet

Notes:

1. This equipment list specifies major systems components and equipment, and should not be interpreted as a "bill of materials". This list may not detail all equipment required for complete, working systems. It is the AV Systems Contractor's responsibility to provide complete, working systems regardless of the completeness of this list.
2. No formulas are being provided with this workbook. It is the AV Systems Contractor's responsibility to create and confirm any formulas in the excel workbook prior to submitting bid

	ROOM	TOTAL EQUIPMENT COSTS	TOTAL NON-EQUIPMENT COSTS	TOTAL AV CONTRACTOR COSTS	ROOM COUNT	GRAND TOTAL
	Theater				1	$ -
	Dressing Room				2	$ -
	Lobby				1	$ -
	Academic System (EXISTING)				1	$ -
TOTAL - PROJECT						**$ -**

Trinity Consultants | CERAMI Longman Lindsey

DASNY CCNY Aronow Theater - ADDENDUM #3								September 16, 2025
ROOM: Theater								
ITEM #	**DESCRIPTION**	**MANUFACTURER**	**MODEL NUMBER**	**NOTES**	**QTY**	**UNIT COST**	**COST**	**ISSUANCE**
PROJECTION SYSTEMS								
8-1	30,000lm 3-Chip DLP Projector, 4K	Panasonic	PT-RQ35K		1			
8-1A	Projector lens, (7.34-13.8:1)	Panasonic	ET-D3LET80		1			**addendum 3**
8-1B	Video Projector - Mount Heavy-Duty	Chief	VCMU		1			
8-1C	Mount Extension Column	Chief	CMSxxxxxx		1			
6-2	Network Video Endpoints, ENCODE/DECODE, 1-HDMI, 1-USB-C IN, 1-HDMI OUT, SCALER	QSYS	NV-21-HU	PROJ	1			
10-1	Front Projection Screen, Paragon Electric; 16:9 Format, 160"H X 284"W (324" dia), TecVision XT1100X surface, 48" blackdrop, black housing, external LVC IV	Draper	quote SQDADEU477537-2		1			
						PROJECTION SYSTEMS TOTAL		
AUDIO SYSTEMS								
4-11	**Server Core, 256x256 networked audio channels, 8x8 Dante channels (license up to 256), 64 AEC channels, dual network ports, harddrive**	**QSYS**	**X10**		**1**			**addendum 3**
4-12	**Four (4) mic/line input expander**	**QSYS**	**Qio-ML4i**		**2**			**addendum 3**
4-13	**Four (4) line output expander**	**QSYS**	**Qio-L4o**		**1**			**addendum 3**
4-14	**Dante audio bridge**	**QSYS**	**CDN64**		**1**			**addendum 3**
4-15	**Low-Voltage Relay**	**QSYS**	**QIO-LVR4**		**1**			**addendum 3**
4-16	**Serial expander**	**QSYS**	**QIO-S4**		**1**			**addendum 3**
4-17	**GPIO expander**	**QSYS**	**QIO-GP8x8**		**1**			**addendum 3**
4-18	**Dante license, 64x64**	**QSYS**	**SLDAN-64-P**		**1**			**addendum 3**
4-31	Wireless Mic - Receiver 4ch.	Shure	ULXD4Q		3			
4-32	Bodypack	Shure	ULXD1		8			
4-33	Handheld transmitter	Shure	ULXD2B58		4			
4-34	Supercardioid lavaliere	Shure	WL184		6			
4-35	Directional wideband antenna	Shure	PA805		**2**			**addendum 3**
4-36	Antenna Distribution System	Shure	UA845UWB		1			
4-37	Antenna Amp	Shure	UA834WB		2			
4-38	DuraPlex Omnidirectional Subminiature Headset Microphone	Shure	DH5C/O-LM3		8			
4-41	**Digital Mixer. 33 faders (48channels + 1 master) 96kHz, 12 stereo mixes+LR, 3 stereo matrix, 8 FX engines, assignable keys, 64x64 I/O**	**Allen Heath**	**SQ-7**		**1**			**addendum 3**
4-42	**Dante card**	**Allen Heath**	**SQ Dante 64x64**		**1**			**addendum 3**
4-43	**48in / 16out expander**	**Allen Heath**	**GX4816**		**1**			**addendum 3**
4-45	**16in / 8out 96kHz Expander**	**Allen Heath**	**DX168**		**2**			**addendum 3**
4-44	6U rSeries Rolling Rack	SKB	1SKB-R6UW	for stage rack	2			
5-12	Control room speakers	Genelec	8030C	CONTROL ROOM	2			
4-61	Audio Amplifier - 4 ch, 800W Q-LAN	QSYS	CX-Q 2K4		4			
4-62	Audio Amplifier - 4 ch, 1500W, Q-LAN	QSYS	CX-Q 4K4		1			
4-63	Audio Amplifier - 4 ch, 2400W, Q-LAN	QSYS	CX-Q 8K4		1			
4-71	ListenIR iDSP Standard System (Dante), includes IR transmitter, IR radiator, receivers, ear phone, signage and accessories	Listen	LS-100-01-D		1			
4-72	Additional stationary IR Radiator, Grey	Listen	LA-140		1			
5-1	Passive 8-inch 2-way Line Array Loudspeaker	QSYS	PL-LA8		12			
5-2	Passive 18-inch Subwoofer	QSYS	PL-SUB18		2			
5-1A	Rigging hardware: shackles, clips, wire rope TO SUPPORT LEFT, CENTER, RIGHT LINE ARRAY CLUSTERS	By AV Contractor	Class 5 or better		1			
5-1B	Beam Clamp for Hooks and Hangers with T-Handle, for 8"-18" Beam Width	McMaster Carr	8941T14		6			
5-11	**12-inch coaxial full range Stage Monitor**	**QSYS**	**PL-CA12**		**8**			**addendum 3**
5-1.1	PL-LA8 array speaker rigging frame	QSYS	PL-LA8-AF		**2**			**addendum 3**
5-1.2	PL-LA8 array speaker pullback bar	QSYS	PL-LA8-PB		**2**			**addendum 3**
5-3	6.5-inch, 2-way, low profile, zero bezel	QSYS	AD-C6T-ZB	CONTROL ROOM	2			
DIR-1	Active 2 channel direct box	Whirlwind	Direct2		2			
MIC-1	Condenser instrument microphone	Shure	SM81		2			
MIC-2	Dynamic moving-coil microphone (hypercardioid)	Beyer Dynamic	M88		1			
MIC-3	Vocal mic	Shure	BETA 58		3			
MIC-4	Instrument mic	Shure	SM57		3			
STD-1	Low-Profile straight Mic Stand Ebony	Atlas	MS-12CE		8			
STD-2	30 inch Tripod and Boom Kit	Atlas	TB1930		4			
STD-3	64 inch Tripod and Boom Kit	Atlas	TB3664		8			

Trinity Consultants | CERAMI Longman Lindsey

DASNY CCNY Aronow Theater - ADDENDUM #3 — **September 16, 2025**

ROOM: Theater

ITEM #	DESCRIPTION	MANUFACTURER	MODEL NUMBER	NOTES	QTY	UNIT COST	COST	ISSUANCE
STD-4	30 inch Tripod Mic Stand	Atlas	T1930		4			
STD-5	Microphone adapter clamp	Atlas	MAC-1		4			
MC-5	Microphone cable, 10'	Whirlwind	MK10		4			
MC-6	Microphone cable, 15'	Whirlwind	MK15		4			
MC-7	Microphone cable, 25'	Whirlwind	MK25		4			
SC-1	Speaker cable, NL4, 10'	Whirlwind	NL410		4			
SC-2	Speaker cable, NL4, 25'	Whirlwind	NL425		4			
						AUDIO SYSTEMS TOTAL		
VIDEO SYSTEMS								
6-1	40 Network 4K PTZ Camera	QSYS	NC-20X60		1			
6-2	Network Video Endpoints, ENCODE/DECODE, 1-HDMI, 1-USB-C IN, 1-HDMI OUT, SCALER	QSYS	NV-21-HU		7			
OFE-01	OFE PC	OFE	OFE		1			
6-2	Network Video Endpoints, ENCODE/DECODE, 1-HDMI, 1-USB-C IN, 1-HDMI OUT, SCALER	QSYS	NV-21-HU	FLOATERS	2			
						VIDEO SYSTEMS TOTAL		
CONTROL SYSTEMS								
3-2	48 PORT, 40 POE+ Gigabit Ethernet ports with PoE+, 8 SFP+ ports, 960 W	Netgear	GSM4248PX		1			
3-2.1	**24x1G PoE+ 480W 2x1G and 4xSFP+ Managed Switch**	**Netgear**	**GSM4230PX**		**1**			**addendum 3**
3-3	Clarity 6 48-port Category 6 patch panel - six-port modules	Ortronics	PHD66U48		2			
3-1	High Definition Touch Screen Controller, 10.1"	QSYS	TSC-101-G3		2			
3-1A	Tabletop stand	QSYS	TSC-710t-G3	CONTROL ROOM	1			
3-1B	Rack Mount Kit for TSW-1070 Series USE FOR QSYS	Crestron	TSW-1070-RMK-2	RACK	1			
3-80	base station for the wireless FreeSpeak II 1.9 GHz and 2.4 GHz active transceiver antennas and beltpacks	Clearcom	FSII-BASE-II-X5		1			
3-81	Double-ear Premium Light-weight Headset	Clearcom	CC-220		5			
3-82	Charging station	Clearcom	AC60		1			
3-83	Battery	Clearcom	BAT60		5			
3-84	FreeSpeak Edge wireless intercom Transceiver, 2,4GHZ	Clearcom	FSE-TCVR-24		5			
3-85	2.4 GHz Wireless Beltpack	Clearcom	FSII-BP24		1			
3-86	Beltpack mount	Clearcom	BP-MOUNT		5			
						CONTROL SYSTEMS TOTAL		
MISCELLANEOUS EQUIPMENT AND SYSTEMS								
1-1	Equipment Rack; 45 Rack Unit High x 27" Deep, include sides	Middle Atlantic	BGR-45SA-27		1			
1-1A	Caster base	Middle Atlantic	CBS-ERK-27		1			
1-1B	Fan Top	Middle Atlantic	BGR-276FT-FC		1			
PWR-1	Rackmount Power, 9 Outlet, 20A with Series Surge Protection	Middle Atlantic	PD-920R-SP		2			
MSC-1	Miscellaneous Wire, Cable, Connectors	Custom	By Audiovisual Contractor		1			
						TOTAL EQUIPMENT COST		
						ENGINEERING		
						PROJECT MANAGEMENT		
						PRE-INSTALLATION & RACK FABRICATION		
						INSTALLATION (Union or Non-Union)		
						TAX		
						G&A		
						NON-EQUIPMENT COST		
						TOTAL AV CONTRACTOR COST		

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DASNY CCNY Aronow Theater - ADDENDUM #3 — **September 16, 2025**

ROOM: Dressing Room

ITEM #	DESCRIPTION	MANUFACTURER	MODEL NUMBER	NOTES	QTY	UNIT COST	COST	ISSUANCE
DISPLAY SYSTEMS								
7-65	Bravia 4K display 65"	Sony	65BZ30L		2			
2-IWB	Large Low-Profile In-Wall Swing Arm Mount - 22 Inch	Chief	PNRIWUB		2			
						DISPLAY SYSTEMS TOTAL		
VIDEO SYSTEMS								
6-2	Network Video Endpoints, ENCODE/DECODE, 1-HDMI, 1-USB-C IN, 1-HDMI OUT, SCALER	QSYS	NV-21-HU		2			
						VIDEO SYSTEMS TOTAL		
AUDIO SYSTEMS								
5-3	6.5-inch, 2-way, low profile, zero bezel	QSYS	AD-C6T-ZB		10			
4-51	Decora Plate Mounted Attenuator (100W)	Atlas Sound	AT100D		2			
						AUDIO SYSTEMS TOTAL		
MISCELLANEOUS EQUIPMENT AND SYSTEMS								
MSC-1	Miscellaneous Wire, Cable, Connectors	Custom	By Audiovisual Contractor		1			
						MISCELLANEOUS EQUIPMENT AND SYSTEMS TOTAL		
						TOTAL EQUIPMENT COST		

ENGINEERING	
PROJECT MANAGEMENT	
PRE-INSTALLATION & RACK FABRICATION	
INSTALLATION (Union or Non-Union)	
TAX	
G&A	
NON-EQUIPMENT COST	
TOTAL AV CONTRACTOR COST	

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DASNY CCNY Aronow Theater - ADDENDUM #3 — **September 16, 2025**

ROOM: Lobby

ITEM #	DESCRIPTION	MANUFACTURER	MODEL NUMBER	NOTES	QTY	UNIT COST	COST	ISSUANCE
DISPLAY SYSTEMS								
7-98	Bravia 4K display 98"	Sony	FW-98BZ53L		1			
MNT-1.2	8 Inch (203 mm) Ceiling Plate	Chief	CMA110		1			
8-1C	Mount Extension Column	Chief	CMSxxxxxx	VIF LENGTH	1			
MNT-1	Fusion Extra-Large Single Pole Flat Panel Ceiling Mounts	Chief	XCM1U		1			
						DISPLAY SYSTEMS TOTAL		
AUDIO SYSTEMS								
5-4	Integrated SUB/SAT Pendant Loudspeaker System	QSYS	AD-P.HALO		2			
						AUDIO SYSTEMS TOTAL		
VIDEO SYSTEMS								
6-2	Network Video Endpoints, ENCODE/DECODE, 1-HDMI, 1-USB-C IN, 1-HDMI OUT, SCALER	QSYS	NV-21-HU		1			
6-50	4K video decoding media player, POE+,	iCompel	ICRP-HD-QR-N-R3		1			
						VIDEO SYSTEMS TOTAL		
MISCELLANEOUS EQUIPMENT AND SYSTEMS								
MSC-1	Miscellaneous Wire, Cable, Connectors	Custom	By Audiovisual Contractor		1			
						MISCELLANEOUS EQUIPMENT AND SYSTEMS TOTAL		
TOTAL EQUIPMENT COST								

ENGINEERING	
PROJECT MANAGEMENT	
PRE-INSTALLATION & RACK FABRICATION	
INSTALLATION (Union or Non-Union)	
TAX	
G&A	
NON-EQUIPMENT COST	
TOTAL AV CONTRACTOR COST	

Trinity Consultants | CERAMI Longman Lindsey

DASNY CCNY Aronow Theater - ADDENDUM #3								September 16, 2025
ROOM: Academic System (EXISTING)		**NOTE: Academic system was decommissioned and stored. AVC to re-integrate into theater.**						
ITEM #	**DESCRIPTION**	**MANUFACTURER**	**MODEL NUMBER**	**NOTES**	**QTY**	**UNIT COST**	**COST**	**ISSUANCE**
PROJECTION SYSTEMS								
8-10	16,000 Lumens WUXGA Laser Projector	Panasonic	PT-MZKL16		1			
8-10.1	4.14-7.40:1 Zoom Lens	Panasonic	ET-EMT800		1			
						PROJECTION SYSTEMS TOTAL		
AUDIO SYSTEMS								
4-90	Coaxial Array Speaker w/ mount	TOA	HS1500WT		4			
DSP-10	DSP - Tesira SERVER-IO	Biamp	Tesira SERVER-IO	assembled in rack	1			
DSP-10.1	4 Channel Mic/Line Input Card	Biamp	Tesira SIC-4	assembled in rack	7			
DSP-10.2	4 Channel Mic/Line Output Card	Biamp	Tesira SOC-4	assembled in rack	2			
4-10	Revoluto Line Array Microphone	Beyerdynamic	RM 31 RC		1			
AMP-10	4 Channel 100 W 70 V Amplifier	Extron Electronics	60-1760-02		1			
4-20	Headworn Microphone	Shure	MX153B/O-TQG		lot			
4-30	Wireless Microphone Bodypack	Shure	QLXD1=-G50		lot			
4-40	Handheld Wireless Microphone	Shure	QLXD2/B58=-G50		lot			
4-50	Wireless Microphone Reciever	Shure	QLXD4=-G50		4			
4-60	Amplified Antenna Mount	Shure	UA834WB		2			
4-70	Antenna Distribution System	Shure	UA844+SWB		4			
4-80	Lavalier Microphone	Shure	WL-185		lot			
						AUDIO SYSTEMS TOTAL		
VIDEO SYSTEMS								
6-10	DigitalMedia RX	Crestron Electronics	DM-RMC-4KZ-100-C		1			
6-20	DigitalMedia RX	Crestron Electronics	DM-RMC-4KZ-100-SC	assembled in lectern	1			
6-30	3 Input HDMI DigitalMedia Switch	Crestron Electronics	DM-TX-4KZ-302-C		1			
6-40	6 Input 2 Output DigitalMedia Presentation Switch	Crestron Electronics	HD-PS622 HDR	assembled in rack	1			
6-50	4K video decoding media player, POE+,	iCompel	ICRP-HD-QR-N-R3		1			
6-60	Document Camera	Epson	DC-21	assembled in lectern	1			
6-70	2 x 2 USM 3.0 Matrix Switcher	Inogeni	TOGGLE	assembled in lectern	1			
6-80	Collaboration Hub	Kramer Electronics	VIA Connect Plus	assembled in rack	1			
6-90	Robotic Camera	Lumens Digital Optics	VC-TR1		1			
						VIDEO SYSTEMS TOTAL		
CONTROL SYSTEMS								
CTL-10	Control System	Crestron Electronics	CP4	assembled in rack	1			
3-100	10 inch Touch Screen	Crestron Electronics	TSW-1070-B-S	on wall	1			
						CONTROL SYSTEMS TOTAL		
MISCELLANEOUS EQUIPMENT AND SYSTEMS								
1-1B	Fan Top	Middle Atlantic	BGR-276FT-FC		1			
1-10	DWR Series Pivoting Wall Rack - DWR-35-22 (loaded with equipment)	Middle Atlantic	DWR-35-22	equipment rack with equipment decommissioned	1			
1-10.1	Fan Kit with Thermo Controller	Middle Atlantic	FAN2-DC-FC		1			
1-01.2	Solid Front Door	Middle Atlantic	FD-35		1			
1-20	62 inch wide by 32-40 inch high Lectern (loaded with equipment)	Spectrum Industries	Freedom XRS		1			
8-10.2	**Projector cart, heavy duty, adjustable 24"-42"**	**Luxor**	**LUX-AVJ42XL**		**1**			**addendum 3**
MSC-10	**Miscellaneous Wire, Cable, Connectors (allow for additional hardware/accessories stored prior to demoilition)**	**Custom**	**By Audiovisual Contractor**		**1**			
						TOTAL EQUIPMENT COST		
						ENGINEERING		
						PROJECT MANAGEMENT		
						PRE-INSTALLATION & RACK FABRICATION		
						INSTALLATION (Union or Non-Union)		
						TAX		
						G&A		
						NON-EQUIPMENT COST		
						TOTAL AV CONTRACTOR COST		