

# *Atlantic City Convention Center LED Sign - Wave Wall*

*1 Convention Boulevard*

*Atlantic City, NJ 08401*

Project Manual

Project Number: 17010.01

Construction Documents

July 1, 2018

**Addendum #1**

**August 3, 2018**





**DOCUMENT 000002**

**PROJECT TEAM**

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**END OF SECTION**



**SECTION 000110**

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**PROCUREMENT AND CONTRACTING REQUIREMENTS**

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**DIVISION 01 – 10 NOT USED**

**DIVISION 11 - EQUIPMENT**

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**END OF DOCUMENT**



## PART ONE: GENERAL

### 1.1 RELATED DOCUMENTS

#### A. General

This specification covers installation, technical support, maintenance and warranty support associated with a large "Wave Wall Marquee" LED signage display in the main lobby of the Atlantic City Convention Center in Atlantic City, NJ. The objective is to procure and install the display, associated wiring and source device, as well as establish pricing agreements covering ongoing support and maintenance for a period of one year commencing on the date of substantial completion of the display covered within this section.

Bids must also include separate pricing for and extended parts and labor warranty for each of the following durations:

Year 2

Years 2 & 3

Years 2 through 4

Each warranty year shall include a 6 month and 12 month preventive maintenance inspection, 48-hour response time, hot-swap replacement parts, on-site labor and an online service log for all extended warranty service performed and parts provided.

#### B. Stipulations

The specifications section "General Conditions" or other correspondence provided by the owner with this document and related amendments, form a part of this specification by this reference thereto and shall have the same force and effect as if printed herewith in full.

#### C. Project Drawings

The drawings for the project include the following drawings provided in support of this Section dated 8-25-17. The Video Renovation drawing set includes five (5) sheets including the following:

#### D. Project Specifications

Section 115201 Atrium Wave Wall Marquee (this document)

### 1.2 SCOPE OF SPECIFICATION

The intent of this section is to define the products, methods and scope of services required to provide a single professionally installed, performance tested and fully operational LED signage system. This section in conjunction with the project drawings defines the technical, functional and performance requirements for the specified system.

The systems specified herein shall be purchased by the Atlantic City Convention Center Authority from a qualified contractor whose current business operations and experience, include the successful integration of video display systems on projects of size and scope similar to the system specified herein as well as maintaining all capabilities, qualifications, staffing and expertise as described within this section. The contractor's proposal shall be provided on a lump sum basis with unit price details.

The contractor's proposal is to be based on a Lump Sum price inclusive of all items required to meet the design intent. The design intent is specifically defined within Part 1, 2 and 3 of this Section and

on the drawings that are referenced to, and part of, this section. Equipment as described in part 2 of this section prepared as a convenience to the bidding contractors. The contractor's lump sum price shall include all materials and services as required to fulfill the design intent.

The proposed lump sum price shall include all goods and services as shown on the project drawings and within these specifications.

The Video renovation project includes the following items:

Main Hall 3680 x 1120 pixel LED display, including all mounting hardware and Display Interface Unit (DIU)

Rack room equipment, including video equipment rack, PDU, surge protector, fans and mounting accessories

Digital signage players

Cabling connectors and all related interfacing equipment

### 1.3 SYSTEM DESCRIPTIONS

The following provides a description of the features and equipment to be included within the video display system for this project.

1. This system is comprised of one approximately 4,300 lb., 168 inch high x 540 inch wide curved LED display wall, Display Interface Unit (DIU), outboard windowing processor, signage players and mounting equipment and accessories.

The display will be mounted in the main atrium lobby, suspended overhead above the Rock Bar. The display will be comprised of 1,288 LED modules, each with 80 x 40 pixels with 3.8 MM pitch. Weight is approximately 4,300 lbs. The display will be mounted on an existing curved wall structure as pictured below:



2. All functions and features specified herein are to be provided by the contractor. Where specific manufacturer's names and model numbers are specified, such identification is to identify the expected performance parameters and to functionally define the specific product requirement.

Where a contractor intends to provide goods other than those specifically identified, such "equivalent" items must be clearly identified in the Post Award Initial Submittal. "Equivalent" items included in the Post Award Initial Submittal must include written certification from the



manufacturer of the "equivalent" item stating the equivalency of each and every substituted item relative to the specified items in regard to features, function, performance and future expansion capability.

Contractors wishing to provide "equivalent" products for specified devices may be required to demonstrate the equivalency of the proposed substitute items to the owner at the contractor's expense. Such proof of equivalency, in addition to the manufacturer's letter as noted above, may include the following:

- a. An on-site, side-by-side demonstration of both the specified and proposed substitute items.
- b. A formal bipartisan, laboratory test report comparing the technical performance of each and every proposed substitute, versus specified item.

Such test reports for Video System components, shall include a spreadsheet comparison of all critical distortion, power, frequency response, noise and dynamic range measurements.

All comparison tests for Audio Video System components shall be performed following the established AES and/or ICIA defined, testing procedures.

The responsibility of proving the equivalency of substitute products with respect to the specified products shall lie solely with the contractor.

All costs associated with providing information or performing the above outlined tests and comparisons required to confirm the equivalency of substitute products shall be at the sole expense of the contractor. Such costs may include but are not limited to:

- \* Independent laboratory tests
- \* Cost of equipment items for demonstration of specified and proposed substitute items
- \* Contractor incurred travel costs and miscellaneous expenses
- \* Professional Services Fees (architects, engineers and consultants) charged to the owner as a result of time charged to participating in the review of proposed substitute items.

## 1.5 REFERENCES

All work included in this specification is to be performed within the guidelines of the following standards:

- A. NEC (National Electric Code).
- B. ASTM (American Society of Tests and Measurements).
- C. IEEE (Institute of Electrical and Electronic Engineers).
- E. NAB (National Association of Broadcasters)
- F. InfoComm (International Communications Industry Association)
- G. ADA (Americans with Disabilities Act)
- H. ANSI (American National Standards Institute)

## 1.6 DEFINITION OF TERMS

- A. The term "Contractor" or "Video Systems Contractor", refers to the Video System contractor who has been awarded the contract for providing the goods and services specified and defined within this specification section.
- B. The term "or equivalent" when mentioned in regard to a specified product or device shall mean that the contractor may provide a functional and technical equivalent product in place of the listed item or device. Determination of equivalent models or products shall be at discretion of the owner following the guidelines defined in paragraph 1.4 above.
- C. The term "Work By Others" shall mean: Any work required by the project but not required of the contractor or subcontractor responsible for this section. Assignment of and Execution of, "Work by Others" as defined within this section shall be the responsibility of the owner, the owner's general contractor or the project electrical contractor.
- D. The term "Furnish" shall mean: Supply the referenced device, item or system including all applicable warranties to the owner.
- E. The term "Install" shall mean: Deliver the referenced item to the project; physically install the item including all terminations, mounting or other labor necessary to successfully integrate the referenced device, item or system into the project including all applicable warranties.
- F. The term "Provide" shall mean: Furnish and Install the referenced device, item or system.
- G. The term AV System, or Video Systems shall mean the complete systems as defined within this section including video equipment, lighting equipment, control system equipment, digital conversion equipment and related items that are described herein, mentioned herein, shown on the referenced AV drawing set or as necessary to fulfill the design intent.
- H. The abbreviation AV shall mean Video.
- I. The term CTS shall mean Certified Technology Specialist. The CTS certification program is ANSI certified, industry recognized certification program developed and administered by InfoComm International that confirms an individual's general knowledge of AV products, systems and generally accepted practices of the AV industry.
- J. The term CTS-I shall mean Certified Technology Specialist with Installation Specialty. The CTS-I certification program is ANSI certified, industry recognized certification program developed and administered by InfoComm International that confirms an individual's specific knowledge and experience with respect to the installation and implementation processes, technical requirements and best practices associated with the installation and implementation of AV systems typical of those described within this section.
- K. The term CTS-D shall mean Certified Technology Specialist with Design Specialty. The CTS-D certification program is ANSI certified, industry recognized certification program developed and administered by InfoComm International an individual's specific knowledge and experience with respect to the engineering, design, installation and implementation processes, technical requirements and best practices associated with the implementation of AV systems typical of those described within this section including the professional services and related integrities required to assure that a system of the type defined within this section is properly coordinated with all members of the project team and respective trade groups serving the project.
- L. The term "Owner", shall mean Atlantic City Convention Center.

## 1.7 SUBMITTALS

### A. Pre-Bid

All Contractor pre-bid questions pertaining to the AV System specifications and the scope of work described within this section shall be reviewed by, signed and submitted by an experienced and qualified staff member of the bidding contractor.

Qualifications and experience for the person who shall review, sign and submit pre-bid AV questions shall be as described within paragraph 1.8.B below.

### B. With Bid

#### 1. Unit Price and AV System Cost Information

The contractor proposal shall include a complete Unit Price schedule identifying all system components, labor, miscellaneous materials, project management services, engineering services, programming services, warranty, field labor, in-house labor including unit price and extended price for each, a subtotal of equipment and material costs, a subtotal for all labor and services as well as a lump sum price for the overall scope of work for each specified AV System Type.

Provide a cost summary displaying the overall system cost for each AV system type multiplied by the total number of required systems.

Provide Contractor Acknowledgement as shown on Page 5 of the attached Contractor Quote Form document.

Acceptable format for this submission is provided in the pages that follow this section.

#### 2. Facility and Capabilities Report

Provide detailed professional resumes of the bidding contractor staff members who shall be fulfilling the roles defined within paragraph 1.6 of this section. Provide a written statement signed by an officer of the company stating that if the company is awarded the specified work, that the contractor shall assign the identified staff members, or equivalently qualified staff members to the project for the duration of the project. Failure to include the above stated resumes and letter in the bid response shall be grounds for rejection of bid.

Provide a summary of the Video System contractor's capabilities, which satisfactorily demonstrate that the selected Audio Video System vendor maintains the physical plant, personnel and equipment necessary to provide the specified systems.

The report shall also include a sheet identifying the contractor's test equipment inventory as of the date of bid. This inventory at a minimum must include the following equipment items:

Dual Channel 20mhz Oscilloscope  
Polarity Tester  
HDMI/HDCEP Compliance Tester  
Light Meter

Provide a list of five projects similar in scope and complexity to this project. Include client names and contact information for each project. Projects must include Video Systems of similar size and scope.

All qualification information shall be reviewed by the owner's representative to verify that the Video System contractor maintains the capabilities and experience necessary to ensure that a satisfactory system installation is accomplished.

Should the owner determine that the submitted qualifications do not meet the specified requirements, the general contractor shall be required at no additional cost to the owner, to cancel any agreements with the proposed Contractor and to then subcontract the services of a Contractor who's qualifications fulfill the specified requirements.

C. Shop Drawings

Within 45 days of award, provide the following information for review:

1. Bill of Material

Complete bill of material including all material, component devices and equipment required for complete and operable systems. The bill of material shall contain the following information for each item listed:

- a. Quantity
- b. Description
- c. Manufacturer's name and model number

2. Product Data Sheets

Provide a complete set of product data sheets for all equipment, devices, hardware and related items that shall be provided. The Data Sheets shall be presented in 3 ring binder format, tab and organized such that the data sheets are readily referenced to the above noted Bill of Material Sheet.

3. Engineering documentation identifying any and all proposed variances from the specified system layout.

4. AV Plan Drawings, Device, Cable and Related Legends

Provide Device legend information for all field installed AV equipment items. Device Legend information shall include the following:

- Device ID
- Device Name
- Device Description
- Manufacturer Name
- Manufacturer Model Number
- Back Box Description
- Back Box Dimension
- Back Box Height
- Device Weight
- Device Location
- Heat Load Information

Electrical Load Information  
Clear Definition of Work Required by Others  
Conduit and Related Rough-in Requirements  
Cable Pull Information  
Device Color Information  
Applicable Notes

Provide scaled device location drawings showing all wall and floor mounted AV system devices located in floor plan.

Provide scaled device location drawings showing all ceiling mounted AV system devices within a properly coordinated ceiling plan.

5. Section and Elevation Details

Provide scaled and properly dimensioned section and elevation details showing all video displays, equipment racks, and related AV system devices.

6. AV Plate and Panel Drawings

Provide scaled drawings identifying all AV connection plates, panels and related devices. Plate and Panel drawings shall include:

Plate Dimension  
Detailed view of each required connector  
Lettering Requirements  
Plate/Panel Material and Finish  
Plate Color  
Lettering Color  
Connector Colors

Any other information required for successful manufacture/ fabrication of the plate and panel devices for the project.

7. Single Line Diagrams

Provide single line drawings for each of the following disciplines:

Video  
Network and Data Connections  
Electrical

Single line diagrams shall indicate each and every AV equipment item, signal flow, input connection information, output connection information, bus connection information, port information, signal type, cable numbering and related circuit information for all AV equipment devices as well as the following information:

Location reference for each device shown in single line.

Cable system details including all input plates, panels and connectors.

Indicate device, panel and plate locations coordinated with the riser and block diagrams.

Organized cable numbering system for all system cables. Include cable schedules following the cable designations indicated on the schematic and functional diagrams. Cable schedules shall be provided for field wiring, inner-rack and inter-rack terminals.

AV network diagrams shall indicate all interconnections between the AV system, building network devices, telephone equipment devices and any other connections associated with equipment being provided by others.

8. Equipment Rack Details

Provide properly scaled front and rear rack elevation details for all equipment rack assemblies. Equipment rack layouts shall include all front and rear mounted devices, including device name and number coordinated with the single line diagrams. Show all blank, vent, tie line and custom fabricated panels.

Show overall dimensions of each rack assembly including height, depth, width and weight.

Show scaled labeling details for each rack mounted equipment item.

Identify each equipment rack by make and model.

Provide EIA rack spacing reference adjacent to all rack elevation details such that rack locations and heights for all rack mounted devices can be easily identified by way of their vertical position in the rack.

Provide scaled, properly dimensioned details relevant to cable entry, ladder trays, cable management, back-boxes and appurtenances associated with the physical installation of each AV equipment rack.

Provide electrical connection information.

Show all vertically mounted electrical distribution devices within each rack assembly.

9. Suspended Device Drawings

Provide mechanical drawings depicting weights, scaled dimensions and related information required for fabrication, assembly and installation for all products covered by this section that shall be suspended from walls, ceilings or other overhead installation conditions.

Suspended device drawings must be prepared, signed and sealed by a properly qualified engineering professional.

10. AV Network Device Ledger

Provide a well-organized ledger sheet presented in 8.5" x 11" format that clearly describes all AV devices requiring connection to any network, network switch, LAN, WAN or Wireless network connection.

At a minimum, the AV Network Ledger Sheet shall include the following information for each and every network connected device:

- a. Device Name and ID #
  - b. Manufacturer Name
  - c. Model
  - d. MAC Address (if not available, leave space blank for later use)
  - e. IP Address (if not available, leave space blank for later use)
  - f. Switch ID
  - g. Port ID
  - h. Device Location
11. Name and contact information of the CTS-D and CTS-I certified staff members who shall be assigned to this project.
  14. Name, contact information and project resume, of the staff member or members who shall be responsible for final set-up and testing of the specified Video Systems (see paragraph 1.6.E below).
  15. The video contractor shall provide a Shop Drawing Sheet Numbering scheme that clearly differentiates the shop drawing documents from the construction document set that is provided with these specifications. Recommended sheet names would begin with an alphabetical prefix indicative of the video contractor firm name, followed by sheet number.

The contractor shall be authorized to use the specification "AV" drawing files for the purpose of preparing the required submittal and as-built documentation.

These drawing files and related title blocks may be modified by the contractor in their preparation of shop drawings, to reflect the as-built conditions and to identify the contractor as a participant and responsible installing contractor for the project. No other use or re-use of the specification drawings in whole or part, shall be allowed without the expressed written consent of the drawing author.

Unless specifically agreed to in writing by the owner and the drawing author, the contents of the AV drawing files shall not be re-used, copied or otherwise implemented by the contractor, it's employees or subcontractors for any other project, proposal, report, article or other form of publication.

If the contractor chooses to use the specification AV drawing files, the contractor shall clearly identify any changes, modifications or adjustments made to the drawings. The contractor shall clearly identify the original author of each drawing with notations of revisions including the name of the person making the revision, date of revisions and purpose of each revision.

D. As-Built Documentation

Upon completion of the systems installation and prior to formal acceptance of the Video Systems by the Owner, the Contractor shall submit "As-Built" versions of the shop drawing set as well as other documentation covered within this section.

E. Contract Close-out

At the time of formal acceptance of the systems by the owner, the contractor shall provide the following:

1. A minimum 12 page, 8.5" x 11" Simplified Video System Instruction Manual for each subsystem. This document shall be prepared specifically for this project and shall

provide the non-technical user with a step-by-step set of instructions defining all steps necessary to activate, connect and otherwise operate the specified Video System. These instructions shall at a minimum, cover the following topics:

- a. System turn on / off / reboot procedures
  - b. Signal routing, DUI and window processor use
  - e. Signage player use
2. One set of the owner/operator manuals for each video system component as supplied by the component manufacturers. Manuals shall be provided, three hole punched and mounted in a three-ring binder. The contents shall be organized with an alphabetized cover sheet and alphabetized tabs for each of the equipment items. The binder shall be turned over to a representative of the owner upon completion and acceptance of the systems installation.

Binder shall be provided with clear identification of its purpose and content.

3. One set of system functional diagrams shall be provided for each system, laminated and mounted adjacent to each equipment rack assembly. Drawings shall be either xerographic or plotted original drawings. Diazo, blue-line or black-line copies are not acceptable.
4. Two complete sets of As-Built drawings printed to the project sheet size.
5. Two sets of the As-Built drawings printed 18" x 24" Sheets.
6. Two USB Thumb Drives with the following files provided in an organized file folder format:

Shop drawings in DWG format  
Shop drawings in PDF format  
Manufacturer's equipment owner/user/maintenance manuals in PDF format  
Software configuration files

## 1.8 QUALITY ASSURANCE

- A. All qualification requirements of this paragraph must be met by the bidding contractor. If the bidding contractor shall require the services of a qualified subcontractor in order to fulfill the specified qualification requirements, the qualified sub-contractor must be clearly identified in the bid response. All submittal requirements must be provided on the qualified vendor/subcontractor's letterhead.
- B. The contractor shall provide qualified, industry certified staff members for all technical work associated with the work of this section.

At least one ANSI/InfoComm International Certified Technical Specialist with Design Specialty (CTS-D), certified staff member must be provided by the contractor. The CTS-D staff member must maintain a minimum of five-years design and/or project management experience.

The certified (CTS-D) staff member must be engaged in the project throughout all phases of design, integration and testing. The designated CTS-D staff member shall be responsible for the following:



1. Review and approval including signature of all shop drawings, submittals and documentation prepared by the contractor.
2. Review and approval of any scope of work associated with any change order, work modification or field work order. All change orders must be reviewed and approved by the project CTS-D prior to final submission of such change orders to the owner, general contractor or architect.
3. Review, approve and/or preparation of all Request For Information or similar documents submitted by the contractor.
4. Resolution of any technical, trade, scope of work or similar disputes that may arise throughout the course of the project.
5. Attendance at meetings with the owner, architect, general contractor or electrical contractor
6. Site inspection and approval of all work including shop fabricated items, field installed devices and the overall system installation prior to demonstration to the owner.
7. All demonstration to, and training of, the owner.
8. Review and approval of all as-built submissions including owner manuals.

The following items may be performed by either a CTS-D or CTS-I InfoComm/ANSI Certified or equivalently qualified staff member:

9. Field verification of all work by others including but not limited to:
  - a. System Grounding
  - b. Electrical Systems
  - c. Rigging
  - d. Millwork
  - e. Mechanical Systems
  - f. Cabling Systems
10. Supervision of Field Terminations
11. Fabrication, terminations and preliminary testing of pre-fabricated equipment rack assemblies.

All other contractor staff members performing technician level work specified within this section but not identified in items 1 through 11 above must be minimally certified as an InfoComm/ANSI Certified Technical Specialist (CTS).

Qualified contractors who do not participate in InfoComm/ANSI Certification and training, yet otherwise maintain personnel qualified to fulfill the intent of these specifications must provide the following information for review and approval by the project architect:

Personal resume of, including project references for six projects of similar size and scope and itemized list of technical capabilities of the staff member who shall be responsible for the successful integration of the specified systems and all items defined above under items 1 through 8.

Said individual must maintain a minimum of five-years, experience in Video Systems integration, a bachelor's degree in electrical engineering from a fully accredited college or university and must be prepared to readily demonstrate capabilities equivalent to those of an InfoComm International CTS-D certified individual.

Personal resume of, including project references for six projects of similar size and scope and itemized list of technical capabilities of the staff member who shall be responsible for the successful integration of the specified systems and all items defined above under items 9 through 11. Said individual must maintain a minimum of four years' experience in video display systems integration, an Associate's Degree in electrical-electronic engineering technology from a fully accredited college or university and must be prepared to readily demonstrate capabilities equivalent to those of an InfoComm/ANSI certified CTS-I individual.

Failure to comply with the Quality Assurance requirements defined above shall constitute breach of contract by the video contractor. Should the video contractor be found to be in breach of this paragraph, the owner reserves the right to hire an Independent Technical Service Provider of their choosing to provide the services described in item 1 through 11 above.

Should the owner choose to hire an Independent Technical Service Provider as a result of the video contractor's failure to fulfill the requirements of items 1 through 11 above, all costs associated with hiring the Independent Technical Service Provider shall be deducted from the video contractor's lump sum price for the project.

- C. The contractor shall be required to attend a minimum of two (2) pre-installation conferences with the owner's representative. The intent of these conferences shall be to review the contractor's submittals and to review the proposed methods of implementation and to coordinate the Video System installation with the work of other trades.

The contractor shall be responsible for providing coordination documentation that shall insure that the owner's staff or designated contractors can properly provide electrical power to the Video Equipment Rack as well as sufficient physical space for the Equipment Racks.

The video contractor shall be responsible for reviewing all AV work that shall be provided by others. The review of work by others must be provided in a timely and well-coordinated manner. Any discrepancies found by the video contractor must be clearly and concisely identified in writing and provided to the owner within five days of the date of review.

- D. The video contractor shall inspect and verify all work performed by the project electrical contractor as necessary to insure that all work including, device installation, power receptacles, back-boxes, conduits, etc, are performed in compliance with these specifications.
- E. Video System final set-up shall be accomplished by a qualified Video System technician or engineer who has been trained in the procedures and methods necessary for successful Video System installation.
- F. The contractor's services shall include a qualified staff member with significant and demonstrable experience with the specified or equivalent, LED video system as well as current factory issued certifications confirming such experience and qualifications.
- G. All materials shall be new and shall conform to applicable provisions of Underwriters Laboratories and the American Standards Association.

- H. Safety Certifications as required to meet local code and as required for obtaining the owner's Certificate of Occupancy, are the responsibility of the contractor.
- I. Prior to the owner and/or the owner's consultant review of the installed AV systems, the video contractor's CTS-D certified staff member shall perform an initial review of the system's completeness and readiness for demonstration to the owner and/or the owners AV System consultant. The video contractor's review shall be performed using the "Standard Guide for Audiovisual Systems Performance Verification Checklist" as published by InfoComm International. All relevant elements of that checklist shall be verified, noted and submitted by the video contractor for the owner's review, prior to demonstration of the system condition or training of owner personnel.

#### 1.9 DELIVERY, HANDLING AND STORAGE

##### A. Packing and Shipping

- 1. All items delivered to the job-site shall be properly packaged and sealed.
- 2. All items to be delivered to the job-site via contractor vehicles shall be properly and adequately protected. Equipment racks are not to be delivered to the job-site, unprotected and unpacked.

##### B. Acceptance at Job-Site

- 1. All deliveries of specified components are to be received on the job site by the contractor.

##### C. Storage and Protection

- 1. The contractor shall be required to maintain adequate fire and theft protection for all specified items of equipment through the duration of the project.

Upon written notice by the contractor to the owner, the owner may provide a secured area for equipment storage for a limited period of time during the installation.

The schedule of time where such secured areas shall be required must be identified by the contractor and submitted to the owner at least three weeks prior to the delivery of equipment.

Although the owner may provide the aforementioned secured areas, responsibility of equipment protection and liability for fire and theft damage shall remain with the contractor.

#### 1.10 SCOPE OF WORK

All labor, equipment, apparatus, and wiring devices, as required to provide the systems with broadcast quality in excellent working order, as specified herein, and as specified by relevant drawings, including:

- A. Submission of drawings for approval by the owner's representative prior to fabrication and installation.
- B. Furnish and Install video cable within racks and as required to fulfill the described project scope.

- C. Furnish and install all fiber optic and copper network cable as required between the IDF and LED Wave Wall.
- D. Furnish and install all Raceway, J-Hooks, Ladders, related hardware and appurtenances as required for proper, code compliant installation of the fiber optic and copper network cable as required between the IDF and LED Wave Wall.
- E. All cables installed between the IDF and LED Wave Wall shall be concealed from view. If these cables cannot be concealed by way of ceiling or wall installation, provide sufficiently sized conduit or enclosed raceway devices as necessary to ensure that these cables are not exposed to public view.
- F. Verification of dimensions and conditions at the job site.
- G. Coordination of electrical and physical requirements.
- H. Installation of all specified materials in accordance with these specifications, manufacturer's recommendations and all applicable code requirements.
- I. Initial tests and adjustments of the systems as well as final equalization and alignment of the systems.
- J. Training as defined in part 3 of this section.
- K. Maintenance services and warranty repair service for one year following acceptance of the systems.
- L. Provision of As-Built and Contract Closeout Documentation.
- M. Provide all labor on-site as required to install the specified components and systems. On-site labor shall be performed in harmony with all other trades and trade jurisdictions.
- N. Procure and pay for all necessary permits, licenses and inspections and observe any requirements stipulated therein.
- O. Conform in all applicable trades with all local regulations and codes.
- P. Comply with federal, state and local labor regulations and applicable union regulations.
- Q. Provide miscellaneous AV cable assemblies as necessary to connect the specified devices to plates, panels and related devices.
- R. Proof of Performance Demonstration
  - I. Following substantial completion of the renovated system installation and following the contractor's effort to confirm that all systems have been installed and tested for compliance with the specified requirements, the video contractor shall provide a complete system demonstration where all features, functions and system capabilities are demonstrated to the owner, the construction manager and their AV consultant.
  - II. The video contractor's proof of performance demonstration shall be presented by the staff member who fulfills the requirements defined in paragraph 1.8.B.1 through

1.8.B.8 above. See also paragraph 1.8.H above and in compliance with the requirements of Part 3 of this section.

- S. Furnish and Install all miscellaneous rack plates, panels and connectors including terminal strips as required.
- T. Provide Life Safety Mute as required by Local Codes.
- U. Coordinate all work to occur in harmony with the owner's scheduled use of the facility.

1.11 RELATED WORK

None

1.12 PERFORMANCE REQUIREMENTS

Prior to formal acceptance by the owner, the specified systems shall be tested in accordance with the procedures and requirements as outlined in section 3 of this document. The results of all systems tests and measurements shall be documented by the Videos Contractor as specified and defined in Part 3 of this Section.

End of Page

End of Part 1

## PART TWO - PRODUCT SPECIFICATIONS

### 2.1 GENERAL

#### A. Manufactured Products

1. All equipment provided by contractor shall be "brand new".
2. Demonstration models or previously used equipment shall not be acceptable.
3. Equipment that was specified as current but rendered obsolete by a manufacturer shall be identified by contractor in contractor's bid response.
4. Owner reserves the right to accept a substitute item as the closest replacement item at the expense of the contractor if not notified in advance of the obsolescence of the specified item.
5. Technical specifications for each item may or may not be identified within this document. Contractor shall be advised that in lieu of exact technical or functional specifications provided for each item, the technical and functional specifications of each item shall be implied by the specific make and model number identified herein.
6. The products listed within this section including manufacturer names and model numbers provide a definition of features, capabilities and quality required for each specified item. The contractor may submit alternative, equivalent product models for approval as defined in paragraph 1.4 of this section.

#### B. Custom Fabricated Items

All custom fabricated items are subject to the owner and engineer's approval of the contractor's shop drawings, samples or prototype submissions for the custom fabricated items. Custom fabricated items are to provide a professionally fabricated, "made to order" appearance.

### 2.2 MATERIALS

The material requirements for the Video System are defined by the following material list and the project drawings. Quantities shown within the specification text are provided as a convenience to the bidding contractors. Contractor shall be responsible for providing all materials in the quantities required to fulfill the intent of the specified system, as defined within this document and as shown on the system design drawings. If a discrepancy exists between the drawings and text specification, the contractor shall provide the greater quantity, for instance:

The contractor is responsible for providing all equipment and devices shown on the drawings regardless of whether such devices are identified within the specification text. Refer also to paragraph 1.3 of this specification for further detail of the functional requirements of the specified system. Materials defined within paragraph 1.3 are required regardless of identification within this paragraph or shown on drawings.

## 2.3 EQUIPMENT

### A. LED Display Wall:

1. (1) NanoLumens Nanocurve 46W X 28T as indicated on drawings AFAB-11253-VOL
2. (1) NanoLumens DIU w/ 2 Send Cards

### B. Network Switch:

3. (1) Cisco C3560CX-12PC – 12 port POE Ethernet switch with 2 SFP uplinks

### C. Windows Processor:

4. (1) Analog Way NXT1604-4K-AE  
Quote #000048458 dated 6/8/2018 by Seth Teates (240) 483-6921

### D. Signage Players:

5. (4) BrightSign XT1144 Expanded I/O Player

### E. Equipment Rack:

6. (1) Middle Atlantic DWR-18-32 wall rack
7. (2) Middle Atlantic U1 – 1RU rack shelf
8. (1) Middle Atlantic blank panels, lot
9. (1) Middle Atlantic vent panels, lot
10. (1) Middle Atlantic trim screws, lot
11. (1) Middle Atlantic UPS2200-8-IP UPS
12. (1) Middle Atlantic RM-KB-LCD-17-KVMHD - rackmount KVM

End of Page

End of Part 2

### 3.1 INSTALLATION

#### A. General:

1. All materials and equipment are to be new and unused.
2. Wiring practices unless herein specified to the contrary shall be in strict conformance with the contents of the "AV Installation Handbook The Best Practices for Quality Audiovisual Systems" Second Edition as published by InfoComm.
3. Fastenings and supports for all fixed equipment and components including conduit and cables, to provide a safety factor of 5 or better.
4. Installation with all precautions necessary to prevent against electromagnetic and electrostatic hum.
5. All precautions necessary to assure adequate ventilation.
6. Precautions to assure the safety of users shall be implemented as required by applicable codes.
7. Microphone and 600-ohm lines fully insulated from each other and from their conduit.
8. Lines in conduit free of any splices.
9. Wiring joints and connections made with rosin-core solder or approved mechanical connections.
10. Cables free from wiring damage.
11. All equipment installed neatly, with boxes and racks plumb, level and true to line and level.
12. Switches, connectors, jacks, receptacles, conduits, outlets and cable terminations clearly, logically, and permanently marked.
13. Moderate moves or changes as necessary to accommodate aesthetics to preserve symmetry, and for pleasing appearance without claim for additional payment.
14. Cooperation with other trades to achieve well-coordinated and satisfactory order.
15. Job shall be adequately staffed at all times.
16. Same individual in charge of work throughout execution, unless illness, loss of personnel, or other circumstances beyond the control of the contractor intervenes.
17. Job site and all equipment and materials left clean and free of marks and blemishes.
18. All work shall be provided in a manner such that the work is provided in compliance with the general requirements stated within or implied by the "Standard Guide for Audiovisual Systems Performance Verification Checklist" as published by InfoComm International.

### 3.2 IDENTIFICATION

- #### A. Provide permanent intelligible identification on, or adjacent to all controls, fuses, circuit breakers, patching jacks, conduit receptacles, and the like. This identification shall clearly and distinctly indicate the function of the item and shall be numbered or lettered to correspond with the function, circuit and use consistent with the field and shop drawings.
1. Identification of fuses and circuit breakers shall indicate protected circuitry, rating of protective device and voltage across open circuited protected device.
  2. Panel surfaces shall be engraved and filled, silk screened or shall be equipped with 1/16 inch laminated plastic labels with engraved characters at least 1/4" inch height (white characters on black background). Under no conditions shall embossed plastic labels, transfer lettering (Chartpak, LetraSet, etc) or other make shift labeling be considered acceptable. Engraving and other identification requirement specifically shown on the specification drawings prevail over this paragraph.
  3. Each principal element of the system shall be completely integrated with consistently identified terminal strips or blocks for all connections. These designations shall be shown on related drawings and documentation.



4. All rack mounted devices shall include an engraved laminate tag (black tag with white letters) that identifies the rack mounted device using the abbreviated nomenclature shown for that device within the project shop drawings.

### 3.6 DEMONSTRATION AND ACCEPTANCE TESTING

#### General:

Upon approval of the above test report, and at a time set by the owner's representative, the contractor shall demonstrate operation of each major component of the system, each source device and display. After demonstration, contractor shall assist as required in the following acceptance tests which shall be conducted by the owner's representative:

#### B. Equipment Tests:

1. May include measurements of light output, light consistency or other performance characteristics.
2. May be performed on any item or group of items to verify conformity with specifications.

#### C. Additional Adjustments and Tests:

If need for additional adjustment becomes evident during demonstration and testing, contractor's work shall be continued until the system installation operates properly.

### 3.7 TRAINING

Provide prepared and organized training sessions for the benefit of the owner's personnel. These training sessions shall be of the following minimum duration:

#### A. Video Systems Training                      8 Hours

The training requirements shall include multiple sessions including on-site support for 4-hour event support. Training and event support shall be provided by the CTS-D or equivalently qualified project lead personnel and/or the CTS-I or equivalently qualified AV technician or technicians who are directly familiar with the work described and provided under this section.

### 3.8 GUARANTEE

- A. Labor and materials provided under this specification shall be warranted, commencing on the date of final acceptance of the installation by the owner, for a period of one year, to be free of defects and deficiencies, and to conform to the component specifications and this document as to kind, quality, function and characteristics. Defects in labor, or materials, occurring within the warranty period shall be rectified by replacement or repair without charge. Paint and exterior finishes are excluded from this warranty, unless damage or failure is the result of defective materials or workmanship covered by warranty, or work performed under warranty in the repairing of defects.
- B. Warranty service shall be provided to the owner for the warranted items within 48 hours of notice to the contractor.
- C. Manufacturer's warranties which exceed the one year Contractor warranty shall be activated in the owner's name prior to system acceptance. Warranty cards and

registration information shall be executed in the owner's name and forwarded to the respective manufacturers prior to final system acceptance.

### 3.9 MAINTENANCE AND SERVICE

- A. Provide one maintenance site visit at six months and twelve months following the system acceptance.

During the maintenance site visit, activate all system components and verify proper operation of controls and devices. Repair or replace all defective materials within the scope of the above stated warranty.

- B. All service calls answered by contractor within 48 hours.

### 3.10 Performance Verification Checklist

The contractor shall provide all services necessary to complete the AV industry standard checklist questionnaire as defined on the following pages.

This checklist and report has been prepared using the InfoComm International Standard Guide for Audio Visual Systems Performance Verification Checklist as a basis for providing an organized report on the condition of the above noted AV system as of the dates noted above.

The InfoComm Standard Guide is intended to provide owners, consultants and integrators with a comprehensive and singular source of tests to determine if the audiovisual system achieves the client's goals or objectives and that the system performs in accordance with the best practices of the industry. By providing this list to the audiovisual industry, InfoComm is establishing a set of commissioning guidelines to help industry professionals and their clients communicate effectively about their expectations for system performance.

#### Standard Guide for Audio Visual Systems Performance Verification Checklist

<b>Project Title:</b>	
<b>Description:</b>	
<b>Project Location:</b>	
<b>Project Architect:</b>	
<b>System Designer:</b>	
<b>Date of Report:</b>	
<b>Date of Site Visit/Tests:</b>	
<b>video contractor:</b>	
<b>Client:</b>	

#### Contents of the Standard Audiovisual Systems Verification Tests Checklist

I AV-PH	Physical Installation
II AV-CM	Cable Management, Termination and Labeling
III AV-E	Electrical
IV AV-S	Serviceability
V AV-A	Not Used for this project

VI AV-V	Not Used for this project
VII AV-N/AV-C	Not Used for this project
VIII AV-AC	Not Used for this project
IX AV-DR	Verification and Documentation

## Project Specific Notes and Reporting

Although not all segments or line items covered by the InfoComm Standard Guide may not be applicable to this specific project, all elements of the standard guide have been included in this report. In cases where a particular test or reporting element of the standard guide is not applicable to this specific project, such items shall be noted as Not Applicable (N/A) or otherwise explained.

### I AV-PH: Physical Installation

AV-PH-01	Site Inventory of AV Equipment  Is all equipment in shop or on site?
AV-PH-02	Installation Status of AV Equipment  Is all rackable equipment installed?
AV-PH-03	AV Rack Cleanliness  Racks are "clean" - grease markings removed, etc.
AV-PH-04	AV Rack Blanks and Vents Installation  All blanks and vents installed in unused rack spaces?
AV-PH-05	AV Patch Bay Labeling  All patchbays labeled
AV-PH-06	AV Patch Bay Configuration  Patchbays configured with all outputs on top rows, inputs on bottom rows
AV-PH-07	AV Rack Thermal Gradient Performance  Thermal gradient inspected; all equipment operating within manufacturers' guidelines
AV-PH-08	AV Rack Protective Treatments  Small racks have carpet tiles on bottom to avoid scratching credenzas.
AV-PH-09	AV Equipment Labeling  All engraved labels permanently fastened.
AV-PH-10	AV System Cabling Verification  All peripheral equipment hooked up as per flow diagram.

## **II AV-CM: Cable Management, Termination and Labeling**

AV-CM-01	AV Equipment Power Cable Management	Equipment without IEC removable power cords are not tie-wrapped to the cabinet, and there are no obstructions to the item being pulled from the front of the rack.
AV-CM-02	Verification of AV Rack Cable Installation	Tie wraps are not too tight as to deform the cable. UTP cables are laced and bound with Velcro ties.
AV-CM-03	Verification of AV Rack Cable Installation	Terminations are free from stress due to gravity acting on the cabling or cable dressing technique.
AV-CM-04	Verification of AV Rack Cable Installation	Terminations have sufficient service loop, allowing a re-termination or two without having to open a cable bundle or pathway to lay in a new cable.
AV-CM-05	Verification of AV Rack Cable Installation	Cables appropriately dressed and bundled according to cable type.
AV-CM-06	Verification of AV Rack Cable Installation	Verify cable supports are used depending on size and stiffness of cable.
AV-CM-07	Verification of AV Rack Cable Installation	Cables have appropriate separation according to signal type and level.
AV-CM-08	Verification of AV Rack Cable Installation	Verify all cables are installed with an adequate bend radius as recommended by the manufacturer and general system requirements.
AV-CM-09	AV System Cable Labeling	All cables have clearly legible, unambiguous identifying labels, and labels are oriented and positioned consistently. Labels are visible without system disassembly and are not hidden in cable bundles.
AV-CM-10	AV System Cable Labeling	All cable labels are permanent, non-slipping and according to specification.
AV-CM-11	AV Connector Verification	All terminations are in agreement with the equipment and system requirements.
AV-CM-12	AV Connector Verification	

All connectors are correctly seated to its mating connector.

AV-CM-13 AV Connector Plate Labeling

All connectors on input and output plates are labeled.

AV-CM-14 AV Connector Plate Labeling

Confirm all labeling nomenclature for consistency between drawings, touch screen labels, wall plates and other labeling of connectors, connection points and devices.

### III AV-E: Electrical

AV-E-01 AV System Power and Grounding

Verification Stray AC voltages on any equipment accessible to a user relative to ground?

AV-E-02 AV System Power and Grounding

Verification Neutral and isolated ground current test.

AV-E-03 AV System Power and Grounding Verification

Verify equipment is powered by correct circuits.

### IV AV-S: Serviceability

AV-S-01 AV System Serviceability

Input/output panels are easily accessible.

AV-S-02 AV System Serviceability

If there are obstructions prohibiting the disconnection of terminations on the back of AV equipment, there must be sufficient cabling to permit the equipment to be pulled from the front, and disconnected there.

AV-S-03 AV System Serviceability

It is relatively easy to find proper cable termination points when removed or replaced equipment is re-installed.

AV-S-04 AV System Serviceability

Equipment can be pulled for repair or replacement without hindrance.

AV-S-05 AV System Serviceability

Equipment must be able to be serviced indefinitely; designed with the maintenance technician in mind (he or she shall "own it" longer than the person who fabricated the system initially).

**V AV-A: not used, this project**

**VI AV-V: not used, this project**

**VII AV-N / AV-C: not used, this project**

**VIII AV-AC: not used, this project**

**IX AV-DR: Verification and Documentation**

AV-DR-01	AV System Documentation  There is perfect agreement between the "paper model" documentation (drawings), the control system user interface (i.e., touch panel screens, push button labels, panel engravings, etc.), and the physical wiring and labeling. This includes designation strips, equipment labeling, etc.
AV-DR-02	Video System Test Reporting  Video system tested (all pathways tested, all interconnections marked as tested on drawing).
AV-DR-03	Video Test Reporting  Video Tested (all pathways tested, all interconnections marked as tested on drawing).
AV-DR-04	Control System Test Reporting  Control tested (all pathways tested, all interconnections marked as tested on drawing). Emulate closures for screens, motors, etc.
AV-DR-05	AV System Commissioning Sanity Check  Sanity Check: Is there any reason why this system should NOT be turned over to the owner for use.
AV-DR-06	Final Commissioning Report and System Turnover  Prepare document report, certifying the product, performance, and practices are in compliance and note any exceptions. Distribute accordingly.

End of Part 3

End of Section 115200