Tom Green County

AV Court Technology

Construction Documents
Project Manual

Bid Set

February 4, 2022

HDR Project No. 10163575

TABLE OF CONTENTS

DIVISION 00

PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 00 26 00
SUBSTITUTIONS PRIOR TO BIDDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling requests for substitutions made prior to bid.
   1. Any product proposed by Contractor which does not meet requirements of Contract Documents, whether in product characteristics, size, performance, quality, manufacturer, or brand name is considered a substitution.
   2. In case of non-availability of materials contact Architect for review and action.

B. For bidding purposes, base all bids on materials, equipment, and procedures specified, or approved by Addenda.

1.2 SUBSTITUTION PRIOR TO BID

A. Submit complete data substantiating compliance of proposed substitution with Contract Documents.

B. Products and Systems:
   1. Product identification, including manufacturer's name.
   2. Manufacturer's literature marked to indicate specific model, type, size, and options to be considered:
      a. Product description.
      b. Performance and test data.
      c. Reference standards.
      d. Difference in power demand, connectivity, etc.
      e. Dimensional differences from specified unit.
      f. Finishes differences if specified finish is not available.
   3. Samples:
      a. Architect reserves right to request and retain sample until physical units are installed on project for comparison purposes.
      b. Samples shall be available in the Dallas/Fort Worth metroplex for testing by Architect and in Tom Green County for the Owner's review.
      c. Full size product samples should display the equivalent feature(s) and type of finish(es) for each item specified but are not required to match in color.
      d. Requester pay all costs of furnishing and return of samples.
      e. Architect is not responsible for loss of or damage to samples.
   4. Name and address of at least three similar projects that proposed product has been in use on for at least four years, and name and phone number of owner's and architect's or engineer's representative, which Owner or Architect can contact to discuss product, installation, and field performance data.

C. Construction Methods:
   1. Detail description of proposed method.
   2. Illustrate with drawings.

D. Itemized comparison of proposed substitute to specified item; make clear variations.

E. Identify effect and changes required on other trades, subcontractors or contracts.

F. Data related to any change in contract time.

G. Cost of proposed substitution in comparison with product, system or method specified.

H. Availability of maintenance and repair services, and sources of repair or replacement items.

I. Warranty comparison with specified product or system.

1.3 PRODUCT SELECTION - GENERAL

A. Certain types of products are described in Project Manual by means of trade names, catalog numbers or manufacturer's names, or both.
   1. This is not intended to exclude products from consideration which may be capable of accomplishing purpose indicated if price, quality, design esthetic, functional aspects and warranty are equal to or exceed specified products.

B. Other types of products may be considered acceptable to Owner and Architect in place of those specified.

C. Listing of a manufacturer implies acceptance of them only as supplier of a product which complies with specified item.

D. **No substitutions are permitted after execution of contract**, unless allowed by Contract Documents.

E. Conditional bids and voluntary alternates will not be considered unless allowed by Instructions to Bidders.

1.4 SUBSTITUTION REQUESTS

A. Only written requests with complete data for evaluation will be considered.
   ~~1.~~ Request must be received by 5:00 PM fourteen calendar days prior to bid day.
   2. Requests received late will not be considered.
   3. Submit evaluation data with attached form to martin.aguirre@hdrinc.com.

B. In making request for substitution, Suppliers represent:
   1. Personal investigation of proposed product, system or method, has been conducted and determined it equal or superior in all respects to that specified, and will perform intended function.
   2. Product, system or method is in full compliance with applicable codes.
   3. Warranty for substitute item as for product, system or method specified meets or exceeds specified product.
   4. Finish products shall comply relative to color and pattern with base specified items.
   5. Contractor will coordinate installation of accepted substitution into Work, to include building modifications if necessary, and be responsible for such modifications as may be required for Work to be complete and functional in all respects.
   6. Certified cost data is complete and includes all related costs, excluding Architect's review and redesign cost.
   7. Waives claims for additional costs or time extensions related to substitution which subsequently become apparent or are caused by substitution.
   8. Pay additional costs to other trades, subcontractors or contracts caused by substitution.
   9. Pay all Architect's review and redesign cost, special inspections, and other costs incurred by substitutions or revisions made necessary by acts or omissions of Contractor, due to product submittal or product not being ordered in a timely manner, due to ease of construction progress or Work, or which are in interest of or are for convenience of supplier, subcontractor or Contractor.
   10. Acknowledge acceptance of these provisions.

C. Supplier to sign substitution request in space provided on form acknowledging acceptance of terms.

1.5 APPROVAL OF SUBSTITUTION REQUEST

A. No verbal or written approvals other than by Addenda will be valid.
   1. Addendum listing approved substitutions will be published prior to Bid date.

1.6 REJECTION OF SUBSTITUTION REQUESTS

A. Substitutions may not be considered if:
   1. Submitted after stipulated date or time period.
   2. Not submitted in accord with this Section.
   3. Acceptance will require substantial revision of Contract Documents, building or system.
   4. Substitution request does not indicate specific item for which request is submitted.
   5. Substitution Request form is not properly executed and signed.
   6. Substitution request for manufacturer acceptance only.
   7. Insufficient information submitted.
   8. Substitution color, pattern or appearance does not comply with base specified item.
   9. Substitution does not appear to comply with requirements of specifications for base item.

END OF SECTION

SUBSTITUTION REQUEST

PROJECT: Tom Green County – AV/Court Technology

PROJECT NUMBER: 10163575

To Office of Architect via _____

SPECIFIED PRODUCT:

Substitution request for Item

Tag: _____

Item description: _____

_____

REASON FOR SUBSTITUTION REQUEST:

- ☐ Fails to comply with building code requirements
- ☐ Unavailable to meet Project schedule
- ☐ No qualified installer for specified item
- ☐ Supplier refuses to warrant item or installation
- ☐ Supplier, Subcontractor or Contractor convenience
- ☐ Other:
- ☐ Not available
- ☐ Reduce Project contract time
- ☐ Project cost savings
- ☐ Unsuitable for application
- ☐ Constructability issue

Explanation in Detail: ☐ See attached: _____

SUPPORTING DATA:

Attach product description, specifications, drawings, photographs, performance data, test data, environmental criteria, and any additional data or information for evaluation of the proposed substitution in accord with requirements of Section 00 26 00.

Sample is included:	Yes ☐	No ☐
Sample will be sent if requested:	Yes ☐	No ☐
Maintenance Service Available:	Yes ☐	No ☐

If yes, location: _____

Spare Parts Source: _____

PRODUCT/SYSTEM COMPARISON:
Provide a one-to-one comparison of proposed substitution with ALL specified attributes and qualities of specified item(s)

	SPECIFIED PRODUCT	PROPOSED SUBSTITUTION
Manufacturer:		
Name, brand:		
Catalog No.:		
Unit Cost:		
Attributes / Qualities / Variations / Warranty / etc:		

REFERENCES:
LIST MINIMUM OF THREE PREVIOUS INSTALLATIONS, WHICH PROPOSED PRODUCT HAS BEEN INSTALLED FOR AT LEAST FOUR YEARS:

Project: ____________________
Address: ____________________
Architect (name a phone): ____________________
Owner (name & phone): ____________________
Contractor: ____________________
Date Installed: ____________________
Dollar Value this Work: $ ____________________

Project: ____________________
Address: ____________________
Architect (name & phone): ____________________
Owner (name & phone): ____________________
Contractor: ____________________
Date Installed: ____________________
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Owner (name & phone): ____________________
Contractor: ____________________
Date Installed: ____________________
Dollar Value this Work: $ ____________________

Project: ____________________
Address: ____________________
Architect (name & phone): ____________________
Owner (name & phone): ____________________
Contractor: ____________________
Date Installed: ____________________
Dollar Value this Work: $ ____________________

EFFECT OF SUBSTITUTION:

Substitution affects other parts of Work:	No ☐	Yes ☐	(If yes, explain below)
Substitution requires dimensional revision or redesign of structure, mechanical, electrical or other connectivity Work:	No ☐	Yes ☐	(If yes, explain below)
Same warranty provided as specified base product:	No ☐	Yes ☐	(If no, explain below)

Explanation: _____

_____

_____

Cost difference:	$ _____	(add / deduct).
Total cost implications of substitution on Project:	$ _____	(add / deduct).
Total time implications:	$ _____	(add / deduct) calendar days.

STATEMENT OF CONFORMANCE OF REQUEST TO CONTRACT REQUIREMENTS:

Supplier, Subcontractor and Contractor in making substitution request or in using an approved substitution represent:

- ☐ Has personally investigated the proposed substitution and determined it is equal or superior in all respects to specified product or system and will perform intended function, except as stated above.
- ☐ Is in full compliance with applicable code requirements.
- ☐ Will provide same warranty for substitute item as for product, system or method specified.
- ☐ Will coordinate installation of accepted substitution into Work, to include building modifications if necessary, making such changes as may be required for Work to be complete in all respects.
- ☐ Waive all claims for additional costs or time extensions related to substitution that subsequently become apparent or are caused by substitution.
- ☐ If a finish product, color wise and pattern wise complies with base specified items.
- ☐ Certifies cost data presented is complete and includes all related costs under this Contract, excluding Architect's review and redesign cost.
- ☐ Will pay Architect's review and redesign cost, special inspections, and other costs caused by substitution. (refer to full wording in Section 00 26 00.1.4.B.9 above)
- ☐ Will pay additional costs to other contractors caused by substitution.
- ☐ Will modify other parts of Work as may be needed, to make all parts of Work complete and functioning.
- ☐ Acknowledge acceptance of these provisions.

List of Attachments: _____

_____

ACKNOWLEDGEMENTS:

FOLLOWING FIRM HEREBY REQUESTS CONSIDERATION OF FOLLOWING PRODUCT OR SYSTEMS AS A SUBSTITUTION IN ACCORD WITH PROVISIONS OF CONTRACT DOCUMENTS:

Supplier/Vender: _____

Acknowledged by (print): _____ Date: _____

Signature: _____ Phone _____

Position: _____

END OF SUBSTITUTION REQUEST

SECTION 00 41 13
BID FORM

DATE: _____

Bidder, _____, a * _____ organized and existing under

the laws of the State of _____, does business as ** _____.

* Insert corporation, partnership, or individual, as applicable.
** Insert trade or business name.

TO: Tom Green County, Texas, 112 W. Beauregard Ave., San Angelo, Texas 76903
Hereinafter referred to as Owner

Gentlemen:
The Bidder, in compliance with your invitation for bids for procurement and installation of Audio Visual and Court Technology for: Tom Green County, having examined the Bidding Documents prepared by HDR Architecture, Inc., and other related documents and being familiar with site of proposed Work, and with all conditions surrounding delivery to and installation of proposed Project including availability of materials and labor, hereby propose to furnish all labor, materials, tools, equipment, machinery, equipment rental, transportation, superintendence, perform all Work, provide all services, and to provide and install all Work in accordance with Bidding Documents, within time and amounts stated herein. These amounts are to cover all expenses incurred in performing Work required under Bidding Documents, of which this Bid is a part, and utilizing industry standard best practices to govern requirements not herein stated.

Bidder, if awarded contract, hereby agrees to perform Work under this contract according to the phased installation schedule included in the Bidding Documents.

PART A – MATERIALS AND INSTALLATION:

Bid amount shall be expressed in words and in figures. In case of discrepancy, amount shown in words will govern.

BASE BID - FOR CONTRACT: Bidder agrees to perform all Work as described in Bidding Documents,

for Lump Sum of _____ dollars (Bidder to fill in)
($_____).

Following Alternates shall be expressed in words and figures as add/deduct to Base Bid as indicated. Cross out terms, "Add" or "Deduct" as applicable. In case of discrepancy, amount shown in words will govern. See Division 01 for description.

ALTERNATE 1: Add/Deduct the sum of _____ ($ _____)
Dollars

ALTERNATE 2: Add/Deduct the sum of _____ ($ _____)
Dollars

ALTERNATE 3: Add/Deduct the sum of _____ ($ _____)
Dollars

PART B – UNIT PRICES - NOT USED for this Bid

PART C – BID SECURITY:

Bid Security attached in sum of _____ ($_____), as required by this RFB/P, becomes property of Owner in event contract agreement is not executed and Performance Bond, and Labor and Material Payment Bonds are not delivered within time set forth.

If awarded a contract, Contractor shall furnish Performance Bond, and Labor and Material Payment Bond within thirty days following date agreement is entered into, and prior to commencement of Work. The bidder's Surety for Performance and Payment Bonds will be: _____

_____.

PART D – ADDENDA:
Bidder acknowledges receipt of following addenda. (Note: All published Addenda must be acknowledged here.)

ADDENDUM NO. _____ DATED: _____

ADDENDUM NO. _____ DATED: _____

ADDENDUM NO. _____ DATED: _____

Bidder agrees that this Bid shall be good and will not be withdrawn for period of 90 calendar days after date for opening of bid.

Bidder understands that Owner reserves right to reject any or all bids and to waive any informalities or irregularities therein.

Upon notice of award of this Bid, bidder and Owner will execute Contract Agreement prior to start of Work, or may begin with issuance of an official Notice to Proceed.

Respectfully submitted,

Signature if an Individual: _____

Doing Business as: _____

Business Address: _____

Signature if a Partnership: _____

By: _____ Member of Firm

_____ Member of Firm

Business Address: _____

Signature if a Corporation

_____

By: _____ Title: _____

Business Address: _____

Telephone Number: _____

END OF SECTION

DIVISION 01

GENERAL REQUIREMENTS

SECTION 01 10 00
SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project information.
   2. Contract, Job Conditions
   3. Work covered by Contract Documents.
   4. Phased construction.
   5. Owner-furnished products.
   6. Definitions.
   7. Referenced Standards.

B. Related Sections include but are not necessarily limited to:
   1. Section 01 31 26 - Newforma Contract Management System Requirements.

1.2 PROJECT INFORMATION

A. Project Identification: Tom Green County Court Rooms.
   1. Project Locations:
      a. Historic Courthouse - 112 W. Beauregard Ave., San Angelo, Texas 76903
      b. Court Facility – 122 W. Harris, San Angelo, Texas 76903
      c. Detention Facility - 4382 N US Hwy 277, San Angelo, Texas 76905
      d. Juvenile Justice Center – 1253 W. 19th St., San Angelo, Texas 76903.

B. Architect: HDR Architecture, Inc., 8750 N. Central Expressway, Suite 100, Dallas, TX 75231.

C. Web-Based Project Software: Project software administered by Architect will be used for purposes of managing communication and documents during the construction stage.
   1. See Section 01 31 26 for requirements for establishing, administering and using web-based Project software.

1.3 CONTRACT, JOB CONDITIONS

A. Type of Contract:
   1. Project will be constructed under a single prime contract.

B. Owner, through another contractor or on their own, will provide temporary building conditioning. The AV/Court Technology Bidder will be responsible for providing for removal of trash generated by this work. Bidder shall not use another dumpster on site, if there is one. Coordinate trash removal procedure with Construction Manager.

C. Work for this Contract shall be performed concurrently with and/or in close coordination with Work performed on the Project under other Contracts to make a functionally complete Project.

D. Coordination: The Project will require close coordination and cooperation with Owner, Construction Manager/Building Contractor, Architect and other Contractors. The work under this Contract is one of the last phases of the Project. The timely and orderly coordination and completion of the work under this Contract is critical to Owner occupancy of the Project. Contractor shall provide management of their Contract Work. This includes on- and off-site management necessary to coordinate with the other contractors and the Owner, and to complete the Work within the Contract time.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and generally consists of the following. Bidder to provide everything necessary to make a functionally complete Project.

1. Ordering and procuring all items specified herein.
2. Shop drawings and other submittals are the responsibility of this Contractor.
3. Coordinating power, data and other infrastructure (including blocking/mounting support) requirements with Architect and Building Contractor for spaces that are in the current Building Contractor's scope of work in the Historic Courthouse.
    a. Refer to supplemental reference docs for AV/CT bidding that indicate scope of work in other contracts.
4. **For all other spaces in the Historic Courthouse and for the other buildings in this scope listed in Section 1.2.A.1, the AV/CT Contractor shall provide electrical engineering and other infrastructure needed for this scope of work to function. It will be this Contractor's responsibility to hire an electrical engineer and contractor to design, seal, permit and install power and data infrastructure where required.**
5. Coordinating delivery location of AV/Court Technology from factory. Bidder to arrange and pay for climate-controlled warehousing if not shipping directly to site. Note: There is no loading dock at the site.
6. Staging AV/Court Technology for installation. Do not plan for this to be able to happen on site.
7. Coordinating installation schedule and technicalities with Building Contractor and Owner.
8. Protecting building from damage due to AV/Court Technology install.
9. Installing AV/Court Technology where and how indicated in Contract Documents.
10. Run power and data systems in AV/Court Technology where required.
11. Cleanup.
12. Ordering and installing incomplete parts and repairing damaged items.
13. User demonstration.
14. Compiling spare parts and maintenance and warranty manuals.

B. AV/Court Technology Contractor will be responsible for their own equipment, materials and whatever else is needed to comply with Contract Documents.

C. AV/Court Technology Contractor shall coordinate, pay for and assume full responsibility for any subcontractors necessary for the installation of their work unless otherwise noted.

D. AV/Court Technology Contractor will be responsible for cleaning up their messes and hauling their trash off site daily.

1.5 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, protecting, and installing Owner-furnished products and coordinating building services connections.

1.6 DEFINITIONS

A. The terms "Architect, Architect/Engineer, Arch/Eng, A/E, Engineer" or like terms shall mean Design Professional.

B. The term "GC" or like terms shall mean General Contractor, CMAR or Building Contractor.

C. The term "Provide" shall mean furnish and install.

D. The term "By Others" or "NIC" or like terms shall mean the Owner or other individual Contractor.

E. The term "Contractor" shall mean the Successful Bidder of Work related to this contract.

1.7 REFERENCED STANDARDS

A. Referenced standards or codes shall not supersede the division of responsibility established in the Contract Documents.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION - (NOT USED)

END OF SECTION

SECTION 01 11 16
WORK BY OWNER

PART 1 - GENERAL

1.1 SUMMARY

A. Owner may perform work with their staff or may award separate contracts for performance of certain construction operations at site.

B. Owner operations may be scheduled to be performed during Work under this Contract.

C. Separate contracts include but are not limited to following:
   1. Equipment and items indicated in documents as Owner furnished.
   2. Infrastructure pathways for this Work when run through new construction.
   3. Power and data to locations of this Work.
   4. Owner furnished furnishings.
   5. Refer to Documents for additional items.

D. Contractors holding separate contracts with Owner to perform work for Owner may be non-union contractors.
   1. By executing this Contract, the Contractor and subcontractors acknowledge and have no objection and agree it will not impact the Project negatively.

E. Schedule activities to minimize interference with work of others and cooperate with other parties involved in such concurrent Work.

F. Cooperation by Contractor shall not be grounds for a claim of delay or additional cost.

END OF SECTION

SECTION 01 14 16
COORDINATION WITH OCCUPANTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Contractor use of site and premises.

B. Working days and hours

C. Directed premium time

D. Work sequence.

E. Owner occupancy.

F. Disruption of existing services.

1.2 CONTRACTOR USE OF SITE AND PREMISES

A. Limit operations and use of site to "Limits of Construction," and as required to perform Work.

B. Secure written approval of Owner to disturb portions of site beyond area of required Work.
   1. Obtain written approval from Owner at least seven (7) calendar days in advance when scheduling Work outside limits of construction.
   2. Provide Owner an estimate of time needed to perform Work outside limits of construction.
   3. Cutting, capping, and reconnecting utility systems outside limits of construction shall be performed by Contractor, unless otherwise noted.
   4. Conform to laws, ordinances, permits and regulations affecting Work on site.
   5. Maintain existing roads, streets, drives, parking lots, entrances and required fire exit ways clear and available at all times for their intended use.
      a. Do not use these areas for parking, staging or storage without Owner's written approval.
      b. Coordinate with Owner and provide alternate routes for public and Owner access if normal routes are affected.
   6. Do not encumber site with equipment, materials or vehicles.
   7. Return improvements on, or about, site and adjacent property which are not shown to be altered, removed or otherwise changed; to conditions which existed previous to starting performance under Contract.
   8. Owner will have limited parking spaces available for construction personnel. Coordinate parking location for each site with Owner. Other parking must be arranged by the Contractor away from the site to allow public and employee parking for the facility.
   9. Coordinate with Owner if exterior space will be required for storage. If required, space to be secured by Contractor. At end of project restore location to pre-project condition.

C. Use of Facilities:
   1. Limit use and operation within existing facilities to areas indicated for construction Work and as required to perform Work.
   2. Areas within facility shall not be disturbed or disrupted.
   3. Do not to interfere or inconvenience public, staff and Owner's operation.
   4. Maintain and keep clear required fire exit ways throughout facility within and in vicinity of construction areas.
   5. Coordinate alternate temporary egress routes with Owner and Local Fire Authority.
   6. Do not load structure with weights that will endanger structure.
   7. Smoking is prohibited within facilities and on Owner's property.
   8. Audio devices and radios are prohibited, except two-way radios needed for Contractor's operations.
   9. Limit use of two-way radios within occupied facilities, so not to disrupt occupants.

10. Use of toilet facilities, washrooms, and telephones within existing facility or occupied areas is not allowed. Contractor to provide own temporary facilities.
11. Elevators in existing facility or within occupied areas of addition may not be used by construction personnel without Owner's written approval and such use shall meet following conditions:
    a. Protect and maintain system and finishes during use.
    b. Repair or replace damaged components of system and finishes.
    c. Clean finishes.
12. Clothing with derogatory depictions, language, or slogans which are racial, gang-related or sexual in nature, shall not be worn on premises.
13. Clothing with depictions, language, or slogans regarding alcohol or drugs shall not be worn on premises.
14. Derogatory language or graphic display of artifacts which are racial, sexual or religious in nature, shall not be used on premises.
15. Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
16. Maintain existing building in weather tight condition throughout construction period.
17. Repair damage and leaks caused by construction operations.
18. Protect building and its occupants during construction period.
19. Keep noise to a minimum in construction operation and employ reasonable noise control measures during operations.
20. Jack hammers and other impact and loud noise-generating equipment will not be permitted within existing building without Owner's consent. Notify and schedule loud noises with the Owner at least 24 hours in advance.

D. Limit Use of Site and Premises to Allow:
    1. Owner occupancy.
    2. Work by Others.
    3. Use of site and premises by public.

1.3 WORKING DAYS AND HOURS

A. Days: Monday through Friday.

B. Hours: 8:00 AM to 5:00 PM.

C. Work performed during Holidays or other than normal working days or hours shall be scheduled in advance with and approved by Owner.

1.4 DIRECTED PREMIUM TIME

A. Actual premium wages paid for original contract Work directed by Owner to be performed other than normal working hours, including; social security taxes, unemployment insurance, and union fringe benefits if required by union agreements; to be without overhead and profit mark-ups.
    1. Owner approved scheduled utility line tie-in or shutdown affecting building operation that is not allowed to be completed during normal working hours shall be completed on premium time basis.

1.5 OWNER OCCUPANCY

A. Perform Work within existing building. Each Contractor will have access to areas in which work occurs, subject to rights of Owner.

B. Owner will occupy existing building during life of this contract.

C. Schedule work at such time and in such a manner to minimize interference and inconvenience to public, staff and Owner's operations.

D. Activities which may disrupt court proceedings shall be rescheduled to non-courthouse operations time and coordinated with courthouse security. Court schedules are generally set at

least one week in advance which will allow adequate advance time for scheduling construction activities.

E. Obtain approval of Owner prior to commencement of work within existing area of building.

F. Area immediately surrounding areas of Work shall be protected from danger of materials being dropped or dislodged.

G. Carry out Work in a manner that does not impose hardship, danger, or inconvenience to public, staff or occupants.

H. Prior to commencement of Work, Contractor and Owner shall jointly survey construction site and surrounding areas, making permanent record of such existing damage as cracks, malfunctioning utility equipment and fixtures, or other similar damage.
   1. This record shall serve as a basis for determination of subsequent damage to these structures and adjacent areas due to Contractor's operations.

I. Report damage to structures and adjacent areas not noted in original survey to Owner.

J. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

K. Schedule work to accommodate this requirement.

1.6 DISRUPTION OF EXISTING SERVICES

A. Plan Work to minimize shutdown time of service.
   1. Request approval of a utility or equipment shutdown in writing to Owner not less than seven working days before time shutdown is desired.
   2. Provide Owner an estimate of duration of shutdown and how facility is going to be affected.
   3. Coordinate with Owner's building engineering staff in advance of shut down.
   4. Begin work only after engineering staff is fully informed and has agreed to schedule of shut offs.
   5. Do not cut into existing services without first verifying with Owner that service has been correctly identified and shut off.
   6. Operation of existing valves, switches, etc., to affect service shutdown will be completed by Owner, unless arranged otherwise.

B. Limit duration of disruptions of service to maximum of 4 HRS or as approved by Owner.

C. Fabricate and install interconnecting portions of these systems prior to shut down for final connections.

D. Maintain utilities or other service, indicated to be abandoned, in service or provide alternate means of service until new facilities are provided, tested, and put in operation.

E. Maintain fire protection and fire alarm systems operational within existing facilities.

F. Review existing conditions, drawings and other documents for proper coordination between new and existing construction.

G. Active utilities whose locations are unknown to Owner but suspected to exist.
   1. Exercise caution of their existence. If encountered report to Owner for direction.

H. Repair or replace to original conditions damage to existing structures, utilities and other items caused by Contractor's operations at Contractor's expense.

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section identifies each Alternate by number and describes basic changes to be incorporated into Work, only when that Alternate is made a part of Work by specific provisions in Construction Contract.

B. Section includes only nontechnical descriptions of Alternates.

C. Refer to specific Sections of Specifications and Drawings for technical description of Alternates.

D. Coordinate related Work, and modify surrounding Work as required to properly integrate Work under each Alternate and to provide complete Project required by Contract Documents.

1.2 DESCRIPTION

A. Work includes:
   1. Indicate Alternate prices on Bid Form.
   2. Alternates will be selected after bids are evaluated.
   3. Selected Alternates will be made a part of Contract and final Contract Amount will be adjusted accordingly.

A. Alternate No. 1 - Witness Annotation Monitor
   1. A touch screen monitor with annotation processor shall be provided at the witness stand in place of the standard monitor with the ability to display the video output with annotations throughout the room.
   2. The control system shall have the capability to route annotation video and clear annotations.
   3. Refer to Section 27 41 16 Integrated Audio/Visual Systems and Equipment.

B. Alternate No.2: Court Reporter Audio Record Output
   1. An audio output shall be provided at the court reporter location specifically as a record output.
   2. Refer to Section 27 41 16 Integrated Audio/Visual Systems and Equipment.

C. Alternate No. 3 - Court Room A Streaming Card
   1. A streaming output card shall be provided in the matrix video switch in Courtroom A to facilitate sending a video stream to owner provided tablets in the jury box.
   2. Refer to Section 27 41 16 Integrated Audio/Visual Systems and Equipment.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION – (NOT USED)

END OF SECTION

SECTION 01 25 13
SUBSTITUTION PROCEDURES AFTER EXECUTION OF CONTRACT

PART 1 - GENERAL

1.1 DEFINITION

A. Products proposed by Contractor that do not meet requirements of Contract Documents, whether in product characteristics, performance, quality, or manufacturer or brand names, is considered a substitution.

B. No substitutions will be considered:
   1. In case of non-availability of materials contact Architect for review and action.

1.2 SUBSTITUTION AFTER EXECUTION OF CONTRACT

A. All costs including Architect cost will be responsibility of Contractor for substitutions or revisions made necessary by acts or omissions of Contractor, requested due to product submittal or product not being ordered in a timely manner, requested due to ease of installation progress or Work, or requests which are in interest of or for convenience of supplier, subcontractor or Contractor.

1.3 SUBSTITUTION REQUESTS

A. Only written requests with complete data for evaluation will be considered.
   1. Submit evaluation data with attached form to Architect.
   2. Submit in timely manner to allow Architect adequate time for evaluating, making recommendation, and for Owner approval.

B. Supplier, Subcontractor and Contractor in making substitution request, or in using an approved substitution, represent:
   1. has personally investigated proposed product, system or method, and has determined that it is equal or superior in all respects to that specified, and that it will perform intended function;
   2. is in full compliance with applicable code;
   3. will provide same warranty for substitute item as for product, system or method specified;
   4. if a finish product, complies color wise and pattern wise with base specified items;
   5. will coordinate installation of accepted substitution into Work, to include building modifications if necessary, and be responsible for such modifications as may be required for Work to be complete and functional in all respects;
   6. certifies cost data presented is complete and includes all related costs, excluding Architect's review and redesign cost;
   7. waive all claims for additional costs or time extensions related to substitution which subsequently become apparent or are caused by substitution;
   8. will pay additional costs to other trades, subcontractors or contracts caused by substitution;
   9. will pay all Architect's review and redesign cost, special inspections, and other costs caused by substitutions or revisions made necessary by the acts or omissions of Contractor, due to product submittal or product not being ordered in a timely manner, due to ease of construction progress or Work, or which are in interest of or are for convenience of supplier, subcontractor or Contractor;
   10. responsibility of Contractor for substitutions or revisions made necessary by the acts or omissions of Contractor, requested due to product submittal or product not being ordered in a timely manor, requested to ease construction progress or Work, or which are in interest of or requests for convenience of supplier, subcontractor or Contractor;
   11. acknowledge acceptance of these provisions.

C. Contractor sign Substitution Request in space provided on form acknowledging acceptance of terms.

1.4 SUBSTITUTION DATA

A. Submit complete data substantiating compliance of proposed substitution with Contract Documents.

B. For products and systems:
   1. Product identification, including manufacturer's name.
   2. Manufacturer's literature, marked to indicate specific model, type, size, and options to be considered:
      a. Product description.
      b. Performance and test data.
      c. Reference standards.
      d. Difference in power demand, connectivity, etc.
      e. Dimensional differences from specified unit.
      f. Finishes difference if specified finish is discontinued.
   3. Samples:
      a. Architect reserves right to request and retain sample until physical units are installed on project for comparison purposes.
      b. Samples shall be available in the Dallas/Fort Worth metroplex for testing by Architect and in Tom Green County for the Owner's review.
      c. Full size product samples should display the equivalent feature(s) and type of finish(es) for each item specified but are not required to match in color.
      d. Requester pay all costs of furnishing and return of samples.
      e. Owner and Architect are not responsible for loss of or damage to samples.
   4. Name and address of at least three similar projects that proposed product has been in use for at least four years, and name and phone number of owner's and architect's or engineer's representative, which Owner or Architect can contact to discuss; product, installation, and field performance data.

C. For construction methods:
   1. Detailed description of proposed system or method.
   2. Illustrate with drawings.

D. Itemized comparison of proposed substitute to specified item; indicate variations.

E. Warranty comparison with specified product or system.

F. Effect and changes required on other trades, subcontractors or contracts.

G. Data relating to any change in contract time.

H. Complete breakdown of costs, of proposed substitution that shall include additional costs or saving generated by proposed substitution and shall indicate amount, if any, to be deducted from Contract Sum if proposed substitution is accepted.

I. Include life cycle cost savings by product, system or assembly proposed, if applicable.

J. Availability of maintenance and repair services, and sources of repair or replacement items.

1.5 APPROVAL OF SUBSTITUTION REQUEST

A. For substitutions which have no cost or time impacts, no verbal or written approvals other than by Owner's signed approval on attached Substitution Request form.

B. For substitutions which have cost or time impacts, no verbal or written approvals other than by Owner's signed approval of a Change Order.

1.6 REJECTION OF SUBSTITUTION REQUEST

A. Substitution may not be considered if:
   1. Submitted after stipulated time period.
   2. Not submitted in accord with this section.
   3. Acceptance will require substantial revision of Contract Documents, building or systems.

4. Substitution request does not indicate specific item for which request is submitted.
5. Substitution Request form is not properly executed and signed.
6. Substitution request for manufacturer acceptance only.
7. Subcontractor or supplier requested directly.
8. Insufficient information submitted.
9. Substitution color, pattern or appearance does not comply with base specified item.
10. Substitution does not appear to comply with requirements of specifications for base product.
11. Owner or Architect does not want to consider.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION – (NOT USED)

END OF SECTION

SUBSTITUTION REQUEST

PROJECT: Tom Green County – AV/Court Technology

PROJECT NUMBER: 10163575 REQUEST NO.:

TO: Office of the Architect:

HDR Architecture, Inc.
8750 N. Central Expressway, Suite 100
Dallas, TX 75231
Attention: Martin Aguirre

If no physical samples are included/needed, email request with all documentation to be considered to martin.aguirre@hdrinc.com.

SPECIFIED PRODUCT:

Substitution request for Item Tag:

Item Description:

REASON FOR SUBSTITUTION: Non-availability due to:

- ☐ Strike
- ☐ Lockout
- ☐ Bankruptcy
- ☐ Discontinuation of Production
- ☐ Proven Shortage (Explain)
- ☐ Similar Occurrence (Explain)
- ☐ Fails to comply with building code requirements
- ☐ Unavailable to meet Project schedule
- ☐ No qualified installer for specified item
- ☐ Supplier refuses to warrant item or installation
- ☐ Supplier, Subcontractor or Contractor convenience
- ☐ Other:
- ☐ Not available
- ☐ Reduce Project contract time
- ☐ Project cost savings
- ☐ Unsuitable for application
- ☐ Constructability issue

Explanation in Detail: ☐ See attached:

REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS: ☐ See attached:

SUPPORTING DATA:

Attach product description, Specifications, Drawings, photographs, performance data, test data, environmental criteria, and any additional data or information for evaluation of the proposed substitution in accord with requirements of Section 01 25 13.

Sample is attached: Yes ☐ No ☐

Sample will be sent if requested: Yes ☐ No ☐

Maintenance Service Available: Yes ☐ No ☐

If yes, location: _____

Spare Parts Source: _____

PRODUCT / SYSTEM COMPARISON:

Provide a one-to-one comparison of proposed substitution with ALL specified attributes and qualities of specified item(s)

	SPECIFIED PRODUCT	PROPOSED SUBSTITUTION
Manufacturer:		
Name, brand:		
Catalog No.:		
Unit Cost:		
Attributes /		
Qualities /		
Variations /		
Warranty /		
etc:		

REFERENCES:

LIST MINIMUM OF THREE PREVIOUS INSTALLATIONS, WHICH PROPOSED PRODUCT HAS BEEN INSTALLED FOR AT LEAST FOUR YEARS:

Project: _____

Address: _____

Architect (name & phone): _____

Owner (name & phone): _____

Contractor: _____

Date Installed: _____

Dollar Value this Work: $ _____

Project: _____

Address: _____

Architect (name & phone): _____

Owner (name & phone): _____

Contractor: _____

Date Installed: _____

Dollar Value this Work: $ _____

Project: _____

Address: _____

Architect (name & phone): _____

Owner (name & phone): _____

Contractor: _____

Date Installed: _____

Dollar Value this Work: $ _____

Project: _____

Address: _____

Architect (name & phone): _____

Owner (name & phone): _____

Contractor: _____

Date Installed: _____

Dollar Value this Work: $ _____

REFERENCES:

LIST MINIMUM OF THREE PREVIOUS INSTALLATIONS, WHICH PROPOSED PRODUCT HAS BEEN INSTALLED FOR AT LEAST FOUR YEARS:

EFFECT OF SUBSTITUTION:

Substitution affects other parts of Work:	No ☐	Yes ☐	(If yes, explain below)
Substitution requires dimensional revision or redesign of structure, mechanical, electrical or connectivity Work:	No ☐	Yes ☐	(If yes, explain below)
Same warrantee provided as specified base product:	No ☐	Yes ☐	(If no, explain below)

Explanation: _____

_____

_____

Cost difference:	$ _____	(add / deduct).
Total cost implications of substitution on Project:	$ _____	(add / deduct).
Total time implications:	$ _____	(add / deduct) calendar days.

STATEMENT OF CONFORMANCE OF REQUEST TO CONTRACT REQUIREMENTS:

Supplier, Subcontractor and Contractor in making substitution request or in using an approved substitution represent:

- ☐ Has personally investigated the proposed substitution and determined it is equal or superior in all respects to specified product or system and will perform intended function, except as stated above.
- ☐ Is in full compliance with applicable code requirements.
- ☐ Will provide same warranty for substitute item as for product, system or method specified.
- ☐ Will coordinate installation of accepted substitution into Work, to include building modifications if necessary, making such changes as may be required for Work to be complete in all respects.
- ☐ Waive all claims for additional costs or time extensions related to substitution that subsequently become apparent or are caused by substitution.
- ☐ If a finish product, color, pattern and appearance complies with base specified items.
- ☐ Certifies cost data presented is complete and includes all related costs under this Contract, excluding Architect's review and redesign cost.
- ☐ Will pay Architect's review and redesign cost, special inspections, and other costs caused by substitution.
- ☐ Will pay additional costs to other contractors caused by substitution.
- ☐ Will modify other parts of Work as may be needed, to make all parts of Work complete and functioning.
- ☐ Acknowledge acceptance of these provisions.

List of Attachments: _____

_____

ACKNOWLEDGEMENTS:

FOLLOWING FIRM HEREBY REQUESTS CONSIDERATION OF FOLLOWING PRODUCT OR SYSTEMS AS A SUBSTITUTION IN ACCORD WITH PROVISIONS OF CONTRACT DOCUMENTS:

Requested by (firm): _____

Acknowledged by (print): _____ Date: _____

Position: _____ Phone _____

Signature _____

ARCHITECT'S ACTION / RECOMMENDATION:

- ☐ Recommend Owner's approval.
- ☐ Submitted to Owner for authorization for Architect's as Change in service to further evaluate and make recommendation.
- ☐ Do not recommend (see comments below).
- ☐ Rejected:
  - ☐ Submitted after stipulated time period.
  - ☐ Not submitted in accordance with Section 01 25 13.
  - ☐ Acceptance will require substantial revision of Contract Documents, building or systems.
  - ☐ Request does not indicate specific item which is being requested.
  - ☐ Requested for manufacturer acceptance only.
  - ☐ Request form is not properly executed and signed.
  - ☐ Subcontractor or supplier requested directly.
  - ☐ Insufficient information submitted.
  - ☐ Does not comply color, pattern or appearance wise with base specified items.
  - ☐ Insufficient information submitted to evaluate.
  - ☐ Does not appear to comply with requirements of specifications for base product.
  - ☐ Other:
- ☐ Additional information needed - Returned to Contractor for providing following:

Comments: _____

_____

_____

_____

_____

_____

Architect: _____

By (print & sign): _____ Date: _____

Position: _____

Distribution: ☐Owner ☐Contractor ☐file

OWNER ACTION:

- ☐ Reject - Do not want to consider.
- ☐ Approved - Contractor may proceed with request as submitted.
- ☐ Approved – Architect directed as Change in Services to issue change document to incorporate substitution into contract Documents, adjust Contract Sum and/or Project time.
- ☐ Architect authorized as Change in Services to further evaluate and make recommendation.
- ☐ Additional information needed - Returned for providing following:

Comments: _____

_____

_____

Owner: _____

By: (print & sign) _____ Date: _____

Position: _____

Distribution: ☐ Architect ☐ Contractor

ARCHITECT FURTHER ACTION / RECOMMENDATION (if needed):

- ☐ Incorporating into change document _____ as directed by Owner.
- ☐ Recommend Owner's approval.
- ☐ Do not recommend.

Comments: _____

_____

_____

_____

Architect: _____

By: (print & sign) _____ Date: _____

Position:

Distribution: ☐ Owner ☐ Contractor ☐ file

OWNER FURTHER ACTION (if needed):

- ☐ Reject - Do not want to consider.
- ☐ Approved - Contractor may proceed with request as submitted.
- ☐ Approved – Architect directed as Change in Services to issue change document to incorporate substitution into contract Documents, adjust Contract Sum and/or Project time.
- ☐ Additional information needed - Returned for providing following:

Comments: _____

_____

Owner: _____

By: (print & sign) _____ Date: _____

Position: _____

Distribution: ☐ Architect ☐ Contractor ☐ file

END OF SUBSTITUTION REQUEST

SECTION 01 26 00
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section defines administrative and procedural requirements for handling and processing Changes in Work.

B. Provisions within this section take precedence over provisions in General Conditions governing Changes in Work.

C. Provisions followed by an asterisk (*) include some or all provision as obtained from AIA Document A201- General Conditions of the Contract for Construction.

1.2 DESCRIPTION

A. Changes in Work may be accomplished after execution of Contract, and without invalidating Contract, by Change Order (CO), Change Proposal Request (CPR), Construction Change Directive (CCD) or order for a minor change in Work, subject to the limitations stated in this Section and elsewhere in Contract Documents. *
   1. A Change Order or Change Proposal Request shall be based upon agreement among Owner, Contractor and Architect.*
   2. A Construction Change Directive requires agreement by Owner and Architect and may or may not be agreed to by Contractor.*
   3. An order for a minor change in Work may be issued by Architect alone. *

B. Changes in Work shall be performed under this Section and other applicable provisions of Contract Documents, and Contractor shall proceed promptly, unless otherwise provided in a Change Order, Change Proposal Request, Construction Change Directive or order for a minor change in Work. *

C. Contractor may anticipate a minimum of zero (0) change documents being issued during Project duration: however such quantities shall not guarantee nor limit total quantity of changes.

D. Manage changes issued so as not to adversely affect Project Schedule.

E. Neither Owner nor Architect recognize “reservation of rights” or similar language from Contractor that would state or purport to preserve ability to make additional claims or demands related to a change, not in conformance with terms and provisions provided by Contract Documents.
   1. Claims or other demands for changes, compensation or an extension of time must be made in strict conformance with the provisions of Contract Documents.
   2. Agreement on any Change Order, Construction Change Directive or Change Proposal Request shall constitute a final settlement of the event and all matters related thereto.
   3. Contractor waives and releases Owner and Architect of direct material costs, labor costs, equipment costs, overhead and profit, costs or losses due to productivity loss, morale, attitude, staffing changes, supervision, acceleration, delay, interference, logistics, fatigue, ripple effect, overtime, time extensions related to costs, and other costs related to any change that are not expressly included in an agreement on any Change Order, Change Proposal Request or Construction Change Directive.

F. Verbal or other informal orders provided by Owner or Architect should be considered as temporary or emergency instructions.
   1. Verbal or other informal orders shall be formally documented, using one of procedures indicated in this Section.
   2. Should Contractor choose to proceed with any verbal or informal instructions, Contractor does so at their own risk.

3. Should Contractor not receive written verification of verbal or informal instructions in a timely manner, Contractor should request verification using Request for Information (RFI) process.
4. Contractor shall not proceed with verbal or informal instructions which may result in a change to Contract Sum or Contract Time, until an approved Change Order or Change Proposal Request is received.

G. Incorporate approved changes in Project Record Documents and Construction Schedules for Project.
1. Submit revised schedules for Project to Owner and Architect.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CHANGE ORDERS*

A. A Change Order (CO) is a written instrument prepared by Architect and signed by Owner, Contractor and Architect, stating their agreement upon following:
1. Change in Work,
2. amount of adjustment, if any, in Contract Sum, and
3. extent of adjustment, if any, in Contract Time.

3.2 CHANGE PROPOSAL REQUEST

A. Change Proposal Request (CPR) is prepared and initiated by Architect at Owner's request or may be issued in response to an Request for Information which has a cost or time impact, or some other required or desired change in the Work that may require an adjustment to Contract Sum or Contract Time.
1. Change Proposal Requests will include a description of proposed change and may include supplemental or revised Drawings and Specifications, or written instruments prepared by Architect.
2. Initiation and issuance of a Change Proposal Request is not direction to either stop Work in progress or to proceed with change.
3. Architect will issue Change Proposal Request via Newforma.
4. Contractor can download electronic documents for further processing from email and/or from HDR's Newforma Info Exchange for the project.
5. Upon receipt, Contractor and Subcontractors shall review and evaluate scope of change, and potential impact on Project.
    a. If potential impact to schedule, Contractor shall immediately initiate and forward Change proposal to Owner for processing.
    b. If potential impact, Owner may direct Contractor to stop Work in area affected by change to minimize cost impact, or may issue a Construction Change Directive (CCD) directing Contractor to proceed with change.
6. Evaluate Subcontractor's cost proposals, make recommendations and submit proposal to Architect on CPR form issued by Architect within twenty-one (21) calendar days of receipt so not to delay progress of Project.
    a. Proposals shall include Contractor's Cost Summary form from Contractor and each Subcontractor with complete itemized accounting, together with appropriate supporting data to substantiate adjustments in Contract Sum and Contract Time, including labor, materials and equipment.

B. Method used to determine an adjustment in Contract Sum shall be limited to following:
1. Labor Wages:
    a. Itemized by each craft involved, indicating hourly rate for each and hours required, excluding premium pay, paid to employees directly engaged in Work.

b. Rates shall be actual rate paid the workman in accordance with established management labor agreements.
c. Labor rates indicated in Contractor Agreement or Subcontractor Agreements are not applicable if they cannot be substantiated in writing as direct labor burden when requested by Owner or Architect.

2. Labor Burden:
   a. Percent of actual wages for each craft including:
      1) Mandatory fringe benefits required by established agreements.
      2) Health and Welfare.
      3) Pension.
      4) Apprenticeship and other required programs.
      5) Social Security.
      6) Unemployment Insurance.
3. Subsistence, Mileage, or both:
   a. If in union agreements.
4. Materials and Equipment:
   a. Materials incorporated in Work at Contractor's actual invoice cost, including freight and applicable sales tax, and any volume or other discounts.
   b. Indicate rates and units required.
5. Amount of credit allowed for a deletion or change which results in net decrease in Contract Sum shall be net cost.
   a. When both additions and credits covering related Work or substitutions are involved in a change, allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.
6. Overhead and Profit:
   a. Ten percent (10%) of net increase of labor and material for work performed by own forces including, but not limited to:
      1) Project Manager.
      2) Estimating.
      3) Field supervision above foremen level superintendents.
      4) Assistant superintendents.
      5) General foremen.
      6) Engineers.
      7) Accountants.
      8) Timekeepers.
      9) Office managers and others on staff.
      10) Office supplies.
      11) Computers and software.
      12) Drinking water.
      13) Temporary heat.
      14) Temporary cooling.
      15) Light and power.
      16) Sanitation facilities.
      17) Small tools valued at $500 or less.
      18) Record documents; and other
      19) Cost of materials, equipment or both not incorporated in Work or directly associated with Work, including home office and on site office costs.
7. Directed Premium Time on Contract Work:
   a. Actual premium portion of wages for original contract Work which was directed by Owner to be performed other than normal working hours, including:
      1) Social Security Taxes.
      2) Unemployment Insurance.
      3) Union Fringe Benefits if required by Union Agreements.
8. Major Construction Equipment:
   a. Owned:

1) Cost not to exceed eighty-five percent (85%) of current prevailing rates or blue book rates for rental of appropriate equipment for job and time period of use.

b. Leased:

1) Contractor's reasonable invoiced cost, except lease-purchase equipment which is considered "Contractor owned".

9. Contractor's overhead and profit on Subcontractor's Work:
   a. Contractor's overhead and profit on Subcontractor's Work shall not exceed five percent (5%) on net increase of Work performed by Subcontractor.
10. Subcontractor overhead and profit markup is not allowed on their Sub-subcontractor's Work.
11. Subcontractor Cost:
    a. Quote in same manner as prescribed herein for "Contractor".
12. Bond and Insurance:
    a. Actual amount based on net increase or deduct to be paid to surety and insurance carrier.

C. Only delay impacting critical path of Work shall be considered when determining if Contractor is entitled to additional time.
   1. If proposals include a change in time, Contractor shall substantiate number of days proposed.
      a. An estimate of cost and of probable effect of delay of the Work progress and Project schedule shall be included to substantiate potential delay, including a comparison of Project Construction Schedule and schedules prepared to substantiate a change in time.
      b. Indicate in CPM format both critical and non-critical path activities affected, and show Project Construction Schedule and change sequences, durations and float.

D. Owner shall have right within its sole discretion to require Contractor to commence performance of changes to Work prior to submission by Contractor of proposal, or Owner's approval of proposal.
   1. Proceed with Work upon receipt of a Construction Change Directive from Owner, and thereafter submit to Owner and Architect as soon as possible any cost proposal required for approval.

E. Change Proposal Request signed by Contractor and Owner indicates agreement therewith, and shall be considered a Change Order.
   1. Contractor is authorized to proceed with the change after Owner approval thereof.

F. Construction Change Directive may be prepared if Contractor's proposal is not acceptable or change need be expedited to reduce or eliminate impact on project.

3.3 CONSTRUCTION CHANGE DIRECTIVES

A. Written order prepared by Architect or Owner and signed by Owner, directing a change in Work prior to agreement on adjustment, if any, in Contract Sum, Contract Time, or both.

B. Owner may by Construction Change Directive, without invalidating Contract, order changes in Work within general scope of Contract consisting of additions, deletions or other revisions, Contract Sum and Contract Time being adjusted accordingly.*

C. Construction Change Directive may be used in absence of total agreement on terms of a Change Order or Change Proposal Request.*

D. If Construction Change Directive provides for an adjustment to Contract Sum, the adjustment shall be based on one of following methods: *
   1. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation, *
   2. Unit prices stated in Contract Documents or subsequently agreed upon, *
   3. cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee,
   4. or as provided in Paragraph 3.2 B and C.

E. Upon receipt of a Construction Change Directive, proceed with change in Work involved and advise Owner and Architect of Contractor's agreement or disagreement with method, if any, provided in Construction Change Directive for determining proposed adjustment in Contract Sum or Contract Time.*

F. Failure of Contractor and Owner to agree on an adjustment of Contract Sum or Contract Time shall not excuse Contractor from proceeding with prosecution and performance of Work. Contractor and Subcontractors, Sub-subcontractors and Suppliers shall administer all disputes in a manner that will permit Work to proceed on schedule while matter in dispute is being resolved.

G. Construction Change Directive signed by Contractor indicates agreement of Contractor therewith, including adjustment in Contract Sum and Contract Time or method for determining them.
   1. Such agreement shall be effective immediately and shall be recorded as a Change Order.*

H. The amount of credit allowed by Contractor to Owner for a deletion or change which results in a net decrease in Contract Sum shall be actual net cost.*
   1. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on basis of net increase, if any, with respect to that change.*

I. Present an itemized accounting together with appropriate supporting data in accordance with Paragraph 3.2 B and C.

J. When Owner and Contractor reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.*

K. For any portion of such cost that remains in dispute, Owner shall hire independent professional estimator to make determination. Resulting determination of cost shall adjust Contract Sum, subject to right of either party to disagree and assert a claim.*

L. When Owner and Contractor agree with determination made by independent professional estimator concerning the adjustments in Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order.*

3.4 MINOR CHANGES IN WORK

A. Architect has authority to order minor changes in Work not involving adjustment in Contract Sum or extension of Contract Time and not inconsistent with the intent of Contract Documents.*

B. Such changes shall be effected by written order and shall be binding on Owner and Contractor.*

C. Following may be used as a written order to order minor change in the Work:
   1. Clarification-Interpretation (C-I) or Architect's Supplemental Instruction (ASI) issued by Architect.
   2. Response to a Request for Information by Architect.
   3. Architect's comments or direction on a Contractor's Submittal.
   4. Minor changes indicated in Architect's project visit report.

D. Contractor shall carry out such written orders promptly. *

E. If Contractor perceives direction in a written order requires adjustment to Contract Time or Contract Sum, Contractor shall not execute such direction, and shall submit a claim to Architect along with substantiation within twenty-one (21) working days of receipt of such written order.

3.5 CONTRACTOR'S PROPOSED CHANGES TO WORK

A. Architect and Owner may consider properly prepared, timely Contractor Proposed Changes (CPC) to Work, if requested by Owner or Architect, or at any time Contractor believes unforeseen conditions may require modifications to the Contract Sum or Contract time.

1. A Contractor Proposed Change shall be properly prepared, accompanied by proposed cost, sufficient supporting data and information to permit Architect to make a reasonable determination without extensive investigation to determine if change may be considered warranted.
    a. Include a statement outlining reasons for change and effect of change on Work.
    b. Provide a complete description of proposed change.
    c. Indicate effect of proposed change on Contract Sum and the Contract Time.
    d. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made.
        1) Indicate separately any credit due Owner for products eliminated.
        2) If requested, furnish survey data to substantiate quantities.
    e. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    f. Include costs of labor and supervision directly attributable to change and identify separately any credit for work previously bid but would be eliminated.
    g. In event proposed change effects construction schedule, include an updated Contractor's Construction Schedule indicating effect of change, including, but not limited to:
        1) Changes in activity duration.
        2) Start and finish times.
        3) Activity relationship.
        4) Use available total float before requesting an extension of Contract Time.
        5) Document use of float or proposed alternate methods to maintain original schedule or both.
2. Contractor Proposed Change shall be submitted to Architect in such format and on such form included herein or as Architect may require.

B. Architect will take appropriate action on Contractor Proposed Changes.
1. Architect may issue an order for a minor change in Work if it is determined that proposed change is not materially different from requirements of Contract Documents.
2. Architect may incorporate proposed change into a change document and issue for Owner's consideration.
3. If Architect determines that implementation of proposed change would result in a material change to Contract that may cause an adjustment in Contract Time or Contract Sum, Architect may make a recommendation to Owner who may authorize further evaluation of proposed change or may authorize issuance of such change.
4. Architect may reject such proposed change if it will require substantial revisions to Contract Documents, building or systems or if Architect determines they are not appropriate or substantiated.

END OF SECTION

CHANGE PROPOSAL IMPACT EVALUATION

PROJECT: Tom Green County AV/Court Technology **CPR NO.:**

HDR PROJECT NO.: 10163575

TO OWNER:

We have reviewed and evaluated the scope of above referenced change and potential impact on Project. If the change is required or desired we recommend following in order to expedite Work and avoid or minimize delays in the Work which may affect cost of the change or impact to the schedule:

☐ Recommend Work stop in area affected by this change for _____ calendar days so change can be priced and processed. Contract Sum or Contract Time due to stopping Work will not increase.

☐ Recommend proceeding with change immediately:

1. Proposed basis of adjustment to Contract Sum or Guaranteed Maximum Price is:
   - ☐ No additional cost.
   - ☐ GMP amount will not change. Cost indicated will be taken from GMP Contingency.
   - ☐ Lump Sum (increase) (decrease) of $ _____
   - ☐ Unit Price of $ _____ per _____
   - ☐ Time & Materials, not to exceed $ _____
     (Daily time, material, and equipment documentation required for above)
   - ☐ As follows: _____
     (Method used in determining above adjustments shall be as defined in Contract Documents)
2. Contract Time is proposed to (be adjusted) (remain unchanged), by an (increase) (decrease) of _____ calendar days.

FROM: CONTRACTOR: _____

BY: _____ DATE: _____

DISTRIBUTION: ☐ OWNER ☐ ARCHITECT ☐ _____

CONSTRUCTION CHANGE DIRECTIVE

TO CONTRACTOR: _____

You are hereby directed to:

☐ Stop work in area affected by above referenced change until it has been processed and appropriate action taken.

☐ Proceed with above referenced change immediately.

When signed by Owner and received by Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and Contractor shall proceed based per above.

FROM OWNER: _____

BY: _____ DATE: _____

DISTRIBUTION: ☐ CONTRACTOR ☐ ARCHITECT ☐ _____

CONTRACTOR'S COST SUMMARY

PROJECT: Tom Green County AV/Court Technology **CHANGE DOCUMENT:**

PROJECT NO.: 10163575
CONTRACTOR: **DATE:**
SUBCONTRACTOR: **DATE:**

This form, itemized accountings and appropriate supporting data must be attached to any change documents or claim.

(Only fill in applicable line items)

1.	Labor * (including benefits)	$		(Attach Cost Summaries and breakdowns)
2.	Materials and Products *	$		(Attach Cost Summaries and breakdowns)
3.	(Subtotal of lines 1 and 2)		$	
4.	Overhead and Profit (10% of line 3)		$	
5.	Premium Time on Contract Work		$	
6.	Major Construction Equipment Rental *		$	(Shall not exceed A.E.D. Schedules)
7.	Subcontractor's name and cost: (Attach Cost Summaries and breakdowns)			Work Category:
a		$		
b		$		
c		$		
d		$		
e		$		
f		$		
g		$		
h		$		
i		$		
j		$		
k		$		
l		$		
m		$		
n		$		
o		$		
p		$		
q		$		
8.	Total Subcontractor cost (total of lines 7a through 7q)		$	
9.	Contractor's O & P on Sub's. Work (5% of line 8)		$	
10.	(Subtotal of lines 3, 4, 5, 6, 8 and 9)			$
11.	Bond ____% and Insurance ____% (if required) = ____% of line 10			$

12. **TOTAL PROPOSED COST ADJUSTMENT** (total of lines 10 and 11): **$**

13 **PROPOSED CONTRACT TIME ADJUSTMENT** : _____ ☐ADD ☐DEDUCT (calendar days)
(Provide supportive data substantiating claim for additional days in accordance with Contract Documents)

* Attach complete breakdown of itemized accounting and supporting data, sufficient to permit evaluation.

CONTRACTOR PROPOSED CHANGE

PROJECT: Tom Green County AV/Court Technology

HDR PROJECT NUMBER: 10163575

TO: **HDR Architecture, Inc.**

REASON FOR PROPOSAL:

- ☐ Design to comply with building code requirements
- ☐ Product / material unavailable to meet Project schedule
- ☐ No qualified installer for specified item
- ☐ Supplier refuses to warrant product or installation
- ☐ Project cost cutting / cost reduction
- ☐ Supplier, Subcontractor or Contractor convenience
- ☐ Product not available
- ☐ Reduce Project construction time
- ☐ Unanticipated / existing condition
- ☐ Specified product / system unsuitable for application
- ☐ Owner suggested or requested
- ☐ Constructability issue
- ☐ Value Engineering (may be used for "Value Engineering Change Proposal" govern by Federal Acquisition Regulations)
- ☐ Other:

Explanation in Detail: ☐ See attached: _____

REASON FOR NOT GIVING PRIORITY TO SPECIFIED METHOD, ITEMS OR SYSTEM: ☐ See attached:

REFERENCES:

Specification Section number: _____ Article(s)/paragraph(s): _____

Drawings / Sections / Details: _____

DESCRIPTION OF PROPOSAL:

SUPPORTING DATA:

Attach description, specifications, drawings, photographs, performance data, test data, environmental criteria, and any additional data or information for evaluation.

Sample is attached:	Yes ☐	No ☐
Sample will be sent if requested:	Yes ☐	No ☐
Maintenance Service Available:	Yes ☐	No ☐

If yes, location:

Spare Parts Source:

PRODUCT / SYSTEM COMPARISON:

Provide a one-to-one comparison of proposed item with ALL specified attributes and qualities of specified item(s)

	SPECIFIED PRODUCT	PROPOSED SUBSTITUTION
Manufacturer:		
Name, brand:		
Catalog No.:		
Unit Cost:		
Attributes /		
Qualities /		
Variations /		
Warranty /		
etc:		

REFERENCES:

LIST MINIMUM OF FIVE PREVIOUS INSTALLATIONS, WHICH PROPOSED METHOD / SYSTEM / PRODUCT HAS BEEN INSTALLED FOR AT LEAST FOUR YEARS:

Project: ______________________________
Address: ______________________________
Architect (name and phone): ______________________________
Owner (name and phone): ______________________________
General Contractor: ______________________________
Date Installed: ______________________________
Dollar Value this Work: $ ______________________________

Project: ______________________________
Address: ______________________________
Architect (name and phone): ______________________________
Owner (name and phone): ______________________________
General Contractor: ______________________________
Date Installed: ______________________________
Dollar Value this Work: $ ______________________________

Project: ______________________________
Address: ______________________________
Architect (name and phone): ______________________________
Owner (name and phone): ______________________________
General Contractor: ______________________________
Date Installed: ______________________________
Dollar Value this Work: $ ______________________________

Project: ______________________________
Address: ______________________________
Architect (name and phone): ______________________________
Owner (name and phone): ______________________________
General Contractor: ______________________________
Date Installed: ______________________________
Dollar Value this Work: $ ______________________________

Project: ______________________________
Address: ______________________________
Architect (name and phone): ______________________________
Owner (name and phone): ______________________________
General Contractor: ______________________________
Date Installed: ______________________________
Dollar Value this Work: $ ______________________________

Project: ______________________________
Address: ______________________________
Architect (name and phone): ______________________________
Owner (name and phone): ______________________________
General Contractor: ______________________________
Date Installed: ______________________________
Dollar Value this Work: $ ______________________________

EFFECT OF PROPOSAL:

Effects on other parts of Work:	No ☐	Yes ☐	(If yes, explain below)
Proposal requires dimensional revision or redesign of structure or mechanical and electrical Work:	No ☐	Yes ☐	(If yes, explain below)
Same warranty provided as specified item:	No ☐	Yes ☐	(If yes, explain below)

Explanation:

Cost difference:	$ _____	(increase / decrease)
Total Contract Sum implications of proposal on Project:	$ _____	(increase / decrease)
Total Contract Time implications:	_____	(increase / decrease) calendar days.

STATEMENT OF CONFORMANCE OF PROPOSAL TO CONTRACT REQUIREMENTS:

Supplier, Subcontractor, Contractor in making substitution request or in using an approved substitution represent:

- ☐ Has personally investigated the proposal and determined it is equal or superior in all respects to specified product, system or method and will perform intended function, except as stated above.
- ☐ Has same quality and life-cycle cost as design in the Contract Documents, except as stated above.
- ☐ Is in full compliance with applicable code requirements.
- ☐ Will provide same warranty for substitute item as for product, system or method specified.
- ☐ Will coordinate installation of proposal into Work, to include building modifications if necessary, making such changes as may be required for Work to be complete in all respects.
- ☐ Waive all claims for additional costs or time extensions related to proposal that subsequently become apparent or are caused by proposal.
- ☐ If a finish product, color wise and pattern wise complies with base specified items.
- ☐ Certifies cost data presented is complete and includes all related costs under this Contract, excluding Architect's review and redesign cost.
- ☐ Will pay Architect's review and redesign cost, special inspections, and other costs caused by proposal.
- ☐ Will pay additional costs to other contractors caused by proposal.
- ☐ Will modify other parts of Work as may be needed, to make all parts of Work complete and functioning.
- ☐ Acknowledge acceptance of these provisions.

List of Attachments: _____

_____

ACKNOWLEDGEMENTS:

FOLLOWING FIRM HEREBY REQUESTS CONSIDERATION OF PROPOSAL:

Requested by (firm): _____

Acknowledged by (print & sign): _____ Date: _____

Position: _____ Phone _____

Subcontractor: _____

Acknowledged by (print & sign): _____ Date: _____

Position: _____ Phone _____

Contractor: _____

Acknowledged by (print & sign): _____ Date: _____

Position: _____ Phone _____

ARCHITECT'S ACTION / RECOMMENDATION:

- ☐ Recommend Owner's approval.
- ☐ Submitted to Owner for authorization for Architect's as Change in Service to further evaluate and make recommendation.
- ☐ Submitted to Owner for authorization for Architect's as Change in Service to revised Contract Documents to incorporate proposal, and issue change document to the contractor for submitting a complete cost proposal for Owner's consideration.

☐ Do not recommend (see comments below).
☐ Rejected:
- ☐ Acceptance will require substantial revision of Contract Documents, building or systems.
- ☐ Request does not indicate specific item, system or method which is being proposed.
- ☐ Requested for manufacturer acceptance only.
- ☐ Request form is not properly executed and signed.
- ☐ Subcontractor or supplier requested directly.
- ☐ Insufficient information submitted.
- ☐ Does not comply color wise or pattern wise with base specified items.
- ☐ Insufficient information submitted to evaluate.
- ☐ Does not appear to comply with requirements of specifications for base specified product.
- ☐ Other:

☐ Additional information needed - Returned to Contractor for providing following:

Comments: _____

_____

_____

Architect: _____

By (print & sign): _____ Date: _____

Position: _____

Distribution: ☐Owner ☐Contractor ☐file

OWNER ACTION:

☐ Reject - Do not want to consider.
☐ Product substitution approved - Contractor may proceed with request as a submitted.
☐ Approved – Architect directed as Change in Services to issue change document to incorporate substitution into contract Documents, and adjust Contract Sum and/or Contract time.
☐ Architect authorized as Change in Services to further evaluate and make recommendation.
☐ Architect authorized as Change in Services to revised Contract Documents to incorporate proposal, and issue change document to the contractor for submitting a complete cost proposal for Owner's consideration.
☐ Additional information needed - Returned for providing following:

Comments: _____

_____

_____

Owner: _____

By: (print & sign) _____ Date: _____

Position: _____

Distribution: ☐ Architect ☐ Contractor

ARCHITECT FURTHER ACTION / RECOMMENDATION (if needed):

- ☐ Incorporating into change document as directed by Owner. Change document _____ will be used.
- ☐ Recommend Owner's approval.
- ☐ Submitted to Owner for authorization for Architect's as Change in Service to revised Contract Documents to incorporate proposal, and issue change document to the contractor for submitting a complete cost proposal for Owner's consideration.
- ☐ Do not recommend (see comments below).
- ☐ Rejected:
  - ☐ Acceptance will require substantial revision of Contract Documents, building or systems.
  - ☐ Request does not indicate specific item, system or method which is being proposed.
  - ☐ Requested for manufacturer acceptance only.
  - ☐ Request form is not properly executed and signed.
  - ☐ Subcontractor or supplier requested directly.
  - ☐ Insufficient information submitted.
  - ☐ Does not comply color wise or pattern wise with base specified items.
  - ☐ Insufficient information submitted to evaluate.
  - ☐ Does not appear to comply with requirements of specifications for base specified product.
  - ☐ Other:
- ☐ Additional information needed - Returned to Contractor for providing following:
- ☐ Recommend Owner's approval.
- ☐ Do not recommend.

Comments: _____

Architect: _____

By: (print & sign) _____ Date: _____

Position: _____

Distribution: ☐ Owner ☐ Contractor ☐ file

OWNER FURTHER ACTION (if needed):

- ☐ Reject - Do not want to consider.
- ☐ Product substitution approved - Contractor may proceed with request as a submitted.
- ☐ Approved – Architect directed as Change in Services to issue change document to incorporate substitution into contract Documents, and adjust Contract Sum and/or Contract time.
  Architect authorized as Change in Services to revised Contract Documents to incorporate proposal, and issue change document to the contractor for submitting a complete cost proposal for Owner's consideration.
- ☐ Additional information needed - Returned for providing following:

Comments: _____

Owner: _____

By: (print & sign) _____ Date: _____

Position: _____

Distribution: ☐ Architect ☐ Contractor ☐ file

END OF FORMS

SECTION 01 26 13
REQUESTS FOR INFORMATION (RFI)

PART 1 - GENERAL

1.1 SUMMARY

A. Section specifies administrative and procedural requirements for handling and processing Requests for Information (RFI).

B. RFI is intended for requesting clarifications and interpretations of Contract Documents due to inconsistencies, errors or omissions in Contract Documents, and unanticipated existing conditions.

C. RFI is not intended for general communication, requesting substitutions, Contractor's proposed changes, resolution of nonconforming work, and coordination between contractors or for general questions not related to Contract Documents.

D. RFI process is a cooperative enterprise between Architect and Contractor to expedite RFI response and maintain progress of Work.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 REQUESTS FOR INFORMATION

A. Review of Contract Documents and Field Conditions:
   1. Contract Documents are complementary. Before starting each portion of Work, Contractor shall carefully study and compare various Drawings, Specifications and other Contract Documents, coordination drawings, shop drawings, prior correspondence or documentation relative to that portion of Work, as well as information furnished by Owner.
   2. Contractor and Subcontractors shall evaluate and take field measurements of conditions related to that portion of Work and shall observe any conditions at site affecting it.
   3. These obligations are for purpose of facilitating coordination and construction by Contractor and are not for purpose of discovering errors, omissions, or inconsistencies in Contract Documents.
   4. Contractor and subcontractors acknowledge that all documents pertaining to Work has been examined, have examined character of site and any existing conditions, and are satisfied with nature of Work, and other matters which can affect Work.
   5. In event of inconsistency between portions of Contract Documents or within Contract Documents; provide better quality or greater quantity of Work, and comply with more stringent requirement, either or both in accordance with Architect's interpretation.
   6. Report errors, inconsistencies or omissions discovered in Contract Documents promptly to Architect as a properly prepared and timely RFI.
   7. Contractor and Subcontractors are not required to ascertain Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, and rules and regulations, unless they bear upon construction means, methods, techniques or safety and health precautions, but the Contractor shall promptly report to Architect any nonconformity discovered by or made known to Contractor as a RFI.
   8. On condition that Contractor or Subcontractor fail to give such notice, and knowingly proceeds with Work affected by errors or omissions in Contract Documents, Contractor shall correct any such errors, inconsistencies, or omissions at no additional cost.
   9. Prior to bid, Contractor shall review existing facilities related to this contract and shall be familiar with utility requirements and construction.

a. New facility documents may be available through Owner or Architect for review.
b. Perform preliminary investigations as required to ascertain extent of Work.
c. Conditions which would be apparent by such investigation will not be allowed as cause for claims for extra costs.

B. Contractor's and Subcontractor's Responsibilities:
1. Process request through Contractor when interpretation, clarification or explanation of portion of Construction Documents is needed by Contractor, Subcontractor, Vendor or Supplier.
a. Review request for completeness, quality, proper referencing to drawing or specification section and reason submitted.
b. In event request is not acceptable return to submitter with comments regarding reason for being returned.
c. Make every attempt to validate, resolve or respond to RFI by thoroughly researching and reviewing Contract Documents and field conditions.
d. Respond to RFI accordingly if review of RFI discloses a response or is related to coordination of construction or other issue not related to Contract Documents.
e. If request is unclear, rewrite and state in clear, concise, correct, complete and easily understood manner.
1) Include additional information if necessary, and submit to Architect for response.
2. Submit request for interpretation, clarification or explanation of Contract Documents to Architect through Contractor.
a. List specific Contract Documents researched when seeking information being requested.
b. Reference applicable Contract Drawings by sheet number, section, detail, room number, door number, etc., Specifications by section and paragraph number, and reference other relevant documents.
c. The field titled "Regarding" on attached RFI form must be clear for future reference in reports or correspondence.
d. Clearly state request and provide Contract Document references and any additional information needed so request can be fully understood, including sketches, photos or other reference material.
e. Fully assess issues, suggest any reasonable solutions and include various factors, including potential costs, schedule impacts, if any, and recommendations which will aid in determining a solution or response.
1) In event a reasonable solution cannot be suggested, a statement to that effect should be so stated.
f. Indicate reason request is being submitted.
g. Clearly indicate critical RFI's requiring a rapid response with an explanation as to why RFI is critical.
h. Indicate priority for responses when multiple RFI's are submitted within short period of time.
3. Distribute copies of responses to RFI's to all parties affected.
4. Response to RFI shall not be considered a notice to proceed with a change that may revise the Contract Sum or Contract Time, unless authorized by Owner in writing.
5. In event response to RFI is determined incomplete, resubmit with explanation for unacceptability of response and necessary additional information within five (5) days of receipt to RFI response.
6. On condition Contractor determines or believes additional cost or time is involved due to clarifications, interpretations or instructions issued by Architect in response to a RFI, resubmit RFI within five (5) days of receipt of response with reason and alternate solution or suggestion for performing work at no additional cost.
a. In event no other solution is possible or desirable, submit Claim in accordance with Contract Documents within twenty-one (21) days of receipt of response to RFI.

C. RFI Submittal Process:

1. Process and submit RFI's to Architect by Contractor utilizing web based application, Newforma Contract Management System.
    a. A unique user name and password will be assigned to Contractor for access to system, project data and submittal of RFI's.
    b. Employ systems RFI module to submit RFIs by Contractor.
    c. Insert entire question or requested information in "Question" portion of system.
    d. Electronic file of sketches, photos or other pertinent information may be uploaded with a RFI request in system to clarify request.
    e. Submittal automatically receives current date stamp upon submittal of RFI in system.
    f. To protect submitted data from being altered, "Question" portion of screen and submitted date cannot be changed once RFI has been submitted.
    g. System will assign a unique RFI number in sequential order (1, 2, 3, 4, etc.).
    h. In event previously submitted RFI request requires revision to provide additional information, initiate a new RFI.
        1) New RFI shall be renumbered with previous submitted RFI succeeded by ".1 " to indicate revision one of RFI (i.e.: RFI No. 34.1 for revision 1 to RFI No. 34).
2. Architect will respond to RFI's utilizing Newforma Contract Management System.
    a. Architect may upload electronic files with RFI response in system to help clarify response.
    b. Upon response to RFI by Architect, the current date will be automatically entered into system.
    c. To protect responding data from being altered, "Answer" portion of screen and submitted date cannot be changed once RFI has been addressed.
3. After receipt of RFI response, the system can be accessed for RFI response, attachments and printing.
4. Status of RFI's submitted and data regarding RFI's may be viewed or printed from system.
5. RFIs and a variety of different RFI summaries, and filtered reports may be generated, viewed, or printed from system.

D. Architect's Response to Request for Information (RFI):
1. Clarifications, interpretations and decisions of Architect in response to RFI will be consistent with intent of and reasonably inferable from Contract Documents, in writing, and may be provided in form of drawings and other attachments, or both.
2. When making such interpretations and decisions, Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.
3. Architect's decisions on matters related to aesthetic effects will be final if consistent with intent expressed in Contract Documents.
4. Architect will not undertake to settle differences between Contractor, Subcontractors, trades suppliers, fabricator or manufacturer, or act as arbiter as to which Subcontractor, trade, supplier or manufacturer is to furnish or install various items indicated or required.
5. Architect shall provide responses to RFI's with reasonable promptness, but will endeavor to respond within fourteen (14) days from date of receipt.
    a. If multiple RFI's are submitted on same day or within a five (5) day period, review time may be extended by mutual agreement of parties.
    b. Architect will provide a written response to RFI if Architect believes response only involves an interpretation, clarification, supplemental information or orders a minor change in Work not involving an adjustment in Contract Sum or extension of Contract Time, and is not inconsistent with intent of Contract Documents, and shall be binding.
    c. If Architect believes response may result in a change to Contract Sum or Contract Time, response will indicate that a change document will be issued for the response, and appropriate change document will be issued indicating changes to Contract Documents.
    d. Architect will provide any additional or supplemental drawings, specifications or other information as Architect may deem necessary to facilitate response.
6. Architect may return RFI without response for following reasons:

a. Is considered a “Contractor Proposed Change”.
b. Response is consistent with the intent of the Contract Drawings.
c. Request is unclear or incomplete.
d. Is due to Contractor’s lack of adequate coordination.
e. Is related to construction means, methods or techniques.
f. Response is required by another party.
g. Is considered a “Substitution Request.”

E. If requested information is available from careful study and comparison of Contract Documents, field conditions, other Owner-provided information, coordination drawings, or prior Project correspondence or documentation, Architect may invoice Owner as a change in services for costs involved in Architect’s review, analysis, responding and processing of such RFI.
   1. Contractor shall reimburse Owner for such costs.

F. Contractor and Subcontractors may anticipate receiving fifty (50) clarifications, interpretations, orders for Minor Changes in Work or responses to valid requests for interpretations or clarifications of Contract Documents.

END OF SECTION

SECTION 01 29 00

APPLICATIONS FOR PAYMENT AND SCHEDULE OF VALUES (GC)

PART 1 - GENERAL

1.1 SUBMITTALS

A. Project Information:
   1. Submittals, prior to first application for payment:
      a. Copy of Executed Contract.
      b. Copy of Performance and Payment Bonds.
      c. Schedule of Values.
      d. Copy of Owner's Notice to Proceed.

B. Contract Closeout Information:
   1. See Section 01 77 00.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF VALUES

A. Prior to first Application for Payment, submit to Architect a Schedule of Values allocated to various portions of Work, prepared in such form and supported by such data to substantiate its accuracy as Owner and Architect may require.

B. Subdivide into following allocated items:
   1. Bond.
   2. Insurance.
   3. General condition items including but not limited to:
      a. Mobilization.
      b. Temporary facilities.
      c. Temporary utilities.
      d. Submittals.
      e. Demobilization.
      f. Other similar general condition items.
   4. Phases or areas or both of building.
   5. Specification Sections.
   6. Individual components of Work, and major pieces of equipment.
   7. Labor amount and material or equipment amount, listed separately.
   8. Contract closeout items including but not limited to:
      a. Manuals.
      b. Spare parts.
      c. Maintenance material.
      d. System demonstrations.
      e. Record documents.
      f. Operation and maintenance data.
      g. Other similar contract closeout items.
   9. Individually approved changes.

C. Labor amount shall include all onsite installation costs including labor, applicable labor taxes, insurance, fringe benefits, erection equipment, tools, overhead and profit.

D. Material and equipment shall include all material and manufactured equipment costs including delivery costs, taxes, insurance, overhead and profit.

E. Schedule, unless objected to by Owner or Architect, shall be used as a basis for reviewing percent complete of line items on Contractor's Applications for Payments.

3.2 APPLICATION FOR PAYMENT

A. On or before 10th day of month, Contractor submit to Architect itemized Application for Payment for work completed during previous calendar month, in accordance with schedule of values.
   1. Submit on AIA Document G702 - Application and Certificate for Payment, and AIA Document G703 - Continuation Sheet, or similar format acceptable to Architect.
      a. Itemize in accordance with approved Schedule of Values, and as indicated in AIA documents.
      b. Bond and insurance costs may be requested for payment on first application.
      c. Equal monthly payments may be made for general conditions based upon number of months Contractor is scheduled to be on site.
      d. May include amounts for changes in work that have been authorized by Construction Change Directives, or by Change Proposal Requests approved by Owner.
      e. Furnish in triplicate.
      f. Signed by duly authorized agent of Contractor.
      g. Notarize Application for Payment.
   2. Furnish copies of requisitions from Subcontractors and suppliers to substantiate values.
   3. Shall not include request for payments for portions of Work for which Contractor does not intend to pay to a Subcontractor or supplier, unless such Work has been performed by others whom Contractor intends to pay.
   4. Provide additional supporting data substantiating Contractor's right to payment, as Owner or Architect may require.

B. Application for Payment serves as certification of status by Contractor of Project.

C. Contractor warrants that title to all Work covered by an Application for Payment will pass to Owner upon receipt of payment.

D. Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from Owner shall, to the best of Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to Work.

3.3 PAYMENT FOR STORED MATERIAL AND EQUIPMENT

A. Application for Payment may include materials and equipment ready, but not yet incorporated in Work, delivered, and suitably stored at site.

B. Application for Payment may include materials and equipment ready, but not yet incorporated in Work, delivered, and suitably stored at site, or off–site, if approved by Owner in advance and in writing.
   1. For purpose of above paragraph, "materials and equipment" eligible for payment, are defined as finished goods made specifically for subject job, and requiring extensive time to be manufactured or obtained.
   2. Raw materials or work-in-process at manufacturer's plant are not eligible for payment, unless authorized by Owner.
   3. Off-site storage of items such as tubing, conduit, pipe, drywall, studs, cable, etc., and items which are readily available for purchase will not be considered eligible.

C. Payment will be made by Owner for off-site stored materials and equipment provided following is accomplished:
   1. Items must be listed separately as material or equipment cost on Application for Payment Schedule of Values.

2. Provide receipted Invoices or Bills of Sale as evidence that Contractor is unconditional owner of equipment or material, with Application for Payment.
3. Provide Stored Material and Equipment Affidavit with Application for Payment; use form included herein or acceptable to Architect.
4. Identify items in storage as property of Owner, and furnish description of identification method.
5. Provide written and photographic inventory of items, including Contractor's certification that all quantities have been received, and are in good condition.
6. Owner must approve location of off-site storage, in advance and in writing.
7. Provide insurance coverage for items in storage and in transit.

D. Owner retains right to verify storage by physical inspection prior to partial payment, and at any time thereafter.

E. Payment does not relieve Contractor's responsibility for protecting, safeguarding, insurance, transporting, and proper installation of equipment or materials.

F. Warranty and guarantee period does not commence until Final Completion of work.

G. Payment will be treated same as "work-in-place," with evidence of delivery to job site or other location acceptable to Owner, except that payments will not include value of labor and mark-up.

H. Each subsequent Application for Payment will restate prior month's materials and equipment not incorporated in Work, and current month additions and deletions for materials and equipment incorporated into work. Inventory must be updated and included with each subsequent application to indicate current status.
   1. Use Stored Material and Equipment Inventory form included herein or similar format acceptable to Architect.

I. Upon making of partial payments by Owner, all materials and equipment covered thereby become sole property of Owner. Partial payments, however, do not constitute Owner's acceptance of material, equipment or work, nor be construed as waiver of any right or claim by Owner.

J. Contractor shall be deemed as having care, custody, and control of items.

3.4 RETAINAGE

A. Until Substantial Completion of entire project, 10% retainage will be withheld from value of Work completed and material stored.

B. (Not Used)

END OF SECTION

STORED MATERIAL AND EQUIPMENT AFFIDAVIT

PROJECT: Tom Green County – AV/Court Technology PROJECT NO: 10163575

Item Number	Quantity	Unit	Material or Equipment Description	Value

LOCATION STORED: _____

IDENTIFICATION METHOD: _____

AFFIDAVIT:

Items listed above have been purchased exclusively for use on above referenced Project and have been received in good condition, and items are identified as property for use only on above referenced Project. Owner may enter upon premises for verification, inspection, or for any other purpose considered necessary. It is expressly understood and agreed that this affidavit is furnished to the Owner for purpose of obtaining approval for payment for said items, and that storage thereof at location indicated and payment by Owner shall not relieve Contractor of full responsibility for the protection, safeguarding, insurance, transporting, and proper installation at Project referenced above, and will warrant and defend against claims and demands of all persons. Upon making of partial payment by Owner, said items covered thereby become sole property of Owner.

Attached are receipted invoice(s), bills of sale(s), and/or other documents as evidence that Contractor is unconditional owner of said items, and they are free from all encumbrance, security agreements, mortgages or liens.

FROM CONTRACTOR: _____

BY: _____ DATE: _____

SUBSCRIBED AND SWORN TO BEFORE ME THIS _____ DAY OF _____, _____.

NOTARY PUBLIC: _____ MY COMMISSION EXPIRES:

Owner (APPROVES) (DISAPPROVES) location of off site storage, and Contractor's inclusion of cost for above items in an Application for Payment.

OWNER'S APPROVAL:

BY: _____ DATE: _____

Contractor shall include this affidavit and other required documents with Application for Payment and shall maintain an inventory of all stored materials for submittal with future applications.

END OF FORM

STORED MATERIAL AND EQUIPMENT INVENTORY

PROJECT: Tom Green County – AV/Court Technology FOR APPLICATION NO.:

PAGE: of

The following inventory represents our accounting of the current status of material and equipment in storage which we have received payment for:

Item No.	Material or Equipment Description	Quantity	Value	Appl. No.	Incorporated Date/Quantity	

FROM CONTRACTOR: _____

BY: _____ DATE: _____

This form is required to be updated and submitted with each application for payment.

END OF FORM

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.1 GENERAL

A. Due to the current COVID-19 pandemic, physical attendance at meetings is subject to parameters specified in any governmental Orders applicable at the time. During the project if virtual meetings are to occur it will be the responsibility of the Successful Bidder to arrange for and schedule such meetings.

1.2 PREBID CONFERENCE

A. See ADDITIONAL INFORMATION in Owner's RFP instructions that proceed EXHIBIT A.

1.3 PREPROJECT CONFERENCE

A. The Architect will schedule and hold pre-project conference shortly after contract award.

B. Attendance Required:
   1. Owner:
      a. Project Representative.
      b. Director of IT.
   2. Architect.
   3. Contractor:
      a. Home office representative.
      b. Field/Installation Project Manager.
   4. Building contractor representative.

C. Contractor must be prepared to discuss the following items:
   1. List of subcontractors.
   2. Tentative Project schedule.
      a. Start and completion dates.
      b. Critical work sequence.
   3. Status of Contract, bonds, and insurance.
      a. Accepted alternates.
   4. Procedures.
   5. Designation of responsible personnel.
   6. Processing of field decisions and change orders.
   7. Submittal process.
   8. Procedures for maintaining record documents.
   9. Submission and processing of Applications for Payment and associated requirements.
   10. Coordination with building construction.

D. Contractor to conduct a meeting with subcontractors after preconstruction conference to discuss procedures.

1.4 CONTRACTOR MEETINGS

A. Conduct weekly progress, coordination and scheduling meetings with subcontractors.

1.5 PROGRESS MEETINGS

A. Contractor to schedule meetings on time, day and place to be determined.
   1. Generally, meetings will be held monthly or as required by progress of the Work and scheduled to coincide with Architect's regular scheduled site visits.
   2. Meetings to be held at job site or as arranged.
   3. Contractor administer meetings and record minutes.
   4. Distribute minutes to meeting attendees within 7 days of meeting.

B. Attendance Required:
   1. Owner's Representative(s).
   2. Architect's Representative(s).
   3. Contractor:
      a. Home office representative.
      b. Field/Installation Project Manager.
   4. Building Contractor Representative.

C. Agenda:
   1. Review, approve minutes of previous meeting.
   2. Review work progress since last meeting.
   3. Planned progress during next work period.
   4. Review project schedule
   5. Coordination with building construction.
   6. Identify concerns which impede planned progress.
   7. Note field observations, questions, and decisions.
   8. Review submittal schedules.
   9. Review RFIs.
   10. Review Owner/Contractor coordination items.
   11. Review status of changes.

1.6 PREINSTALLATION CONFERENCE

A. Contractor administer meeting and record minutes.
   1. Convene affected parties for coordination where required by Contract Documents.
   2. Conduct meetings prior to installation of the Work.
   3. Meetings to be held at job site or as arranged.
   4. Distribute minutes to meeting attendees within 7 days of meeting.

B. Attendance Required:
   1. Owner's Representative(s).
   2. Director of IT.
   3. Architect's Representative(s).
   4. Contractor:
      a. Field/Installation Project Manager.
      b. Fabricator or Supplier.
      c. Others whose work may affect or be affected by installation.
   6. Building Contractor Representative.

C. Agenda:
   1. Review or inspect existing conditions.
   2. Review submittals.
   3. Review building construction schedule, compare with installation schedule of this project's Work, and identify concerns.
   4. Review Owner/Contractor coordination items.
   5. Discuss mobilization, delivery and work sequencing.
   6. Use of premises:
      a. Office, work and storage areas
      b. Owner's requirements
         1) Safety and first-aid procedures
         2) Security procedures
      c. Hours available for installation
      d. Acceptable location, process and path for deliveries
   7. Note field observations, questions, and decisions.
   8. Procedures of maintaining record documents.
   9. Review proposed recycling/trash removal procedure and process for cleaning up at end of day.

END OF SECTION

SECTION 01 31 26
NEWFORMA CONTRACT MANAGEMENT SYSTEM REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Newforma Contract Management System (Newforma) will be utilized on this Project for collaboration and certain administrative functions.

1.2 CONTRACT MANAGEMENT COLLABORATION SYSTEM

A. Newforma Contract Management System is a web-based application furnished by Architect at no cost to Owner and Contractor.

B. Contractor will have access to projects and modules for which they have permissions.

C. Architect will manage and administer Newforma Contract Management System.

D. Enables project team to review status of documents and generates a variety of reports which can be filtered by different criteria.

E. Allows uploading, viewing and printing of multiple documents and attachments in most modules.

F. Certain documents will be distributed by Architect by means of Newforma.

G. Newforma Help Guide is available from application.

1.3 HARDWARE REQUIREMENTS

A. Computer with high-speed internet connection.

1.4 SOFTWARE REQUIREMENTS

A. Web Browser:
   1. Microsoft Internet Explorer v11 or newer.
      a. Silverlight plug-in required for files larger than 2 GB.
   2. Google Chrome and Mozilla Firefox
      a. Limited file sizes.
      b. Some known display abnormalities
      c. Unsupported by HDR

B. Adobe Acrobat or Bluebeam PDF to view reports and PDF documents generated by Newforma.

C. Additional applications: MS Word, MS Excel, imaging software to open DOC, XLS, TIFF and JPEG attachments.

D. Email application and service.

1.5 ACCESSING HDR NEWFORMA COLLABORATION SYSTEM

A. HDR will assign each required external user a temporary password to access Newforma Contract Management System.
   1. User will be directed to change temporary password.

B. Access Newforma from a web browser at https;//Newforma.hdrinc.com/userweb

C. External user logging in to Newforma Info Exchange:
   1. Newforma will prompt to login with Username and Password.
   2. Password is case sensitive.

PART 2 - (NOT USED)

PART 3 - EXECUTION

3.1 MODULES / FUNCTIONS

A. Verify with HDR's project Construction Contract Administrator which Newforma modules will be made available to Contractor and the document nomenclature which will be used.

B. Contractor will utilize following Newforma modules:
   1. Submittals:
      a. Samples and Project Information that requires professional seals and signatures shall not be submitted electronically.
      b. Other Submittals - Contractor to submit electronically:
         1) Submit as PDF documents.
         2) Recommended file creation: 200 DPI minimum, 400 DPI maximum Scan text in text mode. Scan images with text in text/photo mode.
         3) Include executed HDR Submittal Transmittal form with submittal.
         4) Name PDF file same as Submittal Number. i.e.: 063420-1A.pdf
         5) Do not submit file in Adobe PDF/A mode.
         6) Transmitting submittal files with Newforma Contract Management System:
            a) Select assigned project for submittal transmittal.
            b) Select Submittal tab to open Send Submittal screen
            c) Enter information in fields regarding submittal.
               (1) Sender ID: will be assigned by HDR
               (2) Subject: Include the Section Title
               (3) To: Designated project submittal processor
               (4) CC: Other designated personnel
            d) Select specification Section in the pull down menu.
            e) Add Remarks as needed to differentiate submittal from similar submittals.
            f) Attach PDF documents and other electronic files.
            g) No further action is required by the contractor until they received notice that the reviews are complete.
      c. When submittals have been reviewed and posted, they will appear in the Response or Closed column of the submittal log.
      d. Contractor will have access to Newforma to download electronic submittal image file for their further processing.
      e. See Section 01 33 00 - Submittal Processing for additional requirements.
   2. Request for Information (RFI):
      a. Contractor shall create new RFI's in Newforma for requesting information from Architect.
      b. Architect will access requested information and any attachments.
      c. Contractor will access Newforma to view response and any attachments.
      d. See Section 01 26 13 - Requests for Information for additional information.
   3. Contractor Proposal Requests (CPR):
      a. Architect will notify Contractor by email when document has been issued and posted to Newforma.
      b. Contractor will access Newforma to download electronic documents for further processing.
      c. See Section 01 26 00 – Contract Modification Procedures for additional information on processing changes.
   4. Supplemental Instructions (SI):
      a. Architect will notify Contractor by email when document have been issued and posted to Newforma.
      b. Contractor will access Newforma to download electronic documents for further processing.

c. See Section 01 26 00 – Contract Modification Procedures for additional information on processing changes.

5. Construction Change Directives (CCD):
   a. Architect shall notify Contractor by email when document has been issued and posted to Newforma.
   b. See Section 01 26 00 – Contract Modification Procedures for additional information on processing changes.
6. Change Order Proposal:
   a. Architect will notify Contractor by email when document has been issued and posted to Newforma.
   b. Contractor will access Newforma to download electronic documents for further processing.

END OF SECTION

SECTION 01 32 16
PROJECT SCHEDULES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Includes:
   1. Upon award of the Contract, Contractor shall prepare and submit a Contractor's project schedule for the Work for the Owner's and Architect's information.
      a. Submit per 1.2 below.
      b. Schedule shall not exceed time limits current under Contract Documents, shall be revised at appropriate intervals as required by conditions of the Work and Project, shall be related to entire Project to extent required by Contract Documents, and shall provide for expeditious and practicable execution of Work.
   2. Coordinate Subcontractors' (if applicable) schedules for entire Project:
      a. Secure time commitments for performing critical elements of Work from parties involved.
      b. Coordinate each element on the schedule with other project activities; include minor elements involved in sequence of Work.
      c. Show each activity in proper sequence.
      d. Indicate graphically the sequences necessary for completion of related portions of Work.
      e. Resolve conflicts among schedules of Subcontractors.
      f. Revise as required by conditions and progress of Work.
      g. Furnish copy of schedules for entire Project to each Subcontractor.
   3. Schedule of Work must be based on coordination with Owner and building contractor.
   4. Preliminary Project Schedule shall be based on project schedule included with this Bid package.
   5. Contractor shall perform Work in general accordance with most recent schedules submitted to Owner and Architect.

1.2 SUBMITTALS

A. Project Information:
   1. Preliminary Project Schedule:
      a. Submit to Owner and Architect prior to date set for Preconstruction Conference and prior to start of Work.
   2. Project Schedules:
      a. Provide to Owner and Architect within 30 days of start of Work.
   3. Updated Project Schedules:
      a. Provide to Owner and Architect every other month with pay application.
      b. Provide if completion date is revised or sequence of Work is revised.

1.3 MILESTONES

A. A Milestone schedule has been included with this Bid package as the basis of delivery of this Work. The schedule is based upon delivery dates of the building construction, installation of this Work, and subsequent Owner installation of IT services then occupancy.

B. A "Milestone" is defined as a scheduled event representing the start of end of a series of activities or an accomplishment or event in the course of the project. The date of the Milestone is a significant point in time, is relied upon by other parties for their coordination efforts, and is contractually binding on the Contractor.

C. If Milestone dates are delayed through no fault of the Contractor, subsequent milestones shall be adjusted upon application to the Owner for a time adjustment. Upon Owner approval of such

time adjustment, no increase in contract price shall be expected unless such delay can be proven to cause undue financial hardship to the Contractor that would not have occurred if such delay had not occurred.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 FORM OF SCHEDULES

A. Horizontal Bar Chart:
   1. Indicate each bar with start and completion date of each item, its total percent to be completed for each month.
   2. Identify each bar column:
      a. By Work element and major component.
      b. By distinct graphic delineation.
   3. Horizontal time scale:
      a. Identify first week day of each week.
   4. Scale and spacing:
      a. Allow space for updating.
   5. As Work progresses, place contrasting mark in each bar to indicate actual progress and completion.

B. Sheet Size:
   1. Maximum 11 x 17 IN.
   2. Provide in electronic PDF format.

3.2 CONTENT OF SCHEDULES

A. Provide complete sequence of Work by activity.
   1. Pre-Installation:
      a. Shop drawings, product data and samples
      b. Dates reviewed copies will be required.
      c. Product procurement and delivery dates.
   2. Installation:
      a. Dates product information and delivery of Owner furnished, installed equipment and materials is needed.
      b. Show the complete sequence of installation by activity.

B. Dates for early and late beginning, and completion of each element of construction.

C. Provide Subcontractor schedules to define critical portions of prime schedule.

D. Identify Work of separate floors, or separate phases, or other logically grouped activities.

E. Show how requirements for phased completion and subsequent IT installation by Owner affect sequence of Work, if applicable.

F. Indicate important stages of project for each major portion of Work, including submittal review, testing, and installation.

G. Identify punch list preparation and completion durations, agencies inspections, and Owner occupancy dates.

H. Show projected percentage of completion for each item of Work as of last day of every month.

I. Identify restraints and constraints.

J. Identify critical path and critical portions of entire schedule. There shall be only one critical path and it shall be clearly identified.

3.3 UPDATING

A. Show changes occurring since previous submission of updated schedules.

B. Indicate progress of each activity, actual verses scheduled start and completion dates, and actual verses scheduled percent complete by month.

C. Include:
   1. Major changes in scope.
   2. Activities modified since previous updating.
   3. Review projections due to changes.
   4. Other identifiable changes.

D. Provide Narrative report Including:
   1. Discussion of problem areas including current and anticipated delay factors and their impact.
   2. Corrective action taken or proposed and its effect.
   3. Effect of change in schedule.
   4. Description of revisions.
      a. Effect on schedule due to changes to Contract.
      b. Revisions in duration of activities.
      c. Other changes that may affect schedule.

5. Narrative should not be lengthy. Intent is to provide a thorough observation and recommendation for the project team.

3.4 DISTRIBUTION

A. Distribute copies of revised schedules to:
   1. Owner.
   2. Architect.
   3. Contractors/Subcontractors.
   4. Other concerned parties.

B. Instruct recipients to report inability to comply and provide detailed requirements and schedule, with suggested remedies.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Shop Drawings, Product Data, Samples, Project Information submittals including Contract Closeout submittals.

B. Provisions of this Section take precedence over provisions in General Conditions of the Contract for Construction, if used, governing Shop Drawings, Product Data, Samples, Project Information and Contract Closeout Information submittals.

C. Submittals are not to be used as means for substitution requests.
   1. Submittals that include substitutions will be returned without review or action.

D. Contact Architect in event of non-availability of specified product due to strikes, lockouts, bankruptcy, production discontinuance, proven shortage, or similar occurrences.
   1. Notify Architect, in writing, with substantiating data as soon as non-availability becomes apparent.
   2. Notify in time to avoid delay in project.

E. Appropriateness and accuracy of calculations are responsibility of Contractor and Contractor's licensed professional when such calculations are required to be professionally sealed.

F. When professional or other certification of performance criteria of materials, systems or equipment is required by Contract Documents, Architect shall be entitled to rely upon accuracy and completeness of such calculations and certifications.

1.2 DEFINITIONS

A. General:
   1. Submittals are not Contract Documents.
   2. Purpose of submittals is to demonstrate way by which Contractor proposes to conform to information given and design concept expressed in Contract Documents for those portions of Work for which Contract Documents require submittals..

B. Shop Drawings Action Submittals:
   1. Drawings to scale, diagrams, schedules and other data specially prepared for Work by Contractor or a Subcontractor, sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of Work.

C. Product Data Action Submittals:
   1. Illustrations, standard schedules, performance charts, instructions, brochures, color charts, performance curves, diagrams, test data and other information furnished by Contractor to illustrate material, product, equipment or system for some portion of Work.

D. Samples Action Submittals:
   1. Physical examples which illustrate size, kind, pattern, texture, materials, equipment, systems or workmanship and establish standards by which Work will be judged.
   2. Samples also include job site Mock-ups and sample construction.

E. Project Information Submittals:
   1. Examples of Information Submittals, which do not require review or action by Architect, include but are not limited to;
      a. Progress Reports
      b. Contractor Coordination Drawings
      c. Bonds.

d. Construction Schedules.
e. Manufacturer's Installation or Adjustment Instructions.
f. Statements of Qualifications.
g. Certificates.
h. Field Service, Laboratory Test.
i. Start-Up Reports,
j. Design Calculations.
k. Material Safety Data Sheets.
l. Safety Programs and Reports.
m. Other Information Submittals identified in individual specification sections.

F. "Contract Closeout Information" Submittals:
1. Items pertaining to quality control and Owner information, which are required at Substantial or Final Completion, and do not require review or action by Architect.
2. Architect may review at its sole discretion, for general compliance with Contract Documents only.
3. Review will not constitute a detailed check of submitted design calculations.
4. Examples of Contract Closeout Information Submittals which do not require review or action by Architect include, but are not limited to, Pre-occupancy test reports.
a. Operation and Maintenance Data.
b. Warranties and Guarantees
c. Owner instruction reports.
d. Project Record documents.
e. Extra materials or tools.
f. Other Submittals identified in individual specification sections.

G. Manufacturers and products, base and optional: See Section 01 61 00.

1.3 SUBMITTALS

A. Project information:
1. Schedule of Submittals:
a. Provide in advance of transmittal of first submittal and prior to first application for payment.

1.4 SCHEDULE OF SUBMITTALS

A. Complete Schedule of Submittals shall include Shop Drawings, Product Data, Samples, Project Information, and Contract Closeout Information required by specification section Submittal paragraphs.
1. Submittals Schedule shall be mutually agreed upon, in writing, by Architect and Contractor.
2. Contractor or Subcontractors may require submittals for their coordination purposes even when submittals are not required by Contract Documents for Architect's review. Do not include or submit such submittals to Architect.
3. Schedule shall be in horizontal bar chart format divided by weeks.
4. Indicate proposed submittal dates for each submittal.
5. Schedule shall allow for adequate time to perform orderly and proper review of submittals, including time for consultants and Owner if required and resubmittals by Contractor if necessary, and to cause no delay in Work or in activities of Owner or other contractors.
a. Allow at least two weeks for Architect's review and processing of each submittal, excluding mailing if physical sample included.
6. Coordinate each submittal with fabrication purchasing, testing, delivery, other submittals and related activities that require sequential activity.
7. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

8. Architect reserves the right to withhold action on a submittal which, in the Architect's opinion, requires coordination with other submittals until related submittals are received, and will notify the Contractor, in writing, when he exercises this right.
9. Do not include or submit items not required to be submitted by Contract Documents.
10. Arrange submittals by product type or tag:
    a. Submit Shop Drawings, Product Data, and Project Information (except for Field Test Reports) items specified for a single item or tag at same time for a complete review.
        1) Shop Drawings: Individual submittal item. Subparagraphs represent description of items to include.
            a) Indicate additional submittals that will be generated as result of dividing required submittal by building, floor, area of a floor, or other subdivision.
        2) Product Data: Individual submittal item. Subparagraphs represent description of items to include as part of single submittal.
        3) Sample and Information submittals: Each subparagraph represents an individual submittal item.
11. Indicate submittals that will be provided to agencies having jurisdiction. Schedule sufficiently in advance of date required to allow agency reasonable time for review, and Contractor resubmission if necessary, and to cause no delay in Work or in activities of Owner or other contractors.
12. Indicate additional submittals that will be generated as result of dividing required submittal by building, floor, area of a floor, or other subdivision.
13. Submit all submittals required by a section at same time which are needed for a complete review, except Contract Closeout Information Submittals, and Shop Drawing submittals divided by building area.
14. Do not submit large quantities of submittals at one time.
15. Schedule Contract Closeout Information submittals during last quarter of project period and prior to Substantial Completion.
16. Partial payment requests may be withheld until satisfactory Schedule of Submittals has been received.

1.5 SHOP DRAWINGS

A. Shop Drawing Action Submittals are required as called for in each specification section Submittal paragraph.
    1. Do not use Contract Drawings as Shop Drawings.

B. Certain Shop Drawing plan sheets shall be produced in electronic format for the purpose of completing Coordination Drawings or updating Project Record Drawings as may be required in other Sections.
    1. If so required, Architect's electronic files will be provided in the native format in which they were produced.
        a. Architect makes no representation as to accuracy or completeness of electronic files.
        b. Complete the Architect's standard Electronic Media Release form before electronic files are provided to the Contractor by the Architect.
    2. Have skilled CAD technician produce following Shop Drawing plans in same CAD program and version utilized by Architects for design drawings.
        a. .Plans.

    3. Use layers compliant with National CAD Standard to facilitate Coordination Drawings and Project Record Documents, using the background as a reference to the coordination file.
    4. Contractor may choose to increase scale of plotted drawings to facilitate clarity of detail. Revised scale shall be indicated on plotted sheets.

C. Submit high quality, high contrast copy of Shop Drawings in Portable Document Format (PDF).
    1. Use Newforma Contract Management System (Newforma). See Section 01 31 26 for specific information.

1.6 PRODUCT DATA

A. Product Data Action Submittals are required as called for in each specification section Submittal paragraph.

B. Submit high quality, high contrast copy of Product Data in Portable Document Format (PDF).
   1. Use Newforma Contract Management System (Newforma). See Section 01 31 26 for specific information.
   2. Include index if multiple items under specification section are included in submittal.
   3. Mark each copy to show exact item, model, and options submitted for review.
   4. Show compliance with specified reference standards, performance characteristics, and capacities; wiring and networking diagrams; component parts; finishes; dimensions; and required clearances; notation of coordination requirements.
   5. Mark through items on manufacturer's standard sheets which are not being proposed. Submittals without indications and deletions will be returned without review.
   6. Include scale details, sizes, dimensions, performance characteristics, capacities, wiring diagrams, controls, mounting and installation details, and other pertinent data.

1.7 SAMPLES

A. Sample Action Submittals are required as called for in each applicable specification section Submittal paragraph.
   1. Identify samples with manufacturer’s name, item, use, type, Project designation, specification section or drawing, detail reference, color, range, texture, finish and other pertinent data.
   2. Send samples to address indicated, or Project site if required or requested.
   3. Samples shall have a label affixed or attached thereto of sufficient size to accommodate Contractor’s approval stamp.
   4. Submit one sample of each color or type indicated.
   5. Architect may retain one sample for comparison purposes.

   B. When specific colors, textures, or patterns are not specified, submit samples from full range of manufacturer's standards for selection. When custom or standard finishes are specified, submit samples of specified colors, textures or patterns.

1.8 PROJECT INFORMATION AND CONTRACT CLOSEOUT INFORMATION

A. Project Information and Contract Closeout Information are submittals are required as delineated in each specification section submittal paragraph..

B. Submit high quality, high contrast copy of Product Data in Portable Document Format (PDF).
   1. Organize by specification section.
   2. Utilizing Newforma Contract Management System (Newforma). See Section 01 31 26 for specific information.

1.9 SUBMITTALS REQUIRING PROFESSIONAL SEALS AND SIGNATURES

A. Shall be submitted per following:
   1. Unless otherwise agreed to by Architect, submit to Architect for records one (1) original, or high quality high contrast copy of submittal suitable for reproduction, unless quantity is indicated elsewhere. Submit quantity indicated in specifications sections to Owner.
   2. Architect is not required to return submittal.
   3. Do not fold. Submit in envelope large enough for submitted items.

1.10 TRANSMITTAL

A. Contractor is responsible for making submissions.
   1. Electronic submittals shall be submitted utilizing web-based Newforma Contract Management System. See Section 01 31 26 for specific information.
   2. Samples and submittals which require hard copies, submit items to office of Architect:

HDR Architecture, Inc.
8750 N. Central Expressway, Suite 100
Dallas, TX 75231
Attention: Martin Aguirre

B. Transmit items with Submittal Transmittal form included at end of this section, or supplied by Architect, or similar format approved in advance by Architect.
   1. Contact Architect for copy made for Project.
   2. Indicate Project name, Architect's project number, specification section title, description of submitted items or systems, manufacturer and submittal type on transmittal form.
   3. Indicate submitted date, approval and sign in appropriate space on transmittal form.
   4. Submittal Transmittal form shall stay with submittal throughout its routing.
   5. Indicate submittal number in space provided on Submittal Transmittal form. Following submittal numbering system shall be used:
      a. Identify each submittal using applicable 6 digit specification section number from Contract Documents.
      b. After section number, indicate sequence number. First submittal of section series would be numbered "######-1 IN, next would be "######-2 IN, etc.
      c. If returned for re-submission, add a designation character. Second submission would be "######-1A", third would be "######-1B", etc.
   6. Indicate description of submitted items including drawing numbers, etc.
   7. Indicate "Submittal type" being submitted.

C. Submittals shall only include items from one specification section.
   1. Project Information Submittals and Contract Closeout Information Submittals shall be submitted separately from other submittals required by specification section.
   2. Submit all items specified in section at same time for complete review, except Contract Closeout Information Submittals.

D. Do not submit following:
   1. Submittals not required by specification section Submittal paragraph.
   2. Submittals required by other contractors or trades for their coordination that are not required by specification section Submittal paragraph.
   3. Submittal of products, systems or manufactures not specified.
   4. Submittal of substitution.
   5. Submittal of MSDS information.
   6. Large quantities of submittals at one time.

E. Do not mark copies with highlighters that black out information, or turn opaque when reproduced, or will not scan or reproduce legibly.

1.11 CONTRACTOR AND SUBCONTRACTOR ACTION

A. Submit submittals required by Contract Documents in accordance with submittal schedule approved by Architect or, in absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in Work or in the activities of Owner or of separate Contractors.

B. Direct specific attention in writing with submittal or on submittal, indicating deviations from requirements of Contract Documents.
   1. Contractor shall not be relieved of responsibility for any deviation from requirements of Contract Documents by Architect's approval of submittals unless,
      a. Contractor has specifically informed Architect in writing of such deviation at time of submission, and
      b. Architect has given written approval to specific deviation as a minor change in Work, or

c. a Change Order or Construction Change Directive has been issued authorizing the deviation.

2. Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.
3. Completed Work shall match appearance of approved samples and mock-ups.

C. Contractor represents and warrants that submittals shall be prepared by persons and entities possessing expertise and experience in the trade for which submittal is prepared, and if required by Architect or applicable law, by a licensed professional where so stipulated.

D. Contractor is responsible for confirmation and correlation of dimensions at Project site; for information that pertains solely to fabrication processes or to techniques of construction; and for coordination of work of trades.

E. Contractor and Subcontractor shall review submittal required by Contract Documents for compliance with Contract Documents, approve and submit to Architect.

F. Submittal to Architect indicates Contractor, Subcontractor represent they have:
1. Reviewed submittal for compliance with the Contract Documents and has approved submittal;
2. Determined and verified field measurements, and field construction criteria related thereto, or will do so;
3. Determined and verified quantities, materials, performance criteria, installation requirements, catalog numbers and similar data related thereto;
4. Determined substitutions have not been included;
5. Checked, determined, verified and coordinated information contained within such submittals with requirements of Work, Contract Documents and other submittals;

G. Resubmit items returned by Architect and marked "Revise and Resubmit" or "Not Approved" until approval is received.
1. Direct specific attention, in writing, or on resubmitted submittals to revisions other than those requested by Architect on previous submittals.
2. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.
3. Bubble or otherwise clearly identify all changes from previous submittal.
4. Tag each re-submittal with a designation that reuses the previous submittal number and a suffix designating the re-submittal sequence in accordance with the numbering system indicated in this section.

H. Contractor shall reproduce and distribute copies of submittals after Architect's review to:
1. Project site: Copy of "Approved" or "Approved as Noted" submittals for use by Contractor's field staff, Owner and Architect's representatives.
2. Subcontractor or vendor.
3. Other Contractors, Subcontractors or vendors as may be required for coordination purposes.
4. Owner: Copy of "Approved" or "Approved as Noted" submittals.
5. Authorities having jurisdiction: Copy of "Approved" or "Approved as Noted" submittals if required by Authority Having Jurisdiction (AHJ).
6. Inspector (if any): Copy of "Approved" or "Approved as Noted" submittals.
7. Testing and Inspection Agencies: Copy of "Approved" or "Approved as Noted" submittals required for them to perform inspections and testing.

I. Contractor shall not be relieved from responsibility for coordination with other submittals or for errors or omissions in submittals by Architect's approval thereof.

J. Material lists and quantity information included in submittals are sole responsibility of Contractor.

K. Where a submittal is required by Specifications, any related Work performed prior to Architect's review and approval of the pertinent submission will be sole expense and responsibility of Contractor.

1.12 ARCHITECT ACTION ON SUBMITTALS

A. Architect's action on submittals:
   1. "APPROVED": Submittal is in general conformance with the design concept of Project and in general compliance with information given in Contract Documents.
   2. "APPROVED AS NOTED": Submittal has minor issues. Noted corrections must be made in final installation. Architect has option to require re-submission for record.
   3. "REVISE AND RESUBMIT": Re-submission is required, due to nature or number of issues.
   4. "NOT APPROVED": Submittal does not meet contract requirements or is not required to be submitted.
   5. "NO ACTION REQUIRED BY ARCHITECT": Submittal not required, Project Information or Contract Closeout Information Submittal

B. Architect will review and approve or take other appropriate action upon Contractor's submittals, but only for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.
   1. Such review and action is limited to only those submittals identified in Contract Documents.
   2. Architect's review of such submittals is not conducted for purpose of determining accuracy and completeness of other details and information such as dimensions, quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain responsibility of the Contractor.
   3. Architect's review or approval of a specific item shall not indicate approval of an assembly of which the item is a component.
   4. Architect's review or approval shall not constitute a review of safety or health precautions, or of any construction means, methods, techniques, sequences or procedures.
   5. Architect's review or approval on a resubmission shall not apply to revisions that Contractor has not directed specific attention to in writing on resubmitted submittals, other than those requested by Architect on previous submittal.

C. Architect's action will be taken with such reasonable promptness as to cause no delay in Work or in activities of Owner, Contractor or separate contractors, while allowing sufficient time in Architect's professional judgment to permit adequate review by Architect, Architect's consultants, and Owner, if needed.
   1. Architect's obligation to review or approve submittals and to return them with reasonable promptness is conditional upon prior review and approval of submittals by Contractor, and Contractor's transmittal of submittals in accordance with Contract Documents and approved Schedule of Submittals.

D. Items not submitted in accordance with provisions of this section may be returned, without review or action.
   1. Submittals which do not indicate Contractor has reviewed submittal for compliance with Contract Documents, and approved submittal.
   2. Submittals which are not required by Contract Documents.
   3. Submittal on items not approved for use by Contract Documents.
   4. Submittals which include information from more than one specification section.
   5. Project Information Submittals or Contract Closeout Information Submittals included with other submittals required by specification section Submittal paragraph.
   6. Submittals required by other contractors or trades for their coordination that are not required by specification section Submittal paragraph.
   7. Submittal of products, systems, or manufactures not specified.
   8. Submittal of substitution.
   9. Submittal of MSDS information.
   10. Information on only a portion of a submittal.
   11. If approved Submittal Transmittal form was not used.

E. If a submittal must be delayed for coordination with other submittals not yet submitted, Architect may, as an option, either return submittal with no action or notify Contractor of other submittals which must be received before submittal will be reviewed.

F. Additional copies of submittals not required or requested may not be returned.

G. Architect may review Project Information Submittals or Contract Closeout Information Submittals at its sole discretion, for general compliance with design concept expressed in Contract Documents.

H. Architect will return submittal utilizing Newforma Contract Management System (Newforma) indicating comments and action taken for Contractor's use and distribution.
   1. Architect will notify Contractor by email when submittals have been reviewed and posted to Newforma.
   2. Architect is not required to return Samples, Project Information and Contract Closeout Information submittals.
   3. Submittals may be returned by regular mail at Architect's discretion.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION – (NOT USED)

END OF SECTION

SECTION 01 42 19
REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Materials specified by reference to number, symbol, or title of a specified standard such as a State standard, commercial standard, federal specifications, ASTM or trade-association standard, or other similar standard shall comply with requirements in the revision thereof and any amendments or supplements thereto in effect on date execution of Contract.

B. Standard referred to, except as modified herein, shall have full force and effect as though printed in these specification.
   1. These standards are not furnished to Contractor, since manufacturers and trades involved are assumed to be familiar with their requirements.

C. By submitting a Bid, Contractor is deemed to represent self as competent to accomplish Work of this Division in conformance with applicable Codes. In case of conflict between the Contract Documents and Code requirements, the Codes shall take precedence. Should such conflicts appear, cease Work on parts of Contract affected and immediately contact Architect in writing. It shall be Contractor's responsibility to correct, at no cost to Owner, work Contractor executes in violation of Code requirements.

1.2 REFERENCE STANDARDS

A. Perform Work in conformance with latest edition of applicable standards recognized by local Authority Having Jurisdiction (AHJ) at the time of Contract Award, including, but not limited to following:

ADA	Americans with Disabilities Act
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASTM	ASTM International
AWI	American Woodwork Institute
BIFMA	The Business and Institutional Furniture Manufacturer's Association
FGI	Facilities Guidelines Institute
IBC	International Building Code
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
TAS	Texas Accessibility Standards
UL	Underwriter's Laboratories, Inc.
--	State and Municipal Codes in force in the Specific Project Area

B. Where locally adopted Codes or authorities having jurisdiction otherwise stipulate, follow the specific edition.

C. Conflicts between referenced Standards: Comply with one establishing more stringent requirements.

D. In event conflicts between referenced Standards and Contract Documents appear, comply with the standard or document establishing more stringent requirements.

END OF SECTION

SECTION 01 43 39
MOCK-UPS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Build indicated mock-up on site for review and approval before proceeding with any construction that may be affected by construction represented by mock-up.

B. THERE ARE NO MOCK-UPS CURRENTLY REQUIRED FOR THIS BID PACKAGE.

1.2 PROCEDURE

A. Extent, size, form and primary components are indicated on Drawings or in Specifications.

B. Locate mock-up where indicated on drawings or, if not indicated, locate as directed by Architect.

C. Do not provide mock-up until corresponding product data, shop drawings, samples and other preparatory submittals are approved.

D. Do not provide mock-up until specified Preinstallation Conferences related to mock-up components are held.

E. Mock-up shall be rebuilt as necessary until approved by Architect.

F. After approval, mock-up shall remain and serve as the standard for judging acceptance or rejection of the appearance characteristics and workmanship of corresponding construction.

G. After completion and acceptance of the corresponding installation, mock-up shall be removed when directed by Architect unless approved mock-up has been located as part of permanent installation.

H. Surrounding and other Work affected by mock-up installation or removal shall be completed as indicated or, if Work is not indicated, site shall be restored to condition existing before mock-up installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials used in initial mock-up installation shall comply as specified in applicable sections for Work and as approved by submittal reviews.

B. Materials may be modified only to extent required for mock-up approval by Architect.
   1. Modified materials shall comply with specified requirements but may differ in appearance characteristics, such as color and texture.

C. Materials used in installation of approved mock-up shall be used in corresponding permanent installation.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Provide initial mock-up installation by methods proposed for corresponding permanent installation.
   1. Comply with installation and application requirements for each component as specified in section applicable for Work.

B. Methods of installation may be modified only to extent required for mock-up approval by Architect.
   1. Modified methods of installation shall comply with specified requirements as well as approved details of workmanship.

C. Methods of installation used for approved mock-up shall be used in corresponding permanent installation.

END OF SECTION

SECTION 01 45 00
QUALITY ASSURANCE AND CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Provisions followed by an asterisk (*) include some or all provision as obtained from AIA Document A201- General Conditions of the Contract for Construction. While this document may or may not be the form of contract between successful Bidder and Owner, it is a document that provides industry-recognized terminology.

1.2 SECTION INCLUDES

A. Quality assurance and control.

B. Regulatory requirements.

C. Tolerances.

D. Mock-ups.

E. Manufacturer's field services.

1.3 QUALITY ASSURANCE AND CONTROL

A. Monitor quality assurance and control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturer's instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified and experienced to produce required or specified quality.

F. Verify that field measurements are as indicated on approved shop drawings or as instructed by manufacturer of product.

G. When required, secure products in place with positive anchorage devices or products designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

H. Materials shall be compatible with one another and with other materials with which they may come in contact.

1.4 SUPERVISION AND CONSTRUCTION PROCEDURES

A. Contractor shall supervise and direct Work, using Contractor’s best skill and attention. *

B. Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of Work under the Contract, unless Contract Documents give other specific instructions concerning these matters. *

C. Whether or not Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall review, substantiate, and comply with current industry execution standards and manufacturer's current execution instructions and evaluate jobsite safety thereof and shall be fully and solely responsible for jobsite safety of such means, methods, techniques, sequences or procedures. *

1. If Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to Owner and Architect and shall not proceed with that portion of Work without further written instructions from Architect. *
2. If Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures. *

D. Contractor shall be responsible to Owner for acts and omissions of Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of Work for, or on behalf of Contractor or any of its Subcontractors. *

E. Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work. *

F. Contractor is solely responsible for coordination of scope of Work for its own forces, and of Subcontractors and suppliers, and to complete all Work, whether performed by the Contractor or a Subcontractor.

1.5 REGULATORY REQUIREMENTS

A. Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of Work. *

B. If Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction, including, but not limited to, any penalties, fines or other damages realized. *

C. When Contract Documents require Contractor, Subcontractor, Vendor or other supplier to provide selection or design of parts of Work, such selection or design shall meet requirements of Municipal, State or other governmental authorities having jurisdiction.

1.6 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce approved Work.
1. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances.
1. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.7 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When field services are specified, have material or product suppliers, or manufacturers, provide technically competent staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and supervise installation where specified, as applicable and to initiate instructions when necessary.

B. Report observations, and site decisions or instructions given to applicators or installers which are supplemental or contrary to manufacturer's written instructions.

C. Submit report in duplicate within 30 days of observation.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that rough-in utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01 61 00
COMMON PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Performance of product, material, or system is result of manufacturing, fabrication, installation procedures, use, and maintenance:
   1. Therefore, Architect endeavors to specify quality levels for products, materials, or systems that are advertised to conceptually meet performance goals and desired attributes for Project.
      a. For most conceptually equal systems and materials, the Architect may specify multiple manufactures.
      b. In some cases, based on quality and attribute goals for Project, number of manufacturers may be limited.

B. Product, material, or system substitutions:
   1. Prior to bid: See Section 00 26 00.
   2. After execution of the contract: See Section 01 25 13.

1.2 SPECIFYING METHODS AND PRODUCT OPTIONS

A. Method 1: Products are specified by naming two or more manufacturers. Substitutions are not permitted. Any one of manufacturers named may be used that meet specified requirements.

B. Method 2: Products are specified by naming one or more manufacturers. Substitutions are permitted. Any one of manufacturers named may be used that meet specified requirements. Submit a substitution request for any manufacturer not specifically named.

C. Method 3: Proprietary: No Substitutions. Products are specified by naming only one manufacturer.

D. Method 4: "Base" and "Optional".
   1. Base:
      a. Manufacturer listed as Base in Part 2 of specification section.
      b. Manufacturer listed as Base is particular manufacturer of a specific product used as basis of design.
         1) Products of the Base manufacturer are specific products, assemblies or systems used and identified with model numbers, dimensions or other identifying features.
   2. Optional:
      a. Manufacturer listed as Optional in Part 2 of specification section.
      b. More than one manufacturer may be listed as Optional.
      c. Proposals may be based on any of the manufacturers listed.
      d. Manufacturers listed as Optional are particular manufacturers of products similar to the specific product used as basis of design.
      e. Optional products are without model numbers, dimensions or other identifying features.
      f. Listing manufacturer as Optional indicates acceptance of that manufacturer as supplier of a product to extent product complies with specified descriptive requirements listed in technical specification, including salient qualities provided by Base manufacturer's product.
         1) Salient qualities include, but are not necessarily limited to following:
            a) Purpose and function.
            b) Material and finish.
            c) Strength, durability and other applicable physical properties.
            d) Compatibility and performance attributes for indicated application.
            e) Capacity and operating characteristics, where applicable.

f) Size and configuration to extent required for fit with adjoining and adjacent conditions and within spatial limitations.
g) Appearance, including exposed dimensions, profile, texture, pattern and color, where visible to personnel in finished space, or from exterior.

2) Optional Products that significantly differ in appearance or quality of Base product will not be accepted.

g. Contractor is responsible for costs to provide dimensional, operational, structural, utility, or other related adjustments to fit an Optional manufacturer's product into Work.

h. Submit Optional Manufacturer Product/System Comparison form with Bid for the Optional product.

1) See Section 01 33 00, Submittal Procedures, for protocol and form.

3. Refer to specification sections for additional requirements.

E. Method 5: Generic: Products are specified by reference standard, by performance, by description or by any combination of these three.
1. Products meeting or exceeding specification requirements may be used.
2. Contractor assumes responsibility for compatibility of products selected.

F. Method 6: Visual Matching: Where specifications and drawings require matching existing materials or a sample, the Architect's decision on whether a proposed product matches is final. Where no product matches or complies with other requirements, comply with specified substitution requests and submittal procedures.

1.3 DEFINITIONS

A. "Product" means material, machinery, components, equipment, fixtures and systems forming Work. The term does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. New Products: Items not previously incorporated into another project or facility, [except products consisting of recycled-content materials are allowed, unless explicitly stated otherwise]. Products salvaged or recycled from other projects are not considered new products.

END OF SECTION

SECTION 01 65 00
DELIVERY, HANDLING AND STORAGE OF MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 JOB CONDITIONS

A. Comply with applicable codes.

B. Accomplish work to avoid damage to property.

C. Provide fire protection.

PART 2 - EXECUTION

2.1 PRODUCT DELIVERY

A. Convey by manufacturer's normal means.

B. Ship in original labeled packaging to staging location.

C. Where applicable display UL labeling on packages.

D. Schedule and coordinate deliveries to avoid interference with Owner's operation and other contractors working on site .

E. Sequence deliveries to avoid unnecessary construction of temporary protection.

F. Schedule deliveries to avoid delaying Work and to minimize space and duration of storage on site.

G. Contractor responsible for acceptance at site.
   1. Inspect items for damage upon delivery, reorder as required.

H. There is no loading dock available at project site. Coordinate loading/unloading location with Owner.

2.2 PRODUCT HANDLING AND STORAGE

A. No on site storage will be available. Deliver product to site each day for that day's installation needs.

B. When off-site storage is utilized, move items to site at no added cost.

C. Use methods to avoid damage to item or structure.

D. Protect weather fragile items from weather damage.

E. Handle and store bulk aggregates to avoid contamination.

F. Store to allow air circulation.

G. Uncrate, assemble if required, and remove debris.

H. Replace or repair damaged items.

2.3 CLEANUP

A. Clean debris from site each day.

B. Remove excess materials from site.

C. Deliver to Owner excess materials scheduled to remain.

D. Restore on-site dumpster area, if brought in for project, to original condition or as directed by Architect or Owner.

END OF SECTION

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, materials, tools, equipment, and services for Cutting and Patching in accordance with provisions of Contract Documents.

B. Completely coordinate with the work of other trades.

1.2 DESCRIPTION

A. This section covers cut and patch work either in remodel, add-on or new construction as necessary for execution of the Work.

B. Install Work in such a manner and sequence as to preclude or minimize cutting and patching of new Work.

C. Execute cutting, fitting or patching of Work, required to:
   1. Make several parts fit properly.
   2. Uncover Work to provide for installation of ill-timed Work.
   3. Remove and replace defective Work.
   4. Remove and replace non-conforming Work.
   5. Remove samples of installed Work for testing.
   6. Install specified Work in existing construction.
   7. Provide rerouting penetrations of non-structural surfaces for installation of piping and electrical conduit.
   8. Patch and repair fireproofing damaged after installation of other Work or demolition activities.

D. Do not endanger any Work or Work of other Contractors, by cutting, excavating, or otherwise altering Work except with written consent of Contractor subject to review by Architect.

E. Do not cut into or cut away structural concrete, other concrete or other structural members nor dig under foundations or into structural walls or other parts, or in any case allow same to be done without full knowledge and written consent of Architect.

F. Repair or replace damaged work resulting from violation of these provisions.

G. Use only firms or individual trades qualified to perform Work required under this Section.

1.3 QUALITY ASSURANCE

A. Employ skilled persons experienced with material requiring cutting and patching.
   1. To the greatest extent practicable, employ original installer to perform cutting and patching for weather-exposed and moisture-resistant components, and sight-exposed surfaces.

B. Written Requests:
   1. Submit requests in advance of cutting or alteration which affects:
      a. Structural integrity of any component of Project.
      b. Integrity of weather-exposed or moisture-resistant component.
      c. Efficiency, maintenance, or safety of an operational component.
      d. Visual qualities of sight-exposed components.
      e. Work of Owner or separate contractor.
   2. Include in Request:
      a. Location and description of affected work.
      b. Necessity for cutting or alteration.
      c. Description of proposed work, and products to be used.

d. Alternatives to cutting and patching.
e. Effect on work of Owner or separate contractor.
f. Written permission of affected separate contractor.
g. Date and time work will be executed.

C. Proceed with cutting and patching at the earliest feasible time and complete without delay.

D. Operational Limitations:
1. Cut and patch operating elements or related components in a manner that results in maintaining their capacity to perform as intended.
2. Cut and patch operating elements or related components in a manner that does not result in increased maintenance or decreased operational life or safety.

E. Structural Work:
1. Cut and patch structural elements in a manner that maintains their load-carrying capacity or load-deflection ratio.
2. Follow applicable NFPA Standards when torch cutting is required.

F. Visual Requirements:
1. Cut and patch construction exposed on exterior or in occupied spaces in a manner to, in Architect's opinion, retain the building's aesthetic or visual qualities.
2. Cut and patch construction in a manner to avoid visual evidence of cutting and patching.
3. Remove and replace construction which was cut and patched in a visually unsatisfactory manner.

G. Warranties and Existing Warranties:
1. Replace, patch, and repair material and surfaces cut or damaged by methods and with materials and in such manner to maintain warranties.

1.4 JOB CONDITIONS

A. Before start of Work, obtain and pay for permits required by authorities having jurisdiction and notify utilities companies.

B. Obtain approval of Owner and authorities having jurisdiction for Work which affects existing means of egress.
1. Review with and obtain approval of authorities for temporary construction.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Protect existing construction during cutting and patching to prevent damage.

E. Provide protection from adverse weather conditions.

F. Avoid cutting existing utilities, pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until alternate provisions have been provided.

G. Carefully remove and store items to be salvaged in an area as directed by or easily accessible by Owner.

1.5 SUBMITTALS

A. Shop Drawings:
1. Provide dimensioned drawings showing position and size of sleeves and openings in relation to structural grid of building, equipment, and other assemblies.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use materials identical to existing materials.

B. For exposed surfaces, use materials that visually match existing adjacent surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used.

C. Use materials whose installed performance will equal or surpass that of existing materials.

D. Where applicable, comply with specifications for type of Work to be performed.

PART 3 - EXECUTION

3.1 INSPECTION

A. Prior to bid, become knowledgeable of existing facilities, utility requirements and construction.
   1. Existing facility documents may be available through the Owner for review.

B. Perform preliminary investigations to determine extent of Work.
   1. Conditions evident by such investigation will not be allowed as claim for extra cost.

C. Inspect conditions for work, including elements subject to movement or damage during:
   1. Cutting and patching.

D. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

E. Before proceeding, meet at site with parties involved in cutting and patching, including mechanical and electrical trades.
   1. Review areas of potential interference and conflict.
   2. Coordinate procedures and resolve potential conflicts before proceeding.

F. After uncovering existing conditions for Work, inspect conditions affecting installation of new products or Work.

3.2 PREPARATION PRIOR TO CUTTING

A. Provide shoring, bracing and support to maintain structural integrity.

B. Provide protection for other affected portions of Project.

C. Provide protection from elements when required.

D. Existing Utility Services and Mechanical/Electrical Systems:
   1. Bypass existing utility services and building systems to be removed, relocated, or abandoned, before cutting to prevent interruption to occupied areas.

E. Maintain excavations free of water.

3.3 CUTTING AND REMOVAL - GENERAL

A. Execute fitting and adjustment to provide finished installation to comply with specified tolerances and finishes.

B. Execute cutting with methods to avoid damage of existing or other Work and provide surfaces to receive installation of new Work.

C. Neatly cut and remove materials, and prepare openings to receive new work.

D. Remove masonry or concrete in small sections.

E. Provide shoring, bracing, and other supports to prevent movement, settlement, or collapse of remaining or adjacent wall areas, structure, or facilities.

F. Arrange shoring, bracing, and supports to prevent overloading of structure.

G. Exercise caution to prevent damage to existing remaining work or to adjacent facilities.

H. Execute Work using methods which will prevent interference with use of remaining and adjacent facilities by Owner.

I. Remove existing work indicated to be removed, or as necessary for installation of new Work.

J. Provide for cutting, fitting, repairing, patching and finishing of Work disturbed by installation of new Work.

K. Do not remove or damage fireproofing materials.
   1. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.
   2. Repair or replace damaged fireproofing.

3.4 CUTTING

A. Cut existing construction to:
   1. Provide for installation of other components or performance of other construction activities, and subsequent fitting and patching to restore surfaces to their original condition.
   2. Fit products together, to integrate with other work.
   3. Uncover work to install ill-timed work.
   4. Remove and replace defective and non-conforming work.
   5. Provide openings for mechanical and electrical penetrations.

B. Cut existing construction using methods least likely to damage components to be retained or adjoining construction.
   1. Where possible, review proposed procedures with original installer or comply with original installer's recommendations.
   2. Use hand or small power tools designed for sawing or grinding, not hammering and chopping.
      a. Cut holes and slots to size required, with minimum disturbance of adjacent surfaces.
      b. Temporarily cover openings when not in use.
   3. Cut or drill existing finished surfaces from exposed or finished side into concealed surfaces.
   4. Cut concrete and masonry using a carborundum saw or diamond core drill.
   5. Bypass portions of existing utility services to remain, removed, relocated or abandoned, before cutting.
      a. Cut pipe or conduit partitions to be removed in walls.
      b. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.

3.5 CUTTING IN CONCRETE CONSTRUCTION

A. Do not cut or core drill openings or holes in beams, joists, and columns without prior written approval of Architect.
   1. Comply with additional requirements and instructions of Architect.

B. In members other than beams, joists, and columns and unless shown on architectural or structural drawings, obtain prior written approval of Architect for openings larger than 10 IN in any dimension, or where dimension between 2 openings in less than 2 times maximum dimension of largest opening.

C. At floor slabs and walls to be core drilled or cut, locate and mark reinforcing in both faces by means of x-ray, ground penetrating radar, pach-ometer, or prof-ometer.
   1. Submit drawings showing location of rebar and proposed cuts or cores for review.

D. When written approval is obtained, comply with additional requirements and instructions of Architect.

3.6 CUTTING IN POST TENSIONED CONCRETE CONSTRUCTION

A. Do not cut into nor core drill openings or holes in beams or joists.

B. Do not cut into nor core drill openings or holes in slabs without prior written approval of Architect.
   1. When approval is obtained, comply with additional requirements and instructions of Architect.

C. Openings not greater than 6 IN in any dimension are permitted in flat slab portions of construction except that such openings shall not interfere with or disturb strands.
   1. Do not place closer than 12 IN to any column face, or closer than 24 IN to any post tensioning strand anchor.

D. Do not install any trenched duct electrical systems.

3.7 CUTTING IN PRECAST/PRESTRESSED CONCRETE CONSTRUCTION

A. Do not cut openings nor core drill vertically nor horizontally through stems of members.

B. Openings smaller than 6 IN diameter or 6 IN maximum dimension may be cut in flanges of units after obtaining prior written approval of Architect.
   1. When approval is obtained, comply with instructions of Architect.

3.8 MATCHING AND PATCHING

A. Where items are removed from existing walls, ceilings, floors or partitions to remain, repair wall, ceiling, floor or partition disturbed by removal.

B. Where walls, ceilings, floors or partitions are removed, repair abutting walls, ceilings or floors disturbed by removal.

C. Where existing construction is cut, removed or otherwise disturbed to permit installation of new Work, match and patch existing disturbed construction.

D. Install new products to provide completed Work in accordance with requirements of Contract Documents.

E. Use methods and materials similar in appearance, and equal in quality to areas or surfaces being repaired.

F. Patch Work to match existing work and adjacent surfaces.

G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.
   1. Refinish continuous surfaces to nearest intersections.
   2. Refinish assemblies entirely.

H. Remove and replace existing ceilings and finishes for installation of Work, if not shown to be removed on Architectural Drawings and Schedules.
   1. If existing ceiling cannot be satisfactorily reinstalled, replace with like materials and construction.

I. Provide firestopping at penetrations of fire-rated walls and smoke partitions, ceiling or floor construction, in accordance with Section 07 84 00.

J. Repair or replace non-coordinated or defective Work, or Work not conforming to Contract Documents.

END OF SECTION

SECTION 01 74 23
CLEANING

PART 1 - GENERAL

1.1 FIRE PROTECTION

A. Store volatile waste in listed disposal containers.

B. Maintain site and building so no condition provides a fire hazard.

C. Remove combustible debris from building at end of each shift and from site daily.

D. Sources of ignition and smoking are prohibited on site.

E. Do not burn on-site.

1.2 POLLUTION CONTROL

A. Conduct cleanup and disposal operations to comply with codes, rules, regulations, ordinances, and anti-pollution laws.

B. Do not burn or dispose of combustible debris, rubbish and waste material on site.

C. Do not discharge volatile, harmful, or dangerous materials into storm or sanitary drains or sewer systems.

D. Prevent accumulation of wastes that create hazardous conditions.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Use materials recommended by manufacturers of surfaces to be cleaned.

B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

C. Use only those cleaning materials which will not create hazards to health or property and will not damage surfaces.

PART 3 - EXECUTION

3.1 GENERAL

A. Clean items installed under this Contract.
   1. Leave free of stains, dirt, dust, damage, or defects.
   2. Include washing, sweeping, polishing of wall surfaces, floors, windows, hardware, mirrors, lighting fixtures, equipment, etc.

3.2 DURING CONSTRUCTION

A. Provide on-site listed disposal containers for collection of waste materials, debris, and rubbish.
   1. Dispose of off-site once a week – or when full - at an approved solid waste disposal site.
   2. Cover container to prevent blowing by wind.

B. Keep work areas clean so as not to hinder health, safety or convenience of personnel in existing facility operations.

C. Interior cleaning:
   1. Clean and vacuum interior space prior to installation of products that will cover such surfaces.
   2. Schedule cleaning operations so contaminants do not fall on wet painted surfaces.

3. Clean and protect Work in progress, if applicable, and adjoining materials in place, during handling and installation.
4. Clean lunch/break area after each use. Only eat in designated areas.

3.3 FINAL CLEANING

A. At Substantial Completion, perform final cleaning of Work and existing areas wherever any areas are left less than clean by construction operations.
   1. Complete cleaning operations before requesting review for Substantial Completion.

B. Use experienced professional cleaners for final cleaning.

C. Repair and touch-up marred areas. Coordinate with building Contractor who may require original trade perform repair at this Contractor's expense to ensure end product matches seamlessly. Architect to make final decision on finish match.

D. Broom clean and remove stains from paved surfaces; rake clean other surfaces of grounds.

E. Remove grease, dust, dirt, stains, labels, fingerprints, mastic, adhesive, and foreign materials from interior and exterior surfaces, and fixtures, hardware, and equipment.

F. Polish glossy surfaces to a clear shine.

G. Remove temporary protection and facilities installed for protection of the Work during construction.

3.4 FIELD QUALITY CONTROL

A. Prior to Owner occupancy, Contractor and Owner shall conduct an inspection of interior and exterior surfaces and Work areas to verify Project is clean to Owner's satisfaction. Building Contractor will have cleaned building prior to installation of this Work. Any subsequent soiling of building will be evident.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES (GC)

PART 1 - GENERAL

1.1 PROVISIONS FOLLOWED BY AN ASTERISK (*) INCLUDE SOME OR ALL OF THE PROVISION AS OBTAINED FROM AIA DOCUMENT A201 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION.

1.2 SUBMITTALS

A. Contract Closeout Information:
   1. For substantial completion:
      a. Comprehensive list of all items to be completed or corrected.
      b. Contractor's Notice of Substantial Completion.
      c. Certificates of governing authorities.
      d. Submittals required by other Sections.
   2. For final completion:
      a. Contractor's Certificate of Completion.
      b. Evidence of payments and release or waiver of liens in triplicate.
         1) Contractor's Affidavit of Payments of Debts and Claims: AIA Document G706.
         2) Contractor's Affidavit of Release of Liens: AIA Document G706A.
         3) Contractor's release or waiver of liens.
         4) Separate releases or waivers of liens for subcontractors, suppliers, and others with lien rights against Owner, together with list of all such parties.
         5) If required by Owner, other data establishing payment or satisfaction of obligations arising out of Contract.
      c. Consent of Surety (if any) to Final Payment: AIA Document G707.
      d. Certificates evidencing that insurance to remain enforce.
      e. Final application for payment.
      f. Initialed list(s) of items to be completed or corrected verifying completion of each items.
      g. List of Subcontractors and equipment suppliers. Include:
         1) Name.
         2) Address.
         3) Telephone number.
         4) Representative.
      h. Letter of site conformance.
      i. Closeout submittals required by other Sections.

1.3 SUBSTANTIAL COMPLETION

A. Substantial Completion is the stage in the progress of Work when the Work or designated portion thereof is sufficiently complete in general accordance with Contract Documents so Owner can occupy or utilize Work for its intended use. *
   1. Work will not be considered for Substantial Completion until all systems and equipment are operational; all designated or required governing agency inspections and certifications have been made and posted, instruction of designated Owner's personnel in operation of systems and equipment has been completed and operation and maintenance data has been satisfactorily turned over to Owner. In general, the only remaining Work shall be minor in nature, such that Owner may occupy or utilize Work or designated portion there of, and completion or correction of Work by Contractor would not materially interfere with or hamper Owner's intended business use or operation.
   2. Contractor shall certify that all remaining Work will be completed within 30 consecutive calendar days following date of Substantial Completion, or as agreed to in writing, and failure to do so shall automatically reinstate provisions for damages due Owner as contained

elsewhere in Contract Document or as provided by law for such period of time as may be required by Contractor to fully complete Work whether Owner has occupied Work or not.

B. When Contractor considers that Work, or a portion thereof which Owner agrees to accept separately, is substantially complete, Contractor shall thoroughly inspect Work, and prepare and submit to Architect a comprehensive list of items to be corrected or completed, and Contractor's Notice of Substantial Completion (utilize form at end of this Section). *

C. Contractor certifies that:
   1. Work performed under this Contract has been thoroughly inspected and considered to be sufficiently complete, in accordance with Contract Documents, so Owner can occupy or utilize Work for its intended use.

D. Failure of Contractor to include an item on such list(s) does not alter responsibility of Contractor to complete all Work in accordance with Contract Documents. *

E. Contractor shall proceed promptly to complete and correct the items on list.

F. After receipt of Contractor's comprehensive list of items to be corrected or completed, and Contractor's Notice of Substantial Completion, Architect and Owner will, within reasonable period after notification, review list of items to be completed or corrected, or inspect Work, or designated portion thereof, to determine whether Work is Substantially Complete. *

G. If Architect's or Owner's review or inspection discloses any item, whether or not included on Contractor's list, which is not sufficiently complete in general accordance with Contract Documents so Owner can occupy or utilize Work or designated portion thereof for its intended use: *
   1. Contractor will be notified stating reasons.
   2. Contractor shall substantially complete or correct Work.
   3. Contractor shall thoroughly re-inspect Work.
   4. Contractor shall submit another Contractor's Notice of Substantial Completion, a revised list of items to be completed or corrected, and a request for another review.
   5. Architect and Owner will again review list of items to be completed or corrected and Work.

H. If Contractor prematurely submits a Contractor's Notice of Substantial Completion or requests Architect's review of Work, and Architect determines that Project or designated portion thereof is not Substantially Complete, Architect may invoice Owner as a change in services for such cost involved in evaluating and reviewing Work, and associated travel costs. Contractor shall reimburse Owner for such costs.

I. Architect will not perform more reviews of sub-projects or phases than number indicated in Contract Documents or Owner – Architect Agreement, unless otherwise mutually agreed to by Architect and Owner.

J. When Work or designated portion thereof is considered Substantially Complete, Architect will prepare a Certificate of Substantial Completion.
   1. The Certificate of Substantial Completion shall establish date of Substantial Completion, shall establish responsibilities of Owner and Contractor for security, maintenance, utilities, damage to Work and insurance, and shall fix time within which Contractor shall complete and correct Work.
   2. Warranties and guarantees required by Contract Documents shall commence on date of Substantial Completion of Work or designated portion thereof unless otherwise provided in Certificate of Substantial Completion.
   3. The Certificate of Substantial Completion shall be submitted to Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. *

K. Owner may occupy Project, or designated portion thereof, under provisions agreed to in Certificate of Substantial Completion, and if required, a certificate of occupancy has been issued by governing authorities.

1. If Owner is going to occupy Project, or designated portion thereof, Contractor shall perform final cleaning immediately.
2. If Owner or Architect discovers any Work which is not complete and/or is not in conformance with Contract Documents, during or after occupying or utilizes Work, whether included on a list or not, Owner shall notify Contractor to complete or correct item(s) identified.

L. Contractor shall proceed expeditiously with adequate forces to complete or correct Work, and to complete all Project closeout requirements within designated time.

1.4 FINAL COMPLETION

A. After Contractor has completed all Work, and has thoroughly inspected Work to determine that it is sufficiently complete, it is in general accordance with Contract Documents, and Contract is fully performed, Contractor shall submit Contractor's Certificate of Completion to Architect, and the list(s) of items to be completed or corrected initialed to indicate Contractor has verified completion of each item. * Utilize form at end of this section. Contractor certifies that:
1. Work has been thoroughly inspected by Contractor for compliance with Contract Documents.
2. Work has been completed in accordance with Contract Documents.
3. Equipment and systems have been tested and are operating satisfactorily.
4. Contract closeout requirements have been completed satisfactorily and submitted.
5. Contractor knows of no reason that insurance will not be renewable to cover period required by Contract Documents.
6. Work is ready for final inspection and acceptance.

B. Contractor submit final closeout submittals required by this and other Sections.

C. Owner and Architect will make final walk through within a reasonable time after receipt of Contractor's Certificate of Completion and final Application for Payment. *
1. If Contractor prematurely submits a Contractor's Notice of Final Completion or requests Architect's final review of Project, and Architect determines that Project is not satisfactorily complete, Architect may invoice Owner as a change in services for such cost involved in evaluating and reviewing Work, and associated travel costs. Contractor shall reimburse Owner for such costs.

D. Contractor shall remedy any remaining deficiencies or incomplete Work, at Contractor's expense.

E. When Owner and Architect finds Work acceptable under Contract Documents and Contract satisfactorily performed, Architect will promptly issue a final Certificate for Payment. *

F. Neither final payment nor any retained percentage shall become due until Contractor submits to Architect;
1. an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with Work for which Owner or Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied (AIA Documents G706 and G706A),
2. a certificate evidencing that insurance required by Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to Owner,
3. a written statement that Contractor knows of no substantial reason that insurance will not be renewable to cover period required by Contract Documents,
4. consent of surety, if any, to final payment (AIA Document G707),
5. Contractor's and Subcontractor's final release or waiver of liens,
6. if required by Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of Contract, to extent and in such form as may be designated by Owner, for Owner's review, and

7. if a Subcontractor refuses to furnish a release or waiver required by Owner, Contractor may furnish a bond satisfactory to Owner to indemnify Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to Owner all money that Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees. *

G. If Substantial Completion or Final Completion is delayed through no fault of Owner or Architect, Architect may invoice Owner as a change in services for such costs, and associated travel costs. Contractor shall reimburse the Owner for such costs.

END OF SECTION

CONTRACTOR'S NOTICE OF SUBSTANTIAL COMPLETION

PROJECT: Tom Green County AV/Court Technology

ARCH PROJ. NO.: 10163575 CONTRACT DATE:
CONTRACT FOR:

WORK OR DESIGNATED PORTION SHALL INCLUDE:

Work performed under this Contract has been thoroughly inspected and is considered to be sufficiently complete, in accordance with Contract Documents, so Owner can occupy or utilize Work or designated portion thereof for its intended use.

- ❑ Certificates of inspections indicating compliance with requirements of governing authorities, are attached hereto.
- ❑ Certificate of Occupancy have been obtained from governing authorities, are attached hereto.
- ❑ A comprehensive list of items to be completed or corrected, prepared by Contractor is attached, hereto. Failure to include any items on such list does not alter responsibility of Contractor to complete all Work in accordance with Contract Documents.

Contractor will complete or correct Work by:

CONTRACTOR:
BY: DATE:

OWNER (agrees) (does not agree) to accept portion designated above separately from rest of Project.

Owner intends to utilize, occupy or take use on:

OWNER:
BY: DATE:

The Work designated above, has been determined to be:

- ❑ Substantially Complete and a Certificate of Substantial Completion will be issued.
- ❑ Not substantially complete for following reasons:

ARCHITECT: HDR Architecture, Inc.
BY: DATE:

DISTRIBUTION: ❑ OWNER ❑ ARCHITECT ❑ CONTRACTOR

END OF CONTRACTOR'S NOTICE OF SUBSTANTIAL COMPLETION

CONTRACTOR'S CERTIFICATE OF COMPLETION

PROJECT: Tom Green County AV/Court Technology
ARCH. PROJECT NUMBER: 10163575
CONTRACT FOR: _____
CONTRACT DATE: _____

This is to certify that I am an authorized official of, and have been properly authorized by said firm or corporation to certify following:
I know of my own personal knowledge, and do hereby certify on behalf of Contractor,
that Work has been reviewed and thoroughly inspected for compliance with Contract Documents,
that Work has been completed, in accordance with Contract Documents and Contract is fully performed,
that all equipment and systems have been tested and are operating satisfactorily,
that all Contract closeout requirements have been completed satisfactorily and submitted,
know of no substantial reason that insurance will not be renewable to cover period required by Contract Documents, and Work is ready for final inspection and acceptance.

Attached are three (3) copies of following documents, which are required prior to final payment:

- ❑ Final Application for Payment.
- ❑ Contractor's Affidavit of Payments of Debts and Claims: AIA Document G706.
- ❑ Contractor's Affidavit of Release of Liens: AIA Document G706A.
- ❑ Contractor's Final Release or Waiver of Liens.
- ❑ Consent of Surety (if any) to Final Payment: AIA Document G707.
- ❑ Certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to Owner.
- ❑ The list(s) of if items which were to be completed and corrected, with each item initialed to indicate Contractor has verified completion or correction of each.
- ❑ List of subcontractors and equipment suppliers.
- ❑ Certified list of all sales and service taxes paid.
- ❑ Letter of site conformance by licensed surveyor.
- ❑ If required by Owner, other data establishing payment or satisfaction of obligations arising out of Contract.
- ❑ Bond satisfactory to Owner to indemnify Owner against liens from Subcontractors.
- ❑ Transmittal indicating Owner has received Project Record Documents.

I understand that acceptance of final payment by Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at time of final Application for Payment.

CONTRACTOR: _____ BY: _____

TITLE: _____ DATE: _____

Subscribed and sworn to me this _____ day of _____ _____

NOTARY PUBLIC: _____

My commission expires: _____

DISTRIBUTION: ❑ OWNER ❑ ARCHITECT

END OF CONTRACTOR'S CERTIFICATE OF COMPLETION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUBMITTALS

A. Contract Closeout Information:
   1. Operation and Maintenance Data.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE MANUALS

A. Assemble data indicated and data required to completely describe operation and maintenance procedures.

B. Assemble information in form of a multiple file composite electronic PDF file for each manual type required.
   1. Index files by product tag, with each item clearly labeled.
   2. Identify each volume with Project name and contents.
   3. Identify each item in manner consistent with names and identification numbers used in Contract Documents, not with manufacturer's catalog numbers.
   4. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

C. Use electronic files prepared by manufacturer where available.
   1. Scan paper documents and configure scanned file for minimum readable file size.

D. Create a Table of Contents, list each item.

2.2 DATA REQUIRED FOR EQUIPMENT AND SYSTEMS

A. Sequence of Operation, if required in Work:
   1. List valves, switches, etc., used to start, stop and adjust systems.
   2. Provide flow diagrams, control sequences and valve directory.

B. Lubrication Instructions, if required of products in Work:
   1. Frequency of inspection and lubrication recommended.
   2. Type of grease.
   3. Amount of lubrication recommended.

C. Maintenance and Troubleshooting Data:
   1. Manufacturer furnished data.
   2. Project record wiring diagrams, when required by Work.
   3. Name and address of manufacturer.
   4. Name and address of local representatives who stock or distribute repair parts.

2.3 DATA REQUIRED FOR FINISH MATERIALS

A. Maintenance Data:
   1. Precautions necessary.
   2. Manufacturer's instructions and recommendations.
   3. Maintenance materials and tools required.
   4. Repair and/or replacement instructions.
   5. Name and address of manufacturer.
   6. Name and address of local supplier of materials.

PART 3 - EXECUTION

3.1 DELIVERY

A. Deliver electronic copies to Owner sixty (60) days prior to Owner instruction of systems and equipment, and substantial completion.

B. Use Operation and Maintenance Data Transmittal form at end of this Section.

C. Acquire Owner's acceptance of items listed on transmittal form.

D. Forward copy of transmittal form with Owner's acceptance to Architect.

END OF SECTION

OPERATION AND MAINTENANCE DATA TRANSMITTAL

Project: Tom Green County AV/Court Technology

To Owner: **Date:**

From Contractor:

Assemble data required to describe operation and maintenance procedures. Deliver as an indexed electronic PDF file. Include name, address, and phone number of closest supplier for each item.

Section	Description	Quantity

Owner's Verification and Acceptance

Accepted by: _____ **Date:** _____

Forward copy of this transmittal to the Architect.

DISTRIBUTION: ☐ OWNER ☐ CONTRACTOR ☐ ARCHITECT

END OF TRANSMITTAL

SECTION 01 78 36
WARRANTIES AND GUARANTEES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Warranties specified in Divisions 02 through 48 Sections shall be in addition to, and run concurrent with other warranties required by Contract Documents.
   1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to the Owner.
   2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for the Owner.

B. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of Contract Documents.

C. Manufacturer's Warranties:
   1. Provide for products, equipment, systems and installations required by Divisions 02 through 48 Sections of Contract Documents for duration indicated.
   2. Where manufacturer's standard warranties or guarantees or both expire before duration required by other Sections of Contract Documents, obtain and pay for extensions as part of Contract Price.

D. Special Warranties:
   1. Refer to Divisions 02 through 48 Sections for specific content requirements and particular requirements for submitting special warranties.
   2. Provide written Special Warranties for products, equipment, systems, installations, and joint responsibilities as noted and required by Divisions 02 through 48 Sections of Contract Documents for duration indicated.
   3. Prepare a written document that contains appropriate terms and identification, ready for execution.
      a. Modified and properly executed Manufacturer's standard form to include project specific information.
      b. Submit draft for approval before final execution.
         1) See Section 01 33 00.

E. Provide Warranties. Special Warranties and Guarantees prior to final payment.
   1. Provide in electronic data format.
      a. Coordinate format with Owner.

F. Warranties. Special Warranties and Guarantees required by Contract Documents shall commence on date of Substantial Completion of Work unless otherwise indicated in Certificate of Substantial Completion.

1.2 SUBMITTALS

A. Contract Closeout Information:
   1. Transmittal letter indicating Owner's receipt of electronic data format containing product equipment and system warranties or guarantees or both required by other Sections of Contact Documents.

1.3 JOB CONDITIONS

A. If for any reason, Contractor cannot warrant or guarantee or both any portion of Work using products or methods indicated or required by other Sections of Contract Documents, notify

Architect in writing during bid period, and before contracts are awarded, indicating reasons and names of products and data on substitutions that can be warranted or guaranteed or both.

1. Should Contractor fail to notify Architect, Contractor will be considered as having agreed to warrant or guarantee the Work indicated.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 PRODUCT, EQUIPMENT AND SYSTEM WARRANTIES AND GUARANTEES

A. Compile approved warranties and guarantees or both required by other Sections of Contract Documents.

1. Assemble information in form of a multiple file composite electronic PDF file utilizing book marks for quick access to each section.
2. Index by product tag, with each warranty, guarantee, or both clearly labeled.
   a. Identify each volume with project name and contents.
3. Identify each warranty or guarantee or both in manner consistent with names and identification numbers used in Contract Documents.
4. Provide transmittal letter containing:
   a. Date
   b. Project title
   c. Contractor's name and address
   d. Title and number of warranties, guarantees, or both
   e. Indication of Owner's receipt
5. Deliver to Owner prior to final payment with copy of transmittal letter indicating Owner's receipt.

END OF SECTION

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. All documents required by Contract Documents, including but not limited to:
   1. Contract Drawings.
   2. Project Manual and Specifications.
   3. Addenda.
   4. Shop Drawings.
   5. Product Data.
   6. Samples and Mock-ups.
   7. Project Information.
   8. Change documents.
   9. Request for Information responses, directives, clarifications, interpretations, etc.
   10. Field test records.
   11. Warranties.

B. Field Documents:
   1. Complete set of all documents required for installation.
   2. Used for installation of project.

C. Periodic Update Documents:
   1. Complete separate set of all documents required for installation, with exception of samples and mock-ups, used for posting and updating on weekly basis.
   2. Do not use for installation of project.

D. Project Record Documents:
   1. Complete set of all documents required for installation, with exception of samples and mock-ups, for updating at end of Project.

1.2 SUBMITTALS

A. Contract Closeout Information:
   1. Copy of transmittal letter to Owner.
      a. At completion of project, turn over Project Record Documents to Owner with letter of transmittal.
      b. Submit Record Documents in suitable electronic format.
      c. Provide Transmittal Letter containing:
         1) Date.
         2) Project title.
         3) Contractor’s name and address.
         4) Title and number of each Project Record Document.
         5) Certification that Project Record Documents submitted are complete, accurate and reflect actual construction of project.
         6) Owner’s signature indicating receipt and acceptance of Project Record Documents.
   2. Electronic copy of Record Drawing files to Architect.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 POSTING PRIOR TO CONSTRUCTION

A. After Contract is executed, but prior to start of Work, obtain Contract Drawings and Project Manual/Specifications that will be used for Field Documents and Periodic Update Documents.

B. Obtain copies of all addenda and post to all above documents.

3.2 FIELD DOCUMENTS

A. Field Documents are intended for use in the installation of the project.

B. Maintain minimum of one copy at project site.

C. Label each document, “FIELD.”

D. Post documents with changes on a daily basis.

3.3 PERIODIC UPDATE DOCUMENTS

A. Periodic Update Documents are intended for use by Architect, Owner, Owner’s consultants, Authorities Having Jurisdiction, Special Inspections, and Testing Agencies.

B. Identify each document within file, “PERIODIC UPDATE.”

C. Update documents on weekly basis:
   1. Contract drawings:
      a. Amend to record actual installation including but not limited to:
         1) Addenda.
         2) Change orders or field orders.
         3) Clarifications, interpretations, directives.
         4) Location of internal utilities and appurtenances concealed.
         5) Field changes of dimension and/or detail.
         6) Revisions incorporated into the contract by Change Order, Field Order, Clarifications, Interpretations or Directives.
   2. Project Manual/Specifications:
      a. Amend affected sections to record changes including but not limited to:
         1) Addenda.
         2) Change orders or field orders.
         3) Clarifications, interpretations, directives.
         4) Include added sections to Project Manual/Specifications.
         5) Indicate manufacturer, makes, and models used for actual installation of project.
   3. Concealed work:
      a. Do not conceal work until concealed information is recorded on Periodic Update Documents.
      b. Work concealed prior to recording must be uncovered.
      c. Upon recording on Periodic Update Documents, restore work at Contractor’s expense.

3.4 PRODUCTION OF PROJECT RECORD DOCUMENTS

A. Record Drawings:
   1. Use one set of printed Contract Documents as base Record Documents or an electronic method in field to record installation changes as they occur.
   2. Mark Contract Drawings completely and accurately.
   3. Employ personnel proficient at recording electronic graphic information in production of marked-up drawings to transfer all changes, corrections, entries, and other items from the Periodic Update Documents to Record Documents.
      a. Refer instances of uncertainty to Architect for resolution.

4. Record Digital Data Files:
    a. Prepare full set of corrected digital data files of Contract Drawings immediately before inspection for Certificate of Substantial Completion:
        1) Provide in annotated PDF electronic file with comment function enabled.
    b. Incorporate changes and additional information previously entered on Periodic Update Drawings.
    c. Delete, redraw, and add details and notations where applicable.
    d. Name each PDF file to match Contract Drawing identification, i.e. "A-103G.pdf".
    e. Label each document “PROJECT RECORD PRODUCED BY CONTRACTOR” and date in prominent place.
5. Provide Owner and Architect original Record Drawings, and digital data files in linked PDF electronic format.
    a. Include:
        1) Addenda.
        2) Change order or field order.
        3) Clarifications, interpretations, directives.
        4) Bind added sections into Project Manual/Specifications.

B. Record Computer Aided Drafting (CAD) System Drawings:
1. Provide Record Drawings in electronic CAD format for systems indicated in Submittal Procedures, Section 01 33 00.
    a. Employ skilled CAD technicians to update CAD files with information from Periodic Update Documents.
    b. Comply with current version of National CAD Standards.
    c. Provide in same size and scale as original Contract Drawings.
    d. Organize CAD information into separate electronic files that correspond to each sheet of Contract Drawings.
        1) Name and number CAD drawing with corresponding information on Contract Drawing.
        2) Name each CAD drawing file with drawing identification.
    e. Label each document “PROJECT RECORD PRODUCED BY CONTRACTOR” and date in prominent location.
    f. Redraw, delete or add details and notations where applicable.
    g. Produce new CAD drawings in lieu of updating original CAD drawing file where not suitable to indicate actual installation.
        1) Produce new CAD drawings when a contract change document was issued, as a result of acceptance of alternate, substitution, or other modification.
    h. Architect will furnish Contractor with revised CAD drawing file of architectural plan backgrounds if significantly revised by Architect during construction phase.
        1) CAD floor plan backgrounds will indicate wall layout, column lines and room names and numbers.
        2) Architect makes no representation as to accuracy or completeness of CAD files.
2. Submit preliminary CAD files to Architect for review prior to submitting final CAD files.
3. Submit final updated CAD files.
    a. Include all system drawing files, whether or not changes and additional information from Periodic Update Documents.
4. Submit data files to Owner and Architect of final Record Drawings in PDF format electronically created from CAD files.
    a. Do not scan.
    b. Include all system drawing files, whether or not changes and additional information was included in Periodic Update Documents.

C. Other Record Documents:
1. Transfer recorded changes from original to replacement copy.
2. Label each document “PROJECT RECORD PRODUCED BY CONTRACTOR” and date in prominent location.

END OF SECTION

SECTION 01 78 43
SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Contract Closeout Information:
   1. Submit spare parts, tools and materials directly to Owner.
   2. Submittal to Architect is not required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Spare Parts and Tools:
   1. Package in clearly identified boxes.
   2. Indicate manufacturer's name, part name and stock number.
   3. Indicate piece of equipment part or tool is for.
   4. Indicate name, address and phone number of closest supplier.

B. Maintenance Materials:
   1. Package in clearly identified boxes.
   2. Indicate trade name and stock number.
   3. Indicate which item material is to be used with.
   4. Indicate name, address and phone number of closest supplier.

C. Extra Materials:
   1. Package in clearly identified containers, or install where indicated.
   2. Indicate trade name, stock number, size, color, etc.
   3. Indicate where product is to be used.
   4. Indicate name, address and phone number of closest supplier.

PART 3 - EXECUTION

3.1 DELIVERY

A. Deliver to Owner prior to substantial completion unless Owner requests earlier delivery.

B. Deliver to location directed by Owner.

C. Complete Maintenance Material Transmittal form at end of this Section.
   1. Acquire Owner's acceptance of items listed on transmittal.
   2. Transmittal to indicate Owner's acceptance.
   3. Forward copy of transmittal forms with Owner's acceptance to Architect.

END OF SECTION

SPARE PARTS, TOOLS AND MAINTENANCE MATERIAL TRANSMITTAL

Project: Tom Green County – AV/Court Technology

To Owner: Date:

From Contractor:

Package extra material, maintenance materials, spare parts, and tools in clearly identified boxes; indicate manufacturer's name, trade name, part name, stock number, size, color, etc. Indicate which item maintenance material is to be used with, piece of equipment part or tool is for, or where extra material is to be used. Indicate name, address, and phone of closest supplier.

TAG	DESCRIPTION	QUANTITY

Owner's Verification and Acceptance

Accepted by: _____ Date: _____

Forward copy of this transmittal to the Architect.

DISTRIBUTION: ☐ OWNER ☐ CONTRACTOR ☐ ARCHITECT

END OF TRANSMITTAL

SECTION 01 79 00
SYSTEM DEMONSTRATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide instruction for equipment and systems which require Operation and Maintenance Data specified in technical sections.

1.2 QUALITY ASSURANCE

A. Instructors:
   1. Member of installer's staff, and authorized representative of component, assembly, or system manufacturer.
   2. See specification technical sections for additional requirements.

1.3 SUBMITTALS

A. Contract Closeout Information:
   1. Transmittal letter indicating Owner’s receipt of required demonstrations, copies of completed reports and video files.

1.4 JOB CONDITIONS

A. Complete instruction prior to Substantial Completion.
   1. Submit separate report for each system or type of equipment to Owner for approval.
      a. Submit report form attached, with preliminary information to Owner at least two (2) weeks prior to first instruction period.
      b. Submit completed report to Owner and Architect.
   2. Submit video files for each instruction to Owner.
      a. Name each file with description of equipment or system.
      b. Provide index of instruction files.
      c. Provide on flash drive.

PART 2 - EXECUTION

2.1 PREPARATION

A. Assemble instructional aids.

B. Supply operation and maintenance data for use during instruction.

C. Provide video equipment available for each instruction.

D. Schedule instruction with Owner when component, assembly, or system has been tested, is in correct operating condition and is fully functional.

2.2 INSTRUCTION

A. Provide video and physical instruction.

B. Explain use of operating and maintenance manuals.

C. Furnish tools required.

D. Instruct Owner’s personnel in operation and maintenance of equipment and systems.
   1. Provide instruction to satisfaction of Owner.

E. Tour building areas involved and identify:
   1. Maintenance points and access.
   2. Control locations and equipment.

F. Operating Sequences:
   1. Identify location and show operation of switches, valves used to start, stop and adjust systems.
   2. Explain use of flow diagrams and operating sequence diagrams.
   3. Demonstrate operation through complete cycle or cycles and full range of operational modes, including testing and operational adjustment.

G. Control Equipment:
   1. Settings.
   2. Switch modes.
   3. Available adjustments.
   4. Reading of gauges.
   5. Functions serviced only by authorized factory representatives.

H. Troubleshooting:
   1. Demonstrate common occurring problems.
   2. Identify procedures requiring attention of factory personnel.

I. Maintenance Procedures:
   1. Identify items requiring periodic maintenance.
   2. Demonstrate preventive maintenance procedures and recommended maintenance intervals.
   3. Demonstrate commonly occurring maintenance procedures not part of preventive maintenance program.
   4. Identify maintenance tools and materials used.

END OF SECTION

EQUIPMENT AND SYSTEMS OWNER INSTRUCTION REPORT

Project: Tom Green County – AV/Court Technology

Project Number: 10163575

Contractor: _____

System or Equipment: _____

Specification Section: _____

PRELIMINARY INFORMATION

To be completed by Contractor:

Proposed dates for instruction period: _____ to _____.

Contractor Representative conducting instruction: _____.

Number of hours of instruction required by Contract Documents: _____.

To be completed by Owner:
Owner's personnel to be instructed (designate supervisor if required).

_____

_____

Contractor's Representative Representative to maintain and complete this report during course of instruction.

Instruction Log						
Date	Hours	Material Covered	Instructor Initials	Owner's Personnel Receiving Instruction	Personnel Initials	Comments

Total Hours Completed: _____ Instructor's Signature: _____

Date Instruction Completed: _____ Owner's Signature: _____

Distribution: ❑ Owner ❑ Architect ❑ Contractor

END INSTRUCTION REPORT

SECTION 01 81 21
INDOOR AIR QUALITY MANAGEMENT PLAN

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements governing protection of indoor air quality (IAQ), absorbent materials, and mechanical system from contamination during construction and building flush-out.

1.2 QUALITY ASSURANCE

A. SMACNA Guidelines for Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3).

1.3 DESCRIPTION - GENERAL

A. IAQ Management Plan: Minimize contaminants generated during construction. Methods to include, but not limited to:
   1. Practices which minimize the amount of dust generated.
   2. Reduction of solvent fumes and volatile organic compound (VOC) emissions.
   3. Maintaining good housekeeping practices including sweeping and periodic dust and debris removal.
   4. Maintain dry conditions to protect stored on-site and installed absorptive materials from moisture damage.
   5. No visible haze in air.

B. Prevent migration of moisture from exterior to building interior and prevent release of moisture from building materials that could result in formation of mold, delamination of adhesive applied materials or other damages caused by water.

1.4 PRECONSTRUCTION CONFERENCE

A. After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner and Architect to discuss the proposed IAQ Management Plan and to develop agreement relative to details of IAQ Management Plan procedures.

1.5 SUBMITTALS

A. Project Information:
   1. Construction IAQ Management Plan.
   2. Compliance Photographs:
      a. Provide a monthly minimum of six (6) photographs at three distinct phases of completion demonstrating compliance with standard or examples of remediation efforts to bring into compliance.
      b. Date and time stamp photographs and identify approach taken for each.
      c. Detailed photo log of implemented IAQ practices.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 CONSTRUCTION IAQ MANAGEMENT

A. Construction IAQ Management Plan:

1. Meet or exceed SMACNA Guidelines for Occupied Buildings under Construction, 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter 3), and include following measures:
    a. HVAC Protection.
    b. Source Control.
    c. Pathway Interruption.
    d. Housekeeping.
    e. Scheduling.
2. Provide solid physical barriers to isolate areas of construction.
    a. Securely attach and seal at floor and structure above.
3. Schedule adequate time for product installation.
4. Maintain negative pressure in construction area.
5. Do not recirculate air prior to occupancy.
6. Seal return air ducts and use direct exhaust to outside.
7. Factory age sheet goods.
8. Comply with manufacturer's instructions for appropriate drying times.
9. Protect installed absorbent materials with recycled or recyclable materials.

B. HVAC Protection:
1. Protect air handling and distribution equipment, and air supply and return ducting during construction.
2. Adequately cover and protect exposed air inlets and outlets, openings, grilles, ducts, plenums, as required to prevent water, moisture, and other contaminant intrusion.
3. Apply protection immediately after installation of equipment and ducting.
4. Protect duct runs at end of each day's Work.
5. During dust producing activities, such as drywall installation and finishing, turn ventilation system off, and protect HVAC supply and return openings from dust infiltration.
    a. Provide temporary ventilation.
6. Provide temporary filtration media for permanently installed air handlers if used during construction,
    a. Provide minimum efficiency reporting value (MERV) of 8 at each return air grille, per ASHRAE Standard 52.2 – 2007, with errata.
    b. Replace filtration media immediately prior to occupancy.
7. Vacuum all ducts prior to installing registers, grills, and diffusers.

C. Source Control:
1. Protect stored on-site or installed absorptive or porous materials from exposure to moisture.
2. Ensure a separate area that is dry and protected from moisture and weather elements is designated to store and protect absorptive materials.
3. Do not use wet, damaged porous materials in the building. Materials with evidence of moisture damage, including stains, are not acceptable, including both stored and installed materials. Immediately remove them from the site and properly dispose.
4. Preconditioning:
    a. Prior to site delivery off-gas odorous products, or products with significant volatile organic compound (VOC) emissions, in dry, well ventilated space for 14 calendar days.
    b. Condition products, without containers and packaging, to maximize off-gassing of VOCs.
    c. Condition products in a ventilated warehouse or other building. Provide a temperature range of 60 DEGF minimum to 90 DEGF maximum continuously during ventilation period.
    d. Do not ventilate within limits of Work unless otherwise accepted by Architect.
    e. Comply with substitution requirements for consideration of other locations.
5. Take special care to prevent accumulation of moisture on installed materials and within packaging during delivery, storage, and handling to prevent development of molds and mildew, including materials with moisture stains.
6. Replace moldy materials with new, undamaged materials.

7. Provide ventilation, air circulation and air changes to dissipate excess humidity when present.
8. Prohibit the use of tobacco products inside the building and within 50 FT of building during any off-site storage and construction periods.

D. Pathway Interruption:
1. Isolate work areas from other spaces by sealed doorways or windows or through the use of temporary barriers.
2. Install exhaust ventilation equipment to maintain negative pressure differential between work area and adjacent areas of building.
3. Exhaust ventilation units to outside of building.
4. Walk-off mats are used at entryways to work areas to reduce the transfer of dirt and pollutants.

E. Housekeeping:
1. Provide temporary ventilation during construction to minimize accumulation of dust fumes, vapors, or gases in the building.
2. Continuously ventilate during and after installation of materials that emit VOCs until emissions dissipate:
   a. Period after installation shall be sufficient to dissipate odors and elevated levels of VOCs. Where no specific period is specified, ventilate for minimum of 72 HRS.
   b. Ventilate areas directly to outside.
   c. If continuous ventilation is not possible via building's HVAC system, ventilate via openings and temporary fans at no less than 3 air changes per hour.
3. Suppress dust with wetting agents or sweeping compounds.
4. Remove dust using a wet method.
5. Increase cleaning frequency when dust build-up is noted.
6. Remove spills or excess applications of solvent-containing products as soon as possible.
7. Remove accumulated water and keep work areas as dry as possible.
8. Keep and store volatile liquid containers closed when container is inside of building and not in use.
9. Saws and other tools shall use dust guards or collectors to capture generated dust/ debris.

F. Scheduling:
1. Where odorous or high VOC-emitting products are applied on site, apply before installation of porous and fibrous materials. Where not possible, protect porous materials with polyethylene vapor retarders.
2. Insure wet applied interior finish materials, such as paints, adhesives, sealants, coatings, finishes, and spray-applied materials, such as structural fireproofing, are fully cured prior to installation of finish materials.
3. Provide adequate ventilation of packaged dry products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues.
4. Complete installation of VOC-emitting products applied on site no less than 14 days prior to Substantial Completion.

3.2 MOISTURE CONTROL

A. Moisture/Water/Mold Prevention:
1. Protect stored on-site or installed absorptive or porous materials from exposure to moisture.
2. Do not introduce water or moisture intrusion into building or structure.
3. Where mold growth is observed as a result of the Work of this contract, the effected materials shall be removed and disposed of by qualified handlers.
4. Correct water leaks or infiltration within 24 HRS of notification.

B. Store fuels, solvents, and other sources of VOCs separately from absorbent material.

C. Dispose materials off site susceptible to microbial growth and replace with new, undamaged materials.

3.3 ENVIRONMENTAL QUALITY MANAGEMENT

A. Environmental Quality Management Plan:
   1. Noise and Nuisance Plan.
      a. Develop a plan based on British Standard 5228-2009 to reduce noise emissions and vibrations from construction equipment and other non-road engines.
      b. Use construction equipment with low noise emissions or the lowest decibel level available that meets performance requirements in the British Standard.
      c. Construction crews must wear ear protection wherever sound levels exceed 85 dB for extended periods. Provide training and protective gear for workers.
      d. Limit effects of vibration on nearby historic or sensitive buildings.

END OF SECTION

SECTION 01 89 30
CONSTRUCTION ACTIVITY ACOUSTICS REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, materials, tools, equipment, and services for Construction Activity Acoustics Requirements, as indicated, in accordance with provisions of Contract Documents.

B. Completely coordinate with work of other trades.

1.2 QUALITY ASSURANCE

A. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to following:
   1. BSI British Standards
      a. BS 5228 Code of Practice for Noise Control On Construction and Open Sites, most current version.

1.3 DESCRIPTION

A. Construction Activity Acoustics Plan: Plan shall include:
   1. Contractors approach to minimizing site noise in compliance with British Standard BS 5228.
   2. Identification of equipment anticipated to be used on the project.
   3. Manufacturer's data indicating A-weighted sound pressure level values at 10 meters.
   4. Contractors plan for correcting non-compliant equipment
   5. Data indicting retrofitting equipment with mufflers or other noise control devices where equipment is not in compliance with required dB levels.
   6. Use of ear protective devices where required.
   7. Anticipated operating hours.
   8. Installation of temporary noise barriers where required.

1.4 SUBMITTALS:

A. Project Information:
   1. Construction Activity Acoustics Plan scaled to work effort that will produce noise.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Minimize noise of site operations.

B. On those parts of site where high levels of noise are anticipated and likely to be a hazard to individuals working on the site, prominent warning notices should be displayed.

C. Construction crews must wear ear protection in areas where sounds levels exceed 85 dBA for extended period of times.

D. Pneumatic impact tools and equipment used at the construction site shall have intake and exhaust mufflers recommended by the manufacturers thereof, to meet relevant noise limitations.

E. Provide impact noise producing equipment, i.e. jackhammers, with noise attenuating shields, shrouds or portable barriers or enclosures, to reduce operating noise.

F. Provide upgraded mufflers, acoustical lining or acoustical paneling for other noisy equipment, including internal combustion engines.

G. Use alternative procedures of construction and select a combination of techniques that generate the least overall noise and vibration. Such alternative procedures could include the following:
   1. Use electric welders powered by remote generators.
   2. Use construction equipment manufactured or modified to reduce noise and vibration emissions, such as:
      a. Electric instead of diesel-powered equipment.
      b. Hydraulic tools instead of pneumatic tools.
      c. Electric saws instead of air or gasoline driven saws.
   3. Turn off idling equipment when not in use for periods longer than 5 minutes.
   4. Operate equipment so as to minimize banging, clattering, buzzing, and other annoying types of noises.
   5. To the extent feasible, configure the construction site in a manner that keeps noisier equipment and activities as far as possible from noise sensitive locations.
   6. Select truck routes for material delivery and spoils disposal so that noise from trucks will have a minimal impact on noise sensitive receptors.
      a. Proposed truck haul routes are to be submitted to the County at least 5 days in advance for approval.
      b. Conduct truck loading, unloading, and hauling operations so noise and vibration are kept to a minimum.
      c. Do not operate haul trucks on streets within 250 FT of court buildings during work hours, without a variance.
   7. In no case shall mitigation measures alter the project's responsibility for compliance with applicable Federal, state, and local safety ordinances and regulations, as well as project specific construction specifications.
   8. Vehicle Idling:
      a. Comply with vehicle idling requirements of Authority having Jurisdiction.
      b. Limit vehicle idling time to a maximum of 5 minutes except where idling is required for the equipment to perform its task.
      c. Limit construction equipment idling time to a maximum of 5 minutes except where idling is required for the equipment to perform its task.
      d. Locate stationary equipment as far as practicable from nearby noise sensitive areas.
      e. Use electric powered motors where feasible.

3.2 MEASUREMENT REQUIREMENTS

A. Where required to substantiate compliance, monitor noise produced from construction operations in accordance with BS 5228.

3.3 NOISE MANAGEMENT –EQUIPMENT REQUIREMENTS

A. Perform renovation operations to minimize noise.
   1. Comply with the requirements of British Standard 5228.

Sound Level Data for Demolition			
Earthmoving	**dBA at 10 m**	**Materials Handling**	**dBA at 10 m**
Hydraulic Hammer		Pneumatic Hammer	83
Generators		Gas powered circular saw	75
Compressors		Tractor with towing trailer	79
		Diesel Generator	65
		Saws	75
		Vibrators	75

3.4 CONSTRUCTION EQUIPMENT NOISE REPORTING FORM

Construction Equipment Noise Reporting Form						
Equipment	Make and Model	ID	HP	Sound Pressure Level at 10m, dBA without mitigation	Noise Mitigation Measures	Sound Pressure Level at 10 m, dBA with mitigation

END OF SECTION

SECTION 27 41 16

INTEGRATED AUDIO/VIDEO SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Integrated Audio-Video Systems and Equipment as part of the Work.

1.2 RELATED DOCUMENTS

A. General provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to this section.

B. Reference the Project Manual for related specification sections.

C. Reference the Project Drawings for additional information.

1.3 SECTION INCLUDES

A. Project instructions for the Contractor and System description details

B. System product description

C. Project completion instructions for the Contractor

1.4 RESPONSIBILTY

A. Responsibilities include, but are not limited to, the following items:
   1. Provide materials, equipment, transportation, and labor necessary for a fully working, tested, and calibrated system. Supply accessories and minor equipment items (such as, but not limited to, power strips, adapters, connectors, mounting hardware, etc.) needed for a complete system, even if not specifically mentioned in these Specifications. Notify the Architect of any discrepancies in part numbers or quantities before bid. Failing to provide such notification, supply items and quantities according to the intent of the Specification and Drawings, without claim for additional payment.
   2. All infrastructure needed for the scope of work to function will be the responsibility of the AV/CT contractor. If they need to supplement their team with an electrical engineer or otherwise, it is their responsibility to incorporate such in their scope of work. Extension and distribution of AC power, data and associated raceway/conduit from nearest electrical closet and IDF/MDF room to the AV system and associated equipment is the responsibility of the AV Installer. Any additional raceway/cable management, as required by code or the project general conditions or required for a complete pathway system or to enclose cabling within public view, but not shown on the AV drawings is to be included the AV Installer's base scope of work. Exposed cabling will not be allowed. Low voltage cable above accessible ceiling area is allowed without conduit, with proper cable management and with use of applicable code rated cabling for spaces where cabling is located. Contractor is responsible to identify and notify Owner at time of proposal if existing AC power is not sufficient for the AV systems.
   3. Specifications and drawings are complementary. Work called for by one is binding as if called for by both. Any discrepancies between specifications and drawings shall be brought to the attention of the Architect for clarification during the bidding period. No allowance shall subsequently be made to the Contractor by reason of his failure to have brought said discrepancies to the attention of the Architect.
   4. Execute work in accordance with the National Electrical Code (NEC), the National Electrical Safety Code, the Occupational Safety and Health Act (OSHA), applicable State and Local codes, ordinances, regulations, authority having jurisdiction (AHJ), and manufacturer's recommendations. If a conflict develops between the contract documents and the appropriate codes and is reported to the Architect prior to bid opening, the Architect will prepare the necessary clarification. Where a

conflict is reported after contract award, propose a resolution of the conflict and, upon approval, perform Work.
5. Required licenses, insurance and permits including payment of charges and fees
6. Verification of dimensions and conditions at the job site.
7. Coordinate location and installation of equipment with other building elements.
8. Preparation of submittal information
9. Pick-up of Owner Furnished Equipment (OFE) and incorporation into project if applicable.
10. Development and implementation of control system software code and control panel layouts, which will become the property of the Owner
11. Final tests and adjustments, written report, and documentation
12. Instruction of operating personnel
13. Provision of manuals
14. Maintenance services and warranty.

1.5 REFERENCES

A. Published specification standards, tests or recommended methods of trade, industry or governmental organizations apply to Work in this section where cited below:
1. American National Safety Institute (ANSI)
2. American Society of Testing and Materials (ASTM)
3. Electronics Industries Association (EIA)
4. Federal Communications Commission (FCC)
5. National Electrical Manufacturer's Association (NEMA)
6. National Electrical Code (NEC)
7. Underwriters Laboratories (UL)
8. Occupational Safety and Health Administration (OSHA)
9. Society of Motion Picture and Television Engineers (SMPTE)
10. Building Industry Consulting Service International (BICSI)
11. Davis and Davis, Sound System Engineering (3rd Edition) (SSE), Howard W. Sams, 2006
12. Giddings, Audio System Design and Installation (ASDI), Howard W. Sams, 2013
13. AV Installation Handbook Second Edition: The Best Practices for Quality Audiovisual Systems, Infocomm (AVIH), 2009

1.6 DEFINITIONS

A. In addition to those Definitions of Division1, the following list of terms as used in this specification shall be defined as follows:
1. Furnish - To purchase, procure, acquire, and deliver complete with related accessories.
2. Install – To set in place, join, attach, link, set up or otherwise connect together and test until complete before turning over to the Owner, all parts, items, or equipment supplied by Contractor.
3. Provide – To furnish and install.

1.7 DESCRIPTIONS & REQUIREMENTS

A. The following is intended to further describe the Work and clarify design intent and is not an exhaustive description of the systems.

B. The work includes provision of complete and working system.
1. The work includes removal or deinstallation of existing courtroom equipment.
2. Coordinate with Owner the protection and removal of any equipment that might be in the way for the removal of the existing equipment.
3. Inventory, identify equipment to be re-used, remove loudspeakers with associated rigging systems, separate equipment tagged to be re-used from other equipment, package and store equipment until re-used and the work is complete.
4. Equipment not labeled for re-use, Inventory and palletize, coordinate storage. Once the work is complete, coordinate disposal with the Owner.
5. Existing projection screens to remain in Court of Law 1 and 2 although they will not be utilized for new system.

C. Standard Court Rooms
   1. The following rooms are classified as a standard courtroom:
      a. Courtroom 109
      b. Courtroom A
      c. Courtroom B
      d. Courtroom C
      e. Courtroom D
      f. Court at Law 1
      g. Court at Law 2
   2. Each court room system shall have a matrix video switch for routing of video sources. Input sources shall be from an HDMI input located at the Judge bench and Lectern. Where applicable, an input shall be provided at the bailiff position.
   3. Desk monitors shall be provided for viewing of video sources at the Judge bench, Witness, Plaintiff and Defense Tables, and Court Reporter positions. Monitors shall also be provided for the jury and gallery. Depending on the layout of the courtroom these displays may be mounted to the wall, ceiling, or existing millwork.
   4. A Video Conferencing system shall be integrated into the Courtroom. Two (2) PTZ cameras shall be provided to enable a video feed of various positions in the room. These video feeds along with audio shall be provided via USB to the Judge bench for use with a laptop. Recording of court proceedings shall be done primarily utilizing a video conferencing application.
   5. The audio system shall consist of tabletop gooseneck microphones located at the Judge's bench, Plaintiff table, Defense table, Bailiff position (if applicable) and Witness stand. There shall be a secondary microphone input located at the Witness stand for an Interpreter and a sidebar microphone at the Judge's bench. A wireless microphone system shall be provided for general use within the courtroom. Additionally, the Gallery shall have ceiling or wall mounted microphones arrays.
   6. Recessed ceiling speakers shall be provided in the public Gallery seating area. The Jury shall have speakers mounted above them in the ceiling or recessed into the Jury rail. The Judge's bench, Witness stand, Plaintiff Table, Defense Table, Court Reporter and Bailiff position (where applicable) shall have small personal speakers located within a pop up table box with a custom mix for each position. The Court Reporter shall also be provided with a headphone jack output.
   7. A personal headphone amplifier with volume knob shall be provided at the court reporter and witness positions.
   8. An Infrared Assisted Listening system shall be provided within the courtroom for occupants with hearing impairments.
   9. System control shall be available from a wireless 9 inch touch panel located at the Clerk position and a wired touch panel at the Judge's bench. These 2 touch panels shall be mirror images of each other. These touchpanels shall have the ability to control:
      a. Video source selection
      b. Audio level control
      c. Side bar discussions
      d. Video Conferencing
      e. Camera PTZ controls
   10. Most court rooms will have their equipment remotely located in a rack in an adjacent room. Courts A, B, and C will share an equipment rack. The County Courts will have a rack located within the room.

D. Courtroom E (CPS)
   1. Courtroom E shall have a matrix video switch for routing of video sources. Input sources shall be from an HDMI input located at the Judge bench and each of the 4 attorney tables.
   2. Desk monitors shall be provided for viewing of video sources at the Judge bench and Attorney Table positions. A larger central display shall also be provided.
   3. A Video Conferencing system shall be integrated into the Courtroom. Two (2) PTZ cameras shall be provided to enable a video feed of various positions in the room. These video feeds along with audio shall be provided via USB to the Judge bench for use with a laptop. Recording of court proceedings shall be done primarily utilizing the video conferencing application.

4. The audio system shall consist of tabletop gooseneck microphones located at the Judge's bench, Witness stand, and 2 at each attorney table. There shall be a secondary microphone input located at the Witness stand for an Interpreter and a sidebar microphone located at the Judge's bench. A wireless microphone system shall be provided for general use within the courtroom.
5. A record out audio port shall be provided at the court reporter location.
6. Recessed ceiling speakers shall be provided in the public Gallery seating area. The Judge's bench, Witness stand, and each attorney table shall have small personal speakers with a custom mix for each position located within recessed table boxes.
7. An Infrared Assisted Listening system shall be provided within the courtroom for occupants with hearing impairments.
8. System control shall be available from a wired touch panel located at the Judge's bench. The touchpanel shall have the ability to control:
    a. Video source selection
    b. Audio level control
    c. Side bar discussions
    d. Video Conferencing
    e. Camera PTZ controls
9. Equipment shall be located in an equipment rack adjacent to the room.

E. Courtroom F
1. Courtroom F shall have a matrix video switch for routing of video sources. Input sources shall be from an HDMI input located at the Judge bench and Plaintiff and Defense tables.
2. Desk monitors shall be provided for viewing of video sources at the Judge bench, Witness, and Attorney Table positions. A larger central display shall also be provided behind the judge bench.
3. A Video Conferencing system shall be integrated into the Courtroom. Two (2) PTZ cameras shall be provided to enable a video feed of various positions in the room. These video feeds along with audio shall be provided via USB to the Judge bench for use with a laptop. Recording of court proceedings shall be done primarily utilizing the video conferencing application.
4. The audio system shall consist of tabletop gooseneck microphones located at the Judge's bench, Witness stand, and Plaintiff and Defense tables. There shall be a secondary microphone input located at the Witness stand for an Interpreter and a sidebar microphone located at the Judge's bench. A wireless microphone system shall be provided for general use within the courtroom.
5. A record out audio port shall be provided at the court reporter location.
6. Recessed ceiling speakers shall be provided in the public Gallery seating area. The Judge's bench, Witness stand, and each attorney table shall have small personal speakers with a custom mix for each position located within recessed table boxes.
7. An Infrared Assisted Listening system shall be provided within the courtroom for occupants with hearing impairments.
8. System control shall be available from a wired touch panel located at the Judge's bench. The touchpanel shall have the ability to control:
    a. Video source selection
    b. Audio level control
    c. Side bar discussions
    d. Video Conferencing
    e. Camera PTZ controls
9. Equipment shall be located in an equipment rack adjacent to the room.

F. Title IV Court
1. The Title IV Court shall have a matrix video switch for routing of video sources. Input sources shall be from an HDMI input located at the Judge bench and Lectern.
2. Desk monitors shall be provided for viewing of video sources at the Judge bench, Witness, Defense, and Plaintiff positions. Monitors shall also be provided for viewing in the gallery.
3. A Video Conferencing system shall be integrated into the Courtroom. Two (2) PTZ cameras shall be provided to enable a video feed of various positions in the room. These video feeds along with audio shall be provided via USB to the Judge bench for use with a laptop. Recording of court proceedings shall be done primarily utilizing the video conferencing application.

4. The audio system shall consist of tabletop gooseneck microphones located at the Judge's bench, Witness, and at Plaintiff and Defense Tables. There shall be a secondary microphone input located at the Witness stand for an Interpreter and a sidebar microphone located at the Judge's bench. A wireless microphone system shall be provided for general use within the courtroom. Additionally, the Gallery shall have ceiling mounted microphones.
5. Recessed ceiling speakers shall be provided in the public Gallery seating area. The Judge's bench, Witness stand, Lectern, and each attorney table shall have small personal speakers with a custom mix for each position located within recessed table boxes.
6. An Infrared Assisted Listening system shall be provided within the courtroom for occupants with hearing impairments.
7. System control shall be available from a wired touch panel located at the Judge's bench. The touchpanel shall have the ability to control:
    a. Video source selection
    b. Audio level control
    c. Side bar discussions
    d. Video Conferencing
    e. Camera PTZ controls
8. Equipment shall be located in an equipment rack within the room.

G. Arraignment Court
1. The Arraignment Court shall have a matrix video switch for routing of video sources. The primary input for the system shall be from an HDMI input located at the Judge position.
2. A Video Conferencing system shall be provided to allow a remote Judge to be seen on the large format monitors to speak to a group as well as a smaller monitor located on the desk behind the window to interact directly with an in-custody individual. A fixed camera shall be provided on the judge side of the window to provide a remote judge with a view of the individual they are interacting with. The camera feed along with audio shall be provided via USB to the Judge position for use with a laptop.
3. The audio system shall consist of gooseneck microphone at the Judge position for a local Judge or facilitator to use and a wall mounted handset next to the window for use by an in-custody individual.
4. Recessed ceiling speakers shall be provided in the seating area as well as over the judge position.
5. System control shall be available from a fixed touch panel located at the Judge position. These touchpanels shall have the ability to control:
    a. Video source selection
    b. Audio level control
6. Equipment shall be located in a rack within the Judge booth.

H. Juvenile Justice Hearing Room
1. The Juvenile Hearing Room shall have a matrix video switch for routing of video sources. Input sources shall be from an HDMI input located at the Judge bench and each attorney table.
2. Desk monitors shall be provided for viewing of video sources at the Judge bench, Witness, and Attorney Table positions. A larger display shall also be provided behind the Judge bench primarily for the inclusion of a remote judge through video conferencing. An additional existing display shall also be utilized in the room for viewing of video sources.
3. A Video Conferencing system shall be integrated into the Courtroom. Two (2) PTZ cameras shall be provided to enable a video feed of various positions in the room. These video feeds along with audio shall be provided via USB to the Judge bench for use with a laptop. Recording of court proceedings shall be done primarily utilizing the video conferencing application.
4. The audio system shall consist of tabletop gooseneck microphones located at the Judge's bench, Witness stand, and Attorney Tables. There shall be a secondary microphone input located at the Witness stand for the Interpreter and a sidebar microphone at the Judge's bench. A wireless microphone system shall be provided for general use within the courtroom.
5. Recessed ceiling speakers shall be provided in the public Gallery seating area. The Judge's bench, Witness stand, and each attorney table shall have small personal speakers with a custom mix for each position located within recessed table boxes.
6. An Infrared Assisted Listening system shall be provided within the courtroom for occupants with hearing impairments.

7. System control shall be available from a wireless 9 inch touch panel located at the Clerk position and a wired touch panel at the Judge's bench. These 2 touch panels shall be mirror images of each other. These touchpanels shall have the ability to control:
    a. Video source selection
    b. Audio level control
    c. Side bar discussions
    d. Video Conferencing
    e. Camera PTZ controls
8. Equipment shall be located in an existing rack in an adjacent room.

I. Jury Rooms:
1. The Jury Rooms shall provide a wall mounted display appropriately sized for each room.
2. Input sources shall be from an HDMI input located under the display. Additional input sources shall be a USB drive with selected evidence provided and formatted by the Courtroom staff. These input sources shall be switched through the rooms display.
3. The audio system shall consist of a soundbar mounted below the display.
4. System control shall be available from a hardwired button panel located next to the display. This button panel shall be programmed to shut down the system automatically every day.

J. Conference Rooms
1. Conference Rooms shall provide a wall mounted display appropriately sized for each room.
2. Input sources shall be from a conferencing appliance as well an HDMI input located at the conference table. Video conferencing capabilities will be provided through the conferencing appliance and using a wall mounted soundbar with built-in microphone and camera.
3. In conference rooms that also function as jury rooms, a USB input shall be provided for evidence display using an USB drive formatted by Courtroom staff.
4. System control shall be available from a touch panel located at the table. This touch panel shall be programmed to shut down the system automatically every day. These touchpanels shall have the ability to control:
    a. Video source selection
    b. Audio level control
    c. Video Conferencing

K. Alternate #1 – Witness Annotation Monitor
1. A touch screen monitor with annotation processor shall be provided at the witness stand in place of the standard monitor with the ability to display the video output with annotations throughout the room.
2. The control system shall have the capability to route annotation video and clear annotations.

L. Alternate #2 – Court Reporter Audio Record Output
1. An audio output shall be provided in the standard court rooms at the court reporter location specifically as a record output.

M. Alternate #3 – Court Room A Streaming Card
1. The built-in content streaming port of the matrix switcher shall be configured to send a video stream to owner provided tablets in the jury box.

1.8 SUBMITTALS

A. Provide submittals in accordance with Conditions of the Contract and Division 1, Submittal Procedures section unless otherwise indicated.

B. Submittals shall contain sufficient information to describe the Work to be performed. Reviewed shop drawings are to be used for final coordination and construction.

C. Shop drawings must be original work produced by the Contractor responsible for performing the work defined in this specification. Scanning, photographic copying, materially copying, or any other reproducing the contents of the drawings or specifications contained within the Contract Documents will be marked as unacceptable and not reviewed for any content. No claim shall be made for delay, undue

burden, or additional costs for the effort to produce shop drawings, schedules, and equipment lists addressing this specification or the overall project manual.

D. Supplementary submittal requirements:
   1. Provide the following in one electronic submission for review within thirty days of issuance of Notice to Proceed (NTP) and prior to commencement of Work:
      a. Complete schedule of submittals.
      b. Chronological schedule of Work in bar chart form.
      c. Product Data Sheets:
         1) Provide a complete table of contents with the following information:
         2) Project title.
         3) Submittal number. In the case of a resubmittal, use the original submittal number immediately followed by the suffix "R" immediately followed by a unique number and be numbered in consecutive order.
         4) Date of submission.
         5) Provide a list of and Manufacturer's data sheets on products to be incorporated with the Work. Arrange data sheets in the same order they appear in this specification. Where a data sheet shows more than one product, indicate the model being proposed with an arrow or other appropriate symbol.
         6) Submit manufacturer's product literature for each type of firestop material to be used. Literature shall include documentation of UL classifications or approved third party testing. Manufacturer's name and number for each part shall be included. Submit drawings of through penetrations, which include the system to be utilized for the firestopping application. Drawing shall indicate construction of wall or floor assembly; size, number and material of penetrating items; firestop system designation; required F-rating, T-rating and remarks.
         7) Upon Owners and/or Consultant's request provide (3) three copies of the submittals. Bind submittal in titled three ring D style binders sized for 150 per cent of the material. Maximum size: three-inch spine. Use multiple volumes as required. Separate major grouping with labeled binder tabs.
         8) Submissions that do not follow the format and configuration described above will be returned without review.
      d. Shop Drawings:
         1) Functional Diagrams/Schematics:
            a) Detailed wiring diagrams showing interconnection of components and products, wiring and cabling diagrams depicting cable types and designators, and device designators for each system. Provide connector designations and terminal strip identification, along with color codes for cables connecting to these devices. Give each component a unique designator and use this designator consistently throughout the project.
         2) Coordination Drawings:
            a) Prepare and submit a set of coordination drawings showing major elements, components, and devices of the audio and video system in relationship with other building components. Prepare drawings to an accurate scale of 1/8"=1'-0" or larger on suitable sized media.
            b) Prepare floor plans, reflected ceiling plans, elevations, sections, and details to conclusively coordinate and integrate all equipment. Indicate locations where space is limited, and where sequencing and coordination of installations is of importance to the efficient flow of the Work including but not necessarily limited to the following:
               (1) Equipment housings
               (2) Ceiling and wall mounted devices
               (3) Raceways
               (4) Cabling
      e. Equipment: Location of equipment within racks, consoles, or on tables, with dimensions; wire routing and cabling within housings; AC power outlet and terminal strip locations.
      f. Patch panel(s): Layouts and designation (labeling) strips, including color schemes.

g. Full fabrication details of any custom enclosures and millwork indicating size, material, finish and openings for equipment.
h. Structural rigging and mounting details:
1) Structural rigging and mounting details of all loudspeakers suspended from or mounted to the building structure: These drawings will identify all types of hardware, fittings and materials to be used. Detail the product manufacture, part numbers and load capacity of the hardware, fittings and materials selected. All loudspeaker structural rigging and mounting detail drawings shall be signed and sealed by a professional engineer licensed to practice in the State and Locality of the installation and will include a copy of the design calculations.
2) The signed and sealed drawings noted above to include the following:
a) Attachment method to building structure for suspended loudspeakers or mounting brackets.
b) Any secondary steel required for attachment to the building structure.
c) All fittings, hardware, materials, and cable used for suspended loudspeakers.
d) All custom brackets, mounts, suspension grids or trusses and loudspeaker cabinet frames or brackets not supplied by the manufacturer of the specific loudspeaker to be mounted or suspended.
i. Projector, loudspeaker, camera mounting details, include hardware types and load capacity.
j. Fabricated Plates and Panels: Provide complete drawings on custom fabricated plates or panels. Drawings shall include dimensioned locations of components, component types, engraving information, plate material and color, and bill of material.
k. Labeling: Equipment and cabling labeling scheme. Include font sizes and styles, explanation of scheme, and designator schedule.
l. Schedules: Wiring schedule showing source and destination of wiring and indicating which wiring is in conduit. Junction box schedule showing type of box, size, mounting and location. Include this information with remainder of wiring diagrams.
m. Consultant's project documents in electronic format will not be supplied to the Contractor for their use as part of submittals.
n. Detail drawings executed at an appropriate scale, but not smaller than 1/8 inch = 1'–0".
o. Submissions that do not follow the format and configuration described above will be returned without review.
p. Any other pertinent data which is necessary to provide the Work.
2. Control System Software:
a. Provide electronic copies of proposed control system user interfaces within sixty (60) days of issuance of Notice to Proceed (NTP).

E. Resubmission requirements:
1. Make all requested corrections or change in submittals required. Resubmit for review until no exceptions are taken.
2. Indicate all changes that have been made other than those requested.

1.9 CONTRACT CLOSE-OUT DOCUMENTS:

A. Provide submittals in accordance with Conditions of the Contract and Division 1, Submittal Procedures section unless otherwise indicated, after substantial completion but prior to final observation:

B. Supplementary submittal requirements:
1. Provide the following in one electronic submission for review.
2. Equipment Manuals:
a. Manufacturer's owner/instruction manual for each type of Product by manufacturer and model or part number unless specified otherwise herein
b. Supply manufacturer's serial numbers for each Product
c. For custom circuits or modifications, a description of the purpose, capabilities, and operation of each item
d. Separately bind list by manufacturer and model or part number of Products incorporated within the Work, arranged in alpha numeric order. When applicable, bind Manufacturer's warranty statements separately.
3. Test Reports: Recorded findings of Commissioning.

4. System Operation and Instructions: Prepare a complete and typical procedure for the operation of the equipment as a system, organized by subsystem or activity.
    a. This procedure should describe the operation of system capabilities.
    b. Assume the intended reader of the manual to be technically inexperienced but familiar with the components and the facility.
5. Service Information, including service phone number(s) and hours; service schedule; description of products recommended or provided for maintenance purposes, and instructions for the proper use of these products.
6. Any other pertinent data generated during the Project or required for future service.
7. Within three (3) weeks of final observation, submit the following in one electronic submission for review. Upon Owners and/or Consultant's request provide (3) three copies of the following:
    a. Record drawings: Final rendition of Shop Drawings depicting what is actually incorporated within the Work.
    b. Hardcopy full size set of Record drawings.
    c. Three (3) compact disc or DVD's containing Record drawings in AutoCAD editable DWG format and Adobe PDF format. Resolution to be sufficient to permit Owner's technicians to be able to clearly read all notes and text on screen.
    d. One set of signed proof-of-training documents.
8. Submittal Format:
    a. Record Drawings: Drawings executed at an appropriate scale, but not smaller than 1/8 inch = 1'–0".
    b. Segregate documents into separate binders containing data relevant to operational, maintenance, and warranty issues. Appropriately duplicate data within the separate bindings when it will reasonably clarify procedures, e.g., operational data in maintenance binding.
    c. Bind Project Record Manual in titled three ring D style binders sized for 150 per cent of the material. Maximum size: three inch spine. Use multiple volumes as required. Separate major grouping with labeled binder tabs.

C. Resubmission requirements:
1. Make all requested corrections or change in submittals required. Resubmit for review until no exceptions are taken.
2. Indicate all changes that have been made other than those requested.

1.10 CUSTOM SOFTWARE

A. Introduction:
1. Proprietary software provided for the Technical Systems shall be subject to this software license between the Contractor and the Owner as an essential element of the system as defined in the system specification and associated documents, drawings and agreement.
2. Contractor shall agree that 3rd party proprietary software provided with the system shall be subject to this agreement.
3. Contractor and Owner agree that this software license is deemed to be part of, and subject to, the terms of the Agreement applicable to both parties; and shall supersede any standard manufacturer or Contractor's standard license agreement.
4. Proprietary software shall be defined to include, but not be limited to, device and system specific software and firmware designed to run on conventional computer based operating platforms as well as all micro-processor based hardware used to program, setup, or operate the system or its components.
5. For sake of this agreement, MS Windows® shall not be considered "proprietary" software, unless a non-public version of Windows® or any of its components are critical to the operation of the system in which case it shall be deemed proprietary.

B. License Grant and Ownership:
1. Contractor hereby grants to Owner a perpetual, non-exclusive, site license to all software for Customer's use in connection with the establishment, use, maintenance and modification of the system implemented by Contractor. Software shall mean executable object code of software programs and the patches, scripts, modifications, enhancements, designs, concepts or other materials

that constitute the software programs necessary for the proper function and operation of the system as delivered by the Contractor and accepted by the Owner.

2. Except as expressly set forth in this agreement, Contractor shall at all times own all intellectual property rights in the software. Any and all licenses, product warranties or service contracts provided by third parties in connection with any software, hardware or other software or services provided in the system shall be delivered to Owner for the sole benefit of Owner.
3. Owner may supply to Contractor or allow the Contractor to use certain proprietary information, including service marks, logos, graphics, software, documents and business information and plans that have been authored or pre-owned by Contractor. All such intellectual property shall remain the exclusive property of Owner and shall not be used by Contractor for any purposes other than those associated with delivery of the system.

C. Copies, Modifications, and Use:
1. Source code shall be available to Owner for a period of not less than 10 years.
2. Owner may make copies of the software for archival purposes and as required for modifications to the system. All copies and distribution of the software shall remain within the direct control of Owner and its representatives.
3. Owner may make modifications to the source code version of the software, if and only if the results of all such modifications are applied solely to the system. In no way does this Software License confer any right for Owner to license, sublicense, sell, or otherwise authorize the use of the software, whether in executable form, source code or otherwise, by any third parties.
4. All express or implied warranties relating to the software shall be deemed null and void in case of any modification to the software made by any party other than Contractor.

D. Warranties and Representations:
1. Contractor represents and warrants to Owner that:
   a. It has all necessary rights and authority to execute and deliver this Software License and perform its obligations hereunder and to grant the rights granted under this Software License to Owner;
   b. The goods and services provided by contractor under this Software License, including the software and all intellectual property provided hereunder, are original to Contractor or its subcontractors or partners; and
   c. The software, as delivered as part of the system, will not infringe or otherwise violate the rights of any third party, or violate any applicable law, rule or regulation.
2. Contractor further represents and warrants that, throughout the System Warranty Period, the executable object code of software and the system will perform substantially in accordance with the System Specifications and Agreement. If the software fails to perform as specified and accepted all remedies are pursuant to the policies set forth in the Specification and in the Agreement. No warranty of any type or nature is provided for the source code version of the software which is delivered as is.
3. Except as expressly stated in this Agreement, there are no warranties, express or implied, including, but not limited to, the implied warranties of fitness for a particular purpose, of merchantability, or warranty of no infringement of third party intellectual property rights.

1.11 QUALITY ASSURANCE

A. Qualifications: Contractor to be experienced in the provision of systems similar in complexity to those required for this project; and meet the requirements listed below. Provide documentation at the time of bid to support these qualifications.
1. No less than three years experience with equipment and systems of the specified types.
2. Experience with at least three comparable scale projects within the last three years.
3. Be a franchised dealer and service facility for the manufacturer’s products furnished.
4. Maintain a fully staffed and equipped service facility with full time field technicians.
5. Have at least one supervisory on site employee having completed and certified CTS-I by Infocomm.
6. At the request of the Owner, demonstrate that:
   a. Adequate plant and equipment is available to complete the work.
   b. Adequate staff with commensurate technical experience is available.

B. Work: Perform Work in compliance with the applicable standards listed herein and governing codes and regulations of the authorities having jurisdiction and the Contract Documents.

1. Drawings and specification requirements govern where they exceed Code and Regulation requirements.
2. Where requirements between governing Codes and Regulations vary, the more restrictive provision applies.
3. Nothing in the Contract Documents grants authority or permission to disregard or violate any legal requirements.

C. Coordinate exact location and installation of equipment, power, grounding, and raceway requirements with the Architect.

1.12 DELIVERY, STORAGE & HANDLING

A. Ship Products in its original container, to prevent damaging or entrance of foreign matter.

B. Handling and shipping in accordance with Manufacturer's recommendation.

C. Provide protective covering during construction of all installed devices, to prevent damaging or entrance of foreign matter.

D. Replace at no expense to Owner, Products damaged during storage, handling or the course of construction.

1.13 PROJECT CONDITIONS

A. Verify conditions on the job site applicable to this work. Notify Architect in writing of discrepancies, conflicts, or omissions promptly upon discovery.

B. The Drawings diagrammatically show cabling and arrangements of equipment fitting the space available without interference. If conditions exist which make it impossible to install work as shown, recommend solutions and/or submit drawings to Architect for approval, showing how the work may be installed.

1.14 WARRANTY

A. Warrant labor and equipment for one year following the date of substantial completion to be free of defects and deficiencies, and to conform to the drawings and specifications as to kind, quality, function, and characteristics. Repair or replace defects occurring in labor or equipment within the Warranty period without charge.

B. This warranty is in addition to any specific warranties issued by manufacturers for greater periods of time.

C. Within the warranty period, answer service calls within twenty four (24) hours during normal working hours and correct the deficiency within forty eight (48) hours.

D. Provide Owner with the name and telephone number of the person to call for service. This information to be part of Project Closeout Documents.

E. Thirty days prior to the end of the warranty period provide a complete checkout of all system components. Repair or replace any defective equipment discovered during the testing. Correct any defects in wiring or other functional problems reported by Owner. Warranty replacement and service of equipment shall not apply to Owner furnished equipment (OFE). Coordinate observation visit with the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. Products quantity is as required. If a quantity is given, provide at least the given amount. Some product listed may not be required to fulfill the obligations of the Work.

B. Equipment and materials shall be new and conform to applicable UL or ANSI provisions.

C. Regardless of the length or completeness of the descriptive paragraph herein, provide Products complying with the specified manufacturer's published specifications.

D. Remove or blank out all manufacturers' names, logos, or other symbols from loudspeakers or other objects placed in view of the public. If logos are removable, remove and repaint to the color of the adjacent surface and reattach.

E. Take care during installation to prevent scratches, dents, chips, etc.

2.2 ACCEPTABLE MANUFACTURERS

A. Model numbers and manufacturers included in this specification are listed as a standard of function, performance, and quality.

B. Refer to General and Supplementary Conditions and Division 1 Specification Sections for equipment substitution procedure.

C. If a specified product has been discontinued by a manufacturer, provide the replacement model (as certified by the manufacturer) at no additional cost.

D. Where required provide manufacturer's rack mount adapter or one manufactured by Middle Atlantic or Winstead unless specified elsewhere.

2.3 MICROPHONES AND ACCESSORIES

A. Quad Wireless Microphone System (WLS, Type 1):
   1. Receiver Type: Digital Wireless System with automatic switching diversity reception with XLR type audio output connectors.
   2. Indicators: LED signal strength meters for battery, RF and audio levels.
   3. Frequency: Coordinate with FCC and local requirements.
   4. Antennas: Rear mount passive antennas for the frequency spectrum chosen.
   5. 1-RU Rack mountable.
   6. Acceptable product to include:
      a. Shure: ULXD4Q Diversity Receiver
      b. Shure: SBC800-US Battery Charger Base

B. Table-mounted Microphone (MIC, Type 1)
   1. 12" Gooseneck
   2. Desktop Base
   3. Programmable Switch
   4. Logic Input and Output Terminals and Attached 10' XLR-3M Cable
   5. Snap-Fit Foam Windscreen
   6. Frequency Range:50 Hz to 17 kHz
   7. Maximum SPL: 122.7 dB SPL (1 kHz, 1% THD, 1-Kilohm Load)
   8. Impedance:180 Ohms at 1 kHz
   9. Dynamic Range: 94 dB (1-Kilohm Load)
   10. Signal-to-Noise Ratio: 65.0 dB (at 1 Pa/94 dB SPL)
   11. Acceptable Product:
      a. Shure MX418D/C

C. Boundary Microphone (MIC, Type 2)
   1. Microflex Omnidirectional Boundary Microphone
   2. Form Factor: Boundary/Surface Mount
   3. Sound Field: Mono
   4. Capsule: Electret Condenser
   5. Frequency Range:50 Hz to 17 kHz
   6. Maximum SPL: 111 dB SPL)
   7. Impedance:180 Ohms at 1 kHz
   8. Dynamic Range: 96.2 dB (1-Kilohm Load)
   9. Signal-to-Noise Ratio: 80.0 dB (at 1 Pa/94 dB SPL)
   10. Acceptable Product:

a. Shure MX391/O

D. Microphone Array (MIC, Type 3)
1. Linear Array Microphone
2. Steerable Coverage technology to capture audio anywhere in the room (up to 4 lobes with a 2-foot array, 8 lobes with a 4-foot array)
3. Autofocus technology fine-tunes each lobe position in real time
4. Default room coverage template enables quick and easy lobe optimization for wall, ceiling, or table installations.
5. IntelliMix DSP includes automatic mixing, acoustic echo cancellation, noise reduction, and automatic gain control.
6. SystemOn Audio Asset Management software for remote management and troubleshooting
7. PoE powered
8. LED status bars with confi gurable colors and brightness
9. Dante & AES67 audio networking protocols
10. Multiple mounting accessories for wall, ceiling, or table installation
11. Acceptable Product:
    a. Shure MXA710

E. Microphone Array (CM, Type 1)
1. Ceiling Array Microphone
2. Audio Capture / DSP
3. Up to eight discrete steerable lobes for precise positioning to participant(s)
4. Shure DSP Utilities:
    a. Steerable Coverage™ Technology
    b. Automatic Mixing
    c. Echo Reduction
    d. 4 Band C/S PEQ per channel
5. Software Control
    a. Simple, smart browser-based interface including templates and varying polar patterns for all device parameters
    b. 10 Presets
6. Connectivity
    a. Dante Audio Networking, standard PoE (class 0) and Control carried on single Ethernet cable
    b. Control strings for third-party preset controllers including Crestron and AMX
7. Hardware / Installation
    a. Configurable multi-color LED bar
    b. Flush mounted into standard ceiling tiles.
    c. Ref Achitect for desired color
    d. Acceptable Product:
        1) Shure MXA910

2.4 AUDIO SIGNAL PROCESSORS

A. Digital Signal Processing System (DSP)
1. Provide independent DSP processing for each system as detailed on the AV drawings.
2. The DSP system and control software shall be operational 30 days prior to the first use of the installed system.
3. Function: Provide all signal processing and control required for the system(s). Devices required include, but are not limited to; mixer, matrix router, crossover, high and low pass filters, delay, compression, 6-band parametric equalizer, limiter, ducker, signal delay, and external control.
4. Unit to be configured with a minimum quantity of inputs and outputs as shown within the AV drawings, including control port requirements.
5. Signal flow and routing to be fully user configurable.
6. Unit to permit hardwire connection of external switches for recalling presets.
7. Unit to permit remote networked control via dedicated devices.
8. Access to external user-adjustable controls shall be restricted.
9. Acceptable product:

a. DSP Type 1:
    1) QSC Q-Sys Core 110f

2.5 AUDIO INTERFACES

A. Phone Line Simulator (PLS, Type 1)
1. Allows two-way communication between standard telecom products
2. Precise dial tone
3. Switch selectable ring cadence
4. Acceptable Products:
    a. Viking DLE-200B

B. Armored No-Dial Phone (HANDSET, Type 1):
1. Jail/Prison/Visitation Phone
2. Constructed of durable 14 guage stainless steel
3. Tamper resistance locking system
4. Built-in mounting plate
5. 1000lb pulling test
6. Magnetic hookswitch/handset
7. Acceptable Product:
    a. G-Tel VP-3500 with 18” Cord Length

C. Headphone Amplifier (HA, Type 1):
1. Wall mounted amplifier
2. Balanced input on rear panel
3. Speaker output on rear panel
4. Mini-Jack headphone output on front panel
5. Setting to turn off power amp upon headphone connection
6. 3.5 watt RMS audio amp into 8 ohms
7. Class D operation
8. Acceptable Product:
    a. RDL DB-HPA3

2.6 POWER AMPLIFIERS

A. Power Amplifier 8ch (PA, Type 1)
1. Channels: 8
2. Sensitivity: 1.4 V
3. Rated Power Output: 125 W per Ch @ 8 Ω
4. Signal to Noise Ratio (below rated power 20 Hz to 20 kHz, A-Weighted): 110 dB
5. Total Harmonic Distortion (THD) (full rated power, 20 Hz - 20 kHz): < 0.5%
6. Intermodular Distortion (from 0 dB down to -40 dB):
7. Frequency Response (at 1W into 4/8 Ω): ± 0.5 dB
8. Crosstalk (below rated power 20 Hz to 1 kHz): > 70 dB
9. Common Mode Rejection (20 Hz to 1 kHz): > 55 dB, typically . 70 dB
10. Acceptable Product:
    a. Crown CT 8150

B. Power Amplifier 2ch (PA, Type 2)
1. Channels: 2
2. Power Output: 500W (per channel @4 Ohms)
3. Sensitivity (for full rated power at 8 Ohms): 1.4V
4. Signal to Noise Ratio: 100dB
5. THD: < 0.5%
6. Damping Factor: >500
7. Frequency Response: 20Hz - 20kHz
8. Input Impedance: 20k Ohms balanced, 10k Ohms unbalanced
9. Acceptable Product:
    a. Crown CDi 1000

C. Power Amplifier 4ch (PA, Type 3)
   1. Channels: 4
   2. Sensitivity 1.4 V
   3. Rated Power Output (all channels driven): 125W per CH @ 4 ohms, 125W per CH @ 8 ohms
   4. Signal to Noise Ratio (below rated power 20 Hz to 20 kHz, A-Weighted): 110 dB
   5. THD (full rated power, 20 Hz - 20 kHz) < 0.05%
   6. Intermodulation Distortion (from 0 dB down to -30 dB) < 0.05%
   7. Frequency Response (at 1W, 4/8 ohms) +/- 0.5 dB
   8. Crosstalk (below rated power) 20 Hz to 1 kHz > 70 dB
   9. Common Mode Rejection (20 Hz to 1 kHz) > 55 dB, typically > 70 dB
   10. Acceptable Product:
      a. Crown CT 4150

D. Power Amplifier 8ch (PA, Type 4)
   1. Channels: 8
   2. Rated Power Output (all channels driven): 1000W per CH @ 4 ohms, 1000W per CH @ 8 ohms, 1000W @ 70V
   3. Signal to Noise Ratio (below rated power 20 Hz to 20 kHz, A-Weighted): 104 dB
   4. Maximum Distortion: 1%
   5. Frequency Response: 20 Hz – 20 kHz +/- 0.3 dB
   6. Acceptable Product:
      a. QSC CX-Q 4K8

2.7 LOUDSPEAKERS

A. Table Speaker (SPEAKER, Type 1)
   1. Power Configuration: Full-range
   2. LF Driver Size: 2.5" Woofer
   3. Total Power: 12W, 48W peak
   4. Impedance: 6 ohms
   5. Inputs: Screw-type Barrier
   6. Frequency Range: 170Hz-20kHz (-10dB)
   7. Maximum Peak SPL: 101dB SPL
   8. Vertical Coverage Angle: 170° (conical)
   9. Enclosure Material: Polystyrene
   10. Mounting Options: Wall Mount Bracket
   11. Height: 3" Width: 3" Depth: 4"
   12. Weight: 1.76 lbs.
   13. Acceptable Product:
      a. Bose FreeSpace 3 Surface-Mount Satellites Speaker

B. Speaker (SP, Type 2)
   1. Ceiling Speaker
   2. LF Driver Size: 1 x 6.5"
   3. HF Driver Size: 1 x 0.1"
   4. Power Rating (Program): 150W
   5. Impedance: 8 ohms
   6. Frequency Range: 55Hz-20kHz (-10dB)
   7. Maximum Peak SPL: 116dB
   8. Horizontal Coverage Angle: 120 Degrees
   9. Vertical Coverage Angle: 120 Degrees
   10. Enclosure Material: Medium Impact Polystyrene
   11. Mounting Options: Ceiling Mountable
   12. Height: 12" Width: 12" Depth: 10.2"
   13. Weight: 11 lbs.
   14. Acceptable Product:
      a. JBL Control 47CT

C. High Ceiling Speaker (SPEAKER, Type 3)
   1. Narrow Pattern for High Ceiling Applications
   2. LF Driver Size: 1 x 6.5"
   3. HF Driver Size: 1 x 1"
   4. Power Rating (Program): 150W
   5. Impedance: 8 ohms
   6. Frequency Range: 55Hz-17kHz
   7. Maximum Peak SPL: 118dB
   8. Coverage Angle: 75 Degrees conical
   9. Mounting Options: Ceiling Mountable
   10. Diameter: 13.1" Depth: 13.8"
   11. Acceptable Product:
      a. JBL Control 47HC

D. Ceiling Speaker (SPEAKER, Type 4)
   1. One 3-inch full-range high-extrusion, high-fidelity polypropylene driver
   2. Frequency range: 115 Hz – 20 kHz (-10dB)
   3. Dispersion angle: 180 degrees
   4. Acceptable Product:
      a. Soundtube IW31-EZ-T (verify color with architect)

E. Sound Bar (SPEAKER, Type 5)
   1. HF Driver: 2 x 19 mm (0.75") Soft Dome Tweeter (one per channel)
   2. LF Driver: 4 x 51 mm (2.0") Low-Frequency Driver (two per channel)
   3. Frequency Range (-10dB): 42Hz – 20kHz
   4. Maximum Peak SPL: 90 dB-SPL at 1m (0 dBV input; Max Volume setting, one channel) 94 dB-SPL at 1m (both channels driven)
   5. Power Amp: 20W per Channel, Class D
   6. Acceptable Product:
      a. JBL PSB-1

F. Decora Speaker (SPEAKER, Type 6):
   1. 2 watt decora style 8 ohm loudspeaker
   2. 2 position detachable terminal block
   3. 180 degree dispersion area
   4. Maximum power up to 10 watts
   5. Acceptable Product:
      a. RDL DB-SP1A

2.8 ASSISTIVE LISTENING

A. Assistive Listening (ALS, Type 1)
   1. iDSP IR Assistive Listening System
   2. Acceptable Product to include:
      a. Listen LS-100-01
         1) One (1) LT-82-01 Stationary IR Transmitter
         2) One (1) LA-326 Universal Rack Mounting Kit
         3) One (1) LA-140 Stationary IR Radiator
         4) Four (4) LR-4200-IR Intelligent DSP IR Receiver
         5) Four (4) LA-430 Intelligent Ear Phone/Neck Loop Lanyard
         6) Four (4) LA-401 Universal Ear Speaker
         7) One (1) LA-304 Assistive Listening Notification Signage Kit
         8) One (1) LA-422 USB to Mico USB Cable
         9) One (1) LA-381-01 Intelligent 12-Unit Charging Tray
         10) One (1) LA-382 Intelligent Cable Management Unit
         11) One (1) LA-904 Listen Dispensing Log Book

B. ListenTALK Transceiver (Type 1)
   1. Fast and simple two-way communication
   2. Push-to-talk functionality
   3. Exclusive encryption technology for added security
   4. Compatible with standard earbuds and Listen Technologies headset
   5. Long-lasting lithium ion rechargeable batteries
   6. Acceptable Product:
      a. Listen LK-1

C. ListenTALK Headset (Type 1)
   1. Single-piece earspeaker with boom mic
   2. Acceptable Product:
      a. Listen LA-451

D. ListenTALK Docking Station (Type 1)
   1. Charges, stores, and programs up to 4 listenTALK transceivers and/or receivers
   2. Locking charging slots
   3. Acceptable Product:
      a. Listen LA-482

2.9 ANNOTATION

A. Annotation Processor (ANO, Type 1)
   1. Video Input HDMI up to 3840 x 2160 @ 24/25/30 fps
   2. Video Output HDMI up to 3840 x 2160 @ 60 fps
   3. Touch Display Compatible with HID Touch Screen
   4. Video Recording Live video recording of all content & annotations
   5. Acceptable Product:
      a. Williams AN-C5P

2.10 VIDEO DISPLAY EQUIPMENT

A. 22” LCD Desktop Monitor (MON, Type 1):
   1. 22” Diagonal
   2. Resolution 1920 x 1080 (HD)
   3. Brightness: 250cd/m2
   4. Acceptable Product To Include:
      a. LG 22MB35PY-I

B. Large Format LCD Monitor (MON, Type 2):
   1. Resolution 3,840 x 2,160 (4K UHD)
   2. Brightness: 500cd/m2
   3. RS232 controllable
   4. 10W + 10W Speakers
   5. Acceptable Products To Include:
      a. LG UH5F Series Display (reference display schedule for size)
      b. Configuration 1: 75-86” display with Chief RXF2
      c. Configuration 2: 55-65” display with Chief LSM1U
      d. Configuration 3: 65-86” with Chief TS525TU
      e. Configuration 4: Ceiling Mount 43-55” with Chief LCMIU, CMA330, and FCA540

C. 22” Touch Screen LCD Desktop Monitor (MON, Type 3):
   1. 22” Diagonal
   2. Resolution 1920 x 1080 (HD)
   3. Brightness: 250cd/m2
   4. RS232 controllable
   5. Touch capable
   6. Acceptable Products to Include:
      a. Planar PCT2265

D. 22” LCD Desktop Monitor (MON, Type 4):
   1. 22” Diagonal
   2. Resolution 1920 x 1080 (HD)
   3. Brightness: 250cd/m2
   4. Acceptable Product To Include:
      a. LG 22SM3G
      b. With FSR100 mount for jury rail where applicable

2.11 AV SOURCES

A. Fixed Camera (CAM, Type 1):
   1. 4K Webcam
   2. 4K/30fps: up to 4096 x 2160
   3. Autofocus
   4. Universal mounting clip
   5. Acceptable Product:
      a. Logitech 4K Pro Webcam

B. HD PTZ Camera (CAM, Type 2):
   1. Horizontal field of view 70° (wide) to 4.1° (tele)
   2. 20x zoom
   3. Resolution: 1080p 60
   4. 1/2.5-type Exmor R CMOS sensor
   5. PoE+
   6. Camera available in black or white finish (coordinate camera color with architect)
   7. Acceptable Products to include:
      a. Vaddio EasyIP 20 Camera (999-30230-000)
      b. Vaddio Suspended Ceiling Mount for Vaddio Cameras (535-2000-206)
      c. Vaddio QuickCAT Universal Suspended Ceiling Camera Mount (999-82000-000) where additional extension from ceiling is required to avoid obstructions.

C. AV Bridge (AV Bridge, Type 1):
   1. Supports four EasyIP camera video feeds plus an HDMI source
   2. 4x4 Dante audio matrix
   3. Concurrent 1080p/60 USB3.0 and HDMI output
   4. PoE+ powered
   5. Acceptable Product:
      a. Vaddio EasyIP Mixer (999-60320-000)

D. AV Bridge (AV Bridge, Type 2):
   1. Supports four EasyIP camera video feeds
   2. 1080p/60 USB 3.0 output
   3. PoE+ powered
   4. Acceptable Product:
      a. Vaddio EasyIP Decoder (999-60210-000)

2.12 VIDEO CONFERENCING

A. Video Conferencing System (UC ENGINE, Type 1)
   1. Front-of-room video conferencing solution for Zoom Rooms software
   2. Complete kit contains:
      a. A 10.1 in. table top touch screen (TP)
      b. Crestron smart soundbar and camera (SOUNDBAR)
      c. UC bracket assembly
      d. UC Presentation Transmitter (UC-PR)
   3. Easy to specify and install — no custom design, programming, or software installation required
   4. Acceptable Product:
      a. Crestron UC-BX30-Z

2.13 VIDEO PROCESSORS AND SWITCHERS

A. DM Video/Audio Matrix (DM MTX, Type 1):
   1. 8 x 8 modular configuration
   2. H.264 streaming from any input source up to 1080p or WUXGA
   3. CONTENT LAN port for streaming
   4. 12.5 Gbps backplane data rate
   5. Handles HDMI devices with Deep Color, 3D, 4K, and high-bitrate 7.1 encoded audio
   6. HDBaseT Certified device
   7. HDCP 2.2 compliant via 4K input and output cards
   8. Distributes Full HD 1080p, Ultra HD, and 4K signals via DM 8G+ and HDBaseT connectivity
   9. Distributes 1080p and WUXGA signals over via DM 8G® Fiber or via DM 8G® SM Fiber
   10. Allows streaming of 1080p signals over an IP network with no distance limitations
   11. Supports first-generation DM CAT and DM Fiber products
   12. Configurable with up to eight DM, HDBaseT, and/or HDMI outputs
   13. Configurable with up to four streaming outputs
   14. Output expansion using multiple DM switchers
   15. Modular inputs support a complete range of digital, analog, and streaming signal types
   16. Automatic AV signal format management via EDID
   17. Device control via CEC
   18. Allows independent scaling for every display through select output cards and DM receivers
   19. Distributes and routes USB HID mouse and keyboard signals
   20. Allows full audio and USB breakaway switching
   21. Supports analog audio embedding and de-embedding
   22. Includes integrated Ethernet switch with Gigabit LAN port
   23. Private Network Mode
   24. Secure access
   25. Hardware level security using 802.1X authentication
   26. TLS, SSL, SSH, and SFTP network security protocols
   27. Includes a built-in web server
   28. 4-space 19 in. rack-mountable
   29. Acceptable Product to include the following:
      a. Crestron DM-MD8x8-CPU3
      b. Provide all input and output cards as required per the design functionals.
      c. Provide compatible PoE+ or PoDM input to DM Input and Output cards to remotely power all wall plate transmitters and receivers using system LAN Switch or additional DM PSU.

B. DM Video/Audio Matrix (DM MTX, Type 2):
   1. H.264 streaming from any input source up to 1080p or WUXGA
   2. CONTENT LAN port for streaming
   3. 12.5 Gbps backplane data rate
   4. Handles HDMI devices with Deep Color, 3D, 4K, and high-bitrate 7.1 encoded audio
   5. HDBaseT Certified device
   6. HDCP 2.2 compliant via 4K input and output cards
   7. Distributes Full HD 1080p, Ultra HD, and 4K signals via DM 8G+ and HDBaseT connectivity
   8. Distributes 1080p and WUXGA signals over via DM 8G® Fiber or via DM 8G® SM Fiber
   9. Allows streaming of 1080p signals over an IP network with no distance limitations
   10. Supports first-generation DM CAT and DM Fiber products
   11. Configurable with up to eight DM, HDBaseT, and/or HDMI outputs
   12. Configurable with up to four streaming outputs
   13. Output expansion using multiple DM switchers
   14. Modular inputs support a complete range of digital, analog, and streaming signal types
   15. Automatic AV signal format management via EDID
   16. Device control via CEC
   17. Allows independent scaling for every display through select output cards and DM receivers
   18. Distributes and routes USB HID mouse and keyboard signals
   19. Allows full audio and USB breakaway switching

20. Supports analog audio embedding and de-embedding
21. Includes integrated Ethernet switch with Gigabit LAN port
22. Private Network Mode
23. Secure access
24. Hardware level security using 802.1X authentication
25. TLS, SSL, SSH, and SFTP network security protocols
26. Includes a built-in web server
27. 7RU height
28. Front mounted control panel
29. Acceptable Product to include the following:
    a. Crestron DM-MD16x16-CPU3
    b. Provide all input and output cards as required per the design functionals.
    c. Provide compatible PoE+ or PoDM input to DM Input and Output cards to remotely power all wall plate transmitters and receivers using system LAN Switch or additional DM PSU.

C. Digital Media Presentation Switch (DMPS, Type 1):
1. 4K matrix presentation switch
2. 6 HDMI inputs
3. 2 DM Inputs
4. 2 HDMI outputs
5. 2 DM Outputs
6. RS232
7. Acceptable Product:
    a. Crestron DMPS3-4K-350-C

D. DM Transmitter Wall Plate (DM TX, Type 1):
1. Converts HDMI to CAT5e/6.
2. Available in black or white
3. Acceptable Product:
    a. Crestron DM-TX-4KZ-100-C-1G (coordinate color with architect)

E. DM Transmitter (DM TX, Type 2):
1. Converts HDMI to CAT5e/6.
2. Acceptable Product:
    a. Crestron DM-TX-4KZ-202-C

F. DM Receiver and Room Controller Wall Plate (DM RX, Type 1):
1. Converts CAT5e/6 to HDMI with serial control
2. Available in black or white
3. Acceptable Product:
    a. Crestron DM-RMC-4K-100-C-1G (coordinate color with architect)

G. DM Receiver (DM RX, Type 2):
1. Converts CAT5e/6 to HDMI with serial control and stereo audio out
2. Supports cable lengths up to 330 ft (100 m) for all resolutions up to UHD and 4K using DM Ultra cable.
3. Acceptable Product:
    a. Crestron DM-RMC-4KZ-100-C

H. DM Receiver (DM RX, Type 3):
1. Converts CAT5e/6 to HDMI with serial control and stereo audio out
2. Acceptable Product:
    a. Crestron DM-RMC-4KZ-Scaler-C

I. Distribution Amplifier (HDMI DA, Type 1)
1. Eight Output Distribution Amplifier
2. Splits one HDMI source to eight outputs
3. Handles 4K60 4:4:4 and HDR video signals [1]
4. Fully compatible with HD 1080p, UHD 4K, and DCI 4K sources and displays

5. Handles 3D video and Deep Color
6. Handles Dolby® TrueHD, Dolby Atmos®, DTS HD®, DTS:X®, and uncompressed 7.1 linear PCM audio
7. Selectable handling of HDCP 2.2 or HDCP 1.4
8. EDID management options
9. Surface, shelf, or single rack rail mountable
10. Acceptable Product:
    a. Crestron HD-DA8-4KZ-E

J. DM Splitter (DM DA, Type 1):
1. Converts and splits a single 4K60 HDMI® signal to feed four separate DM 8G+® or HDBaseT® receivers.
2. Includes 1 HDMI output
3. One PoDM Input
4. Acceptable Product:
    a. Crestron DM-DA4-4K-C

2.14 CONTROL SYSTEM

A. Room Control System (RCS, Type 1)
1. 4-Series control system with 2 GB SDRAM and 8 GB flash memory
2. Embedded 4-Series multicore CPU processor
3. iPhone, iPad, and Android device control app support
4. XPanel computer and web based control
5. Modular programming architecture
6. Onboard IR/serial, COM, I/O, relay, and high-speed gigabit Ethernet control ports
7. High-speed USB 2.0 host port and rear panel memory card slot
8. Enterprise-class network security and authentication
9. SNMP V3 remote IT management support
10. Native BACnet network/IP support
11. Installer setup via software, web browser, or cloud
12. IPv6 ready
13. Integrates with Apple HomeKit technology
14. Rack mountableAcceptable Product to include:
    a. Crestron CP4N

B. Tabletop Touch Panel (TP, Type 1):
1. 10.1 in. (257 mm) widescreen active-matrix color display and 1920 x 1200 WUXGA display resolution
2. Capacitive touch screen display
3. Built-in speakers and microphone
4. H.265, H.264, or MJPEG streaming video display
5. Built-in Bluetooth® communications beacon
6. Built-in web browsing
7. Single wire Ethernet connection with PoE or PoE+ power
8. Wi-Fi® network connectivity
9. Dual USB 2.0 ports for room availability accessories
10. Acceptable Product:
    a. Crestron TS-1070-B-S

C. Touch Panel (TP, Type 2):
1. 8.7" LED backlit color LCD display
2. Capacitive touch screen technology
3. H.264 or MJPEG streaming video display [3]
4. Built-in microphone and speakers
5. Built-in web browsing [2,3]
6. Dual-mode RF wireless performance — Extended Range 2.4 GHz RF plus Wi-Fi® [7]
7. Large-capacity, user-replaceable Li-Ion battery pack

8. Rechargeable using power pack or table dock (both included)
9. Acceptable Product:
    a. Crestron TST-902

D. Wireless Gateway (TP GATEWAY, Type 1):
1. infiNET EX and ER Wireless Gateway
2. Extends range for Crestron wireless devices
3. Acceptable Product:
    a. CEN-GWEXER

E. Button Panel (BP, Type 1):
1. Built in controller
2. PoE Powered
3. Mounts to 1 or 2 gang electrical box
4. RS232 terminal block
5. Acceptable Product:
    a. Crestron MPC3-102-B

F. USB Extender (USB LOCAL & USB REMOTE, Type 1)
1. USB 3.1 over CAT 6a/7 cable up to 328 ft (100m)
2. 24V power supply for each end
3. No drivers required with Windows®, macOS®, Linux®, or Chrome OS operating systems
4. Speeds up to 5gbps
5. Supports up to four remote USB devices with full bandwidth
6. Acceptable Product:
    a. Vaddio USB 3 Extender Series (999-1005-032)

G. USB Transmitter (USB LOCAL, Type 2)
1. USB over Category Cable Extender Wall Plate, Local
2. Extension for most USB 1.1 or 2.0 devices
3. Extend USB signals up to 330 ft (100 m) over CAT5e (or better) twisted-pair cable2
4. 100-240 VAC power supply (included with the Remote endpoint)
5. No drivers required with Windows®, macOS®, or Linux® operating systems
6. Transport USB over CAT5e at speeds up to 480 Mbps
7. Mass Storage Acceleration maximizes USB 2.0 bulk transfer speeds
8. Expandable using up to 4 USB hubs (not included)
9. Provides 2 USB Type A ports
10. Acceptable Product:
    a. USB-EXT-2-LOCAL

H. USB Transmitter Wall Plate (USB LOCAL, Type 3)
1. USB over Category Cable Extender Wall Plate, Local
2. Extension for most USB 1.1 or 2.0 devices
3. Extend USB signals up to 330 ft (100 m) over CAT5e (or better) twisted-pair cable2
4. 100-240 VAC power supply (included with the Remote endpoint)
5. Mount in an unobstructed North American 1-gang electrical box (not included)
6. No drivers required with Windows®, macOS®, or Linux® operating systems
7. Transport USB over CAT5e at speeds up to 480 Mbps
8. Mass Storage Acceleration maximizes USB 2.0 bulk transfer speeds
9. Expandable using up to 4 USB hubs (not included)
10. Provides 2 USB Type A ports
11. Available in black or white
12. Acceptable Product:
    a. USB-EXT-2-LOCAL-1G (coordinate color with architect)

I. USB Receiver (USB REMOTE, Type 2)
1. Extend USB signals up to 330 ft (100 m) over CAT5e (or better) twisted-pair cable2
2. 100-240 VAC power supply (included)
3. Enable transparent point-to-point USB extension without any configuration or programming

4. Plug-and-play compatible with most types of USB 1.1 and 2.0 devices and hosts
5. No drivers required with Windows®, macOS®, or Linux® operating systems
6. Transport USB over CAT5e at speeds up to 480 Mbps
7. Mass Storage Acceleration maximizes USB 2.0 bulk transfer speeds
8. Expandable using up to 4 USB hubs (not included)
9. Provides 2 USB Type A ports
10. Acceptable Product:
    a. USB-EXT-2-REMOTE

J. USB Receiver Wall Plate (USB REMOTE, Type 3)
1. Extend USB signals up to 330 ft (100 m) over CAT5e (or better) twisted-pair cable2
2. 100-240 VAC power supply (included)
3. Enable transparent point-to-point USB extension without any configuration or programming
4. Mount in an unobstructed North American 1-gang electrical box (not included)
5. Plug-and-play compatible with most types of USB 1.1 and 2.0 devices and hosts
6. No drivers required with Windows®, macOS®, or Linux® operating systems
7. Transport USB over CAT5e at speeds up to 480 Mbps
8. Mass Storage Acceleration maximizes USB 2.0 bulk transfer speeds
9. Expandable using up to 4 USB hubs (not included)
10. Provides 2 USB Type A ports
11. Available in black or white
12. Acceptable Product:
    a. USB-EXT-2-REMOTE-1G (coordinate color with architect)

K. Graphical User Interface (“GUI”) and Machine Control:
1. The Contractor is to develop the GUI and machine software control. The development is to be done in five phases.
2. During the first phase, development of the GUI panel layouts and machine functions are to be established. Participants of the development are the Contractor, the Architect’s Consultant via teleconference, and the Owner. This requires multiple meetings with these principles and is an interactive and iterative process.
3. During the second phase, the Contractor produces the initial GUI and machine software control filling the requirements developed during the first phase. This also requires multiple meetings with the Contractor, the Architect’s Consultant via teleconference, and the Owner and is an interactive and iterative process.
4. Upon completion of the second phase, install the control software within the AV Control Systems and inspect the systems for performance compliance. During this process the Contractor debugs the AV Control Systems software code as required to ensure a properly functioning system.
5. During the fourth phase, the Contractor, the Architect’s Consultant, and the Owner inspect the operational aspects of the Systems and develop final software configurations. Upon completion of final configuration, this Contractor installs and debugs the Control Systems software code as required to ensure a properly functioning system as established during the fourth phase.
6. During the fifth phase, the Owner will have 30-45 days of first use. During this time frame the Owner inspects the operational aspects of the systems and develops a list of any changes or bugs within the system. The Contractor installs and debugs the final Control Systems software code as required to ensure a properly functioning system as established during the fifth phase.

2.15 NETWORK EQUIPMENT

A. AV Network Switch (LAN SWITCH, Type 1):
1. Gigabit Switch
2. 802.3af or 802.3at compliant PoE+
3. Streaming Compatible
4. Acceptable Product:
    a. QSC NS Gen 2 Series
    b. Packedge SX Series
    c. Approved Equivalent

B. PoE Injector (POE, Type 1):
   1. Acceptable Product:
      a. Crestron PWE-4803RU

2.16 EQUIPMENT HOUSING AND ACCESSORIES

A. Free Standing Equipment Rack (Type 1)
   1. Finish: Black powder coat
   2. Tapped 10-32 rack rails
   3. Provide side, top, and bottom panels
   4. Provide all necessary trim pieces, blank panels, cable support bars and saddles
   5. Acceptable Product to include:
      a. Middle Atlantic BGR Series
      b. Middle Atlantic BRG-552FT-FC
      c. Middle Atlantic VFD Series

B. Floor-Supported Wall Rack (Type 1)
   1. Finish: Black powder coat
   2. Tapped 10-32 rack rails
   3. Provide side, top, and bottom panels
   4. Provide all necessary trim pieces, blank panels, cable support bars and saddles
   5. Acceptable product to include:
      a. Middle Atlantic SR Series
      b. Middle Atlantic FAN2-DC-FC
      c. Middle Atlantic LVFD Series

C. Free Standing Slide Out Rack (Type 1)
   1. Finish: Black powder coat
   2. Provide side, top, and bottom panels
   3. Wall Rack slides out on tracks for easy equipment access
   4. Provide all necessary trim pieces, blank panels, cable support bars and saddles
   5. Acceptable Product to include:
      a. Middle Atlantic AXS-IR Series
      b. Middle Atlantic VFD-45A
      c. Middle Atlantic BGR-552FT-FC
      d. Middle Atlantic VBK-BGR
      e. Middle Atlantic TRACK-50
      f. Middle Atlantic TRACK-L
      g. Middle Atlantic MPR-8A w/ modules required per design

D. Power Strip (PWR-1):
   1. Provide a 15 Amp power system
   2. Eight switched AC outlets
   3. High-inrush magnetic circuit breaker
   4. Acceptable Product:
      a. Middle Atlantic PD-915R

E. Power Strip (PWR-2):
   1. Provide a 15 Amp power system
   2. Six switched AC outlets
   3. Two unswitched AC outlets
   4. Remote power turnon
   5. Acceptable Product:
      a. Surge X SX1115RT

F. Power Strip (PWR/LIGHT):
   1. Provide a 15 Amp 1800W rating with circuit breaker
   2. Eight rear panel outlets, one on front
   3. Extreme voltage shutdown

4. Multi-segmented, colored LED Voltmeter
5. Pull-out Rack Lights
6. Acceptable Product:
    a. Furman Sound PL-Plus Series II

G. Uninterruptible Power Supply (UPS, Type 1):
1. Provide UPS for the control system master unit
2. Acceptable Product:
    a. Middle Atlantic UPS-2200R

H. Equipment Rack Screws:
1. Install rack mounted equipment with black 10-32 star post security screws with flat nylon washers
2. Quantity as required
3. Provide one spare bit located in a clear plastic bag attached to the inside of each equipment rack in plain view
4. Acceptable Product:
    a. Middle Atlantic HP500

I. Rack Blanks:
1. Acceptable Product:
    a. Middle Atlantic BL series

J. Rack Drawers:
1. Acceptable Product:
    a. Middle Atlantic D series, Middle Atlantic FI-* foam kit

K. Lectern:
1. Flat top surface
2. 33” 12U Rack Bay
3. Architect to select one of manufacturer’s standard wood veneers with a custom color stain to be applied by manufacturer. Architect to supply stain sample to match during submittal period
4. Provide all necessary side panels, trim pieces, tops, power strip, drawer, fan kit, and blank panels
5. Acceptable Product:
    a. Middle Atlantic L5 Series

2.17 PLATES AND PANELS

A. Provide plates and panels and as described in Drawings. Engrave as shown on Drawings. Other Plates and Panels may be required to satisfy the requirements of the Work.

B. Custom panels shall be 1/8-inch thick aluminum, standard EIA sizes, brushed black anodized finish unless otherwise noted. Brush in direction of aluminum grain only.

C. Plate finish shall be coordinated with the Architect. Plastic plates are not acceptable.

D. Panel, plate and label engraving shall be 1/8-inch block sans serif characters unless noted otherwise. On dark panels or pushbuttons, letters shall be white; on stainless steel or brushed natural aluminum pushbuttons, letters shall be black.

E. Custom and/or Engraved Panels:
1. Custom panels constructed of 1/8 inch brushed aluminum
2. Finish: black anodize
3. Acceptable Product:
    a. RCI Custom
    b. ProCo

2.18 CABLES & WIRING

A. General:
   1. All electrical conductors installed under this contract, except where otherwise specified, shall be soft-drawn annealed stranded copper having a conductivity of not less than 98% pure copper, and shall meet appropriate ratings (e.g. CMR, CMP, etc.)
   2. Cables shall carry appropriate fire rating (E.G. CMR, CMP, OFNR, OFNP, etc.) on jacket of cable.
   3. Where cables are routed through cable tray, provide tray rated cable of equal specification.
   4. Where cables are run exposed through a return air plenum, provide plenum rated cable of equal specification.
   5. Where cables are run underground, provide water blocked or direct burial rated cables of equal specification.
   6. Shielded cables located in raceways shall have aluminum foil shield with drain wire.

B. Microphone / Instrument Cables:
   1. Cable properties:
      a. Quad 24-gauge stranded with braided shield, flexible hard service jacket.
      b. Color: black
      c. Each cable to be provided with a Velcro-style tie wrap.
         1) Minimum 5/8-inch width.
         2) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-inch diameter.
         3) Standard of performance:
            a) Rip-Tie CABLEWRAP
   2. Acceptable Cable Manufacturers:
      a. Whirlwind MKQ series
      b. Canare StarQuad
      c. ProCo AmeriQuad

C. Ethernet Audio Cables:
   1. Cable properties:
      a. Color: purple
      b. Neutrik Ethercon connector
      c. Rugged Tactical jacket
      d. Stranded conductor
      e. Each cable to be provided with a Velcro-style tie wrap.
      f. Standard of performance:
         1) Rip-Tie CABLEWRAP
   2. Acceptable Product:
      a. ProCo ProCat
      b. Clark Wire CN424C5TF
      c. Belden DataTuff

D. Speaker Cables:
   1. Cable Properties:
      a. Color: Black
      b. Connector: NL4 to NL4 or NL4 to ¼”
      c. Wire: 12-gauge stranded with SJ jacket
      d. Each cable to be provided with a Velcro-style tie wrap.
         1) Minimum 1” width
         2) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-18 inches in diameter
         3) Standard of performance:
            a) Rip-Tie CABLEWRAP
   2. Acceptable Product:
      a. Whirlwind SK5 series
      b. Approved equivalent

E. Power Extension Cables:

1. Cable properties:
    a. Color: black
    b. 12-gauge, 3 conductor, stranded, flexible hard service jacket
    c. Minimum 1-inch width
    d. Each cable to be provided with a Velcro-style tie wrap.
        1) Length appropriate to wrap minimum 1.5 times around a cable loop of 14-18 inches in diameter
        2) Standard of performance:
            a) Rip-Tie CABLEWRAP
2. Acceptable Product:
    a. ProCo E-Cords series
    b. Middle Atlantic

F. Control Level Wire:
1. Provide unshielded 22 AWG cable.
2. Cable to be CMR or CMP rated.
3. Provide number of conductors as required.
4. Acceptable Product:
    a. West Penn 27x series
    b. West Penn 2527x series (where required)

G. Relay Control Wire
1. Provide unshielded 22 AWG cable.
2. Cable to be CMR or CMP rated.
3. Provide number of conductors as required.
4. Acceptable Product:
    a. West Penn 27x series
    b. West Penn 2527x series (where required)

H. Wireless/Assistive Listening Antenna Cable:
1. 16-gauge, stranded center conductor
2. RG8/X
3. 95% braided shield
4. Acceptable Product:
    a. Belden 9258

I. Antenna Cable:
1. Provide 10 AWG cable.
2. Cable to be CMP rated.
3. Jacket color: Black
4. Acceptable Product:
    a. Belden 7733A

J. Microphone/Line-Level Wire
1. Provide shielded 22 AWG cable.
2. Cable to be PVC jacketed.
3. Jacket color: Black
4. Acceptable Product:
    a. Belden 9451
    b. Liberty 22-1P-EZ
    c. Belden 88761 (where required)
    d. Liberty 22-2C-PSH-WHT (where required)

K. Speaker-Level Wire
1. Provide 14 AWG cable.
2. Cable to be CL3R or CL2P rated.

3. Jacket color: Grey
4. Acceptable Product:
    a. West Penn 226
    b. West Penn 25226 (where required)

L. Speaker-Level Wire
1. For long distance, home run and/or high wattage application
2. Provide 10 AWG cable.
3. Cable to be CL3R or CL2P rated.
4. Jacket Color: Grey
5. Acceptable Product:
    a. West Penn C210
    b. West Penn HA210
    c. West Penn 25210 (where required)

M. Digital Media Twisted Pair Cable:
1. Digital Media Shielded Twisted Pair:
    a. Ultra high-bandwidth CAT7a shielded twisted pair (S/FTP) cable
    b. CMR/CMP rated
    c. Enables lossless distribution of 4K and Ultra HD video signals at distances of 330 ft (100 m) via DM 8G+® or HDBaseT®
    d. Color: Blue
    e. Acceptable Product:
        1) Crestron DM-CBL-ULTRA-NP
        2) Crestron DM-CBL-ULTRA-P (where required)

N. Ethernet/LAN Cable (UTP):
    a. 23-guage solid cable
    b. Category 6+ Enhanced
    c. 4 pair, UTP
    d. Acceptable Product:
        1) Belden 2412F
        2) Belden 2413F (where required)

O. Ethernet/LAN cable for USB 3.0 extension:
1. Category 6A cable
2. 4 pair
3. F/UTP
4. CMR/CMP rated
5. Acceptable Product:
    a. Belden 10GX52F
    b. Belden 10GX53F (where required)
    c. Belden 10GX F/UTP Patch Cords (where required)

P. HDMI Cable:
1. Provide pre-molded cables in lengths as required
2. Acceptable Product:
    a. Crestron Certified HDMI Cable
    b. Extron Ultra Series HDMI Cable

Q. Fiber HDMI Cable:
1. Provide pre-molded cables in lengths as required
2. Acceptable Product:
    a. FSR Next GEN HDMI 2.0 Digital Ribbon Cables
    b. Extron HD Pro Plenum Series

R. Display Port Cable:
1. Provide pre-molded cables in lengths as required
2. Acceptable Product:

a. Extron DisplayPort Ultra Series

S. DVI Cable:
1. Provide pre-molded cables in lengths as required
2. Acceptable Product:
   a. Extron DVID DL Pro Series

T. Wireless /Assisted Listening Antenna Cable:
1. 16 gauge, stranded center conductor
2. RG8/X
3. 95% braided shield
4. Acceptable Product:
   a. Belden 9258

U. Antenna Cable
1. Provide 10 AWG cable
2. Cable to be CMP rated
3. Jacket color: black
4. Acceptable Product:
   a. Belden 7733A

V. Speaker Level Wire:
1. Provide 14 AWG cable
2. Cable to be CL3R or CL2P rated
3. Jacket color: gray
4. Acceptable Product:
   a. West Penn 226
   b. West Penn 25226 (where required)

W. Other Misc. Cables:
1. Acceptable Product:
   a. As per manufacturer specifications

2.19 CONNECTORS

A. XLR Panel mount Connectors:
1. Provide panel mount XLR connectors with unified metal shell
2. RF-Protector connectors
3. Shell Color: Black
4. Contacts: Silver
5. Terminations: Solder
6. Acceptable Product:
   a. Male Connectors: Neutrik NC*MD-L-1-BAG Series
   b. Female Connectors: Neutrik NC*FD-L-1-BAG Series

B. XLR Cable Connectors:
1. Provide XLR cable connectors with die cast shell
2. No-screw type assembly
3. Chuck-type strain relief
4. Shell Color: Black
5. Contacts: Silver
6. Terminations: Solder
7. Acceptable Product:
   a. Male Connectors: Neutrik NC*MX-BAG Series
   b. Female Connectors: Neutrik NC*FX-BAG Series.

3.5MM Panel mount Connectors:
8. Provide panel mount 3.5mm connectors with unified metal shell
9. 3 conductor jack to solder
10. Shell Color: Black

11. Contacts: Silver
12. Terminations: Solder
13. Acceptable Product:
    a. Switchcraft EH35MMSSCB

C. BNC Cable Connectors:
1. Provide cable mount BNC connectors
2. Contacts: Brass or copper
3. Terminations: Crimp
4. Acceptable Product:
    a. Kings
    b. Amp
    c. Amphenol
    d. Canare
    e. Liberty

D. SpeakON Connectors:
1. Provide SpeakOn connectors
2. Shell Color: Black
3. Acceptable Product:
    a. Neutrik NL4 Series

E. HDMI Connectors:
1. Provide panel mout HDMI feedthrough connectors
2. HDMI 2.0 compliant
3. Acceptable Product:
    a. Neutrik NAHDMI-W

F. Ethercon CAT6 Panel Connectors:
1. Provide panel mount Ethercon CAT6 connectors
2. Metal housing
3. Sheilded
4. Acceptable Product:
    a. Neutrik NE8FDY-C6-B

G. Ethercon CAT6A Panel Connectors:
1. Provide panel mount Ethercon CAT6A connectors
2. Metal housing
3. Sheilded
4. Acceptable Product:
    a. Neutrik NE8FDX-Y6-B

H. Other Connectors:
1. As per manufacturers specifications

2.20 MISCELLANEOUS

A. Power Supplies:
1. As required.

B. Table Box (TB, Type 1):
1. Bose Speaker Box and accessories
2. Acceptable Product:
    a. FSR TB-BOSE-IPS-BLK w/ FSR IPS-AC110D, IPS-V610S-BLK, IPS-D717S-BLK

C. Table Box (TB, Type 2):
1. Pop-up 2 gang table box
2. Acceptable Product:
    a. FSR TB-2G with Decora inserts and plates as needed

D. Table Top Box USB Charger (CHG, Type 1):

1. Keystone DC to USB Charger
2. Acceptable Product:
    a. FSR SS-USB-CHRG-PS6

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate incorporation of the Work specified herein with other project work so as to facilitate a cohesive final Products.

B. The installation recommendations contained within ASDI and Telecommunications Distribution Methods Manual are mandatory minimum standards and requirements.

C. Mount equipment and enclosures plumb and level.

D. Permanently installed equipment to be firmly and safely held in place. Design equipment supports to support loads imposed with a safety factor of at least five. Seismic bracing shall be installed on appropriate equipment where local codes require such installation.

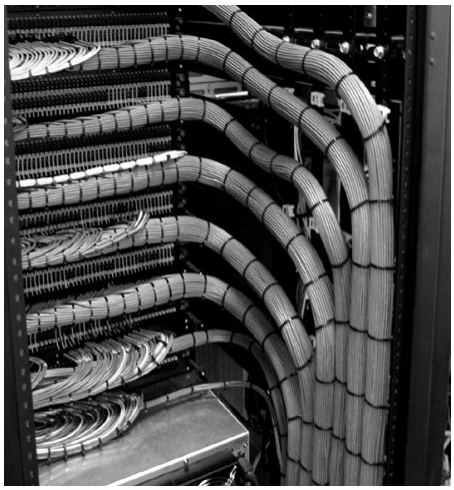
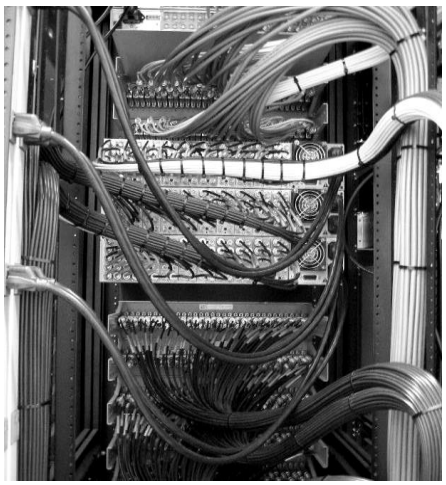
E. Verify all locations of equipment in all rooms with Owner's Representative, Owner, and Consultant.

3.2 INSTALLATION

A. Installation of cable and wiring
    1. Cabling and Wiring:
        a. Install cable in a manner to adhere to manufacturer's specifications for maximum cable pulling tension, minimum bend radius, and restrictions.
        b. Provide appropriate support at all horizontal-to-vertical transitions in order to keep the weight of the cable from degrading at the point of transition.
        c. If a J-hook or trapeze system is used to support cable bundles, all horizontal cables shall be supported at a maximum of 48-inch (1.2 meter) intervals. At no point shall the cables rest on light fixtures, acoustic ceiling grids, panels, conduits, sprinkler pipe, water pipe and/or HVAC system ducting.
        d. Horizontal distribution cables shall be bundled in groups of no more than 50 cables when being supported by J-Hook or trapeze systems. Cable bundle quantities in excess of 50 cables may cause deformation of the bottom cables within the bundle and degrade cable performance. An exception to this rule is when cable is installed in cable tray systems.
        e. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices
        f. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, install appropriate carriers to support the cabling.
        g. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced prior to final acceptance at no cost to the Owner.
        h. Cables shall be identified by a self-adhesive machine label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606-A. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
        i. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.
        j. Provide splice free wiring and cabling from origination to destination. Cables shall be installed in continuous lengths from origin to destination (no splices). Properly designed transition points, or consolidation points are not considered 'splice' points.
        k. Make joints and connections with rosin-core 60/40 solder or with mechanical connectors specifically intended for the type and class of cable being used. Where spade lugs are used, crimp properly with ratchet type tool.

l. Take precaution to prevent and guard against electromagnetic and electrostatic hum. For line-level audio signal, float cable shield at one end. Shield not connected to be folded back over cable jacket and covered with heat-shrink tubing. Do not cut off unused shield.
m. Isolate cables and wires of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback oscillation in any amplifier section. Keep wiring separated into groups for microphone level circuits, line level circuits, loudspeaker circuits, and power circuits.
n. Connect cable to active components through XLR connections whenever multiple formats are available. Make connections to speaker transformers with properly sized closed end connectors crimped with factory approved ratchet type tool. Wire nut or "Scotchlock" connectors are not acceptable. Do not wrap audio cable splices or connections with adhesive backed tape.
o. Cover edges of cable and wire pass-through holes in chassis, housings, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting.
p. Execute wiring in strict adherence to:
    1) Phillip Giddings. Audio System Design and Installation. Indianapolis: Howard W. Sams & Co., 1990.
    2) Don Davis and Carolyn Davis. Appendix II, Recommended Wiring Practices. Sound System Engineering, 2nd Edition. Indianapolis: Howard W. Sams & Co., 1989.
    3) AV Installation Handbook Second Edition: The Best Practices for Quality Audiovisual Systems, Infocomm, 2009

2. Equipment Housing Cabling and Wiring:
    a. Lace, tie, or harness wire or cable as required herein, and in accordance with accepted professional practice. Dress, lace or harness all wire or cable to prevent mechanical stress on electrical connections; no wire or cable shall be supported by a connection point. Install cable and wire neatly tied in manageable bundles with cable lengths cut to minimize excess cable slack but still allow for service and testing. Provide horizontal support bars if cable bundles sag. Reference photos below for standard of quality.

    b. Provide adequate service loops so that equipment mounted on rack slides may be pulled fully out, to their locked position without straining cable.
    c. Neatly bundle excess AC power cable from housing mounted equipment with plastic cable ties.
    d. Provide plastic cable ties or Velcro straps to bundle cabling and wiring. Electrical tape and adhesive backed cable tie anchors are not acceptable.
    e. Install with connections completely visible and labeled.
    f. Provide termination resistors, if required, of 5 per cent tolerance; fully visible and not concealed.

B. Installation of connectors, plates & panels:
    1. Install panel mounted connectors rigidly attached to panels, plumb and level.
    2. Custom rack panels shall be 1/8 inch thick aluminum, standard EIA sizes, brushed black anodized finish (brushed in direction of aluminum grain only), unless otherwise noted.

3. Custom connector plates (speaker, microphone, etc) are typically stainless steel, unless otherwise noted or specified. However, verify plate finish with Architect.
4. Install XLR type connectors in accordance with IEC-268 standard, with a wiring scheme of pin 2 hot (high), pin 3 (low), and pin 1 screen (shield).
5. Other Plates and Panels may be required to satisfy the requirements of the Work.

C. Installation power and grounding:
1. Coordinate final connection of power and ground wiring to housings.
2. Hardwire power wiring directly to internal AC receptacles to ensure uninterrupted operation.
3. Provide 3-conductor, isolated ground, 120 VAC outlets as required within each housing. Provide a minimum of two spare outlets in each rack.
4. Provide a copper ground buss top to bottom in each housing, insulated from the housing. Ground equipment chassis not having a three wire power cord to these busses using 6/32 nuts, bolts and lock-washers with No. 12 wire. Connect green ground wire from each AC outlet in housing to this buss bar.
5. Replace manufacturers supplied 18 gauge IEC power cords with UL listed 18 gauge pre-molded 6", 12", 18", or 24". Use minimum length required. No looped or cable tied IEC power cords will be permitted within the equipment rack.
6. Replace manufacturers supplied 14 gauge IEC power cords with UL listed 14 gauge pre-molded 18" or 36" for all equipment IEC capable. Use minimum length required and minimize looped or cable tied IEC power cords present in the equipment rack.

D. Installation of electronic equipment:
1. Take appropriate precautions against electrostatic discharge (ESD). Establish a personal ground before handling electronic equipment through the use of a grounded wrist wrap and/or an anti-static floor pad.
2. Take appropriate precautions to protect the equipment from damage during installation. Equipment to be installed free of damages, scratches, dents, etc.
3. Mount trim potentiometers, custom circuit cards, relays, and transformers (except large 70V units) in shielded enclosures, and mark their function and connections with engraved lamicoid labels.
4. Mount equipment plumb and level, firmly and safely held in place.

E. Installation of equipment housing:
1. Mount equipment in racks and consoles and fully wire and test before delivery to job site. If field conditions prevent prior assembly of racks, notify Owner in writing that racks will be fabricated on site and the reasons for the change.
2. Provide rear support for housing mounted equipment greater than 15 inches deep.
3. Provide blank panels to fill unused panel space within the equipment housing.
4. If Key door locks are required, key each housing type alike.
5. Looking at the rack from the rear, locate AC power and speaker wiring on the left; line level audio, video, and RF wiring on the right.
6. Provide shaft locks or security covers on non-user operated equipment having front panel controls. These panels are to be installed at the conclusion of testing.
7. If forced air active thermal management is used, provide ventilation blocking material on the front, sides, and rear of the equipment rack as needed. Reference Middle Atlantic Products "Controlling the Temperature Inside Equipment Racks".
8. Panels or equipment mounted on the rear rack rails shall not block access to any front mounted components.
9. If equipment rack is not equipped with casters, provide two inch high wood base to isolate equipment rack from floor. Wood base should be capable of supporting the load.

F. Installation of loudspeakers:
1. Loudspeakers shall be mounted at the operating position in a safe, secure and permanent manner.
2. Rigging shall be reviewed by a Professional Engineer (PE) licensed to practice in the State in which the project is located. Stamped drawings showing the rigging systems shall be included as a submittal item. Once the systems are installed, the engineer of record for the rigging system shall physically inspect the methods and means used to verify compliance with the original design.
3. Paint speakers, supports and related hardware color as directed by Architect.

4. The aiming direction of all loudspeakers shall be adjustable by ±5 degrees vertically.
5. Structural support members to have a safety factor of at least five. Mounting hardware and wire rope to have a safety factor of eight. All fasteners to be graded and certified for use in the intended applications. Overhead suspension hardware shall comply with ASME B30.20 standards and all applicable local building and safety codes. Overhead suspension hardware must be of a type that includes product traceability controls.
6. Provide safety cable on all bracket mounted loudspeakers.
7. All loudspeakers located in ceiling tiles shall be located in the center of the tile unless noted otherwise.

G. Installation of projectors:
1. Confirm distance of specified projection lens before mounting projector.
2. Projectors shall be mounted plumb and level at the operating position in a safe, secure and permanent manner.
3. All hardware required to locate the mount and projector at the required location shall be provided.
4. Projectors shall be mounted using tamper proof secure hardware.
5. Contractor may be required to adjust projection screen and lift upper and lower limit switches for projection screens and lifts specified elsewhere and not installed as part of this Contract.

H. Installation of flat panel monitors:
1. Confirm location before mounting.
2. Monitors shall be mounted plumb and level at the operating position in a safe, secure and permanent manner.
3. All hardware required to locate the mount and monitor at the required position shall be provided.
4. Locate monitor on the center line of the room unless noted otherwise.

3.3 FIRESTOP

A. A fire-stop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Fire-stop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.

B. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate fire-stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire-stopped.

C. Fire-stop systems shall be reviewed by a Professional Engineer (PE) licensed to practice in the State in which the project is located. Stamped drawings showing the fire stop systems shall be included as a submittal item. Once the systems are installed, the engineer of record for the firestop system shall physically inspect the methods and means used to verify compliance with the original design.

D. A drawing showing the proposed fire-stop system, stamped/embossed by the PE shall be provided to the Owner's Technical Representative prior to installing the fire-stop system(s).

E. All fire-stop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for observation by the local authorities prior to cable system acceptance.

3.4 CONTROL SYSTEM PROGRAMMING

A. Transport Control
1. Provide standard Stop, Play, Pause, Fast Forward and Rewind for each playback device and menu control for DVD players. Buttons should be arranged in a conventional fashion that will be familiar to the normal user.
2. The selected control function should be displayed by showing the appropriate button "pressed". It should remain this way until another function is selected.
3. For devices that will go into a standby mode after a period of time, the control system shall sense this mode and restore normal operating mode once a transport function has been selected. This may

require the use of current sensors to determine the state of the unit. No direct user action should be required at the playback device to restore the normal operating mode.

B. Screen/Shade Control
   1. In addition to up-down functions, provide a Stop function to allow the movement to be halted. Once movement has been stopped, the up or down buttons should resume travel in the selected direction.
   2. Control system shall not prevent screen/shade wall controls from being used as well.
   3. Touch panel controls should be readily accessible to the user to permit direct control of shades or screen with having to navigate through multiple control pages.

C. Room Combining
   1. Combining of adjacent areas shall be done through a graphical representation of the physical areas to be combined. Use of a floor plan metaphor is recommended with the graphic oriented correctly with respect to control panel location.
   2. Use buttons or other appropriate objects placed along the common wall to enable the combining function.
   3. When spaces are combined, the graphic appearance of those areas shall change to reflect this configuration. Once an area is separated from a combination, the color of its area should revert to the normal room color.
   4. Common control functions between combined rooms shall be linked, allowing control of the combined area from any one of the touch panels. Examples of common functions include:
      a. Background music selection,
      b. Background music volume
      c. Background music muting
      d. Lighting preset recall
      e. Master volume (not individual channel volume)
   5. When combining adjacent rooms, the control system shall force the common functions to a predetermined default configuration so all rooms have the same configuration.
   6. To avoid unintentional changes, a control panel will not be able to operate a function in a remote location without also operating that same function in the room where the panel is located.

D. Level Control
   1. Objects requiring level adjustment such as volume or tone controls shall be through Up/Down buttons with a graphical representation of the actual level.
   2. Increment of level change to be adjusted for reasonable range without the need to push the Up or Down buttons needlessly.

E. Volume Mute
   1. Where the ability to mute the sound is needed, the button shall use the label “Vol On” and “VOL OFF” instead of Mute and Unmute. When in a “VOL OFF” mode, pushing the “VOL UP” button shall restore the sound and bring the system out of the muted mode.
   2. VOL ON/OFF buttons shall change color to indicate the status of the button.

F. Standard Colors
   1. Control functions shall be color coded to add clarity and show relationships between different groups of controls.
   2. The color Red shall be reserved to indicate a fault or abnormal condition.
   3. Green may be used to indicate normal operation, but may be used for standard control colors as well.
   4. Similar controls should maintain the same color scheme across all control pages.
   5. When a function is selected, the graphical depiction of that button should appear to be pressed and its color change to a darker shade of the regular button color.
   6. Color schemes used for background and foreground objects should be selected to be complimentary and provide a consistent theme throughout the control pages.

G. Minimum Button Size and Placement
   1. Minimum visual size of a button is 3/8” wide by 1/4” high.
   2. Spacing between buttons should be no less than 1/16”.
   3. Where buttons are immediately adjacent, the active selection area of the button should be reduced to 80% of the visual area of the button.

H. Button Actions
   1. When a function on a control page is selected, that button or visual object associated with that function should change to reflect what has been chosen.
   2. For functions that are momentary selections (i.e. VOL UP), the change of state is visible for as long as the button is being pressed.
   3. For function that are maintained selections (i.e. PLAY), the change of state remains visible until another function is selected and resets the previous function..
   4. The state change of a button or visible object should depict real-world objects as much as possible including the appearance of the button be pressed inward, change in shade of the original color, but not a change in hue.

I. Labels
   1. Use of simple words or titles are preferred to indicate functionality, navigation and system status.
   2. Use of stylish symbols should be avoided unless their identity is commonly recognized by the general public. Standard symbols for transport functions are acceptable.
   3. Labels should be presented in a clear, sans serif type face that will remain legible on lower resolution touch panels.
   4. Where physical buttons are present along the side of a touch panel, these buttons should be engraved and filled with a contrasting color.

J. Power On/Off
   1. For panels requiring an ON/OFF control, these functions should be linked through current sensors or other methods for the control system to detect the power on condition of the component being controlled.
   2. Powering off a system should not interfere with the ability of a projector to complete its cool down cycle.

K. Look & Feel
   1. Control pages should utilize a clean, elegant but stylish appearance.
   2. Use a common graphical template across all control pages for a consistent look.
   3. The touch screen layout should utilize graphical elements such as drop shadows, gradient fills and transparency to provide a pleasing overall appearance.
   4. Utilize graphical representations of floor plans to convey location information.
   5. Include company logos, icons or watermarks to portray the corporate identity.
   6. Provide clear navigation tools for moving between control pages.
   7. Each sub-page should have a “BACK” button to return to the previous page. This button should appear in the same location on each page.
   8. Provide a “HELP” button or icon on each user page to provide clear, non-technical instructions on how to use the functions available to regular users.

L. Security
   1. Provide password access to control pages not intended to be accessed by the general public.
   2. Unless otherwise noted, provide a minimum of three levels of access
      a. General User
      b. Non-Technical Employee
      c. AV Technician
   3. Segregate the control functions to only allow authorized individuals access to more sophisticated control pages.
   4. Provide a timeout feature to automatically return the control panel back to the default opening screen after 30 seconds of inactivity. After this reset, passwords must be reentered to return to a previous control page.

M. Presets
   1. For systems that have different operating modes or configurations, provide the ability to store and recall preset combinations of system settings.
   2. Provide a “Preset” page that permits a minimum of five presets to be recalled. Each button to include a label describing the function or configuration associated with that button.

3. Provide the ability for new presets to be stored over previous settings. New preset to be able to change the label to reflect the new or revised configuration.
4. When a preset has been recalled, the control page should indicate the active configuration.

3.5 LABELING OF EQUIPMENT

A. Provide each terminal strip with a unique descriptor and a numerical designator for each terminal. Show terminal strip descriptor and designator on system schematic drawing.

B. Provide logical and legible cable and wiring label permanently affixed for easy identification.
1. Labels on cables to be adhesive strip type covered with clear heat-shrink tubing. Factory stamped heat shrink tubing may be used in lieu of the adhesive strip style.
2. Wiring designator to be an alpha-numeric code unique for each cable. Actual cable designation assignments to be determined by Contractor. Add cable designation codes to system schematic drawings.
3. Locate the cable designator at the origination and destination of each circuit within 3 inches of the point of termination or connection. Provide cable designator on circuits with intermediate splice points with an additional suffix to indicate each segment.

3.6 ENGRAVING

A. Text font: 1/8 inch block sans serif characters unless noted otherwise.

B. On dark materials, provide white characters; on stainless steel or brushed natural aluminum plates, or light-colored materials, provide black characters.

C. Provide at least two lines of text with first line listing the general device name, e.g., amplifier. Second line to include schematic reference of the device, e.g., AMP-1.

D. Equipment label: black with white characters except where indicated.

3.7 COMMISSIONING

A. Prior to energizing or testing the system, ensure the following:
1. All products are installed in proper and safe manner according to manufacturer's instructions.
2. Insulation and shrink tubing are present were required.
3. Dust, debris, solder splatter, etc. is removed.
4. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
5. Labeling has been provided.
6. Temporary facilities and utilities have been properly disconnected, removed and disposed of off-site.
7. Products are neat, clean and unmarred and parts securely attached.
8. Broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. have been replaced or properly repaired, and debris cleaned up and discarded.

B. Prior to energizing the System verify and perform the following tests and adjustments in compliance with applicable EIA standards.
1. Electronic devices are properly grounded.
2. Test each AC power receptacle with a circuit checker for proper hot, neutral and ground connections.
3. Verify each individual component is operating properly.
4. Verify each individual component's performance meets the manufacturer's published performance for this unit.
5. Measure and record the DC resistance between the technical ground in any equipment rack or console and the main building ground. Resistance should be 0.15 ohms or less.

C. Speaker Circuit Verification Test
1. Measure the impedance of each speaker line leaving the equipment racks.
2. For constant voltage systems measure the impedance at 100 (or 250) Hz, 1 KHz and 8 (or 10) KHz of each line leaving the equipment rack with the line disconnected from the driving source. For band limited devices, use a frequency appropriate for the operating range of the transducer.

3. When documenting the results of these tests, include the calculated impedance based on number of units on a line and the size and distance of the run. Correct any field readings that differ more than 20% from the calculated impedance.
4. Include the results of the tests in the Project Record Manual.

D. Speaker Polarity Verification Test
1. Use an electronic polarity checker, TEF-20, SYSID, SIM II, Smaart, or other similar device to test each loudspeaker. All speakers should have the same relative polarity.
2. Follow manufacturer's recommendations in conducting the tests.
3. Include the results of the tests in the Project Record Manual.

E. Audio Signal Paths
1. Verify operation from each source device through all switching, amplification and distribution devices.

F. System Gain Adjustment
1. Adjust each active device to have proper gain structure from the mixer output to the input of the amplifier.
2. With all amplifiers turned off, connect a sine wave or pink noise generator to the input of the mixer. Using a RMS AC voltmeter with a dB scale, adjust the mixer to an output between -10 and 0 dBu. Once the level has been established, it should remain unchanged throughout the test. All equalizers should be set flat for this test.
3. Follow the signal flow from the mixer to each subsequent component. Measure the input level and output level of each device at the point of connection to the device. The input level reading should differ no more than 0.25 dB from the level recorded for the preceding device. Diagnose and correct the wiring or equipment when any readings exceed this range.
4. Adjust the output of each component to achieve the proper output level.
5. Record the output levels of each device in the Project Record Manual.

G. Signal Delay Adjustment
1. Adjust the delay to each subsystem to ensure proper synchronization between the main speakers and delayed speakers.
2. Using a TEF 20, SYSID, Smaart, SIM II, or other acceptable time based measurement system, measure the arrival time of the distant signal and then measure the arrival of the local signal.
3. Based on the arrival times measured, adjust the delay applied to the local speakers to synchronize them with the distant speakers. Repeat the test to verify the delay has been set to within 1 ms of the arrival of the distant signal. Once the precise delay time has been determined, provide an additional 10 ms of Haas effect delay to maintain directional orientation toward the original sound source.
4. Continue to test and adjust each separate subsystem with a dedicated delay channel.
5. Provide hard-copy printout of each delay adjustment showing first the arrival times with no delay set and then the result after the delay has been adjusted. Record the settings of each delay in the Project Record Manual.

H. Remote Input Verification Test
1. Using a microphone or portable signal generator, connect to each microphone/line level receptacle throughout the facility.
2. Verify that the receptacle under test appears at the correct input and is operating properly.
3. In a similar manner, check all remote tielines and media related lines for correct wiring and labeling.

I. System Equalization
1. Using a RTA, TEF 20, SYSID, or SMAART, equalize all loudspeaker systems to provide a suitable frequency response as follows:
   a. Speech Reinforcement Systems: flat response from 125 Hz to 2.5 KHz, with 2 dB roll off above.
   b. Program Reproduction Systems: flat response from 65 Hz to 8 KHz, with 2 dB roll off above.
2. Verify system gain and amplifier levels.
3. Provide program levels of at least 85 dB and speech reinforcement levels of at least 70 dB in the seating area without objectionable distortion, buzzes, or rattles.
4. Provide hard copy printouts of the spectral response with the test data.

J. RFI and Parasitic Oscillation
   1. With systems operating check to ensure that all systems are free from spurious oscillation and radio frequency interference in the absence of audio signal.

K. Buzzes, Rattles and other Distortions
   1. Adjust the system for normal operating level in the space. Apply a slow sine wave sweep from 60 Hz to 3 KHz and listen carefully for buzzes, rattles and other objectionable distortions.
   2. Correct the cause of the defect. If the cause is not from the system. Bring the cause to the attention of the GC, indicating cause and suggestive corrective actions.

L. Video Systems Test
   1. Projected images and screen must be plumb with respect to ceiling line.

M. Video System Tests. Verify performance of all video equipment, components and systems, as specified herein.
   1. Video (signal):
      a. S/N (peak to RMS), unweighted DC to 4.2 MHz: 55 dB minimum.
      b. Crosstalk, unweighted DC to 4.2 MHz: 45 dB minimum.
      c. Frequency Response: Within plus to minus 0.5 dB to 4.2 MHz.
      d. Line and Field Tilt: 2% maximum.
      e. Differential Gain: 2% maximum.
      f. Differential Phase: 2 degrees maximum.
      g. Frequency Response: DC to 4.2 MHz within plus or minus 0.5 dB.

N. Video Signal Paths
   1. Verify operation from each source device through all switching, amplification and distribution devices.

O. Video Test Report shall include the following:
   1. Test Failures and Notices
      a. Sink Device EDID Test – Open items or failures shall not be accepted.
      b. Cable Length Test – Open items or failures shall not be accepted.
      c. HDCP KSV Limitations – Limitations shall not be accepted.
      d. Cable Limitations - Limitations shall not be accepted.
      e. EDID Limitations - Limitations shall not be accepted.
      f. Cable Length Limits exceeded – Failing cables shall not be accepted.
   2. Device Model Number, Serial Number, and Firmware Version for main chassis and each input and output card.
   3. Device Model Number, Serial Number, and Firmware Version for connected transmitter and receiver devices.
   4. EDID – Input Resolution and 3D support status for each input.
   5. EDID – Supported Output Resolution and 3D support status for devices connected to each output.
   6. EDID – Supported Audio formats for each input.
   7. EDID – Supported Audio formats for devices connected to each output.

P. Control Systems
   1. Verify operational functions of the control system and all interfaced devices.
   2. Verify operational functionality of any wireless user devices.

3.8 CAT5E/CAT6 CABLE CERTIFICATION

A. General Field Test Requirements
   1. All CAT5E/CAT6 cabling links installed as part of this scope shall be tested for the following, in accordance with the field test specifications defines in ANSI/TIA-568-C.2 “Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard.” This document will be referred to as the “Category 5e Standard”:
      a. Wire Map
      b. Length
      c. Insertion Loss

d. NEXT loss
e. PS NEXT Loss
f. ACR-F Loss
g. PS ACR-F Loss
h. Return Loss
i. Propagation Loss
j. Delay Skew

2. The installed twisted-pair horizontal links shall be tested from terminated end point to terminated end point for compliance with the "Permanent Link" performance specification as defined in the Category 5e Standard.
3. One hundred percent of the installed cabling links must pass the requirements of the Category 5e standard mentioned above and as further detailed in Section B below. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation in accordance with Section C below.
4. The test equipment (tester) shall comply with the accuracy requirements for level IIe field testers as defined in ANSI/TIA-1152. The tester including the appropriate interface adapter must meet the specified accuracy requirements. The accuracy requirements for the permanent link test configuration (baseline accuracy plus adapter contribution) are specified in Table 2 of ANSI/TIA-1152 (Table 2 in this TIA document also specifies the accuracy requirements for the channel configuration).
5. The RJ45 test plug shall fall within the values specified in ANSI/TIA-568-C Annex C for NEXT, FEXT and Return Loss.
6. The tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy.
7. The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
8. The Pass or Fail condition of the link-under-test is determined by the results of the required individual tests (detailed in Section 4.2.2 of ANSI/TIA-1152). Any Fail result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass.
9. A Pass or Fail result for each parameter is determined by comparing the measured values with the specifies test limits for that parameter.

B. Performance Test Parameters
1. The test parameters are defined by the Category 5e Standard. The test of each link shall contain all of the following parameters as detailed below. In order to pass the test, all measurements (at each frequency in the range from 1 MHz through 100 MHz) must meet or exceed the limit value determined in the above mentioned standard.
2. Wire Map - Shall report Pass if the wiring of each wire-pair from end to end is determined to be correct.
3. Length – The field tester shall be capable of measuring length of all pairs of a basic link or channel based on the propagation delay measurement and the average value for NVP. The physical length of the link shall be calculated using the pair with the shortest electrical delay. This length figure shall be reported and shall be used for making the Pass/Fail decision. The Pass/Fail criteria are based on the maximum length allowed for the Permanent Link configuration (90 meters – 295 feet) plus 10% to allow for the variation and uncertainty of NVP.
4. Insertion Loss (Attenuation) – Insertion Loss is a measure of signal loss in the permanent link or channel. The term "Attenuation" has been used to designate "Insertion Loss." Insertion Loss shall be tested from 1 MHz through 100 MHz in maximum step size of 1 MHz. It is preferred to measure insertion loss at the same frequency intervals as NEXT loss in order to provide a more accurate calculation of the Attenuation-to-Crosstalk Ratio (ACR) parameter. Minimum test results documentation (summary results): Identify the worst wire pair (1 of 4 possible). The test results of

the worst wire pair must show the highest attenuation value measured (worst case), the frequency at which the worst case value occurs, and the test limit value at this frequency.

5. NEXT Loss – Pair-to-pair near end crosstalk loss (abbreviated as NEXT loss) shall be tested for each wire pair combination from each end of the link (a total of 12 pair combinations).This parameter is to be measured from 1 through 100 MHz. NEXT Loss measures the crosstalk disturbance on a wire pair at the end from which the disturbance signal is transmitted (near-end) on the disturbing pair. The maximum step size for NEXT loss measurements shall not exceed the maximum step size defined in the Category 5e Standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst value of NEXT (worst case). NEXT is to be measured from each end of the link-under-test. These wire pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.

   Table 1 – Maximum frequency step size as defined in ANSI/TIA-1152

Frequency Range (MHz)	Maximum Step size (MHz)
1 - 31.25	0.15
31.26 - 100	0.25

6. PS NEXT Loss – Power Sum NEXT Loss shall be evaluated and reported for each wire pair from both ends of the link under-test (a total of eight results). PS NEXT Loss captures the combined near-end crosstalk effect (statistical) on a wire pair when all other pairs actively transmit signals. Like NEXT this test parameter must be evaluated from 1 through 100 MHz and the step size may not exceed the maximum step size defined in the Category 5e Standard as shown in Table 1. Maximum test results documentation (summary results): Identify the wire pair that exhibits the worst-case margin and the wire pair that exhibits the worst value for PS next. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
7. ACR-F Loss, pair to pair – Attenuation Crosstalk Ratio Far-end is calculated from the pair-to-pair FEXT Loss. It shall be measured for each wire-pair combination from both ends of the link under-test. FEXT Loss measures the crosstalk disturbance on a wire pair at the opposite end (far-end) from which the transmitter emits the disturbing signal on the disturbing pair. FEXT is measured to compute ACR-F Loss that must be evaluated and reported in the test results. ACR-F measures the relative strength of the far-end crosstalk disturbance relative to the attenuated signal that arrives at the end of the link. This test yields 24 wire pair combinations. ACR-F is to be measured 1 through 100 MHz and the maximum step size for FEXT loss measurements shall not exceed the maximum step size defined as the standard as in Table 1. Minimum test results documentation (summary results): Identify the wire pair combination that exhibits the worst value for ACR-F. There wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
8. PS ACR-F Loss – Power Sum Attenuation Crosstalk Ratio Far-end is a calculated parameter that combines the effect of the FEXT disturbance from three wire pairs of the fourth one. This test yields eight wire-pair combinations. Each wire-pair is evaluated from 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst pair combinations must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
9. Return Loss – Return Loss (RL) measures the total energy reflected on each wire pair. Return Loss is to be measured from both ends of the link-under-test for each wire pair. This parameter is also to be measured from 1 through 100 MHz in frequency increments that do not exceed the maximum step size defined in the Category 5e Standard as shown in Table 1. Minimum test results documentation (summary results): Identify the wire pair that exhibits the worst value of Return Loss. These wire pairs must be identified for the tests performed from each end. Each reported case should include the frequency at which it occurs as well as the test limit value at this frequency.
10. Propagation Delay – Propagation delay is the time required for the signal to travel from one of the links to the other. This measurement is to be performed for each of the four wire pairs. Minimum test

results documentation (summary results): Identify the wire pair with the worst propagation delay. The report shall include the propagation delay value measured as well as the test limit value.

11. Delay Skew – [as defined in the Category 5e Standard; Section 6.2.19] This parameter shows the difference in propagation delay between the four wire pairs. The pair with the shortest propagation delay between the four wire pairs. The pair with the shortest propagation delay is the reference pair with a delay skew value of zero. Minimum test results documentation (summary results): Identify the wire pair with the worst-case propagation delay (the longest propagation delay). The report shall include the delay skew value measured as well as the test limit value.

C. Test Result Documentation
   1. The test results/measurements shall be transferred into a Windows based database utility that allows for the maintenance, inspection, and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test and that these results cannot be modified at a later time.
   2. The database for the completed job shall be stored and delivered on CD-ROM or DVD including the software tools required to view, inspect, and print any selection of test reports.
   3. A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information:
      a. The identification of the link in accordance with the naming convention defined in the overall system documentation.
      b. The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number.
      c. The date and time the test results were saved in the memory of the tester.
   4. General information to be provided in the electronic data base with the test results information for each link:
      a. The identification of the customer site as specified by the end-user.
      b. The identification of the link in accordance with the naming convention defined in the overall system documentation.
      c. The overall Pass/Fail evaluation of the link-under-test
      d. The name of the test limit selected to execute the stored test results
      e. The cable type and value of NVP used for length calculations
      f. The date and time the test results were saved in the memory of the tester
      g. The brand name, model, and serial number of the tester.
      h. The identification of the tester interface
      i. The revision of the tester software and the revision of the test limits database in the tester
      j. The test results information must contain information on each of the required test parameters that are listed in Section B and as further detailed below under paragraph C5.
   5.
   6. For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.
   7.
   8. The detailed test results data to be provided in the electronic database must contain the following information:
      a. Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m330 and test limit value.
      b. Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value.
      c. Delay Skew: Identify the pair with the largest value for delay skew, the value measured in nanoseconds (ns) and the test limit value.
      d. Insertion Loss (Attenuation): Minimum test results documentation as explained in Section B for the worst pair.

e. Return Loss: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link.
f. NEXT, ACR-F: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link.
g. PS NEXT and PS ACR-F: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link.

3.9 FINAL OBSERVATION & TESTING

A. Upon completion of installation, initial adjustments, tests and measurements specified in Part 3, and submission and review of the results, a final observation and test will be performed by the Owner or Owner's representative no earlier than two weeks after receipt of the written results.

B. Provide a minimum of one (1) person for observation and testing familiar with aspects of the System to assist the Owner.

C. The process of testing the System may necessitate moving and adjusting certain components.

D. Testing includes operation of each major system and any other components deemed necessary. Perform tests and provide required test equipment, tools and material required to make any necessary repairs, corrections, or adjustments.

E. The following procedures will be performed on each System:
1. Observation of the methods and means employed to incorporate the System within the facility.
2. Verification of proper operation, from controlling devices to controlled devices.
3. Verification of proper adjustment, balance, and alignment of equipment for optimum quality and to meet the manufacturer's published specifications. Establish and mark normal settings for each level control, and appropriately record these settings within the Record Documents.
4. Other tests on equipment or systems deemed appropriate.

F. In the event the need for further adjustment or work becomes evident during testing, the Contractor is to continue his work until the System is acceptable at no addition to the contract price. If approval is delayed because of defective equipment, or failure of equipment or installation to meet the requirements of these specifications and any extension of the observation and testing period is required, the Contractor shall pay for additional time and expenses of the Owner at the standard rate in effect at that time.

3.10 TEST EQUIPMENT

A. Thirty days prior to start of testing, provide a list to the Owner of test equipment make, model numbers and calibration dates that will be used.

B. The following equipment shall be available on site for the entire test period through final system testing.
1. Sound Level Meter : ANSI S1.4-1971 Type S1A with digital or analog display. Meter to provide ranges of 40 to 120 dBA.
2. Pink Noise Source - Equal energy per octave bandwidth 20 Hz to 20,000 Hz, ±1 dB (long-term average) at 0 dBm output. Stability: ±2 dB per day.
3. Dual-trace oscilloscope - 100 MHz bandwidth, 1 mV/cm sensitivity.
4. Impedance Meter - Capable of testing audio lines at three frequencies, minimum, between 250 Hz and 5k Hz. Measurement Range: 1 ohm to 100 kohms.
5. Audio Oscillator: bandwidth 20 Hz to 20k Hz ±.5 dB at 0 dBm output. Output to be balanced. Oscillator to include adjustable output level over the range from –30 dBu to +10 dBu.
6. Multimeter - Measurement range, DC to 20k Hz, 100 mV to 300 V, 10 ma to 10 A, dB.
7. NTSC Test generator
8. Real time analyzer with LED or CRT display. The unit shall meet the filter requirements of ANSI S1.11 Class III for one third octave filters.
9. Video (analog) test generator capable of generating signal up to 1920 x 1200 with audio.
10. Video (digital) test generator capable of generating signal up to 1920 x 1200 with audio.
11. Ladders and scaffolding necessary to inspect elevated equipment, junction boxes, etc.

C. Provide three portable VHF or UHF business band radios for use during acceptance testing with transmission range sufficient to cover entire project. Include rechargeable batteries and recharger along

with holster for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance.

3.11 INSTRUCTION OF OWNER PERSONNEL

A. Provide 8 hours instruction to Owner designated personnel focusing on the use, operation and maintenance of the systems, scheduled as a minimum of two separate sessions, by an instructor fully knowledgeable and qualified in system operation. The System Reference Manuals should be complete and on site at the time of this instruction. Coordinate schedule of demonstration with Owner's Representative.

B. Video record all training sessions and compile a training video to be provided to the Owner on DVD.

C. Provide sign in sheet to document the attendee's presence.

D. If Contractor is not properly equipped to conduct Owner training on particular equipment, arrange for factory representatives of the equipment to be present to provide training at no additional cost to the Owner.

3.12 CLEANUP AND REPAIR

A. Upon completion of the work, remove refuse and rubbish from and about the premises. Leave areas and equipment clean and in an operational state. Repair any damage caused to the premises by the installation of systems at no cost to the Owner.

END OF SECTION 27 41 16