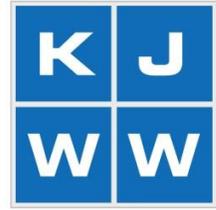


The **FUTURE.**[®]
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PROJECT MANUAL

SET NO. _____



for

PORT AUTHORITY OF THE CITY OF SAINT LOUIS
CCTV System
1520 Market Street
Saint Louis, Missouri 63103

June 22, 2015
KJWW #15.0097.00
Missouri State Certificate of Authority #2003008820

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SECTION 27 05 00
BASIC COMMUNICATIONS SYSTEMS REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Basic Communications Systems Requirements specifically applicable to Division 27 sections, in addition to the Bid Documents.

1.2 SCOPE OF WORK

- A. This Specification and the accompanying drawings govern the work involved in furnishing, installing, testing and placing into satisfactory operation the Communications Systems as shown on the drawings and specified herein.
- B. Each Contractor shall provide all new materials as indicated in the schedules on the drawings, and/or in these specifications, and all items required to make their portion of the Communications Systems a finished and working system.
- C. Description of Systems include but are not limited to the following:
 - 1. Cabling System including, but not limited to:
 - a. Video surveillance system horizontal cabling and terminations.
 - b. Testing
 - 2. Low Voltage Communications Wiring (less than +120VAC) as specified and required for proper system control and communications.

1.3 AUTHORITY FURNISHED PRODUCTS

- A. Equipment rack at SLMPD.
- B. Servers.
- C. Workstations.

1.4 QUALITY ASSURANCE

- A. Telecommunications Structured Cabling System Standards:
 - 1. All work and equipment shall conform to the most current ratified version of the following published standards unless otherwise indicated that draft standards are to be followed:
 - a. ANSI/NECA/BICSI 568 - Standard for Installing Commercial Building Telecommunications Cabling
 - b. ANSI/TIA-568-C.0 - Generic Telecommunications Cabling for Customer Premises
 - 1) C.1 - Commercial Building Telecommunications Standard
 - 2) C.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standard

- c. ANSI/TIA-758-B - Customer-Owned Outside Plant Telecommunications Standard
 - d. ANSI/TIA-1152 - Requirements for Field Test Instruments and Measurements for Balanced Twisted-Pair Cabling
 - e. NFPA 70 (NEC) - National Electrical Code (Current Edition)
 - f. UL 444 - Standard for Safety for Communications Cable
- B. Refer to individual sections for additional Quality Assurance requirements.
- C. Qualifications:
- 1. Only products of reputable manufacturers as determined by the Architect/Engineer will be acceptable.
 - 2. Each Contractor and their subcontractors shall employ only workers who are skilled in their respective trades and fully trained. All workers involved in the termination of cabling shall be individually certified by the manufacturer.
 - 3. The Contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size.
 - 4. The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of copper structured cabling systems and have personnel adequately trained in the use of such tools and equipment.
 - 5. A resume of qualification shall be submitted with the Contractor's bid indicating the following:
 - a. A list of recently completed projects of similar type and size with contact names and telephone numbers for each.
 - b. A list of test equipment proposed for use in verifying the installed integrity of copper systems on the project.
 - c. A technical resume of experience for the Contractor's project manager and on-site installation supervisor assigned to this project.
- D. Compliance with Codes, Laws, Ordinances:
- 1. This Contractor shall conform to all requirements of the City of St. Louis, Missouri Codes, Laws, Ordinances and other regulations having jurisdiction over this installation.
 - 2. In the event there are no local codes having jurisdiction over this job, the current issue of the National Electrical Code shall be followed.
 - 3. If there is a discrepancy between the codes and regulations having jurisdiction over this installation, and these specifications, the codes and regulations shall determine the method or equipment used.
 - 4. If the Contractor notes, at the time of bidding, any parts of the drawings and specifications which are not in accordance with the applicable codes or regulations, he shall inform the Architect/Engineer in writing, requesting a

clarification. If there is insufficient time to follow this procedure, he shall submit with the proposal, a separate price required to make the system shown on the drawings comply with the codes and regulations.

5. All changes to the system made after the letting of the contract, in order to comply with the applicable codes or the requirements of the Inspector, shall be made by the Contractor without cost to the Authority.

E. Permits, Fees, Taxes, Inspections:

1. Procure all applicable permits and licenses.
2. Abide by all applicable laws, regulations, ordinances, and other rules of the State wherein the work is done, or as required by any duly constituted public authority.
3. Pay all applicable charges for such permits or licenses that may be required.
4. Pay all applicable fees and taxes imposed by the State, Municipal and/or other regulatory bodies. This project is exempt from Missouri sales and use taxes.
5. Pay all charges arising out of required inspections due to codes, permits, licenses or as otherwise may be required by an authorized body.
6. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Authority or authorized independent agency/consultant.
7. All equipment and materials shall be as approved or listed by the following (unless approval or listing is not applicable to an item by all acceptable manufacturers):
 - a. Factory Mutual
 - b. Underwriters' Laboratories, Inc.

F. Examination of Drawings:

1. The drawings for the Communications Systems work are diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and the exact routing of cabling so as to best fit the layout of the job. Scaling of the drawings will not be sufficient or accurate for determining this layout. Where a specific route is required, such route will be indicated on the drawings.
3. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Authority.
4. If an item is either shown on the drawings, called for in the specifications or required for proper operation of the system, it shall be considered sufficient for including same in this contract.
5. The determination of quantities of material and equipment required shall be made by the Contractor from the drawings. Schedules on the drawings and in the specifications are completed as an aid to the Contractor but where discrepancies arise, the greater number shall govern.

6. Where words "provide", "install", or "furnish" are used on the drawings or in the specifications, it shall be taken to mean, to furnish, install and terminate completely ready for operation, the items mentioned.

G. Electronic Media/Files:

1. Construction drawings for this project have been prepared utilizing AutoCAD MEP.
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by KJWW.
4. If the information requested includes plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by KJWW for bidding purposes may not be used directly for coordination drawings.
7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by KJWW as to the accuracy or correctness of the information provided. KJWW accepts no responsibility or liability for the Contractor's use of these documents.

H. Field Measurements:

1. Before ordering any materials, this Contractor shall verify all pertinent dimensions at the job site and be responsible for their accuracy.

1.5 SUBMITTALS

- A. Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

1. Submittals list:

Referenced Specification Section	Submittal Item
27 15 00	Horizontal Cabling Requirements
27 17 10	Testing

- B. General Submittal Procedures: In addition to the provisions of the Bid Documents, the following are required:
1. Transmittal: Each transmittal shall include the following:
 - a. Date
 - b. Project title and number
 - c. Contractor's name and address
 - d. Description of items submitted and relevant specification number
 - e. Notations of deviations from the contract documents
 - f. Other pertinent data
 2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
 - a. Date
 - b. Project title and number
 - c. Architect/Engineer
 - d. Contractor and subcontractors' names and addresses
 - e. Supplier and manufacturer's names and addresses
 - f. Description of item submitted (using project nomenclature) and relevant specification number
 - g. Notations of deviations from the contract documents
 - h. Other pertinent data
 - i. Provide space for Contractor's review stamps
 3. Composition:
 - a. Submittals shall be submitted using specification sections and the project nomenclature for each item.
 - b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
 - c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
 4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
 5. Contractor's Approval Stamp:
 - a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
 - b. Unstamped submittals will be rejected.

- c. The Contractor's review shall include, but not be limited to, verification of the following:
 - 1) Only approved manufacturers are used.
 - 2) Addenda items have been incorporated.
 - 3) Catalog numbers and options match those specified.
 - 4) Performance data matches that specified.
 - 5) Electrical characteristics and loads match those specified.
 - 6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
 - 7) Dimensions and service clearances are suitable for the intended location.
 - 8) Equipment dimensions are coordinated.
 - 9) Constructability issues are resolved (e.g., weights and dimensions are suitable.).
 - d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.
 - e. **The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.**
6. Submittal Identification and Markings:
- a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
 - b. The Contractor shall clearly indicate the size, finish, material, etc.
 - c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
 - d. All marks and identifications on the submittals shall be unambiguous.
- 7. Schedule submittals to expedite the project. Coordinate submission of related items.
 - 8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
 - 9. Reproduction of contract documents alone is not acceptable for submittals.
 - 10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
 - 11. Submittals not required by the contract documents may be returned without review.
 - 12. Submittals shall be reviewed and approved by the Architect/Engineer **before** releasing any equipment for manufacture or shipment.

13. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.

C. Electronic Submittal Procedures:

1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. Submittal file name: 27 XX XX.description.YYYYMMDD
 - b. Transmittal file name: 27 XX XX.description.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 4MB. Larger files shall be transmitted via a pre-approved method.

1.6 SCHEDULE OF VALUES/INVOICING

- A. The requirements herein are in addition to the provisions of the Bid Documents.

B. Format:

1. Submit in Excel format where appropriate.
2. Support values given with substantiating data.

C. Preparation:

1. Itemize work required by each specification section and list all providers. All work provided by subcontractors and major suppliers shall be listed on the Schedule of Values. List each subcontractor and supplier by company name.
 - a. Contractor's own labor forces.
 - b. All subcontractors.
 - c. All major suppliers of products or equipment.
2. Break down all costs into:
 - a. Material: Delivered cost of product with taxes paid.
 - b. Labor: Labor cost, excluding overhead and profit.
3. Packing slips for all materials shall be submitted.

1.7 CHANGE ORDERS

- A. A detailed material and labor take-off shall be prepared for each change order along with labor rates and mark-up percentages. Change orders with inadequate breakdown will be rejected.
- B. Change order work shall not proceed until authorized.

1.8 PRODUCT DELIVERY, STORAGE, HANDLING & MAINTENANCE

- A. Exercise care in transporting and handling to prevent damage to fixtures, equipment and materials.
- B. Store materials so as to prevent damage.
- C. Keep fixtures, equipment and materials clean, dry and free from deleterious conditions.

1.9 WARRANTY

- A. At a minimum, provide a one year warranty for all equipment, materials, and workmanship. Individual specifications sections within Division 27 may require additional warranty requirements for specific equipment or systems.
- B. The warranty period for the entire installation described in this Division of the specifications shall commence on August 31, 2015.
- C. Warranty requirements shall extend to correction, without cost to the final user, of all work and/or equipment found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from such defects or nonconformance with contract documents exclusive of repairs required as a result of improper maintenance or operation, or of normal wear as determined by the Architect/Engineer.

1.10 INSURANCE

- A. This Contractor shall maintain insurance coverage as set forth in the Bid Documents.

1.11 MATERIAL

- A. Where several manufacturers' names are given, the first named manufacturer constitutes the basis for job design and establishes the equipment quality required to be used in this contract.
- B. Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meets all requirements of the drawings and specifications and fits in the allocated space. The Architect/Engineer shall make the final determination of whether a product is equivalent.
- C. Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured **in writing** from the Architect/Engineer not later than ten days prior to the bid opening date. The Contractor bears full responsibility for the unnamed manufacturers equipment adequately meeting the intent of design. The Architect/Engineer may reject manufacturer at time of shop drawing submittal. The Contractor assumes all costs incurred by other trades on the project as a result of

changes necessary to accommodate the offered material, equipment or installation method.

- D. Should this Contractor be unable to secure approval from the Architect/Engineer for other unnamed manufacturers as outlined above, this Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder. Should a voluntary alternate material be accepted, This Contractor shall assume all costs that may be incurred as a result of using the offered material, article or equipment necessitating extra expense on This Contractor or on the part of other Contractors whose work is affected.

PART 2 - PRODUCTS

2.1 REFER TO INDIVIDUAL SECTIONS

PART 3 - EXECUTION

3.1 JOBSITE SAFETY

- A. Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or his or her employees and subconsultants at a construction site, shall relieve the Contractor and any other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. It is the Contractor's responsibility to survey the site and include all necessary costs to perform the installation as specified.

3.3 FIELD QUALITY CONTROL

- A. General:
 - 1. Refer to specific Division 27 sections for further requirements.
 - 2. The Contractor shall conduct all tests required and applicable to the work both during and after construction of the work.
 - 3. The necessary instruments and materials required to conduct or make the tests shall be supplied by the Contractor who shall also supply competent personnel for making the tests who has been schooled in the proper testing techniques.
 - 4. In the event the results obtained in the tests are not satisfactory, This Contractor shall make such adjustments, replacements and changes as are necessary and shall then repeat the test or tests which disclose faulty or defective work or

equipment, and shall make such additional tests as the Architect/Engineer or code enforcing agency deems necessary.

5. All telecommunications tests that fail, including those due to excessive cabling lengths, shall be remedied by the Contractor without cost to the project.

B. Protection of cable from foreign materials:

1. It is the Contractor's responsibility to provide adequate physical protection to prevent foreign material application or contact with any cable type. Foreign material is defined as any material that would negatively impact the validity of the manufacturer's performance warranty. This includes, but is not limited, to overspray of paint (accidental or otherwise), drywall compound, or any other surface chemical, liquid or compound that could come in contact with the cable, cable jacket or cable termination components.
2. Application of foreign materials of any kind on any cable, cable jacket or cable termination component will not be accepted. It shall be the Contractor's responsibility to replace any component containing overspray, in its entirety, at no additional cost to the project. Cleaning of the cables with harsh chemicals is not allowed. This requirement is regardless of the PASS/FAIL test results of the cable containing overspray. Should the manufacturer and warrantor of the structured cabling system desire to physically inspect the installed condition and certify the validity of the structured cabling system (via a signed and dated statement by an authorized representative of the structured cabling manufacturer), the Authority may, at their sole discretion, agree to accept said warranty in lieu of having the affected cables replaced. In the case of plenum cabling, in addition to the statement from the manufacturer, the Contractor shall also present to the Authority a letter from the local Authority Having Jurisdiction stating that they consider the plenum rating of the cable to be intact and acceptable.

3.4 PROJECT CLOSEOUT

- A. Refer to the Bid Documents for requirements. The following paragraphs supplement the requirements of the Bid Documents.

B. Final Jobsite Observation:

1. The Architect/Engineer will not perform a final jobsite observation until the project is ready. This is not dictated by schedule, but rather by completeness of the project.
2. Refer to the end of this specification section for a "STATEMENT INDICATING READINESS FOR FINAL JOBSITE OBSERVATION."
3. The Contractor shall sign this form and return it to the Architect/Engineer so that the final observation can commence.

- C. Before final payment will be authorized, this Contractor must have completed the following:

1. Submitted operation and maintenance manuals to the Architect/Engineer for review.
2. Submitted bound copies of approved shop drawings.

3. Record documents including edited drawings and specifications accurately reflecting field conditions, **inclusive** of all project revisions, change orders, and modifications.
4. Submitted a report stating the instructions given to the Authority's representative complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Authority's representative as having received the instructions.
5. Submitted testing reports for all systems requiring final testing as described herein.
6. Submitted start-up reports on all equipment requiring a factory installation inspection and/or start.
7. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to St. Louis Development Corp. offices; submit receipt to Architect/Engineer prior to final payment being approved.
8. Provide System Assurance Warranty certificate for the telecommunications system.

3.5 OPERATION AND MAINTENANCE MANUALS

A. General:

1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer's review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer's comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
2. Approved O&M manuals shall be completed and in the Authority's possession prior to Authority's acceptance and at least ten days prior to instruction of operating personnel.

B. Electronic Submittal Procedures:

1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. O&M file name: O&M.div27.contractor.YYYYMMDD
 - b. Transmittal file name: O&Mtransmittal.div27.contractor.YYYYMMDD

5. File Size: Electronic file size shall be limited to a maximum of 4MB. Larger files shall be divided into files that are clearly labeled as "1 of 2", "2 of 2", etc.
6. Provide the Authority with an approved copy of the O&M manual on compact discs (CD), digital video discs (DVD), or flash drives with a permanently affixed label, printed with the title "Operation and Maintenance Instructions", title of the project and subject matter of disc/flash drive when multiple disc/flash drives are required.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C. Operation and Maintenance Instructions shall include:

1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.
14. Instruction books, cards, and manuals furnished with the equipment.

3.6 INSTRUCTING THE AUTHORITY'S REPRESENTATIVE

- A. Adequately instruct the Authority's designated representative or representatives in the maintenance, care, and operation of the complete systems installed under this contract.
- B. Provide verbal and written instructions to the Authority's representative or representatives by FACTORY PERSONNEL in the care, maintenance, and operation of the equipment and systems.
- C. The Authority has the option to make a video recording of all instructions. Coordinate schedule of instructions to facilitate this recording.
- D. The Architect/Engineer shall be notified of the time and place for the verbal instructions to be given to the Authority's representative so that their representative can be present if desirable.
- E. Refer to the individual specification sections for minimum hours of instruction time for each system.
- F. Operating Instructions:
 - 1. The Contractor is responsible for all instructions to the Authority and/or Authority's operating staff on the Communications Systems.
 - 2. If the Contractor does not have Engineers and/or Technicians on staff who can adequately provide the required instructions on system operation, performance, troubleshooting, care and maintenance, they shall include in the bid an adequate amount to reimburse the Authority for the Architect/Engineer to perform these services.

3.7 SYSTEM COMMISSIONING

- A. The Communications Systems included in the construction documents are to be complete and operating systems. The Architect/Engineer will make periodic job site observations during the construction period. The system start-up, testing, configuration, and satisfactory system performance is the responsibility of the Contractor. This shall include all calibration and adjustments of electrical equipment controls, equipment settings, software configuration, troubleshooting and verification of software, and final adjustments that may be required.
- B. All operating conditions and control sequences shall be simulated and tested during the start-up period.
- C. The Contractor, subcontractors, and equipment suppliers are expected to have skilled technicians to insure that the system performs as designed. If the Architect/Engineer is requested to visit the job site for the purpose of trouble shooting, assisting in the satisfactory start-up, obtaining satisfactory equipment operation, resolving installation and/or workmanship problems, equipment substitution issues or unsatisfactory system performance, including call backs during the warranty period through no fault of the design; the Contractor shall reimburse the Authority on a time and material basis for services rendered at the Architect/Engineer's standard hourly rates in effect at the time the services are requested. The Contractor shall be responsible for making payment to the Authority for services required that are product, installation or workmanship related. Payment is due within 30 days after services are rendered.

3.8 RECORD DOCUMENTS

- A. Refer to the Bid Documents for requirements. The following paragraphs supplement the requirements of the Bid Documents.
- B. Mark specifications to indicate approved substitutions, change orders, and actual equipment and materials used.
- C. This Contractor shall maintain at the job site, a separate and complete set of Communications Drawings which shall be clearly and permanently marked and noted in complete detail any changes made to the location and arrangement of equipment or made to the Communications Systems and wiring as a result of building construction conditions or as a result of instructions from the Architect or Engineer. All Change Orders, RFI responses, Clarifications and other supplemental instructions shall be marked on the documents. Record documents that merely reference the existence of the above items are not acceptable. Should This Contractor fail to complete Record Documents as required by this contract, This Contractor shall reimburse Architect/Engineer for all costs to develop record documents that comply with this requirement. Reimbursement shall be made at the Architect/Engineer's hourly rates in effect at the time of work.
- D. The above record of changes shall be made available for the Architect and Engineer's examination during any regular work time.
- E. Upon completion of the job, and before final payment is made, This Contractor shall give the marked-up drawings to the Architect/Engineer.

3.9 ADJUST AND CLEAN

- A. Contractor shall thoroughly clean all equipment and systems prior to the Authority's final acceptance of the project.
- B. Contractor shall clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from equipment.
- C. Contractor shall remove all rubbish, debris, etc., accumulated during the Contractor's operations from the premises.
- D. Contractor shall affix Authority furnished asset tags to all designated field equipment.

END OF SECTION

STATEMENT INDICATING READINESS FOR FINAL JOBSITE OBSERVATION

In order to assist the contractor in a timely close-out of the project, it is crucial that the final jobsite observation is not conducted prior to the project being ready. The contractor is required to review the completion status of the project at the time the observation is scheduled. This review, and the subsequent submittal of this form to the Architect/Engineer, shall indicate the contractor's agreement that the area of the project being requested for final observation is ready as defined below. The following list represents the degree of completeness required prior to requesting a final observation:

1. All cabling pathways (conduit sleeves, etc) are installed and all cabling has been pulled through them.
2. Telecommunications testing is in progress and at least 25% of testing has been completed.
3. Telecommunications labeling has been provided on at least 25% of each type of component requiring a label.
4. All telecommunications related grounding is complete.
5. All CCTV cameras, mounts, cabling and all headend equipment are installed, programmed and operational.

The project will be ready for final jobsite observation prior to the requested date of the observation, according to the above list of requirement.

Prime Contractor: _____ By: _____

Requested Observation Date _____ Today's Date: _____

Contractor shall sign this readiness statement and transmit to Architect/Engineer at least 10 days prior to the requested date of observation.

It is understood that if the Architect/Engineer finds that the project is not complete as defined above and that the final jobsite observation cannot be completed on the requested date, the Architect/Engineer will return to the site at a later date. All additional visits to the site for the purposes of completing the final observation will be billed T&M to the Contractor at our standard hourly rates, including travel expenses or the contractor's retainage may be deducted for the same amount.

SECTION 27 15 00
HORIZONTAL CABLING REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This section describes the products and execution requirements relating to furnishing and installing horizontal communications cabling and termination components and related subsystems as part of a cabling plant. The cabling plant consists of copper cabling.

1.2 RELATED WORK

- A. Section 27 05 00 - Basic Communications Systems Requirements

1.3 QUALITY ASSURANCE

- A. Refer to Section 27 05 00 for relevant standards.
- B. The channel shall be required to meet the performance requirements indicated herein. The manufacturer shall warranty the performance of their system to the required performance (and not just to the Standard, should the required performance exceed the Standard).
- C. Specific components of the channel shall be required, at a minimum, to meet the Standard component requirements for that particular component.

1.4 SUBMITTALS

- A. Under the provisions of Section 27 05 00 and the Bid Documents, prior to the start of work the Contractor shall submit:
 - 1. Manufacturer's data covering all products proposed, including construction, materials, ratings and all other parameters identified in Part 2 - Products, below.
 - 2. Manufacturer's installation instructions.

1.5 WARRANTY

- A. At a minimum, provide a ten year warranty for all terminations, cabling and workmanship.

PART 2 - PRODUCTS

2.1 HORIZONTAL CABLE

- A. CAT 6 PVC Cable:
 - 1. The horizontal cable requirements must be met, as well as the following channel requirements.
 - 2. At camera locations, CAT 6 cable shall terminate directly to the camera and network switch at locations indicated on the drawings

3. Channel Requirements:

Insertion Loss:	250 MHz	35.8 dB
NEXT:	250 MHz	33.1 dB
PS NEXT:	250 MHz	30.2 dB
ACR:	250 MHz	1.5 dB
PS ACR:	250 MHz	-5.7 dB
ELFEXT	250 MHz	18.8 dB
PS ELFEXT:	250 MHz	12.3 dB
Return Loss:	250 MHz	10.0 dB

4. The jacket color for CAT 6 cable shall be consistent for all camera applications.

5. Outdoor UTP:

- a. 24 AWG solid copper
- b. Gel filled to prevent moisture migration
- c. -4°F to 140°F installation temperature
- d. -40°F to 140°F operating temperature
- e. UV resistant jacket
- f. Cables shall be terminated with 8 pin modular plugs

6. Basis of Design:

- a. Panduit PU06C04BL-U
- b. Belden OSP6U
- c. Mohawk M57622

PART 3 - EXECUTION

3.1 CABLE INSTALLATION REQUIREMENTS

A. Horizontal Cabling:

- 1. All cable shall be free of tension at both ends. In cases where the cable must bear some stress, Kellum grips may be used to spread the strain over a longer length of cable.
- 2. Manufacturer's minimum bend radius specifications shall be observed in all instances.
- 3. Cable sheaths shall be protected from damage from sharp edges. Where a cable passes over a sharp edge, a bushing or grommet shall be used to protect the cable.

4. To reduce or eliminate EMI, the following minimum separation distances from 480V power lines shall be adhered to:
 - a. Twelve inches from power lines of <5-kVa.
 - b. Eighteen inches from high-voltage lighting (including fluorescent).
 - c. Thirty-nine inches from power lines of 5-kVa or greater.
 - d. Thirty-nine inches from transformers and motors.
5. A minimum of three (3) feet of cable shall be coiled in the camera control enclosure for each camera.

3.2 CABLE TERMINATION REQUIREMENTS

A. Cable Terminations - Data UTP:

1. The Contractor shall ensure that the twists in each cable pair are preserved to within 0.5-inch of the termination for data cables. The cable jacket shall be removed only to the extent required to make the termination.

END OF SECTION

SECTION 27 17 10
TESTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. This section describes the testing requirements relating to the structured cabling system and its termination components and related subsystems.

1.2 RELATED WORK

- A. Section 27 05 00 – Basic Communications Systems Requirements

1.3 QUALITY ASSURANCE

- A. Refer to Section 27 05 00 for relevant standards.

1.4 SUBMITTALS

- A. Under the provisions of Section 27 05 00 and the Bid Documents, prior to the start of work, the Contractor shall submit: Complete information on testing procedure as described herein.

PART 2 - PRODUCTS

2.1 TESTING COPPER

- A. General Requirements:
 - 1. The Contractor is responsible to perform acceptance tests as indicated below for each sub-system (e.g., horizontal, etc.) as it is completed.
 - 2. The Contractor is responsible for supplying all equipment and personnel necessary to conduct the acceptance tests. Prior to testing, the Contractor should provide a summary of the proposed test plan for each cable type including equipment to be used, setup, test frequencies or wavelengths, results format, etc. The method of testing shall be approved by the Architect/Engineer.
 - 3. The Contractor shall visually inspect all cabling and termination points to ensure that they are complete and conform to the wiring pattern defined herein. The Contractor shall provide the Architect/Engineer with a written certification that this inspection has been made.
 - 4. The Contractor shall conduct acceptance testing according to a schedule coordinated with the Authority/Architect/Engineer. Representatives of the Authority may be in attendance to witness the test procedures. The Contractor shall provide a minimum of one week's advance notice to the Architect/Engineer to allow for such participation. The notification shall include a written description of the proposed conduct of the tests, including copies of blank test result sheets to be used.
 - 5. Tests related to connected equipment of others shall only be done with the permission and presence of the Contractor involved. The Contractor shall ascertain that testing only is required to prove the wiring connections are correct.
 - 6. The Contractor shall provide test results and describe the conduct of the tests including the date of the tests, the equipment used, and the procedures followed.

At the request of the Architect/Engineer, the Contractor shall provide copies of the original test results.

7. All cabling shall be 100% fault-free unless noted otherwise. If any cable is found to be outside the specification defined herein, that cable and the associated termination(s) shall be replaced at the expense of the Contractor. The applicable tests shall then be repeated.
8. Should it be found by the Architect/Engineer that the materials or any portion thereof furnished and installed under this Contract fail to comply with the specifications and drawings with respect or regard to the quality, amount, or value of materials, appliances, or labor used in the work, it shall be rejected and replaced by the Contractor and all work disturbed by changes necessitated in consequence of said defects or imperfections shall be made good at the Contractor's expense.
 - a. CAT 6 Cable:
 - 1) Testing shall be from the camera to the network switch.
 - 2) Horizontal cable shall be free of shorts within the pairs, and be verified for continuity, pair validity and polarity, and conductor position on the modular jack (e.g., wire map). Any defective, split, or mis-positioned pairs must be identified and corrected.
 - 3) CAT 6 horizontal cable shall also be tested to 250 MHz as defined by TIA/EIA-568-C.2. Measurements shall be of the "Basic Link" including cabling and modular plugs at the camera and network switch. Parameters to be tested must include:
 - a) Wire Map
 - b) Length
 - c) NEXT Loss (Pair-to-Pair)
 - d) NEXT (Power Sum)
 - e) ELFEXT (Pair-to-Pair)
 - f) ELFEXT (Power Sum)
 - g) Return Loss
 - h) Attenuation
 - i) Propagation Delay
 - j) Delay Skew
 - 4) To establish testing baselines, cable samples of known length and of the cable type and lot installed shall be tested. The cable may be terminated with an eight-position CAT 6 modular connector (8-pin) to facilitate testing. Nominal Velocity of Propagation (NVP) and nominal attenuation values shall be calculated based on this test and be utilized during the testing of the installed cable plant. This requirement can be waived if NVP and nominal attenuation data is available from the cable manufacturer for the exact cable type under test.
 - 5) CAT 6 horizontal cable testing shall be performed using a test instrument designed for testing to 250 MHz or higher. Test records shall verify, "PASS" on each cable and display the specified parameters, comparing test values with standards based "templates" integral to the unit. Test records that report a PASS*, FAIL*, or FAIL result for any of the parameters will not be accepted.

- 6) In the event results of the tests are not satisfactory, the Contractor shall make adjustments, replacements, and changes as necessary and shall then repeat the test or tests that disclosed faulty or defective material, equipment, or installation methods, and shall make additional tests as the Architect/Engineer deems necessary at no additional expense to the project or user agency.

2.2 DOCUMENTATION/AS-BUILTS/RECORDS

A. General:

1. Upon completion of the installation, the Contractor shall submit as-builts per the requirements of Section 27 05 00 and the Bid Documents. Documentation shall include the items detailed in the subsections below.
2. All documentation, including hard copy and electronic forms, shall become the property of the Authority.
3. The Architect/Engineer may request that a 10% random field retest be conducted on the cable system at no additional cost to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the Contractor, additional testing can be requested to the extent determined necessary by the Architect/Engineer, including a 100% retest. This retest shall be at no additional cost to the Authority.

B. Copper Media Test Data:

1. Test results shall include a record of test frequencies, cable type, conductor pair and cable (or camera) I.D., measurement direction, test equipment type, model and serial number, date, reference setup, and crew member name(s).
2. Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package. The Contractor shall furnish this information in electronic form (CD-ROM). The CD-ROM shall contain the electronic equivalent of the test results as defined by the bid specification and be of a format readable by Microsoft Word (Version 6.0 or newer). The Contractor shall provide a licensed copy of the software required to view and print the data that is provided in a proprietary format. The Contractor shall furnish one copy of the Data and Display (if applicable) software.

C. Record Drawings:

1. The drawings are to include cable routes and outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided.

PART 3 - EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 28 05 00
BASIC ELECTRONIC SAFETY AND SECURITY SYSTEM REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Basic Safety and Security System Requirements (herein referred to Security) specifically applicable to Division 28 sections, in addition to the Bid Documents.

1.2 SCOPE OF WORK

- A. This Specification and the accompanying drawings govern the work involved in furnishing, installing, testing and placing into satisfactory operation the security systems as shown on the drawings and specified herein.
- B. Each Contractor shall provide all new materials as indicated in the schedules on the drawings, and/or in these specifications, and all items required to make their portion of the security systems a finished and working system.
- C. Description of systems include but are not limited to the following:
 - 1. Video Surveillance
 - 2. Low Voltage Security Wiring (less than +120VAC) as specified and required for proper system control and communications.
 - 3. All associated electrical backboxes, conduit, miscellaneous cabling, and power supplies required for proper system installation and operation.

1.3 AUTHORITY FURNISHED PRODUCTS

- A. Genetec software, servers and workstations.

1.4 DIVISION OF WORK BETWEEN ELECTRICAL AND SECURITY CONTRACTORS

- A. Division of work is the responsibility of the Prime Contractor. Any scope of work described in the contract document shall be sufficient for including said requirement in the project. The Prime Contractor shall be solely responsible for determining the appropriate subcontractor for the described scope. In no case shall the project be assessed an additional cost for scope that is described in the contract documents. The following division of responsibility is a guideline based on typical industry practice.
- B. Definitions:
 - 1. "Electrical Contractor" shall refer to the Contractor listed in Division 28 of this specification when the work shall be provided by the EC.
 - 2. "Security Contractor" as referred to herein refers to the Contractors listed in Division 28 of this Specification.
 - 3. Low Voltage Security Wiring: The wiring (less than 120VAC) associated with the Security Systems, used for analog and/or digital signals between equipment.

C. General:

1. The purpose of these Specifications is to outline typical Electrical and Security Contractor's work responsibilities as related to Security Systems including conduit, power wiring and Low Voltage Security Wiring. The prime contractor is responsible for all divisions of work.
2. The exact wiring requirements for much of the equipment cannot be determined until the systems have been purchased and submittals are approved. Therefore, only known wiring, conduits, raceways, and electrical power as related to such items, is shown on the Security Drawings. Other wiring, conduits, raceways, junction boxes, and electrical power not shown on the Security Drawings but required for the successful operation of the systems shall be the responsibility of the Security Contractor and included in the Contractor's bid.
3. Where the Electrical Contractor is required to install conduit, conduit sleeves and/or power connections in support of Security systems, the final installation shall not begin until a coordination meeting between the Electrical Contractor and the Security Contractor has convened to determine the exact location and requirements of the installation.

D. Electrical Contractor's Responsibility:

1. Assumes all responsibility for all required conduit and power connections to be provided by the Electrical Contractor.
2. Responsible for Security Systems grounding and bonding.
3. This Contractor is responsible for coordination of utilities with all other Contractors. If any field coordination conflicts are found, the Contractor shall coordinate with other Contractors to determine a viable layout.

E. Security Contractor's Responsibility:

1. Assumes all responsibility for the Low Voltage Security Wiring of all systems, including cable support where open cable is specified.
2. Assumes all responsibility for all required backboxes, conduit and power connections not specifically shown as being provided by the Electrical Contractor.
3. Responsible for providing the Electrical Contractor with the required grounding lugs or other hardware for each piece of Security equipment which is required to be bonded to the telecommunications ground system.
4. This Contractor is responsible for coordination of utilities with all other Contractors. If any field coordination conflicts are found, the Contractor shall coordinate with other Contractors to determine a viable layout.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Only products of reputable manufacturers as determined by the Architect/Engineer will be acceptable.

2. Each Contractor and their subcontractors shall employ only workers who are skilled in their respective trades and fully trained. All workers involved in the installation, termination, testing, and placing into operation electronic security devices shall be individually trained by the manufacturer.
3. The Contractor shall be experienced in all aspects of this work and shall be required to demonstrate direct experience on recent systems of similar type and size.
4. The Contractor shall own and maintain tools and equipment necessary for successful installation and testing of electronic security devices and have personnel adequately trained in the use of such tools and equipment.

B. Compliance with Codes, Laws, Ordinances:

1. This Contractor shall conform to all requirements of the City of St. Louis, Missouri Codes, Laws, Ordinances and other regulations having jurisdiction over this installation.
2. If there is a discrepancy between the codes and regulations having jurisdiction over this installation, and these specifications, the codes and regulations shall determine the method or equipment used.
3. If the Contractor notes, at the time of bidding, any parts of the drawings and specifications which are not in accordance with the applicable codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time to follow this procedure, he shall submit with the proposal, a separate price required to make the system shown on the drawings comply with the codes and regulations.
4. All changes to the system made after the letting of the contract, in order to comply with the applicable codes or the requirements of the Inspector, shall be made by the Contractor without cost to the Authority.

C. Permits, Fees, Taxes, Inspections:

1. Procure all applicable permits and licenses.
2. Abide by all applicable laws, regulations, ordinances, and other rules of the State wherein the work is done, or as required by any duly constituted public authority.
3. Pay all applicable charges for such permits or licenses that may be required.
4. Pay all applicable fees and taxes imposed by the State, Municipal and/or other regulatory bodies. This project is exempt from Missouri sales and use taxes.
5. Pay all charges arising out of required inspections due to codes, permits, licenses or as otherwise may be required by an authorized body.
6. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Authority or authorized independent agency/consultant.

7. All equipment, and materials shall be as approved or listed by the following: (Unless approval or listing is not applicable to an item by all acceptable manufacturers.)
 - a. Factory Mutual
 - b. Underwriters' Laboratories, Inc.

D. Examination of Drawings:

1. The drawings for the Security Systems work are diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment etc., and the approximate sizes of equipment.
2. Contractor shall determine the exact locations of equipment and the exact routing of cabling so as to best fit the layout of the job. Scaling of the drawings will not be sufficient or accurate for determining this layout. Where a specific route is required, such route will be indicated on the drawings.
3. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Authority.
4. If an item is either shown on the drawings, called for in the specifications or required for proper operation of the system, it shall be considered sufficient for including same in this contract.
5. The determination of quantities of material and equipment required shall be made by the Contractor from the drawings. Schedules on the drawings and in the specifications are completed as an aid to the Contractor but where discrepancies arise, the greater number shall govern.
6. Where words "provide", "install", or "furnish" are used on the drawings or in the specifications, it shall be taken to mean, to furnish, install and terminate completely ready for operation, the items mentioned.

E. Electronic Media/Files:

1. Construction drawings for this project have been prepared utilizing AutoCAD MEP.
2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by KJWW.
4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
6. The drawings prepared by KJWW for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.

7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by KJWW as to the accuracy or correctness of the information provided. KJWW accepts no responsibility or liability for the Contractor's use of these documents.

F. Field Measurements:

1. Before ordering any materials, this Contractor shall verify all pertinent dimensions at the job site and be responsible for their accuracy.

1.6 SUBMITTALS

- A. Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.

1. Submittals list:

Referenced Specification Section	Submittal Item
28 23 00	Video Surveillance

- B. General Submittal Procedures: In addition to the provisions of the Bid Documents, the following are required:

1. Transmittal: Each transmittal shall include the following:
 - a. Date
 - b. Project title and number
 - c. Contractor's name and address
 - d. Description of items submitted and relevant specification number
 - e. Notations of deviations from the contract documents
 - f. Other pertinent data
2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
 - a. Date
 - b. Project title and number
 - c. Architect/Engineer
 - d. Contractor and subcontractors' names and addresses
 - e. Supplier and manufacturer's names and addresses
 - f. Description of item submitted (using project nomenclature) and relevant specification number
 - g. Notations of deviations from the contract documents
 - h. Other pertinent data
 - i. Provide space for Contractor's review stamps
3. Composition:
 - a. Submittals shall be submitted using specification sections and the project nomenclature for each item.

- b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
 - c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
5. Contractor's Approval Stamp:
- a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
 - b. Unstamped submittals will be rejected.
 - c. The Contractor's review shall include, but not be limited to, verification of the following:
 - 1) Only approved manufacturers are used.
 - 2) Addenda items have been incorporated.
 - 3) Catalog numbers and options match those specified.
 - 4) Performance data matches that specified.
 - 5) Electrical characteristics and loads match those specified.
 - 6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
 - 7) Dimensions and service clearances are suitable for the intended location.
 - 8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
 - 9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).
 - d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.
 - e. **The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.**

6. Submittal Identification and Markings:
 - a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
 - b. The Contractor shall clearly indicate the size, finish, material, etc.
 - c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
 - d. All marks and identifications on the submittals shall be unambiguous.
7. Schedule submittals to expedite the project. Coordinate submission of related items.
8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
9. Reproduction of contract documents alone is not acceptable for submittals.
10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
11. Submittals not required by the contract documents may be returned without review.
12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
13. Submittals shall be reviewed and approved by the Architect/Engineer **before** releasing any equipment for manufacture or shipment.
14. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.

C. Electronic Submittal Procedures:

1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.

4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. Submittal file name: 28 XX XX.description.YYYYMMDD
 - b. Transmittal file name: 28 XX XX.description.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 4MB. Larger files shall be transmitted via a pre-approved method.

1.7 SCHEDULE OF VALUES/INVOICING

- A. The requirements herein are in addition to the provisions of the Bid Documents.
- B. Format:
 1. Submit in Excel format where appropriate.
 2. Support values given with substantiating data.
- C. Preparation:
 1. Itemize work required by each specification section and list all providers. All work provided by subcontractors and major suppliers shall be listed on the Schedule of Values. List each subcontractor and supplier by company name.
 - a. Contractor's own labor forces.
 - b. All subcontractors.
 - c. All major suppliers of products or equipment.
 2. Break down all costs into:
 - a. Material: Delivered cost of product with taxes paid.
 - b. Labor: Labor cost, excluding overhead and profit.
 3. Packing slips for all material shall be submitted:

1.8 CHANGE ORDERS

- A. A detailed material and labor takeoff shall be prepared for each change order, along with labor rates and markup percentages. Change orders with inadequate breakdown will be rejected.
- B. Change order work shall not proceed until authorized.

1.9

1.10 PRODUCT DELIVERY, STORAGE, HANDLING & MAINTENANCE

- A. Exercise care in transporting and handling to prevent damage to fixtures, equipment and materials.
- B. Store materials on the site so as to prevent damage.
- C. Keep fixtures, equipment and materials clean, dry and free from harmful conditions.

1.11 WARRANTY

- A. At a minimum, provide a one year warranty for all equipment, materials, and workmanship. Individual specifications sections within Division 28 may require additional warranty requirements for specific equipment or systems.
- B. The warranty period for the entire installation described in this Division of the specifications shall commence on August 31, 2015.
- C. Warranty requirements shall extend to correction, without cost to the final user, of all work and/or equipment found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from such defects or nonconformance with contract documents exclusive of repairs required as a result of improper maintenance or operation, or of normal wear as determined by the Architect/Engineer.

1.12 INSURANCE

- A. This Contractor shall maintain insurance coverage as set forth in the Bid Documents.

1.13 MATERIAL

- A. Where several manufacturers' names are given, the first named manufacturer constitutes the basis for job design and establishes the equipment quality required to be used in this contract.
- B. Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meets all requirements of the drawings and specifications and fits in the allocated space. The Architect/Engineer shall make the final determination of whether a product is equivalent.
- C. Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured **in writing** from the Architect/Engineer not later than ten days prior to the bid opening date. The Contractor bears full responsibility for the unnamed manufacturers equipment adequately meeting the intent of design. The Architect/Engineer may reject manufacturer at time of shop drawing submittal. The Contractor assumes all costs incurred by other trades on the project as a result of changes necessary to accommodate the offered material, equipment or installation method.
- D. Should this Contractor be unable to secure approval from the Architect/Engineer for other unnamed manufacturers as outlined above, this Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder. Should a voluntary alternate material be accepted, This Contractor shall assume all costs that may be incurred as a result of using the offered material, article or equipment necessitating extra expense on This Contractor or on the part of other Contractors whose work is affected.

PART 2 - PRODUCTS

2.1 REFER TO INDIVIDUAL SECTIONS

PART 3 - EXECUTION

3.1 JOBSITE SAFETY

- A. Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or his or her employees and subconsultants at a construction site, shall relieve the Contractor and any other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. It is the Contractor's responsibility to survey the site and include all necessary costs to perform the installation as specified.
- B. All cables and devices installed in damp or wet locations, including any underground or underslab location, shall be listed as suitable for use in such environments. Follow manufacturer's recommended installation practices for installing cables and devices in damp or wet locations. Any cable or device that fails as a result of being installed in a damp or wet location shall be replaced at the Contractor's expense.

3.3 FIELD QUALITY CONTROL

- A. General:
 - 1. Refer to specific Division 28 sections for further requirements.
 - 2. The Contractor shall conduct all tests required and applicable to the work both during and after construction of the work.
 - 3. The necessary instruments and materials required to conduct or make the tests shall be supplied by the Contractor who shall also supply competent personnel for making the tests who has been schooled in the proper testing techniques.
 - 4. In the event the results obtained in the tests are not satisfactory, This Contractor shall make such adjustments, replacements and changes as are necessary and shall then repeat the test or tests which disclose faulty or defective work or equipment, and shall make such additional tests as the Architect/Engineer or code enforcing agency deems necessary.
- B. Protection of cable from foreign materials:
 - 1. It is the Contractor's responsibility to provide adequate physical protection to prevent foreign material application or contact with any cable type. Foreign material is defined as any material that would negatively impact the validity of the manufacturer's performance warranty. This includes, but is not limited, to overspray of paint (accidental or otherwise), drywall compound, or any other

surface chemical, liquid or compound that could come in contact with the cable, cable jacket or cable termination components.

2. Application of foreign materials of any kind on any cable, cable jacket or cable termination component will not be accepted. It shall be the Contractor's responsibility to replace any component containing overspray, in its entirety, at no additional cost to the project. Cleaning of the cables with harsh chemicals is not allowed. This requirement is regardless of the PASS/FAIL test results of the cable containing overspray. Should the manufacturer and warrantor of the structured cabling system desire to physically inspect the installed condition and certify the validity of the structured cabling system (via a signed and dated statement by an authorized representative of the structured cabling manufacturer), the Authority may, at their sole discretion, agree to accept said warranty in lieu of having the affected cables replaced. In the case of plenum cabling, in addition to the statement from the manufacturer, the Contractor shall also present to the Authority a letter from the local Authority Having Jurisdiction stating that they consider the plenum rating of the cable to be intact and acceptable.

3.4 PROJECT CLOSEOUT

- A. Refer to the Bid Documents for requirements. The following paragraphs supplement the requirements of the Bid Documents.
- B. Final Jobsite Observation:
 1. The Architect/Engineer will not perform a final jobsite observation until the project is ready. This is not dictated by schedule, but rather by completeness of the project.
 2. Refer to the end of Section 27 05 00 for a "STATEMENT INDICATING READINESS FOR FINAL JOBSITE OBSERVATION."
 3. The Contractor shall sign this form and return it to the Architect/Engineer so that the final observation can commence.
- C. Before final payment will be authorized, this Contractor must have completed the following:
 1. Submitted operation and maintenance manuals to the Architect/Engineer for review.
 2. Submitted bound copies of approved shop drawings.
 3. Record documents including edited drawings and specifications accurately reflecting field conditions, **inclusive** of all project revisions, change orders, and modifications.
 4. Submitted a report stating the instructions given to the Authority's representative complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Authority's representative as having received the instructions.
 5. Submitted testing reports for all systems requiring final testing as described herein.

6. Submitted start-up reports on all equipment requiring a factory installation inspection and/or start.
7. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to St. Louis Development Corp. offices; submit receipt to Architect/Engineer prior to final payment being approved.

3.5 OPERATION AND MAINTENANCE MANUALS

A. General:

1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer's review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer's comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
2. Approved O&M manuals shall be completed and in the Authority's possession prior to Authority's acceptance and at least ten days prior to instruction of operating personnel.

B. Electronic Submittal Procedures:

1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. O&M file name: O&M.div28.contractor.YYYYMMDD
 - b. Transmittal file name: O&Mtransmittal.div28.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 4MB. Larger files shall be divided into files that are clearly labeled as "1 of 2", "2 of 2", etc.
6. Provide the Authority with an approved copy of the O&M manual on compact discs (CD), digital video discs (DVD), or flash drives with a permanently affixed label, printed with the title "Operation and Maintenance Instructions", title of the project and subject matter of disc/flash drive when multiple disc/flash drives are required.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

- C. Operation and Maintenance Instructions shall include:
1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
 2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
 3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
 4. Copy of final approved test and balance reports.
 5. Copies of all factory inspections and/or equipment startup reports.
 6. Copies of warranties.
 7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
 8. Dimensional drawings of equipment.
 9. Capacities and utility consumption of equipment.
 10. Detailed parts lists with lists of suppliers.
 11. Operating procedures for each system.
 12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
 13. Repair procedures for major components.
 14. List of lubricants in all equipment and recommended frequency of lubrication.
 15. Instruction books, cards, and manuals furnished with the equipment.

3.6 INSTRUCTING THE AUTHORITY'S REPRESENTATIVE

- A. Adequately instruct the Authority's designated representative or representatives in the maintenance, care, and operation of the complete systems installed under this contract.
- B. Provide verbal and written instructions to the Authority's representative or representatives by FACTORY PERSONNEL in the care, maintenance, and operation of the equipment and systems.
- C. The Authority has the option to make a video recording of all instructions. Coordinate schedule of instructions to facilitate this recording.
- D. The Architect/Engineer shall be notified of the time and place for the verbal instructions to be given to the Authority's representative so that their representative can be present if desirable.

- E. Refer to the individual specification sections for minimum hours of instruction time for each system.
- F. Operating Instructions:
 - 1. The Contractor is responsible for all instructions to the Authority and/or Authority's operating staff on the security systems.
 - 2. If the Contractor does not have Engineers and/or Technicians on staff that can adequately provide the required instructions on system operation, performance, troubleshooting, care and maintenance, they shall include in the bid an adequate amount to reimburse the Authority for the Architect/Engineer to perform these services.

3.7 SYSTEM COMMISSIONING

- A. The security systems included in the construction documents are to be complete and operating systems. The Architect/Engineer will make periodic job site observations during the construction period. The system start-up, testing, configuration, and satisfactory system performance is the responsibility of the Contractor. This shall include all calibration and adjustments of electrical equipment controls, equipment settings, software configuration, troubleshooting and verification of software, and final adjustments that may be required.
- B. All operating conditions and control sequences shall be simulated and tested during the start-up period.
- C. The Contractor, subcontractors, and equipment suppliers are expected to have skilled technicians to insure that the system performs as designed. If the Architect/Engineer is requested to visit the job site for the purpose of trouble shooting, assisting in the satisfactory start-up, obtaining satisfactory equipment operation, resolving installation and/or workmanship problems, equipment substitution issues or unsatisfactory system performance, including call backs during the warranty period through no fault of the design; the Contractor shall reimburse the Authority on a time and material basis for services rendered at the Architect/Engineer's standard hourly rates in effect at the time the services are requested. The Contractor shall be responsible for making payment to the Authority for services required that are product, installation or workmanship related. Payment is due within 30 days after services are rendered.

3.8 RECORD DOCUMENTS

- A. Refer to the Bid Documents for requirements. The following paragraphs supplement the requirements of the Bid Documents.
- B. Mark specifications to indicate approved substitutions, change orders, and actual equipment and materials used.
- C. This Contractor shall maintain at the job site, a separate and complete set of Security Drawings which shall be clearly and permanently marked and noted in complete detail any changes made to the location and arrangement of equipment or made to the Technology Systems and wiring as a result of building construction conditions or as a result of instructions from the Architect or Engineer. All Change Orders, RFI responses, Clarifications and other supplemental instructions shall be marked on the documents. Record documents that merely reference the existence of the above items are not acceptable. Should This Contractor fail to complete Record Documents as required by this contract, This Contractor shall reimburse Architect/Engineer for all costs to develop

record documents that comply with this requirement. Reimbursement shall be made at the Architect/Engineer's hourly rates in effect at the time of work.

- D. The above record of changes shall be made available for the Architect and Engineer's examination during any regular work time.
- E. Upon completion of the job, and before final payment is made, This Contractor shall give the marked-up drawings to the Architect/Engineer.

3.9 ADJUST AND CLEAN

- A. Contractor shall thoroughly clean all equipment and systems prior to the Authority's final acceptance of the project.
- B. Contractor shall clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from equipment.
- C. Contractor shall remove all rubbish, debris, etc., accumulated during the Contractor's operations from the premises.

END OF SECTION

SECTION 28 23 00
VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Network Video Management System (NVMS).
- B. Video Storage Solution
- C. Cameras and Accessories.
- D. Equipment Racks.
- E. Cabling.

1.2 RELATED WORK

- A. Section 28 05 00 - Basic Electronic Safety and Security System Requirements

1.3 QUALITY ASSURANCE

- A. NVMS Software Developer (Manufacturer): The NVMS system shall be Genetec.
- B. Integrator/Installer (Contractor): The Contractor must be a Genetec-certified installation, service, and support company specializing in the manufacturer's product, with demonstrated prior experience with the selected manufacturer's system installation and programming.

1.4 REFERENCES

- A. NFPA 70 - National Electrical Code
- B. Electronic Industries Association (EIA) Video Surveillance Equipment Standards
- C. UL 2044 - Standard for Commercial Closed Circuit Television Equipment
- D. UL 3044 - Standard for Safety for Surveillance Closed Circuit Television Equipment

1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 28 05 00.
- B. Product Data Submittal: Provide manufacturer's technical product specification sheet for each individual component type. Submitted data shall show the following:
 - 1. Compliance with each requirement of these documents.
 - 2. All component options and accessories specific to this project.
 - 3. Electrical power consumption rating and voltage.
 - 4. All required wiring shall be identified.
 - 5. Number of IP addresses that will be required.
 - 6. Statement of Acceptability of Designed Server:
 - a. The server will be furnished by the Authority based on manufacturer requirements. Contractor shall transfer existing server registration to the new server and shall configure the entire Port Authority system.

7. Provide, included in the base bid, the cost for a Genetec Software Maintenance Agreement to extend until August 31, 2017.
- C. System Drawings: Project-specific system CAD drawings shall be provided as follows:
 1. Provide a system block diagram noting system components and interconnection between components. The interconnection of components shall clearly indicate all wiring required in the system. When multiple pieces of equipment are required in the exact same configuration (e.g., multiple identical cameras), the diagram may show one device and refer to the others as “typical” of the device shown.
 - D. Sample format of site specific programming guides to be used for system planning/programming conference with Authority.
 - E. Meeting agenda for planning/programming conference required in Part 3 of this specification.
 - F. Submit detailed description of Authority training to be conducted at project end, including specific training time.
 - G. Quality Assurance:
 1. Provide materials documenting experience requirements of the manufacturer and installing contractor.
 2. Provide system checkout test procedure to be performed at acceptance. Test procedures shall include all external alarm events.

1.6 SYSTEM DESCRIPTION

- A. This specification section describes the furnishing, installation, commissioning and programming of a complete, turnkey, video surveillance system.
- B. Performance Statement: This specification section and the accompanying project drawings are performance based, describing the minimum material quality, required features, and operational requirements of the system. These documents do not convey every wire that must be installed and every equipment connection that must be made. Based on the equipment constraints described and the performance required of the system as presented in these documents, the vendor and the Contractor are solely responsible for determining all wiring, programming and miscellaneous equipment required for a complete and operational system.
- C. Refer to the project drawings for model numbers for the Basis of Design for all equipment.

1.7 AUTHORITY-SUPPLIED MATERIALS

- A. Genetec video surveillance software, servers, and workstations. Existing software is Security Center Version 5.2. See Part 2.3 for server specifications.

1.8 LICENSING REQUIREMENTS

- A. All licenses required for system operation shall be included in the Contractor’s bid.
 1. Camera licenses shall be provided for 13 cameras.

2. The Authority has 45 existing cameras which are to be re-used.
3. Camera licensing that is restricted to a particular device MAC address or in any way is only valid for a particular manufacturer or model number is not acceptable. Camera licenses shall be issued such that the Authority can replace a camera with another camera brand and/or model number and transfer the license from the old camera to the new camera at no additional cost at any future time. This license transfer procedure shall be capable of being performed by the Authority and shall not require the services of an integrator.
4. The Contractor shall furnish and configure licensing for ten concurrent client licenses in addition to the existing client licenses.
5. The Contractor shall fill out the NVMS Bid Inventory Form located herein and provide at the time of bid.

1.9 PROJECT RECORD DOCUMENTS

- A. Submit documents under the provisions of Section 28 05 00.
- B. Provide final system block diagram showing any deviations from shop drawing submittal.
- C. Provide statement that system checkout test, as outlined in shop drawing submittal, is complete and satisfactory.
- D. Provide final camera type and camera requirements schedules documenting all changes made during construction.
- E. Warranty: Submit written warranty and complete all Authority registration forms. Provide one copy of each warranty submission to Authority.
- F. Complete all operation and maintenance manuals as described below.

1.10 OPERATION AND MAINTENANCE DATA

- A. Submit documents under the provisions of Section 28 05 00.
- B. Manuals: Final copies of the manuals shall be delivered within ten days after completing the installation test. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of the contractor responsible for the installation and maintenance of the system and the manufacturer for each piece of equipment for each system. The manuals shall have a table of contents and labeled sections. The final copies delivered after completion of the installation test shall include all modifications made during installation, checkout, and acceptance testing. The manuals shall consist of the following:
 1. Hardware Manual: The manual shall describe all equipment furnished including:
 - a. General description and specifications.
 - b. Installation and check out procedures.
 - c. System layout drawings and schematics.
 - d. Alignment and calibration procedures.

2. Software Manual: The software manual shall describe the functions of all software and shall include all other information necessary to enable proper installation, testing, and operation. The manual shall include:
 - a. Definition of terms and functions.
 - b. System use and application software.
 - c. Graphical user interface use.
 - d. Reports generation.
3. Operator's Manual: The operator's manual shall fully explain all procedures and instructions for the operation of the system including:
 - a. Computers and peripherals.
 - b. System startup and shutdown procedures.
 - c. Use of system.
 - d. Recovery and restart procedures.
 - e. Use of report generator and generation of reports.
 - f. Data entry.
 - g. Operator commands.
 - h. Alarm messages.
 - i. System permissions functions and requirements.
4. Maintenance Manual: The maintenance manual shall include descriptions of maintenance for all equipment including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective components.

1.11 WARRANTY

- A. Unless otherwise noted, provide warranty effective until 24 months after Authority acceptance of the system for all materials and labor.
- B. Onsite Work During Warranty Period: This work shall be included in the Contractor's bid and performed during regular working hours, Monday through Friday.
 1. Inspections: The Contractor shall perform one minor inspection six-months after Substantial Completion and one major inspection prior to the expiration of the warranty.
 2. Minor Inspections: Inspections shall include:
 - a. Visual checks and operational tests of all equipment, field hardware, and electrical and mechanical controls.
 - b. Mechanical adjustments if required on any mechanical or electromechanical devices.
 - c. Install all available software updates, patches, or bug fixes available from the NVMS manufacturer.
 3. Major Inspections: Inspections shall include all work described under paragraph Minor Inspections and the following work:
 - a. Clean all equipment, including interior and exterior surfaces.
 - b. Perform diagnostics on all equipment, including all system software diagnostics, and correct all diagnosed problems.

- c. Adjust all camera alignments that have become out of alignment from their documented position at Substantial Completion.
 - d. Install all available software updates, patches, or bug fixes available from the NVMS manufacturer.
 - e. All warrantable system deficiencies during the Major Inspection shall be remedied under warranty at no cost to the Authority.
- C. Operation: Upon the performance of any scheduled adjustments or repairs, Contractor shall verify operation of the NVMS system.
 - D. Emergency Service: The Authority will initiate service calls when the NVMS system is not functioning properly. Qualified personnel shall be available to provide service within the distance defined above. The Authority shall be furnished with telephone number(s) where service personnel can be reached 24/7/365.
 - E. Records and Logs: The Contractor shall keep records and logs of each task completed under warranty. The log shall contain all initial settings upon Substantial Completion. Complete logs shall be kept and shall be available for review on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the NVMS system.
 - F. Work Requests: The Contractor shall separately record each service call request on a service request form. The form shall include the model and serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials used, the time and date work started, and the time and date of completion. The Contractor shall deliver a record of the work performed within five days after work is accomplished.
 - G. System Modifications: The Contractor shall make any recommendations for system modification in writing to the Authority. No system modifications shall be made without prior approval of the Authority. Any modifications made to the system shall be incorporated into the operations and maintenance manuals, and other documentation affected. To the fullest extent possible, the Authority shall be provided with electronic restorable versions of all configurations prior to the modifications being made.
 - H. Software: The Contractor shall provide all software updates during the period of the warranty and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with NVMS system operators, shall include training for the new changes/features enabled, and shall be incorporated into the operations and maintenance manuals, and software documentation.
 - I. Refer to the individual product sections for further warranty requirements of individual system components.

1.12 SUPPORT

- A. Provide, included in the base bid, the cost for a parts and labor extended warranty to extend until August 31, 2017.

PART 2 - PRODUCTS

2.1 NETWORK VIDEO MANAGEMENT SYSTEM – GENERAL REQUIREMENTS

- A. The network video management system (NVMS) shall be existing Genetec Security Center Omnicast Enterprise.
- B. The VMS shall utilize network switch ports provided by the Authority for all required IP connections. The Contractor shall provide the Authority with a complete list of all IP ports required.
- C. The NVMS system shall consist of the following hardware/software components:
 - 1. Software:
 - a. Server and client
 - b. Recording services, archival services, and storage management
 - c. Configuration tools
 - 2. System storage as specified on the project drawings.
 - 3. Cameras and related hardware as specified on the project drawings.
 - 4. Hardware: Servers, workstations, and miscellaneous hardware (keyboard, mouse, KVM) as specified on the projects drawings.
 - 5. Network electronics and related hardware and software as specified on the project drawings.
- D. Video from any camera on the system (on the LAN, WAN or Internet) shall be capable of being viewed from single or multiple workstations simultaneously at any time, limited only by network bandwidth.
- E. The NVMS shall support simultaneous displaying of live (15 fps) video of a minimum of 16 cameras while the video monitoring screen is configured in a 16-camera split configuration. In no case shall the frame rate of the camera be required to be restricted to less than 15 fps to display a 16-camera split view.
- F. Simultaneous display and recording of every camera shall be supported with independent user-adjustable frame rates that can be set differently for the display stream and the recording stream. These independent settings shall be unique per camera.
- G. The NVMS monitoring software shall support any combination of recorded and live video in any multiple camera split view, including viewing recorded video and live video from the same camera.
- H. The NVMS shall support continuous recording and event-based recording simultaneously. This shall be capable of being set on a per camera basis.
- I. Viewing of video (live and recorded) shall be possible from client software from any client hardware that is connected to the security LAN/WAN or Internet (through appropriate firewalls). In addition, system administration shall be permitted from remote client hardware.

2.2 NVMS MANUFACTURERS

- A. Basis of Design: Genetec Security Center Omnicast Enterprise, no approved equal.

2.3 NVMS SYSTEM DETAILED REQUIREMENTS

A. Server Specifications:

1. For contractor reference, the following are the specifications of the Authority furnished server:

a. Directory Server:

- 1) HP ProLiant DL360 D9 1U rack server
- 2) 2x Intel Xeon ES-2640 V3 2.60 GHz, 2 Processor support
- 3) 16 GB Ram
- 4) Serial ATA controller
- 5) GB Ethernet
- 6) 500 W power supply
- 7) Microsoft Windows Server 2012 R.2 Standard 64 bit
- 8) HP 450 GB 2.5" internal hard drive, SAS, 10,000 RMP, hot swappable
- 9) HP DL360 Gen 9 SFF DVD/USB universal media bay kit

b. Recording Servers quantity two:

- 1) HP ProLiant DL380p G8 2U rack server
- 2) 1x Intel Xeon E52620 v2 2.10 GHz, 2 processor support
- 3) 16 GB RAM
- 4) Serial ATA controller, RAID supported
- 5) GB Ethernet
- 6) Two HP 450 GB 3.5" internal hard drives
- 7) One HP 600 GB 3.5" internal hard drive
- 8) Nine 6 TB internal hard drives
- 9) Microsoft Windows Server 2012 R.2 Standard 64 bit
- 10) HP external DVD-Writer-DVD +-R/+R/+RW USB
- 11) RAID 6 configurations

- c. Servers shall be Authority furnished and Contractor installed. Contractor shall not provide a warranty on the servers. The contractor shall configure servers for a complete and operational system.

B. Workstations:

1. The two workstations are existing, to be re-used.
2. Two new Authority furnished workstations shall be installed and configured by the contractor to display the system cameras, to be located at SLMPD HQ.
3. The contractor shall furnish, install and configure one laptop PC with Genetec Security Center Web Client. This PC will primarily, though not exclusively, be used at meetings to display camera feeds.
4. One Authority furnished workstation shall be installed and configured by the contractor to display the cameras to be located at the office of the Authority.
5. One Authority furnished workstation shall be installed and configured by the

contractor to display the cameras, to be located at the Old Court House Dispatch Center.

2.4 NVMS RECORDING REQUIREMENTS

- A. The NVMS shall provide management of the recording and playback of video, audio, and data (bookmarking, alarm data, etc.).
- B. Unless stated otherwise, cameras shall record full resolution at 12 frames per second, 24 hours a day.
 - 1. Total distributed storage requirements were determined based on a minimum of 14 days storage retention.

2.5 NVMS INTERFACES AND INTEGRATIONS

- A. Security Management System Integration:
 - 1. Contractor shall configure dynamic graphical maps with an icon for every camera. Contractor shall provide maps obtained from the internet.

2.6 NVMS CABLING

- A. Refer to telecommunications specification section for all requirements.

2.7 SUPPLEMENTAL MATERIAL

- A. Provide, included in the base bid, the cost for the following, to be delivered to the Authority's office and utilized as part of Part 1.12 of the specification.
 - 1. Two fixed position cameras as defined on the plans
 - 2. Two pan/tilt/zoom cameras as defined on the plans.
 - 3. One network switch as defined on the plans.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with the manufacturer's instructions and recommendations for installation of all products.
- B. Provide all system wiring between all components as shown on the project drawings or as directed by the manufacturer, whichever is the more stringent requirement.
- C. Mount all cameras in the approximate locations shown on the drawings. Coordinate installation with other trades and utilities in the vicinity.
- D. Contractor is responsible to coordinate with Authority's IT Department on acquiring network configuration information, such as IP numbers, that will be required to connect NVMS to Authority network.
- E. Contractor shall affix Authority furnished asset tags on all Authority defined surveillance system components.

- F. Contractor shall transfer system licensing and software from existing server to new servers defined in Part 2.3 of this specification section.
- G. Contractor shall install new Authority furnished servers in existing rack.
- H. After system operation is transferred to the new servers, contractor shall remove existing server and return to Authority.
- I. Contractor shall configure all system servers and workstations to view system cameras.

3.2 FIELD QUALITY CONTROL

- A. Where these specifications require a product or assembly without the use of a brand or trade name, provide a product that meets the requirements of the specifications as supplied and warranted by the system vendor. If the product or assembly is not available from the system vendor, provide product or assembly as recommended by the system vendor.
- B. Periodic observations will be performed during construction to verify compliance with the requirements of the specifications. These services do not relieve the Contractor of responsibility for compliance with the project drawings.
- C. It shall be the Contractor's responsibility to correct all inadequate picture quality issues prior to acceptance of the system.

3.3 MANUFACTURER'S FIELD SERVICES

- A. Installation shall be performed by a Genetec certified Contractor.
 - 1. The Contractor shall provide a comprehensive, site-specific customer planning guide for the system. The Contractor shall conduct a conference with the Authority prior to any installation to discuss the programming options of the system and the planning guide. The result of this planning guide shall be the determination of the system options for each device and for the software.
- B. The Contractor shall include labor for all planning and all programming activities required to implement the Authority's operational preferences for each device and software. Any software programmable option, within the bounds of the capabilities of the hardware specified, shall be included.
- C. It shall be the responsibility of the Contractor to provide a complete, functional system as described by the project drawings. These responsibilities include:
 - 1. Complete hardware setup, installation, wiring, and software configuration of the system, including all remote operator locations and all peripheral hardware.
 - 2. Complete programming of all hardware and software options in accordance with the Authority's preferences as determined by the planning guide conference.
 - 3. Programming of all custom graphic GUI screens including devices.
 - 4. Complete system diagnostic verification.

3.4 SYSTEM ACCEPTANCE

- A. The vendor shall submit for review a formal acceptance and system checkout program. The system checkout procedures shall include all system components and software. The

Contractor shall perform the tests and document all results under the supervision of the manufacturer's system engineer.

- B. All operational scenarios, as defined by the customer planning guide, shall be tested to simulate the actual use of the system in the normal operating environment. The successful completion of these operational scenarios shall be documented.

3.5 SYSTEM DOCUMENTATION

- A. Complete documentation shall be provided for the system. The documentation shall describe:
 - 1. All operational parameters of the system.
 - 2. Complete documentation of all programming and options.
 - 3. Complete operating instructions for all hardware and software.
- B. The following sections shall be provided in the system documentation:
 - 1. System Administrator Manual: Provides an overview and a step-by-step guide and instructions detailing all system administrator responsibilities and functions.
 - 2. User Manual: A step-by-step guide and instructions detailing all system user functions.
 - 3. Technical Maintenance Manual: A comprehensive document providing all maintenance actions, system testing schedules, troubleshooting flowcharts, functional system layout, wiring diagrams, block diagrams, and schematic diagrams.

3.6 SYSTEM TRAINING

- A. All labor and materials required for on-site system training by a certified representative of the system manufacturer shall be provided. Training shall be conducted at the project site using the project equipment.
- B. Provide two weeks advanced notice of training to the Authority.
- C. Provide a training outline agenda describing the subject matter and the recommended audience for each topic.
- D. At a minimum, the following training shall be conducted:
 - 1. System Administrators: A course detailing the system functions and operations. Provide configuration training on all aspects of the system.
 - 2. Users: Provide a detailed course outlining the operational features of all aspects of the user interface. Topics shall include alarm monitoring functions, reports, error handling, alarm handling, output relay control, and general overview of the report hardware.
 - 3. GUI Editing: Conduct detailed training on using the GUI editing software. Topics shall include the editing of existing graphical maps and the creation of new graphical maps.

- E. Minimum on-site training times shall be:
1. System Administrators: Three days.
 2. Users: One day.
 3. GUI Editing: One day.

END OF SECTION