

## SECTION 08660

### INTERIOR WIRE MESH WINDOW GUARDS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes new interior wire window guards as indicated and as specified.
- B. The materials in this Section are part of the overall USGBC "Leadership in Energy and Environmental Design" LEED prerequisites and credits needed for Project to obtain LEED Silver certification based on LEED for Schools 2007 requirements. See Section 01352 LEED Requirements and this section for more information.
- C. Location: Gymnasium

##### 1.2 SUBMITTALS

- A. Product Data: Submit the following:
  - 1. Materials list of all parts and components of metal window guard.
  - 2. Construction details and fabrication methods.
  - 3. Profiles and dimensions of individual components.
  - 4. Data on hardware, accessories, and finishes.
  - 5. Color charts for selections by Architect..
  - 6. Manufacturer's recommended installation procedures, specifications and other data required to demonstrate compliance with the specified requirements.
- B. Shop Drawings: Submit complete shop drawings for metal window guards. Include information not fully detailed in manufacturer's standard product data, including details of surrounding construction.
  - 1. Fabrication and installation of metal window guards.
  - 2. Layout and installation details, including anchors.
  - 3. Elevations at 1/4 inch = 1 foot scale.
  - 4. Typical unit elevations at 3/4 inch = 1 foot scale.
  - 5. Full-size section details of typical members, including reinforcement and stiffeners.
- D. LEED Submittal:
  - 1. Product Data as required to show compliance with the following credits:
    - a. LEED MR Credit 4.1 and 4.2 - Recycled Content
  - 2. See Section 01352 LEED Requirements and this Section for more information. Submit Materials Credit Documentation Sheet attached to Section 01352 for products in this section, including back-up documentation.

##### 1.4 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect materials of this Section before, during, and after installation and to protect installed work and materials of all other trades.

- B. Delivery and storage: Deliver all materials to the job site in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturer's recommendations.

## 1.5 EXISTING CONDITIONS

- A. Existing Measurements: Check actual existing window openings by accurate field measurement before fabrication. Coordinate fabrication schedule with construction progress to avoid delay of the work.
- B. Coordinate and obtain from the field all dimensions needed for fabrication and installation of new window guards. Include field dimensions on shop drawings. Obtain dimensions and details for the operation windows, and all information needed to install the window guards.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide metal window guards manufactured by one of the following:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Model #2180, Space Guard Partition, or architect-approved comparable product by one of the following:
    - a. Acorn Wire and Iron Works.
    - b. Indiana Wire Products
    - c. Standard Wire and Steel Works.

### 2.2 WIRE WINDOW GUARDS

- A. Mesh: 6 gauge welded 1-1/2-by-2-1/2-inch rectangular steel wire mesh.
- B. Vertical and Horizontal Panel Framing: 16 gauge 1-inch y 1-inch or tube, cold-rolled, C-shaped steel channels.
  - 1. Provide additional reinforcement for locations exceeding structural performance of standard units due to size and or span.
- C. Guards to be hinged on one side to a continuous angle, channel, or special section hinge bar. Hinges to be 1-inch by 1-inch continuous piano hinge. Provide a limit chain at the top of each guard securely fastened to the guard and the window frame to prevent the guard from being opened more than ninety degrees.
- D. Fixed Guards: Provide fixed guards in areas as required where obstructions will prevent operation of a hinged guard. In these areas guards shall be sectionalized so that only guards at fully operational areas are operable. Sectionalized panels shall have fully finished framing at perimeter of wire panels.
- E. Provide continuous strike angle with steel tab and padlock eye for locking into position.

- F. Juncture of wire window guards shall occur at the center line of the replacement window mullions.
- G. Provide all other materials, not specifically described but required for a complete and operable installation of the window guards, including floor and wall anchors and fasteners.
  - 1. Guards shall not be attached to window or window wall framing members.
- H. Attachment Devices: Provide special frames or other attachment devices which will allow secure attachment of guards to construction other than window or window wall framing members. Guards are not allowed to be attached to the window or window wall framing.

## 2.3 FABRICATION

- A. Fabricate and assemble window guards at the manufacturer's shop and before applying finishes, including, but not limited to, welding, cutting, drilling, and fitting of joints. Provide mortising, drilling, tapping, and reinforcement required for hardware at fabrication plant prior to application of finishes.
- B. Use electrodes and methods recommended by manufacturer of material being welded, and in accordance with applicable AWS standards. Use only methods which prevent distortion and discoloration of exposed faces. Grind weld areas smooth. Restore finish of component parts after welding and grinding.
- C. Dissimilar Materials: Separate dissimilar materials with a heavy coating of epoxy paint or other suitable permanent separation as required to prevent galvanic action.

## 2.4 FINISH

- A. Steel Finish: Manufacturer's standard baked enamel or powder coating. Prepare steel surfaces for painting as recommended by coating manufacture.
  - 1. Color: As selected by Architect from a full range of ICI color selections.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. Provide all bolts, hardware and accessories for complete installation.
- B. Erect partitions plumb, rigid, properly aligned, and securely fastened in place. Adjust opening and closing units to operate freely without bind.
- C. Provide additional field bracing as necessary for rigid, secure installation.
- D. Touch up damaged finish after completion of installation using field-applied paint to match color of shop-applied finish.
- E. Wire guards shall be secured to masonry jambs with subframes and fasteners equally spaced no more than 1'-6" on center. Guards shall not be secured to window frame, panning or mullions or any portion of window or window wall.

- F. Install in accordance with approved shop drawings, manufacturer's instructions, and specifications. Plumb and align faces in a single plane and erect screens square and true, adequately anchored. After completion of installation, screens shall be adjusted, in working order and clean.

### 3.2 OPERATION TESTING

- A. After installation and final inspection, test and demonstrate operation.

END OF SECTION

## SECTION 16782

### DIGITAL VIDEO SURVEILLANCE SYSTEM AND COMPONENTS (FOR HIGH SCHOOLS)

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. All sections of Division 16 apply to this section.

##### 1.2 SUMMARY

- A. Section Includes: Materials, labor, and service for the installation of a Digital Video Surveillance (DVS) System including but not limited to:
  - 1. Cabling and Connections
  - 2. DVS Concentrator Remote Enclosures
  - 3. Equipment Mounts and Racks
  - 4. Interconnections to LAN and WAN networks
  - 5. Un-interruptible Power System
  - 6. Final adjustments and system check out
  - 7. Training (BASE BID)
  - 8. DVS Cameras and Housings
  - 9. Viewing Stations
  - 10. Fiber/POE/Switch
  - 11. Server Hardware Equipment: Directory Server, Storage Arrays, Archive Server
- B. The DVS cabling infrastructure shall closely resemble the voice and data unshielded twisted pair (UTP) solutions. This DVS system design is comprised of the most state-of-the-art technology offered by the DVS industry. Instead of a traditional baseband coaxial cable design, this design shall be centered around using one suitable unshielded twisted pair cable and various other components listed below to deliver full motion video signals, control signals, and 24 VAC power over a single cable consisting of four similar unshielded twisted pairs. Coaxial cable system design shall NOT be considered as a design alternative. The DVS system shall be completely digital, using HD cameras to provide better visual imagery for operations and the detail required for video forensics, utilizing the H.264 compression algorithms.
- C. The following viewing stations shall be provided: Principal's Office, Security Office, Security Station and Police Office. All DVS cameras shall be recorded in the MDF Room security system equipment.
- D. The DVS system must allow for remote viewing through the CPS-ITS network from each school through the WAN system to the main offices of the CPS Office of School Safety and Security and the Office of Emergency Management and Communications (OEMC). The remote access feature shall be included in this installation.

- E. The DVS system shall be capable of receiving signals from owners Intrusion Detection System.
- F. In most cases the electrical contractor shall be responsible for the installation of conduits, supports, junction boxes and wall boxes. The security contractor shall coordinate with the electrical contractor to verify a complete system is installed. All security cables are to be installed in conduit. For standalone security projects the security contractor shall be responsible for the installation of conduits and raceway.

### 1.3 DEFINITIONS

- A. DVS: Digital Video Surveillance
- B. CRE: DVS Concentrator Remote Enclosure
- C. MDF: Main Distribution Facility
- D. ITS: Information Technology Services
- E. OEMC: Office of Emergency Management and Communication
- F. OSSS: Office of School Safety and Security
- G. SCC: Student Security Center at 125 S. Clark

### 1.4 SUBMITTALS

- A. Product Data for each component specified, including detailed manufacturer's specifications. Include data on features, ratings, and performance.
- B. Shop Drawings: Detail installed features and devices. Include the following:
  - 1. Floor plans prepared at 1/8 inch scale prepared in AutoCAD 2007 indicating the following:
    - a. Location of all DVS outlets with identification numbers.
    - b. Riser and Connection diagrams.
    - c. Location of DVS remote enclosures (CRE), termination racks and backboards.
    - d. Point-to-point raceway routing, identifying number and type of cables in each raceway. Include pull box locations and sizes.
    - e. Conduit fill calculations, indicating cross-section area percent fill for each raceway.
    - f. Detailed layout drawings of each DVS Remote Enclosure (CRE), MDF racks, including front-view details identifying all components, cabling connections, and cable identification numbers.
  - 2. Programming documentation using manufacturers programming form and system layout work sheets. Contact CPS Office of School Safety and Security at (773) 553-3335 for general programming requirements.
- C. Furnish three (3) copies of an operation and maintenance manual consisting of a 3 ring binder with equipment specifications, programming instructions, programming disk, maintenance instructions and list of spare parts and replacement components. Include names and phone

numbers to contact for assistance, maintenance, and warranty service. Deliver to CPS Office of School Safety and Security at the time of demonstration and training required in Part 3.

- D. Furnish six copies, six CDs of AutoCAD Drawing copies and one reproducible set D size "as built" drawings.
- E. Field test reports for tests specified in Part 3.
- F. Warranty: Special Warranty specified in this section.

### 1.5 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** Engage firms experienced in manufacturing systems and equipment similar to those indicated for this Project and that have a record of successful in-service performance.
- B. **Installer qualifications:** The work of this section shall be performed by a qualified DVS System contractor. Minimum requirements are:
  - 1. Security Contractor shall be factory trained and authorized installer of the products specified.
  - 2. Carries replacement parts in stock and have personnel trained in service and trouble shooting of the products specified.
  - 3. Experienced in installing and servicing low voltage, DVS based systems.
  - 4. Installer shall have staff members trained and familiar with Microsoft Networks and Cisco Systems network hardware and software.
  - 5. Installation shall be performed under the supervision of a technician trained and approved by the manufacturer of the DVS system. Technician shall make final adjustments, check operation of the systems, certify that the final installation is in accordance with the manufacturer, and instruct the CPS Office of School Safety and Security on the programming, use, and operation of the systems.
  - 6. The contractor shall have a minimum of (3) three service personnel on call at the same time and provide service response within 24 hours.
  - 7. Licensed by the State of Illinois as a Private Alarm Contractor to install DVS systems.
  - 8. Licensed by City of Chicago in Accordance with Section 14-12-170 of the City of Chicago Electrical Code.
  - 9. Awarded contractor shall be a current good standing member with the Local 134 Electrical Union.
  - 10. Illinois Department of Financial and Professional Regulation P.E.R.C (Blue) Card.
- C. **Pre-Installation Meeting:**
  - 1. Arrange for a meeting of trades involved in the installation. Camera locations on drawings are not shown in exact location and prior to starting any work, the contractor shall have met with a representative of the CPS Office of School Safety and Security to coordinate final locations and heights of all devices.
  - 2. Arrange a training session for trades involved in the installation.
- D. Comply with City of Chicago Building Code.

- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in City of Chicago Electrical Code, by a qualified testing agency, and marked for intended location and application.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not install electronic components until major construction work in the area is complete. Do not install in areas where dust or moisture can contaminate the working parts or where finish can be marred by construction work.
- B. Stage materials in a secure area of the project site until installation. Materials and items shall be placed so that they are protected from damage and deterioration.

#### 1.7 WARRANTY

- A. The Contractor shall unconditionally warrant all equipment and systems provided under this section to be free from defects in materials for a period of at least 36 months from the date of final acceptance of all work of this section and workmanship for a period of at least 12 months from the date of final acceptance of all work of this section. The horizontal cabling infrastructure performance warranty shall comply with Section 17200 Communication General Requirements.

#### 1.8 SUBSTITUTIONS

- A. The materials, products and equipment described in the Bidding Documents establish a standard of CPS Office of School Safety and Security required functions, dimensions, appearance and quality to be met by any proposed substitution.
- B. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by designated CPS Representative and CPS Office of School Safety and Security at least ten (10) days prior to the date for receipt of Bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including drawings, cuts, performance, test data and warranties, and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or other work than incorporation of the substitute would require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The CPS Representative decision of approval or disapproval of a proposed substitution shall be final.
- C. If the CPS Representative approved any proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. This Addendum shall then be issued to all Bidders.
- D. Requests for substitution shall be made only by a Bidder. Requests for substitution received by the CPS Representative from Sales representative, vendors, suppliers, etc., are not acceptable.

#### 1.9 PROJECT/SITE CONDITIONS

- A. Environmental Requirements:



1. Site should be substantially enclosed and secure prior to installation of hardware.
2. Environmental systems should be in place and operational.
3. Deliver materials onsite at least 24 hours prior to installation to allow materials to reach temperature and humidity equilibrium.

#### 1.10 MAINTENANCE COMPONENTS

- A. Provide the following components, as part of the Project, to the Owner or as part of installed system as indicated:
1. Components to be given to CPS Office of School Safety and Security:
    - a. Three percent (3%) or no less than two (2), whichever is greater, of the following:
      - 1) Storage disk drive
      - 2) Indoor fixed camera
      - 3) Surge Protection Devices

## PART 2 - PRODUCTS

### 2.1 DVS – INFRASTRUCTURE SYSTEM COMPONENTS

- A. DVS-UTP Cable:
1. A Category 6 solution is provided subject to compliance with all requirements as described in Section 17250 – Communications Horizontal Cabling.
  2. The horizontal distribution cabling shall be a four (4) pair, unshielded twisted pair (UTP) design. The horizontal drop cable cabling from the DVS Remote Enclosure (CRE) to camera outlet shall not exceed 295 feet (90 meters) in length, unless approved by CPS Office of School Safety Security for a specific application. Based on horizontal distance limitations, all indoor camera video, control, and power signals shall be met via one cable using only the four pairs available.
  3. Horizontal drop cabling shall only be terminated via an IDC (insulation displacement connection) connection to a 110-format block patch panel at all CRE/MDF/IDF or RJ45 jack at camera location.
  4. The conductors of the pairs shall be a No. 23 AWG solid copper construction.
  5. All DVS-UTP cables shall meet or exceed the following UL listing:
    - a. UL 1690, Data-Processing Cable defining DP-3 or DP-3P listings.
    - b. UL 444, Communications Cable.
  6. Jacket Color: Purple
- B. DVS Power Cable (For outdoor camera installations only):
1. For outdoor camera installations only: in addition to the DVS-UTP cable, a power cable shall be a minimum No. 16 AWG 2-conductor, stranded copper conductor construction. Size of cable is based on voltage drop and camera requirements. This cable is used to feed 24 VAC from a local power supply and shall be provided for each outdoor camera.
- C. DVS Backbone Cable (up to 150 meters): Subject to compliance with requirements in Section 17232 Optical Fiber Backbone Cabling. Provide Indoor 10G/150M Multimode Fiber-Optic Cable: 50/125-micrometer, laser-optimized multimode optical fiber, capable of 10-Gigabit Ethernet transmission up to 492 feet (150 meters), for use in indoor-applications only.
1. Strand Count: 6 (MDF to enclosures);

2. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
  3. Minimum OFL Bandwidth: 700 MHz-km at 850 nm; 500 MHz-km at 1300 nm, as characterized by OFL (overflow launch) measurement per EIA/TIA-455-204.
  4. Cable shall meet or exceed the OM3 standard.
- D. DVS Backbone Cable (up to 300 meters): Subject to compliance with requirements in Section 17232 Optical Fiber Backbone Cabling. Provide Indoor 10G/300M Multimode Fiber-Optic Cable: 50/125-micrometer, laser-optimized multimode optical fiber, optimized for VCSEL-based transmission of 10-Gigabit Ethernet up to 984 feet (300 meters), for use in indoor-applications only.
1. Strand Count: 6 (MDF to enclosures);
  2. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
  3. Minimum Effective Modal Bandwidth: 2000 MHz-km at 850 nm; 500 MHz-km at 1300 nm, as characterized by DMD measurement per EIA/TIA-455-220.
  4. Cable shall meet or exceed the OM3 standard.
- E. DVS UTP Connecting Hardware:
1. DVS Jacks Category 6:
    - a. Subject to compliance with requirements in Section 17250 – Communications Horizontal Cabling.
    - b. DVS jacks shall be in the configuration of an 8-position, Category 6 RJ45 jack with 110 IDC conductor terminations.
    - c. For the purposes of the DVS infrastructure, DVS jacks shall not be installed in multi-jack faceplates with jacks serving other communications systems purposes.
    - d. DVS jacks shall be modular and not a permanent element associated to a faceplate.
    - e. DVS jacks shall be capable of terminating 22 - 24 AWG solid copper conductors without damaging jack.
    - f. DVS Jack Color: Purple
  2. DVS Patch Panels Category 6:
    - a. Subject to compliance with Category 6 requirements. Subject to compliance with requirements in Section 17250 – Communications Horizontal Cabling.
    - b. DVS patch panels in 16, 24, and 32-port configurations shall have 110 IDC conductor terminations and shall be capable of terminating 22 - 24 AWG solid copper conductors without damaging jack.
    - c. DVS patch panels shall be configured to the TIA/EIA 19 inch rack standard.
    - d. Color requirements:
      - 1) DVS Jacks for insertion into DVS patch panels shall be purple color.
      - 2) Color: Black mounting plate with purple RJ45 jacks.
  3. DVS Patch Cords Category 6:
    - a. Subject to compliance with Category 6 requirements. Subject to compliance with requirement in Section 17250 – Communications Horizontal Cabling.
    - b. Patch cords shall be in the configuration of a four (4) pair, unshielded twisted pair design, stranded copper conductor construction.
      - 1) The patch cord insulation shall be PVC and shall be UL rated as CM or CMR.
      - 2) All patch cables shall be component compliant to TIA/EIA Category 6 requirements
      - 3) All patch cords shall meet or exceed the TIA/EIA-568-B.2.1 worst-case electrical characteristics.
      - 4) Patch Cord Color: Purple

- F. DVS Backbone Connecting Hardware, Patch Cords and Optical Cable Connectors:
1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.
  2. Fiber Optic Termination Housing: Rack-mount, with multi-numbered, duplex connector insert adapter panels holding fiber optic strand connectors.
    - a. Optical Fiber Connecting Hardware subject to compliance with requirements in Section 17232 Optical Fiber Backbone Cabling
    - b. Size – Concentrator Enclosures: (1) rack unit height; sized to accommodate a total of two (2) adapter panels.
    - c. Size – MDF/IDF: (3) rack units height, sized to accommodate at least six (6) adapter panels.
  3. Patch Cords:
    - a. Optical Patch Cords subject to compliance with requirements in Section 17232 Optical Fiber Backbone Cabling.
    - b. Patch cords shall be of same manufacturer and consistent with components and performance level of cross-listed solutions indicated in this Section.
    - c. Specification of fiber optic patch cord to match fiber optical backbone served by cord.
  4. Optical Cable Connectors:
    - a. Optical Fiber Connecting Hardware subject to compliance with requirements in Section 17232 Optical Fiber Backbone Cabling.
- G. DVS Concentrator Remote Enclosure (CRE):
1. General: The wall-mounted metal enclosures shall be used to house, secure and protect remotely located DVS equipment from environment, vandalism, etc., in various rooms of the Chicago Public Schools. This enclosure shall also serve as a zone limiting the cabling distance of any DVS camera to 295 feet throughout the school. The unit shall consist of basic enclosures plus accessories required for fully functional system.
  2. Concentrator enclosures shall serve as the CRE for the DVS system. Subject to compliance with requirements in Section 17216 – Cabinets, Racks and Enclosures.
    - a. Enclosure shall have thirteen (13) rack-mount spaces minimum. Vertical rails shall provide front-to-back adjustment of one-inch (1”) minimum or extension brackets for vertical hub enclosures. Enclosure shall be gasketed to provide environmental protection.
    - b. Enclosure body and door shall be provided with welded grounding studs on both sides so that the enclosure and the door can both be grounded using flexible copper braids, with the door hinge installed on either side.
  3. Provide Fan and Fan Filter Kit accessory for CRE.
  4. Power shall be an isolated ground quadruplex receptacle, connected to a 20amp, single pole breaker.
  5. Provide master key for lockable cabinet.
  6. The CREs shall be primarily located in Storage or Office Rooms. Classroom locations are to be avoided.
  7. In existing schools, provide the CRE adjacent to the existing concentrator enclosure with working space of 4” to 6” between enclosures. The two enclosures will be connected by a 2” conduit. Service to the new CRE will be provided by a fiber patch cord from the 3<sup>rd</sup>/4<sup>th</sup> fiber on the existing fiber backbone from the originating concentrator enclosure.
  8. In existing schools where new camera distances exceed 295ft. from the closest concentrator enclosure, a new CRE will be provided per specifications.

H. Equipment Rack:

1. Subject to compliance with requirements in Section 17216 – Cabinets, Racks and Enclosures for communications floor-mounted rack and wire management panels.
2. Provide with double-side vertical wire management on each side.
3. Provide dedicated power, (4) isolated ground duplex receptacles, connected to a 20amp, single pole breaker and dedicated power connection to support the equipment rack UPS from the MDF panelboard to MDF Security Systems Rack.

I. Grounding

1. Provide Telecommunication Rack Grounding Kit.
2. Provide No. 6 AWG copper bonding conductor.
3. Provide one hole compression lugs for bonding conductor terminations.
4. Provide ground from DVS equipment rack to MDF Main Grounding Bussbar.
5. Provide ground from MDF ladder tray to MDF Main Grounding Bussbar.
6. Subject shall comply with Section 17216 – Cabinets, Racks and Enclosures for grounding requirements.

2.2 DVS - EQUIPMENT

A. Typical Indoor Integrated Fixed Camera and Housing:

1. Acceptable interior fixed camera is Arecont AV3155DN 3MP Fixed Vandal-Resistant MegaPixel Dome Camera includes the following unique features for optimal performance for use within a school environment.
  - a. Power-over-Ethernet (PoE) IP Camera, providing power and data transmission via a single Category 6 cable (up to 295 feet)
  - b. The Vandal-Resistant Dome which is a IP66 weatherproof hardened enclosure with security screws
  - c. One-half inch (1/2”) Sensor for low light capabilities and sharper imagery
  - d. Up to 3 MegaPixels of resolution for facial identification at 30 feet
  - e. Multiple streaming (up to eight) at variable resolutions and frame rates
  - f. H.264 compression
2. In rare circumstances (and only upon approval of CPS Office of School Safety and Security Representative), the dome camera shall be ceiling mounted. Provide flush mount camera, with a recessed ceiling mount and secure ceiling tiles with ceiling tile hold down clips.
3. All cameras shall be capable of electronic light control for low light (day /night) conditions. Camera shall provide color images when sufficient light is present and automatically provide black and white images during low light and night conditions. Camera shall have the ability to autoback focus.
4. All cameras shall have automatic iris control with manual override.
5. All lenses shall be selected based on the application and view angle for maximum coverage as placed in drawings.
6. Cameras shall be housed in vandal resistant, low profile, smoke mini-dome enclosures.
7. Camera shall have intelligent video motion detection feature.
8. Acceptable alternative manufacturers to Arecont include: Sony and Axis.

B. Typical Exterior Fixed Camera and Housing:

1. Provide the above specified Arecont AV3155DN-1HK 3MP Fixed Vandal-Resistant MegaPixel Dome Camera.

2. All exterior dome cameras shall be mounted utilizing vandal proof outdoor wall mounted mounting brackets.
3. Provide smoke domes.
4. Provide 10 Watt heaters.
5. Provide power supply if the camera and/or heater/cooler are not completely powered over PoE, or HighPoE.
6. Acceptable alternative manufacturers to Arecont include: Sony and Axis.

C. Specialty Fixed Camera:

1. Special circumstances may require the use of a more close up lens on the fixed camera.
  - a. Zoom lenses are designed with multiple lens groups that when are stretched or pulled together shall change the field of view from wide-angle, to normal, to telephoto.
  - b. The advantage of a zoom lens is the ability to fine tune the area-of-coverage. The Arecont AV3155 includes a 4.5 – 10mm zoom lens for a variable wide-angle coverage. The lens shall be set to 10mm, and focused to infinity, which shall provide focus from one meter to the horizon.
  - c. Lenses should be adjusted to maximize the area-of-coverage both vertically and horizontally and is dependent on the location.
2. Special circumstances may require the use of a wide angle fixed camera.
3. A wide-angle lens is considered a lens that provides a wider than normal view, through the frame of the camera. A telephoto uses the optical glass to see object that are further away closer, within the frame of the camera.
4. The choice of wide-angle or telephoto lenses for security cameras is based entirely on the size of the image sensor. Table 1 depicts the millimeter lengths for the normal lenses for each sensor size. A wide-angle lens would be anything lower than the normal lens (e.g. a 14mm lens on a camera with a 1 inch sensor), and a telephoto would be anything higher than the normal lens.

a. **Table 1: Sensor Size and Normal Field of View**

Sensor Size	Normal Lens
1"	25mm
2/3"	16mm
1/2"	12mm
1/3"	8mm
1/4"	6mm

5. NOTE: Many fixed cameras come with a slightly wide-angle lens as the default.
6. Acceptable alternative manufacturers to Arecont include: Sony and Axis.

D. Outdoor IP PTZ Cameras:

1. Outdoor IP DVS Camera and Housing

- a. Provide IP PTZ Camera with minimal 18X zoom capabilities.
  - b. All cameras shall be capable of electronic light control for low light (day /night) conditions. Camera shall provide color images when sufficient light is present and automatically provide black and white images during low light and night conditions.
  - c. All cameras shall have automatic iris control with manual override.
  - d. All lenses shall be selected based on the application and view angle for maximum coverage as placed in drawings.
  - e. Cameras shall be vandal resistant, low profile, mini-dome enclosures.
  - f. The integrated DVS camera enclosure shall be provided with a manufacturer's warranty covering repair or replacement of defective parts for period of two years from the date of shipment.
  - g. Cameras shall be vandal resistant, low profile, mini-dome enclosures.
  - h. Outdoor enclosures shall have a heater element and sun shields.
  - i. PTZ cameras shall be corner mounted for a 270 degree field of view with gooseneck mounts whenever applicable.
  - j. Provide Power-over-Ethernet (or High Power-over-Ethernet) with significant voltage to power the internal heater and cooling function.
2. Provide power supply if the camera and/or heater/cooler are not completely powered over PoE, or HighPoE. Provide the necessary gauge wire (per wiring and manufacturers specifications) for low-voltage power if the camera and/or heater/cooler are not completely powered over PoE, or HighPoE.
    - 1) Provide 120V, single phase power within 75 feet of all PTZ. Due to proximity of outdoor cameras, providing a combined local power supply for up to four outdoor cameras is permissible. Mount power supply indoors, wall mounted, above third floor drop ceiling.
  3. Manufacturer:
    - a. Pan, tilt cameras shall be Axis Q6032-E HD PTZ dome cameras 18X wide dynamic range with Day/Night ability, vandal proof smoke domes, heaters and blowers.
    - b. Acceptable alternative manufacturers to the Axis Q6032-E HD include: Axis P5534 PTZ or Sony SNC-RH164 PTZ.
- E. Viewing Workstations:
1. Genetec Omnicast Client Station Requirements:
    - a. Intel ® Core ® 2 Quad Processor Q9400 (2.66Ghz, 1333MHz FSB)
    - b. 4 GB DDR2 Non-ECC SDRAM
    - c. 2 x 250 GB Hard Drive
    - d. 256MB ATI Radeon HD3450 Dual Monitor Video Card
    - e. 1600 x 1200 or higher screen resolution
    - f. 10/100/1000 Ethernet network Interface Card, wireless card
    - g. 16x DVD +/- RW Drive
    - h. AX510 Sound Card
    - i. 17" UltraSharp 1708FP flat panel monitor, integrated Gigabit
    - j. Win XP Pro, Office 2003, CPS Image, Keyboard, Optical Mouse
  2. Provide (4) viewing workstations.
  3. View stations shall be connected to local data outlet routed from local concentrator or MDF Room.
  4. The following locations shall be provided with Viewing Stations:
    - a. Principal's Office
    - b. Security Office
    - c. Security Station/Desk

d. Police Office

F. Surge Protection Devices – Outdoor Cameras:

1. Provide surge protection devices shall be required at all outdoor cameras.
2. The method of attachment shall employ a RJ45 jack format for both input and output for video/data, two pairs of 24V power protection and an external grounding screw.
3. Power protection shall be clamped at a maximum of 47 volts AC.
4. Reaction time of the surge protection device shall be in pico seconds
5. The protective devices shall be placed at all outdoor camera locations.
6. The protective device shall be placed in the camera housing, or in a separate weatherproof enclosure
7. Manufacturer: Ditek DTK-PVPIP, DTK-MRJPOE or integral built in surge protector.

G. Software

1. The Genetec Omnicast Enterprise 4.6 (or higher) is the Video Management System software to manage all the cameras, and connections. The base license includes four (4) client/user connections and eight (8) camera connections. Additional camera licenses are required.
2. Archiving requires a physically separate server, as all archiving should be done on completely separate machines so not to slow down the directory and gateway functions. There is a maximum of 75 cameras per 25TB Archiver machine.
3. Additional Federation Server Licenses are a requirement to link each additional school implementation to the CPS (SSC) Student Security Center and the Office of Emergency Management and Communication (OEMC).
4. The software shall be based on a true open architecture that shall not limit the storage capacity and shall allow for gradual upgrades of recording capacity.
5. Required Licenses Include:
  - a. Genetec Omnicast Enterprise 4.6 (or higher) base license includes:
    - 1) One 75 camera/25TB Archiver (on directory machine, camera licenses not included)
    - 2) Gateway - 8 camera connections – 4 client/user connections
    - 3) Maps/Procedures – Camera Sequences - Audio Support – Webpack
    - 4) Virtual Matrix
    - 5) Macros
    - 6) Keyboard connection
    - 7) Alarm Management Module
    - 8) Local Archiving
    - 9) Offline archiving
    - 10) Time Zone Support
  - b. Genetec Additional Camera Licenses X number of camera connections licenses (99 cameras or less).
6. Provide latest version of Genetec software to date of Bid Project.
7. The DVS system shall be capable of receiving signals from owners Intrusion Detection System. Software shall have Alarm Video Monitoring and External Alarm Capabilities.
8. Omnicast Software requirements:
  - a. Operating System: (CPS Preferred Server OS)
    - 1) Microsoft ® Windows Server ® 2008 Standard Edition SP2 32-bit/64-bit
    - 2) Microsoft ® Windows Server ® 2008 Enterprise Edition SP2 32-bit/64-bit
    - 3) Microsoft ® Windows Server ® 2008 Standard/Enterprise Edition R2 64-bit
  - b. Databases: (CPS Preferred SQL Version)

- 1) SQL Server 2008 Express/Standard/Enterprise
- c. Browsers: (CPS Preferred Browser)
  - 1) Internet Explorer 7(for Web Clients).

H. Server Hardware Environment

1. Network device rack with adequate space for required equipment within an environmentally controlled environment or enclosure. If using a two post rack, center-mount rails must be purchased to properly mount servers and storage arrays.
2. Provide the server hardware environment to support the DVS/Genetec Software Solution.
3. The Storage capacity and configuration shall be scalable based on specific application needs without modification to the base video management software package.
4. All hardware platforms will be capable of mounting in a standard nineteen inch (19") equipment rack and accepting power, network and other standard IT wiring connections.
5. The video management software manufacturer and camera manufacturer shall provide storage per camera required based tool to calculate hardware requirements for the specific recording configuration to be managed by the video management software server. In order to determine the hardware storage requirements that are best suited for the actual application coordinate with the video management software manufacturer.
6. For Storage Hardware Calculations: Provide storage capacity use 3MP (2048 x 1536) resolution with 30% compression, 12 FPS 7am to 6pm and 6 FPS 6PM to 7am, and 30 days retention.
7. Server Hardware shall be packaged from DELL and shall be coordinate with CPS ITS Representative.
8. Recommended Server Specifications:
  - a. Dell PowerEdge R710 with Chassis for Up to 6, 3.5-Inch Hard Drives and Intel 56XX Processors
  - b. 48GB Memory (12x4GB), 1333MHz Dual Ranked RDIMMs for 2 Processors
  - c. 2 X Intel Xeon X5677, 3.46Ghz, 12M Cache,Turbo, HT, 1333MHz Max Mem
  - d. 6 X 1TB 7.2K RPM Near-Line SAS 6Gbps 3.5in Hotplug Hard Drive
  - e. PERC H700 Integrated RAID Controller, 512MB Cache, x6
  - f. High Output Power Supply Redundant, 870W
  - g. iDRAC6 Enterprise
  - h. At least one additional storage controller may be needed for each additional storage array that must be added.
  - i. Dell PowerVault MD1200 Direct Attach Storage Array with 12x2Tb 7200K SAS hard drives.
  - j. Mission Critical Package: 4-Hour 7x24 On-Site Service with Emergency Dispatch for three (3) years for both server and storage array.
  - k. Rack mount 17" Keyboard/Monitor combo.
  - l. 8-Port KVM Switch to control Gateway and Archive servers
  - m. Rack mount PDU for servers (APC or compatible)
9. At a minimum one Genetec Gateway Directory Server and one Genetec Archive Server will be required. Additional Archive servers may be required to meet the needs of the installation. The number of servers required will depend on the total number of cameras as well as the camera used. Another determining factor will be the amount of motion. The greater the motion, the greater the use of storage. Below is an example of an Arecont 80 camera implementation, using 3MP (2048 x 1536) resolution, 30% compression, 12 FPS 7am to 6pm and 6 FPS 6PM to 7am, and 30 days retention.
  - a. <http://www.arecontvision.com/sales-tools.html>



- b. Max throughput of about 308 Mbps or 3.86 Mbps per camera
  - c. Storage:
    - 26.5 TB for 13 hours overnight
    - 44 TB for 11 hours daytime
    - 70 TB total Storage required
10. An additional archive server is required for every 75 additional cameras. Each archive server can leverage a combination of the internal and attached storage.
- I. Power Supplies:
- 1. All power supplies shall be Altronix or Pelco, UL listed power supplies with appropriate number of camera inputs. Provide rack mount power supplies in CRE/MDF rack locations. Provide wall mount power supplies within 75 feet of exterior cameras if exterior cameras power requirements exceed PoE or high PoE standards.
- J. Un-interruptible Power Supply :
- 1. If MDF room does not have UPS power for the DVS required AC receptacles, provide un-interruptible power supply(s) with sufficient capacity to power all DVS system head-end components including camera power supplies located in MDF Room for a minimum of 15 minutes.
  - 2. Submit test report stating UPS at time of project completion complies with 15 minutes of backup.
  - 3. Backup Power requirements shall be based on the number of PoE cameras and equipment installed within the CRE and MDF Security System Rack. UPS shall be supplied for DVS equipment in CRE and MDF head end location.
    - a. UPS for CRE shall be APC Rack mount UPS with Surge Protector depending on the power requirements.
      - 1) Provide APC Smart UPS SC 450VA 120V – 1U rack mount unit to support up to 10 PoE cameras and switch.
      - 2) Provide APC Smart UPS SC 1000VA – 2U rack mount unit to support up to 10PoE cameras and switch.
    - b. UPS for MDF Server Rack shall be rack mounted APC Smart UPS 5000VA 208V or 120V.
- K. Switches:
- 1. For CRE: Provide 24 Port Gigabit Fiber/POE/Ethernet Switch.
  - 2. For MDF Security System Rack Fiber Backbone from CRE: Provide 12 Port Gigabit Fiber/POE/Ethernet Switch
  - 3. For MDF Security System Rack: Provide 24 Port Gigabit Fiber/POE/Ethernet Switch
- 2.3 PATHWAYS
- A. General Requirements: Comply with TIA/EIA-569-A.
- B. Ladder Rack Runway: Comply with requirements in Section 17216 – Cabinets, Racks and Enclosures.
- 1. Used for routing of communications cabling within MDF [and IDFs].
- C. Conduit and Boxes: Comply with requirements in Section 16730 – Raceway and Boxes. Flexible metal conduit shall not be used.

1. Outlet boxes shall be no smaller than 4 inch square by 2-1/2 inches deep, fitted with single- or double-gang trim plates to accommodate single- or double-gang communications faceplates as coordinated with Contract Drawings and outlet configuration.

### **PART 3 - EXECUTION**

#### **3.1 WIRING METHODS AND INSTALLATION OF PATHWAYS**

- A. Wiring Method: Install cables in dedicated raceways for DVS System cabling. Conceal raceway except in unfinished spaces.
  1. Comply with requirements for raceways and boxes and their installation specified in Division 16 Section "Raceways and Boxes."
  2. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
  3. Utilize wide sweeping radius bends and elbows.
  4. DVS system shall have dedicated conduit raceway system. No other system wiring shall be allowed in the DVS raceway.
- B. Wiring within Enclosures: Bundle, lace, and train cables to terminal points without exceeding manufacturer's limitations on bending radii. Provide service loop per requirements of this Section. Provide and use lacing bars and distribution spools.
- C. Wiring within MDF [and IDFs]: Bundle, lace, and train cables to terminal points without exceeding manufacturer's limitations on bending radii. Provide Velcro straps. Cable ties are not allowed. Provide service loop per requirements of this Section. Utilize overhead ladder rack runway for cable routing within room(s).
  1. Coordinate with contractor on installation of dedicated floor-mounted rack for DVS system equipment. Coordinate location adjacent to structured cabling floor-mounted racks.
- D. Comply with requirements for ladder rack runway, cabinets, and racks specified in Section 17216 – Cabinets, Racks and Enclosures. Drawings indicate general arrangement of pathways and fittings.
- E. For projects in existing school with a CCTV system to be removed and new DVS system to be installed:
  1. Contractor shall remove all RG59 coax abandoned by the removal of the CCTV system.
  2. Contractor shall utilize wiremold raceway in exposed areas.
  3. Contractor shall utilize conduit raceway in hidden areas.

#### **3.2 GENERAL INSTALLATION**

- A. Install all equipment and components in accordance with manufacturer's written instructions, in compliance with CEC, and with recognized industry practices, to ensure that all items comply with specifications and service intended purposes.

- B. Record serial numbers of all items furnished that are serialized. Serial numbers to be included in warranty manual.
- C. All items must be complete as specified prior to final acceptance. It shall be the responsibility of the Contractor to ensure all cabling meets all specifications and standards defined herein.
- D. Pulling Cable: Do not exceed manufacturer's recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between indicated termination, tap, or junction points. Remove and discard cable where damaged during installation and replace it with new cable.
- E. Terminations: Terminate UTP cables in CRE and MDF room on patch panels. Terminate DVS cables at outlets. Leave 12 inches of slack DVS cable at each outlet box and label cable and outlet box cover plate.
- F. Labeling
  - 1. Identify system components, wiring, cabling, and terminals. Subject to compliance with requirements in Section 17053 – Identification for Communications Systems and Section 16075 Electrical Identification
  - 2. Power supply and equipment used, must be labeled “Class 2”.
  - 3. Outlets: Label cables within outlet boxes.
  - 4. Distribution Racks and Frames: Label each unit and field within that unit.
  - 5. Within Connectors Fields, in MDF Room and CRE: Label each connector and each discrete unit of cable-terminating and connecting hardware.
  - 6. Cables, Generally: Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
  - 7. Head End Equipment: Provide labels on the front of the equipment to identify port number, IP address, subnet mask, and gateway and using a professional labeler
  - 8. Provide labeling for all cameras.
  - 9. Utilize label equipment that is professional grade.
- G. Cable Schedule: Post at a prominent location in each wiring closet and equipment room. List incoming and outgoing cables and their designations, origins, and destinations. Provide a diskette copy of final comprehensive schedules for the project in the software and format selected by the Board.
- H. Programming
  - 1. All cameras to be recorded in MDF on Storage Array Servers. All PTZ cameras to be programmed to tour outside areas per CPS Office of School Safety and Security designee. Tour of duty shall be interrupted by any computer loaded with software and shall resume after two minute idle time delay.
  - 2. DVS System shall be connected to CPS’s LAN and WAN network through static IP addressing via the administration network side. Contractor shall obtain from the CPS-ITS group and program IP addresses into DVS Software Solution. Contractor shall provide the CPS Office of School Safety and Security emergency control center with new IP addresses.
- I. Exterior fixed cameras shall be mounted at a second floor level where possible, minimum of at least 15 feet above finished grade
- J. Exterior PTZ cameras shall be mounted at a third floor or rooftop level where possible.

### 3.3 ADJUSTING

- A. Make adjustments or corrections for operation of the system. Obtain final approval from CPS Office of School Safety and Security Equipment Technician.
- B. Follow the manufacturer's instructions to program the system in accordance with the CPS Office of School Safety and Security requirements and provide a copy of programming on CD-ROM disk in format required for downloading.
- C. Re-adjust or replace system devices until all camera are properly aimed and focused to meet CPS Office of School Safety and Security satisfaction. Personnel shall be available for adjustments for a period of 30 consecutive days.

### 3.4 FIELD QUALITY CONTROL

- A. Inspection: Inspect for physical damage and test cable for continuity and shorts. Test cable segments for faulty connectors, splices, terminations, and the integrity of the cable and its component parts.
- B. Subject to compliance with requirements in included in Section 17100 Commissioning of Communications DVS-UTP Cable Testing Procedures:

### 3.5 COMMISSIONING

- A. Comply with requirements in Division 17 Section "Commissioning of Communications" for performance tests, inspections, correction of deficiencies, and preparation of test and inspection reports.

### 3.6 DEMONSTRATION

- A. Provide a minimum of (2) four hour training sessions for designated CPS Office of School Safety and Security representatives. Training shall include system programming, operation and maintenance procedures, and delivery of manuals required under Part 1.
- B. Training seminar to be prescheduled with principal and selected staff on proper methods of live view, retrieval, setting PTZ tour patterns, printing photos, and saving crucial video shall be included from awarded vendor. All cabling and licensing requirements must meet CPS guidelines.

### 3.7 CLEANING

- A. On completion of installation inspect exposed finishes. Remove burrs, dirt, paint spots, and construction debris. Repair damaged finish(es), including chips, scratches, and abrasions.
- B. All equipment, hardware and finishes shall be cleaned prior to final acceptance. Unless otherwise indicated, clean shall mean free of dust, dirt, mud, debris, oil, grease, residues, and contamination.

- C. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion. Protect conduit and wireway openings against the entrance of foreign matter by means of plugs or caps. Cover fixtures, materials, equipment and devices furnished or installed under this section or otherwise protect against damage, both before and after installation. Hardware, materials, equipment, or devices damaged prior to final acceptance of the work shall be restored to their original condition or replaced.
- D. During the course of installation work, provide for on-going proper disposal of all debris, including but not limited to: equipment packaging and shipping materials, shipping pallets, empty cable reels/boxes, cable cuttings, etc. The Contractor shall, at all times, keep the site free from accumulations of waste material or rubbish caused by its employees or work. Remove all crates, cartons, and other waste materials or trash from the working areas at the end of each working day. Flammable waste material must be removed from the working areas at the time of generation. All rubbish and debris, combustible or not, shall be discarded in covered metal containers daily and removed from the premises at least weekly and legally disposed of.

### 3.8 CONTRACTOR STARTUP AND REPORTING

- A. Vendor to set outdoor PTZ DVSs for tours of duty (medium speed, medium distances), these tours shall have the ability to be set and interrupted by any computer loaded with Genetec software (per principals direction) and resume tours after two minute idle time.
- B. Contractor's responsibility to obtain and program IP addresses as well as all camera alpha descriptors into Genetec and verify connectivity to CPS Emergency Control Center at (773) 553-3335 and (773) 553-3001, Office of Emergency Management and Communication (OEMC), as well as connectivity on school computers. Identify port number, IP address, subnet mask, and gateway and using a professional labeler, label MDF headend equipment with this information.
- C. Contractor shall load up to (4) administrative school computers with latest version of Genetec software (per Principals direction) and shall leave copy of Genetec software with school principal.

END OF SECTION