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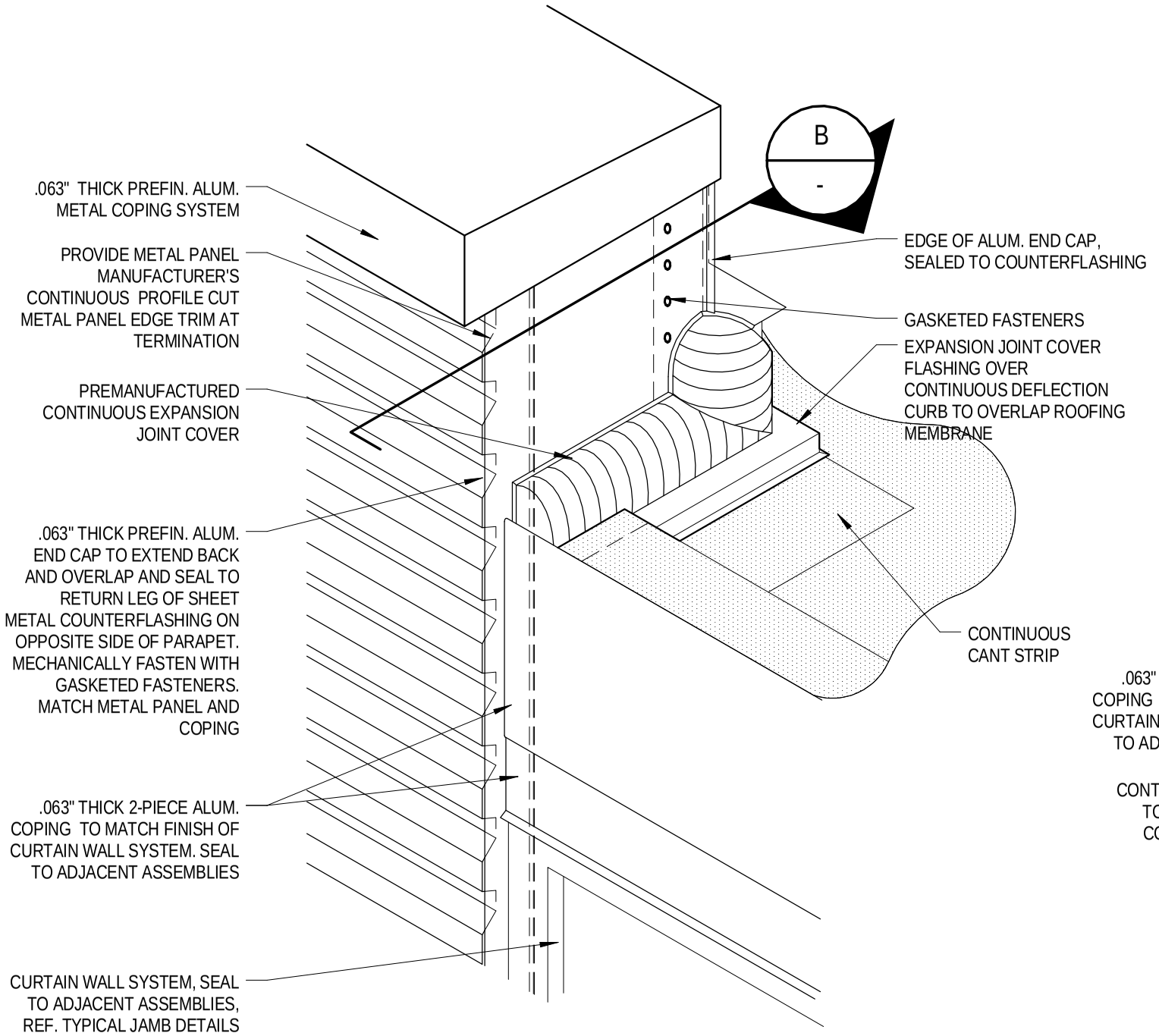
PROJECT: ALEXANDER GRAHAM BELL ELEMENTARY SCHOOL ADDITION

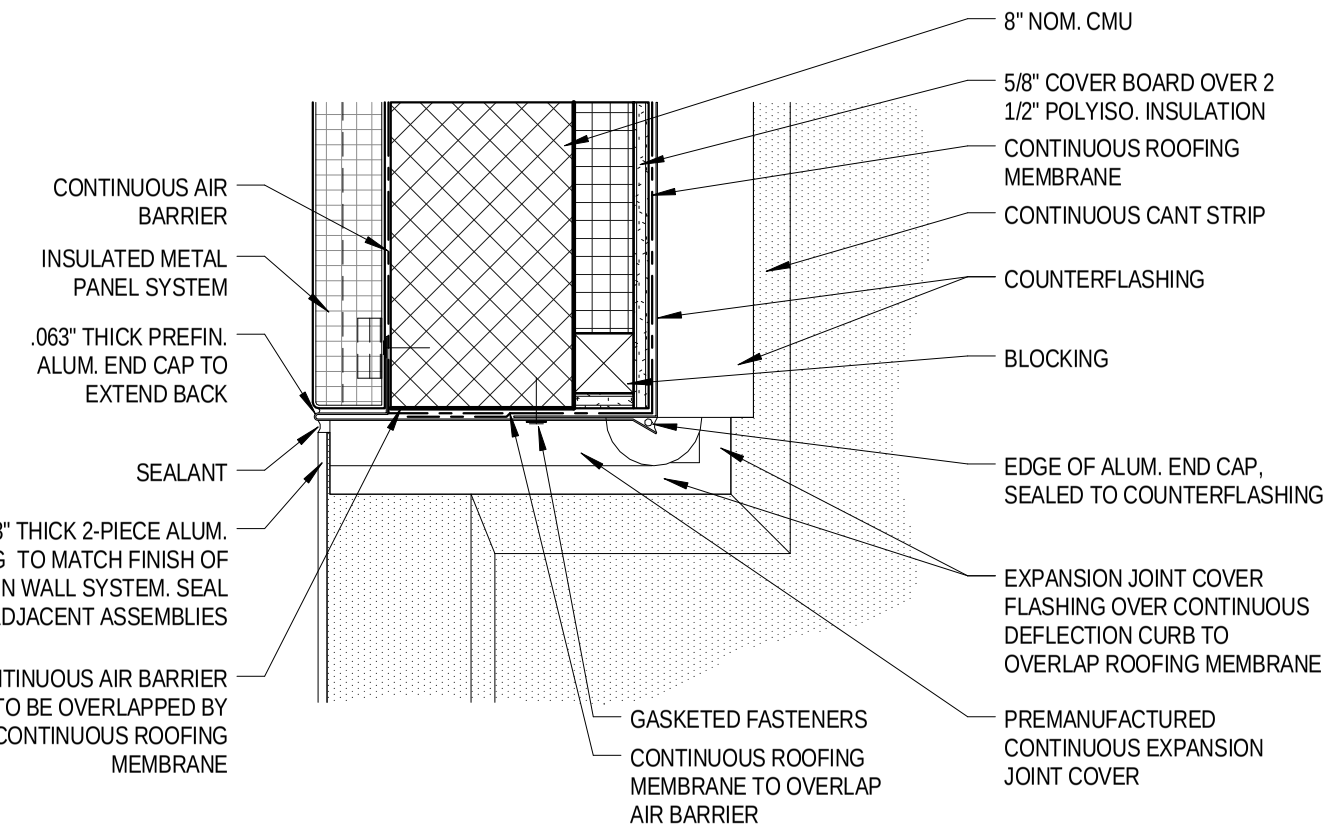
SMNG-A NO.: 1210
PBC NO.: 05530

ISSUE: ISSUE FOR ADDENDUM NO. 2
TITLE: DETAIL 9/A6.4.1

COMMENTS: REF. SHEET A6.4.1



VIEW A - ISOMETRIC

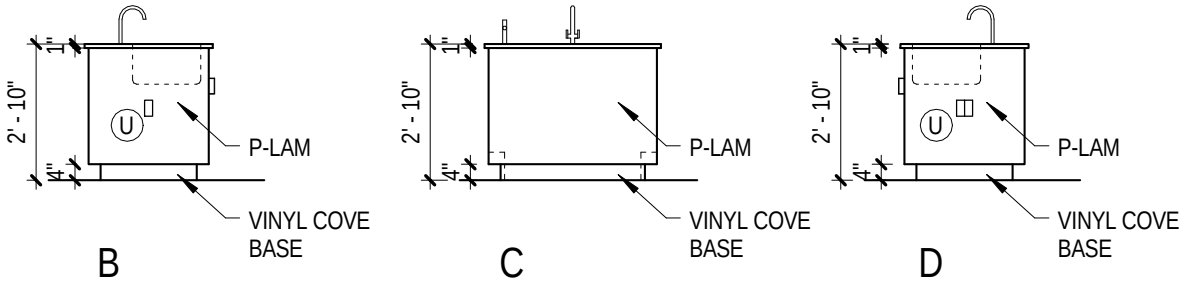


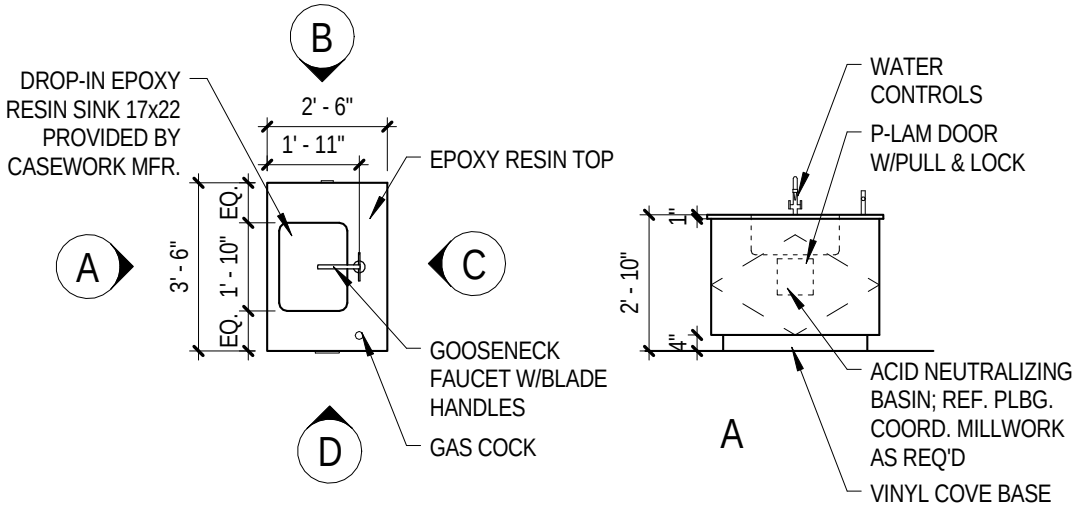
VIEW B - SECTION

2 / 9 A6.4.1 / 1 ASK-07 VERTICAL PARAPET TRANSITION DETAIL
1 1/2" = 1'-0"

ASK-07

ISSUE DATE: 12.11.2012





2

12 / A8.2 — 1 / ASK-08

TEACHERS DEMONSTRATION TABLE

1/4" = 1'-0"

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PROJECT:	ALEXANDER GRAHAM BELL ELEMENTARY SCHOOL ADDITION
SMNG-A NO.:	1210
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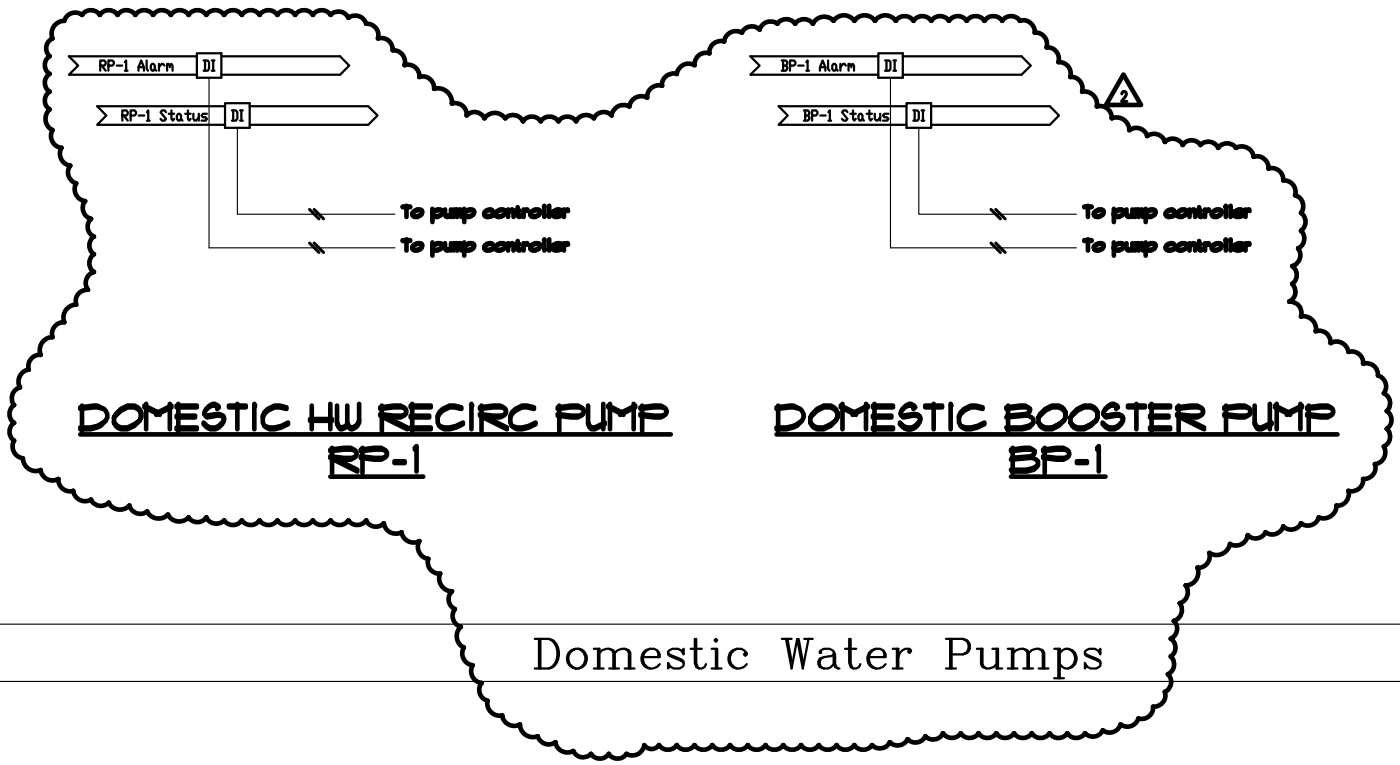
TITLE:	DETAIL 12/A8.2
COMMENTS:	REF. SHEET A8.2

ISSUE DATE: 12.11.2012

ASK-08

POINTS LIST

ADDRESS	POINT DESCRIPTOR	POINT TYPE DI	AI	DO	AO	VP	REMARKS
	Bx Enable			•			
	Bx Status	•					See Note 3
	Bx Alarm	•					
	Bx Burner / SPT				•		See Note 2
	Bx Firing Rate		•				See Note 2
	RP-1 Alarm	•					
	RP-1 Status	•					
	BP-1 Alarm	•					
	BP-1 Status	•					



Domestic Water Pumps

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PROJECT: ALEXANDER GRAHAM BELL ELEMENTARY SCHOOL ADDITION
SMNG-A NO.: 1210
PBC NO.: 05530
CONTRACT NO.:
ISSUE: ISSUE FOR ADDENDUM NO. 2
TITLE: FCU BAS DIAGRAM
COMMENTS: ADDED CONTROL DIAGRAMS FOR RP-1 & BP-1. REFERENCE M5.7

ISSUE DATE: 12.11.12

MSK-07

SECTION 08 56 13

ALUMINUM WINDOWS - ACCESSIBLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes accessible awning windows complete with push out hardware, glazing, weather stripping, insect screens, jamb extensions, specified anchors, trim, attachments and related components as shown on Drawings and specified in this Section.

A. Related Sections:

1. Section 01 35 60.1 – LEED Requirements
2. Section 08 44 13 – Glazed Aluminum Curtain Walls
3. Section 08 80 00 - Glazing

B. The materials in this section are part of the overall USGBC “Leadership in Energy and Environmental Design” (LEED) prerequisites and credits needed for the Project to obtain LEED Silver certification based on *LEED 2009 for Schools* requirements. See Section 01 35 60.1 "LEED Requirements” and this section for more information.

C. Coordination of integration and installation of accessible awning windows into glazed aluminum curtain wall system.

1. Accessible awning window units must be fully integrated into curtain wall framing system(s) for a full warrantable system. Stacked (independent) installations of awning window units and window wall systems are strictly prohibited.

1.2 REFERENCES

A. AAMA - American Architectural Manufacturers Association – *www.aamanet.org*
1. AAMA/WDMA/CSA 101/I.S.2/A440-05 “Standard/Specification for Windows, Doors, and Unit Skylights”
2. AAMA 502-08 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products"
3. AAMA 611-98 "Voluntary Specification for Anodized Architectural Aluminum"
4. AAMA 701/702-04 "Voluntary Specification for Pile Weatherstripping and Replaceable Fenestration Weatherseals”
5. AAMA 800-07 "Voluntary Specifications and Test Methods for Sealants"
6. AAMA 904-01 “Voluntary Specification for Multi-Bar Hinges in Window Applications”
7. AAMA 910-93 “Voluntary ‘Life Cycle’ Specifications and Test Methods for Architectural Grade Windows and Sliding Glass Doors”
8. AAMA 1503-98 "Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors, and Glazed Wall Sections"
9. AAMA 2603-02 “Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels”

10. AAMA 2604-05 “Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels”
11. AAMA 2605-05 “Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels”
12. AAMA CW-10-04 "Care and Handling of Architectural Aluminum from Shop to Site"

B. ANSI – American National Standards Institute – *www.ansi.org*
1. ANSI A117.1-03 ” Accessible and Usable Buildings and Facilities Standards”
2. ANSI Z97.1-04 “American National Standard for Safety Glazing Materials used in Buildings – Safety Performance Specifications and Methods of Test”

C. ASTM - American Society for Testing and Materials – *www.astm.org*
1. ASTM E 90-04 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
2. ASTM E 283-04 "Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen"
3. ASTM E 330-02 "Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference"
4. ASTM E 331-00 "Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference"
5. ASTM E 413-04 Classification for Rating Sound Insulation
6. ASTM E 547-00 “Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference”
7. ASTM E 2190-02 "Standard Specification for Insulating Glass Unit Performance and Evaluation"

D. CCMC – City of Chicago Municipal Code - *www.amlegal.com/library/il/chicago.shtml*
1. CCMC – Chapter 18-11-1109.13.1 - Operable windows.
2. CCMC – Chapter 18-13 Energy Conservation Code

E. CPSC - Product Safety Commission - *www.cpsc.gov*
1. CPSC 16 CFR 1201 “Consumer Product Safety Commission Safety Standard for Architectural Glazing Materials – codified at Title 16, Part 1201 of the Code of Federal Regulations”

F. GANA – Glass Association of North America – *www.glasswebsite.com*
1. GANA - “Glazing Manual” 2008

G. IGCC – Insulating Glass Certification Council – *www.igcc.org*

H. NAAMM - National Association of Architectural Metal Manufacturers - *www.naamm.org*
1. AMP-500-06 “Metal Finishes Manual”

I. NFRC - National Fenestration Rating Council - *www.nfrc.org*
1. NFRC -100-04 “Procedures for Determining Fenestration Product U-factors”
2. NFRC- 300- 04 “Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems

J. PEI – Porcelain Enamel Institute - *www.porcelainenamel.com*
   1. PEI - "Porcelain Enamel for Architects, Designers & Construction Specifiers," 2008

K. SGCC – Safety Glazing Certification Council – *www.sgcc.org*

L. WDMA – Window and Door Manufacturer's Association - *www.wdma.com*
   1. WDMA I.S.4-07A "Water-Repellent Preservative Non-Pressure Treatment for Millwork"

1.2 SYSTEM DESCRIPTION

A. AAMA product designation: AW-PG45-AP

B. Windows: manufacturer's standard awning windows with a minimum frame depth of 2-¼ inches with operable sash installed by the manufacturer into frame; equal leg frame; interior and exterior finishes applied by the window manufacturer; frames and vents assembled by the window manufacturer.

C. Configuration: Match size, shape, proportions and patterns of adjacent windows.

   1. Project out/awning; overlap vent sash in window configurations indicated on drawings.
   2. In projects where installed in a curtain wall system a frameless vent is preferred if available by manufacturer and meeting all other performance criteria.

D. Vent glazing: exterior aluminum glazing bead; with thermal glazing bead on interior and exterior perimeter; 1" insulating glass; glazed by the window manufacturer.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide accessible awning windows units that meet or exceed performance requirements specified as confirmed by testing manufacturer's windows that are representative of those specified, and that are of tested to size indicated below.

B. Performance Class & Grade: All window units installed in project are to conform to AW-PG45-AP specifications of AAMA/WDMA/CSA 101/I.S.2/A440 when tests are performed on a 60" x 36" minimum frame size with the test results as specified below.

   1. In cases where window units required exceed test size stated above, test largest sized unit required for project for compliance with specified performance requirements below.

C. Design Requirements: Provide windows that comply with AAMA 910 life cycle test requirements and meet AAMA/WDMA/CSA 101/I.S.2/A440 standards when tests are performed on a window size matching or exceeding size specified above. Window tests are to be by a recognized Independent Testing Laboratory or Agency, in accordance with ASTM E 283 for air infiltration, and with ASTM E 331 and ASTM E 547 for water penetration

   1. Air Infiltration: of maximum .1 cfm/square foot at a static air pressure difference of 6.24 psf.
   2. Water Penetration: no water penetration shall be permitted at a static air pressure difference of 10 psf.

D. Structural Performance: Provide windows capable of withstanding the effects of the following loads, based on testing units representative of those indicated for Project that pass AAMA/WDMA/CSA 101/I.S.2/A440 requirements for Uniform Load Structural Test:

1. Design Wind Loads: Provide windows identical to windows that have been successfully tested to resist design pressure, but not less than the following:

   a. Pressure: 30 psf in any direction.

2. Uniform Deflection: no more than L/175 when tested per ASTM E 330 at a static air pressure difference of 65 psf.
3. Uniform Structural: Unit is to be tested at 1.5 x design wind pressure, both positive and negative at 97.5 psf in accordance with ASTM E 330. There shall be no glass breakage, permanent damage to fasteners, hardware parts or any other damage to make the window inoperable. There shall be no permanent deformation of any main frame or vent member in excess of 0.2% of its span.

E. Installation Performance Requirements:

1. Design the attachment of the windows at jambs, head, and sill and reinforce mullions to resist 30 psf load applied in any direction.

F. Thermal Movement: Provide windows, including anchorage, that allow for thermal movement resulting from the following maximum range in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change Range: 120 deg F, ambient; 180 deg F material surfaces.

G. Thermal Performance: Provide windows that comply with energy conservation requirements of CCMC as demonstrated by testing per AAMA 1503.

1. U-Factor: Provide window units having maximum U-factor of 0.45 or better as determined in accordance with NFRC 100 by a laboratory accredited by a nationally recognized accreditation organization such as the NRFC and labeled and certified by the manufacturer
2. Condensation Resistance Factor (CRF): Minimum CRF to be 50 or better.
3. Solar Heat Gain Coefficient: Provide window units assembly maximum solar heat gain coefficient (SHGC) for overall glazed area of 0.40 or better as determined in accordance with NFRC 200 by a laboratory accredited by a nationally recognized accreditation organization such as the National Fenestration Rating Council and shall be labeled and certified by the manufacturer.

H. Sound Transmission Class (STC): Provide glazed windows rated for not less than 35 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

I. Accessible Windows: Where accessible glazed openings in accessible rooms or spaces are shown on the Drawings for operation by occupants, provide windows that comply with CCMC accessibilty requirements for operable windows .

1. Window Hardware: Comply with ANSI A117.1 section 309.4 Operation, that need to be pushed, pulled, or lifted to open, provide hardware that requires that no more than 5 lbf of force be used to open or close the operable vent.
2. Operation. Provide controls and operating mechanisms for Accessible Windows, in compliance with ANSI A117.1-2003, section 309.4, Operation, that are operable with one hand with a force of no more than 5 lbf and do not require tight grasping, pinching, or twisting of the wrist. Accessible window units shall be operable throughout the full range of operation (opening and closing), including latching and un-latching, with no more than 5 pounds of force required, including window units with exterior window guards attached.
3. Confirm compliance with specfied operating force requirements by having operable vent of accessible window tested by a recognized Independent Testing Laboratory or Agency and so labeled and certified by the manufacturer. Testing shall have occurred within the last two years, and shall have been performed under similar installation conditions than those required for the project.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, fabrication methods, product performance test certifications, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of accessible awning window indicated.

B. LEED Submittals

1. Product Data for Credit MR 4.1 and Credit MR 4.2: Indicating percentages by weight of postconsumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
2. Credit MR5.1: Submit a statement from the product manufacturer stating the distance between the place of manufacturer and the project location.

C. Shop Drawings: Shop drawings shall be the responsibility of the window manufacturer and prepared by the manufacturer's authorized agent bearing the manufacturer's name. Drawings prepared by others are not acceptable. Include building plans and elevations drawn at a minimum 1/8" scale; window unit elevations at minimum 3/8" scale; details of all components, including required reinforcement, to be drawn full size. Include floor plans, elevations, sections, details, hardware, attachments to other work, operational clearances, installation details, and the following:

1. Mullion details, including reinforcement and stiffeners.
2. Joinery details.
3. Expansion provisions.
4. Flashing and drainage details.
5. Weather-stripping details.
6. Thermal-break details.
7. Glazing details.
8. Window cleaning provisions.
9. Adjacent building assemblies to which the installation relates.
10. Anchorage.
11. Sealant placement.

D. Samples for Verification: For the windows and components required, submit samples of size indicated below:

1. Main Framing Member: 12 inch long, full-size sections of extrusions with factory applied color finish.
2. Window Corner Fabrication: 12 by 12 inch long, full-size window corner including full-size sections of extrusions with factory-applied color finish, weather stripping, and glazing.
3. Operable Window: Full-size unit with factory-applied finish.
4. Hardware: Full-size units with factory-applied finishes.
5. Weather Stripping: 12 inch long sections.

E. Product Schedule: For new windows using same designations indicated on Drawings.

F. Qualification Data: For Installer, manufacturer, and testing agency.

G. Field quality-control test reports.

H. Product Test Reports: Based on AAMA criteria, submit for evaluation of most recent comprehensive tests performed, but in no case older than four years from date of submittal, by a qualified testing agency for each type, class, grade, and size of window. Test results based on use of downsized test units will not be accepted.

I. Maintenance Data: For operable window sash, operating hardware, weather stripping and finishes to include in maintenance manuals.

J. Thermal Performance Certifications: Submit certifications as required under “Performance Requirements” of this Section.

K. Operating Force: provide test results and compliance certification.

L. Warranty: Special warranty as specified in this Section.

M. LEED Submittals:
1. Complete the "Materials Credits Documentation Sheet" and the "Low Emitting Materials Documentation Sheet" attached to Section 01 35 60.1 for products in this section.
2. Credit MR 4: Submit product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
3. Credit MR 5: Submit product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.

1.5 QUALITY ASSURANCE

A. The Drawings and Specifications herein indicate types, sizes, profiles, connections, dimensional and operational requirements for accessible awning windows of the specific manufacturer’s products as specified.

B. Accessible awning windows having equal performance characteristics by other manufacturers may be considered, provided that deviations do not change the design concept or intended performance as determined by the Architect.

C. Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of required windows. Aesthetic effects, such as simulated divided lites, are shown on Drawings by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to each another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects without approval from the Authorized Commission Representative. If modifications are proposed, submit comprehensive explanatory data to the Authorized Commission Representative for review.

D. Manufacturer Qualifications: A manufacturer capable of fabricating windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, calculations and verifiable history of manufacturing specified windows for a minimum of ten (10) years.

E. Installer Qualifications: Installer to be certified by window manufacturer for installation of window units required.

1. Engineering Responsibility: Preparation of data for windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project by a state of Illinois liscensed engineer.
2. Provide skilled craftspeople who have demonstrated a verifiable successful history of installing specified windows for a minimum of five (5) years.

F. In addition to above comply with the following:

1. The Manufacturer shall visit the site before fabrication and examine existing window openings and frames into which the new replacement windows are to be installed. If any discrepancies, or conditions, are discovered that are detrimental to the proper and timely completion of the work, the Manufacturer is to notify the Architect in writing.
2. Check actual window openings by accurate field measurement before fabrication. The replacement window tolerance of 1/2” less than the actual window opening dimensions will apply for all manufactured units. Units supplied plus or minus 1/4” in excess of the tolerance standards will be deemed out of compliance and will be replaced by the Manufacturer. Show recorded measurements on final shop drawings.

G. Source Limitations: Obtain windows through one source from a single manufacturer.

H. Mockups: Build mockups as directed by the Authorized Commission Representative to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup for type(s) of window(s) indicated, in location(s) shown on Drawings.
2. Mock up a minimum of three (3) accessible awning windows of each type, or three (3%) percent of each type of accessible awning window product; whichever is greater.

I. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Book 2A Section 01200(3.5). Review methods and procedures related to windows including, but not limited to, the following:

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review and discuss the finishes of windows that are required to be coordinated with the finishing of other adjacent work for color and finish matching.
3. Review, discuss, and coordinate the interrelationship of windows with other exterior wall components. Include provisions for structural anchorage, glazing, flashing, weeping, sealants, and protection of finishes.
4. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope and fully warrantable system.
5. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

J. Fenestration Standard: For minimum standards of performance,definitions, materials, components, accessories, and fabrication requirements conform to AAMA/WDMA/CSA 101/I.S.2/A440. In case of conflicts, comply with more stringent requirements.

K. Furnish a valid AAMA “Authorization for Product Certification” indicating that the windows for the project conform to AAMA/WDMA/CSA 101/I.S.2/A440.

L. Furnish visible, permanent IGCC certification labels indicating conformance to ASTM E 2190 on insulating glass units.

M. Furnish visible, permanent SGCC certification labels indicating conformance to ANSI Z97.1 and/or 16 CFR 1201 on tempered glass lites, if included on the project, and laminated glass lites, if included on the project.

N. Glazing Standard: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated on Drawings.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.7 DELIVERY, STORAGE AND HANDLING

A. Protect windows from damage during handling and construction operations before, during and after installation.

B. Store windows under cover, setting upright.

C. Do not stack windows flat.

D. Do not lay building materials and/or equipment on window.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.
b. Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
c. Deterioration of metals, other materials, and metal finishes beyond normal weathering.
d. Faulty operation of operable vents and hardware.
e. Failure of insulating glass.

2. Warranty Period:

a. Windows: Ten (10) years from date of Substantial Completion of the Project, as applicable.
b. Metal Finish: Ten (10) years from date of Substantial Completion of window installation.
c. Hardware: Ten (10) years from date of Substantial Completion of window installation.
d. Glazing: Ten (10) years from date of Substantial Completion of window installation.

3. Warranty must be fully coordinated with glazed aluminum curtain wall system.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Description: Subject to compliance with the requirements, provide factory assembled accessible awning windows from:

1. Graham – Series 6500 Projected Window
2. Traco - Series NX- 3500 Thermal Aluminum Awning Window

B. Accessible awning windows having equal performance characteristics by other manufacturers may be considered, provided that deviations do not change the design concept or intended performance as determined by the Architect. The burden of proof for equality of other awning windows is on the proposer.

2.2 MATERIALS

A. Aluminum Extrusions: extruded by the window manufacturer from commercial quality 6063-T5 alloy; free from defects impairing strength and durability.

B. Weather-stripping: Provide full-perimeter weather stripping for each operable ventilator. Installed weather stripping to be UV stable, flexible in low temperatures, and resistant to compression set; conforming to AAMA 701/702.

C. Hardware:

1. General: Provide manufacturer's standard hardware fabricated from stainless steel, designed to operate smoothly and without binding, tightly close, and securely lock windows, and sized to accommodate sash weight and dimensions.

a. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's standard range.

2. Projected Window Hardware:

a. Lock: Provide single lever handle operator, with concealed multipoint lock hardware, capable of being operated in compliance with requirements of the authorities having jurisdiction.

1) Multipoint lock hardware shall be mounted and operate within extruded grooves integral to the frame and sash and shall not require penetrations or fasteners into the frame or sash.
2) Push bar operators are not acceptable.

b. Hinges: Heavy-duty 4-bar hinges complying with AAMA 904; not less than two per sash.
c. Limit Devices: Concealed support arms with adjustable, limited, hold-open limit devices designed to restrict sash opening.

1) Limit clear opening to 4 inches for ventilation; with custodial key release.

D. Screens General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches.

1. Insect Screens: Fabricate insect screens to fully integrate with window frame. Locate screens on inside of window and provide for each operable ventilator where shown on Drawings.

a. Provide insect screens on all operable window units.
b. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints, concealed fasteners and removable PVC spline/anchor concealing edge of frame.
1) Extruded-Aluminum or Aluminum Tubular Framing Sections and Cross Braces: Not less than 0.040 inch wall thickness.
2) Finish: Match aluminum window members.

c. Aluminum Wire Fabric: 18 by 16 mesh of 0.011 inch diameter, coated aluminum wire.
3) Wire-Fabric Finish: Charcoal gray.

2.3 FABRICATION

A. Window Unit Fabrication:

1. Aluminum Fabrication:

   a. Vent and Frame: all members to be tubular; 45 degree reinforced mitered corners; crimped to extruded aluminum corner keys.
   b. Frame and vent joints: factory sealed by window manufacturer with sealant conforming to AAMA 800.

2. Water control: pressure equalization compression gasket on vent interior to resist wind driven rain.
3. Weep holes: Provide exterior weep slots/holes in each sill of sufficient size to allow water drainage to exterior by gravity, but prevent ingress by insects
4. Emboss universal symbol of accessibility (1” diameter) on all operable window frames that comply with ADAAG with a contrasting color.
5. Provide 1-1/2” x 1-1/2” universal symbol of accessibility interior sign on bottom rail of operable window frames that comply with ADAAG. See Division 10 Section “Interior Signage.”

B. Insulating Glass Units:

1. Preglaze window units at the factory using glazing method tested with unit as required and in conformance to ASTM E 2190; with visible, permanent IGCC certification label for window grade and performance requirements specified.
2. Provide glazing as specified in Section 08 80 00 “Glazing” and as indicated on drawings.

C. Finish on Aluminum Extrusions:

1. Comply with NAAMM's "Metal Finishes Manual” for recommendations for applying and designating finishes. Apply on clean extrusions free from serious surface blemishes; on exposed surfaces visible when installed product's operating vents are closed.
2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering or shrink wrapping before shipping.
3. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
4. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
5. Class I, Clear Anodic AA-M12C22A41 Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker complying with AAMA 611.

D. Miscellaneous Metal Finishes:

1. Concealed Steel Items: Galvanized in accordance with ANSI/ASTM A 386 to 2.0 oz/sq. ft. or primed with iron oxide paint.

2. Apply one coat of bituminous paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

E. Installation Accessories

1. Material: extruded aluminum; nominal 0.078" wall for panning and 0.062" wall for trim; with exposed surfaces finished to match window color and finish performance; install with concealed fasteners and required weatherseals. Detail installation for unrestricted expansion and contraction.
2. Interior: Provide all accessories, trims, clips, flashings and the like to fully integrate operable window units into glazed aluminum curtain wall system to meet specified performance values as an assembly and provide a clean, finished weather-tight system.

PART 3 - EXECUTION

3.1 PREPARATION – GENERAL

A. Comply with all applicable laws, rules and regulations.

B. Inspect openings before beginning installation work. Verify that rough or masonry opening is correct and the sill is level.

C. Assure that each window opening conforms to dimensions and tolerances taken at the time of site visit.

D. Perform operations as necessary to prepare openings for proper installation and operation of new retrofit units. Verify openings are in accordance with shop drawings and Architects Drawings. Prepared openings to be in tolerance, plumb, level, and provided with secure anchoring. Window installation shall not begin until all conditions are satisfactory. Failure to do so does not relieve the Contractor from the need to furnish any and all materials, which may be required, in accordance with the specifications, without any additional costs to the Board.

3.2 PREPARATION

A. Perform operations as necessary to prepare openings for proper installation and operation of new construction units. Verify openings are in accordance with shop drawings and Architects Drawings. Prepared openings to be in tolerance, plumb, level, and provided with secure anchoring.

B. New Construction: Verify wall openings and adjoining air and vapor seal materials are clean, dry and ready to receive work of this Section. Verify that rough openings and masonry openings are correct and the sill plate is level.

C. Provide and apply sealant compound, meeting AAMA 808.3, at all joints and intersections at at all other opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth. Coordinate installation with wall flashings and other components of the work.

3.3 INSTALLATION

A. Remove new windows and accessories from crating and packaging material. Verify that all parts and accessories are included.

B. Install in accordance with manufacturer's approved shop drawings, specifications and recommendations for installation of window units, hardware, operators and other components of work.

C. Provide required support and securely fasten and set windows plumb, square, and level without twist or bow of frames or sash. Maintain dimensional tolerances, aligning with adjacent work. Anchor securely in place. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action. In no case shall attachment to structure or to components of the window system be through or affect the thermal barriers of the window units.

D. Coordinate attachment and seal of air and vapor barrier materials. Install under sill and sill brake metal flashing.

E. Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier. Wedge fiberglass insulation between frames of new windows and construction to remain, or between frames and new receptor as applicable. Compress fiberglass to no less than 50 percent of original thickness.

F. Provide and apply sealant compound, meeting AAMA 808.3, at all joints and intersections and at all other opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth. Coordinate installation with wall flashings and other components of the work.

G. Set sill members and other members in continuous bed of compound, joint fillers, or gaskets per manufacturer recommendations to provide weather-tight construction. Seal units per sealant manufacturer’s recommendations at all other opening perimeters. Wipe off excess material and leave all exposed surfaces and joints clean and smooth.

H. Anchor windows on all four sides with anchor clips, or as designed to integrate with Glazed Aluminum Curtain Wall system.

1. Do not allow anchor clips to bridge thermal breaks
2. Use separate clips for each side of thermal breaks.
3. Make connections to allow for thermal and other movements.
4. Do not allow building load to bear on windows.
5. Use manufacturer’s standard clips at all corners and at intermediate points not over 16” on center.
6. Anchor clips are to be fully covered by panning or trim.

I. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with the requirements specified in the window reference standard. Where incompatible metals join together, coat the abutting surfaces with asphaltic paint and use epoxy coated connectors.

J. Pre-fit, pre-punch, etc., all materials so that the unit when assembled shall fit the openings and will not require any cutting, ripping or fitting on the job site other than trimming of the exterior

panning to fit into the masonry opening and cutting interior trim to length by the installing crews.

K. All voids between new and existing window frames shall be packed solid with fiberglass batt insulation before installation of interior trim or panning.

L. Interior and exterior surfaces shall have proper contact for caulking back up. The caulking shall be in full contact with window members and exterior and interior walls providing a continuous air and water tight bead around perimeter of windows as shown on Drawings.

M. It shall be the responsibility of the installation Contractor to repair any exterior and interior surfaces to the satisfaction of the Authorized Commission Representative damaged as a result of the installation procedures involved with the materials and products of this Section.

3.4 FIELD TESTING

A. Field Tests: Contractor shall perform and pay for onsite tests of selected newly installed windows or window system components. Test newly installed accessible awning window products as directed by the Authorized Commission Representative for air leakage and water penetration resistance.

1. All new accessible awning window products shall be field tested in accordance with AAMA 502 by an AAMA accredited laboratory as selected by the Authorized Commission Representative and engaged by the responsible Contractor. Independent testing laboratory engaged to perform tests will meet all requirements of AAMA 204.
2. Costs for all tests, both original and retests shall be paid for by the responsible Contractor. All unsuccessful tests, both original and retest, shall be paid for by the responsible Contractor.
3. All testing work in accordance to AAMA 502 of newly installed accessible awning window products shall commence at initial window installation and shall be completed prior to issuance of a certificate of Substantial Completion for accessible awning window work; and in no case more than six months after the date of Substantial Completion of the installation. Any field testing required six months beyond the date of Final Acceptance of the accessible awning window installation, will be done in accordance with AAMA 511.
4. Testing Quantity: Erect test chambers for each window product type identified on plans. Test three (3) accessible awning window products of each type, or three (3%) percent of each type of accessible awning window products installations; whichever is greater, for air infiltration and water penetration as specified in accordance to AAMA 502 after the accessible awning window products have been completely installed.
5. Test Parameters:

    a. Air infiltration field tests shall be conducted at the same uniform static test pressure as the laboratory test unit. The Maximum allowable rate of air leakage shall not exceed 1.5 times the laboratory test unit for hardware and glazing types consistent with the laboratory test unit. The field test air leakage rate shall not exceed 1.5 times the maximum allowable laboratory performance specified for any configuration.
    b. Water penetration field tests shall be conducted at a static test pressure of 4/5 of the laboratory test performance values for hardware and glazing types consistent with the laboratory test unit. The field test water test pressure shall not be less than

4/5 of the minimum allowable laboratory performance specified for any configuration.

6. All work on accessible awning window products that fail the field tests shall be re-executed until the installation passes the field testing. Modify methods of installation of subsequent work to incorporate required corrections identified by the testing process.

3.5 ADJUSTING AND CLEANING

A. Adjust operating vent and hardware to provide tight fit at contact points and at weatherstripping, for smooth operation and weathertight closure.

B. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes. Remove excess glazing and sealant compounds, dirt, and other substances. Lubricate hardware and moving parts.

C. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.

D. Remove from site all removed materials, debris, packaging, banding and all other surplus materials and equipment. All materials removed from site become property of the Contractor who shall promptly remove same and legally dispose of at no additional cost to the Commission.

3.6 PROTECTION

A. Initiate all protection and other precautions required to ensure that window units will be without damage or deterioration (other than normal weathering) at time of acceptance.

B. Submit to Architect written recommendations for maintenance and protection of windows following Substantial Completion of window installation work.

END OF SECTION

SECTION 28 23 07

DIGITAL VIDEO SURVEILLANCE SYSTEM AND COMPONENTS (FOR EXISTING SCHOOLS AND ADDITIONS)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the materials and components, including programming, for a complete Digital Video Surveillance (DVS) System.

1. Base Bid shall include the following:

a. Cabling and connections, including fiber-optic cabling.
b. DVS concentrator remote enclosures.
c. Equipment mounts and racks.
d. Interconnections to LAN and WAN networks.
e. Uninterruptible power supply (UPS).
f. Final adjustments and system check out.
g. Training of the Board's designated personnel.

2. Allowances, in the amounts indicated in the Bid Documents, are to be included, as part of the Bid, for the following:

a. DVS Cameras and Housings.
b. Server hardware equipment, including directory server, storage arrays, and archive server. (Provided by Public Building Commission (PBC), with purchase pricing coordinated with/through Chicago Public Schools (CPS) ITS department.)

1) Provide PBC and CPS the server and storage project specific size requirements as based upon Drawings and Specifications.

3. Board provided components include the following:

a. PoE Switches.
b. Viewing stations
c. Workstation

1.2 SYSTEM DESCRIPTION

A. Scope – Addition Project:

1. Add new peripheral devices to existing security system. Devices include, but not limited to, camera, power supply, concentrators, mounting hardware, and cabling. Devices shall be added to existing security head end equipment in areas indicated. Provide head end equipment hardware and software required to support new devices and provide 25% additional capacity upgrades.

a. Add head end equipment (server, cards software licenses etc) to support the new devices in areas indicated.

1.3 SYSTEM REQUIREMENTS

A. General:

1. Installation of the DVS system shall be done under the direct supervision of an experienced technician, certified by the Vendor, who is trained and approved by the manufacturer to install an IP-based video surveillance system, cameras, and supporting equipment, utilizing structured telecommunications cabling infrastructure.

a. The DVS system shall record and store images so to ensure they are admissible as evidence in a Court of Law.

B. Review by CPS:

1. CPS Office of School Safety and Security and CPS Office of Information Technology shall receive and review copies of shop drawings, including raceway routing and pull box locations, and programming documentation, including system layout, prior to the start of installation work.

a. Work related to the DVS system shall not proceed prior to receipt of final review comments from CPS Office of School Safety and Security and CPS Office of Assets Management.

C. Programming:

1. Final camera locations and default viewpoints shall be reviewed by CPS Office of School Safety and Security. Adjustments shall be made in the field (on site) as required by CPS (OSSS) and documented as part of the record documents.

a. If a camera's viewpoint is altered remotely, the camera shall return to its default viewpoint when control is electronically relinquished, or after a predetermined period of inactivity.

2. Coordinate and program IP cameras to be interconnected with surveillance system software graphical user interface head end located in the Campus Services Room via the Campus Local Area Network.
3. Camera Control – Hierarchy: Control of cameras shall be provided to the groups/agencies, in the order of priority, indicated below. If a camera has been accessed by one of the groups/agencies indicated, those lower in the priority list shall not be allowed access until control is relinquished; those higher in the priority list shall be able to override control/access by those lower in the list.

a. Chicago Public Schools Office of School Safety and Security(OSSS).
b. Chicago Public Schools Office of Emergency Management and Control (OEMC).
c. Chicago Police Department (CPD).
d. The school (Principal's office, security office, etc.).
e. Other entities, as directed by CPS Office of School Safety and Security.

D. Surge Protection: Protect components from voltage surges entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.

1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Division 26 Section "Surge Protection Devices."
2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Division 26 Section "Surge Protection Devices," as recommended by manufacturer for type of line being protected.

E. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station, control-unit alarm display shall identify tamper alarms and indicate locations.

1.4 SUMMARY

A. Provide and install IP-based video surveillance system, cameras and supporting equipment throughout the facility as shown on the Drawings.

1. Utilize telecommunication structured cabling system as specified in Division 27 Section, "Communications Horizontal Cabling," Division 27 Section, "Communications Optical Fiber Backbone Cabling," Fiber Optic Connector Intermateability Standards (FOCIS) specifications TIA/EIA-604-2, TIA/EIA-604-3-A, TIA/EIA-604-12, AND COMPLY WITH TIA/EIA-568B-3.
2. Provide software and programming on Board provided and contractor installed network electronic (PoE) switches.
3. Provide Software and programming for Board provided and Contractor Installed Work Stations and Servers
4. Provide software Licenses quantity as indicated in contract documents.
5. Federation licenses to be applied separately at the Student Safety Center by vendor for remote viewing of all school federated facilities
6. Provide IP- cameras aiming, programming and interconnection to the CPS Office of School Safety and Security (OSSS) and the Office of Emergency Management and Communication (OEMC) surveillance systems. The remote access feature shall be included in the installation.
7. System required to interface with Intrusion Detection System and all video surveillance system cabling required to be in conduit. Upon alarm of Intrusion Detection system, a notification and live video feed shall be transmitted to the Student Safety Center.

1.5 DEFINITIONS

A. DVS: Digital Video Surveillance.

B. CRE: 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. SSC: Student Security Center at 125 S. Clark.

H. CPD: Chicago Police Department

1.6 SUBMITTALS

A. Submittals shall be simultaneously (concurrently) submitted to the Architect/Engineer and attention CPS Deputy Director Office of School Safety and Security located at 125 S Clark Street, 15th floor Student Safety Center.

B. Product Data: For each type of product specified. Including detailed manufacturer's specifications, data on features, ratings, dimensions, electrical characteristics, performance and finishes.

1. Provide Server requirements to support video management system software to CPS Office of School Safety and Security (OSSS) and CPS Office of Information Technology.
2. Provide Storage requirements based upon Drawings and Specifications to CPS Office of School Safety and Security (OSSS) and CPS Office of Information Technology.

C. Shop Drawings: For video surveillance system, include plans, elevations, sections, details and attachment to other work.

1. Detail installed features and devices.
2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
3. Floor plans, prepared at 1/8 inch scale, indicating the following:

    a. Location of all DVS outlets with identification numbers.
    b. System layout, including, but not limited to, routing of conduit and raceways, locations of concentrator boxes, both existing and new, and other components required as part of the complete system.
    c. Riser and Connection diagrams.
    d. Location of DVS remote enclosures (CRE), termination racks and backboards.
    e. Camera to CRE point-to-point connections with alpha descriptors and IP addresses.
    f. Point-to-point raceway routing, identifying number and type of cables in each raceway. Include pull box locations and sizes.
    g. Conduit fill calculations, indicating cross-section area percent fill for each raceway.
    h. Detailed layout drawings of each DVS Remote Enclosure (CRE), MDF racks, including front-view details identifying all components, cabling connections, and cable identification numbers.

4. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.

5. Programming documentation using manufacturer's programming form and system layout work sheets. Contact CPS Office of School Safety and Security at (773) 553-3001 or (773) 553-5136 for general programming requirements.

    a. Programming submittals must be reviewed and approved by CPS Office of School Safety and Security prior to starting any work.
    b. Programming documentation shall include the following:

        1) Configure Cameras using IP Scheme.
        2) Configure Network Switch.
        3) Load Software.
        4) Install and configure servers and storage.

D. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation.

E. Operation and Maintenance Data: For surveillance system components and equipment, to include in emergency, operation, and maintenance manuals. Include the following:

1. Programming instructions.
2. Programming disk.
3. Contact information for programming assistance.
4. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

F. Installer Qualifications.

G. Test Reports:

1. Final test reports for field tests specified in Division 27 Sections, "Communications Horizontal Cabling" and "Communications Optical Fiber Backbone Cabling."
2. Final reports for startup testing and procedures identified in Article "Contractor Startup and Reporting."

H. Warranty: Special Warranty specified in this section.

1.7 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: Award the digital video surveillance system work to a single firm that is specialized in the installation of digital video surveillance systems, who has successfully completed system installations in not less than three (3) projects of similar size and complexity, to the satisfaction of the Architect and Board Representative, in the last two (2) years, and whose work has resulted in a record of successful in-service performance. The installer shall be a factory trained Salient Complete View; authorized by the manufacturer(s) to install the products and components required for a complete system; employ technicians trained and familiar with Microsoft Networks and Cisco Systems network hardware and software, capable of performing diagnostic testing and servicing of the system components; and maintain a

current P.E.R.C. (Permanent Employee Registration Card – Blue) Card through the Illinois Department of Professional Regulation.

1. The installer shall provide telephone response within one hour and onsite service response within eight (8) hours of the initial call, with the system restored within twenty-four (24) hours of the initial call ninety percent (90%) of the time.
2. The installer shall maintain and provide a 24-hour help desk telephone number.

C. Electrical Components, Devices, and Accessories: Listed and labeled as required by the City of Chicago Electrical Code.

D. Pre-installation Conference: Not less than 14 days prior to starting the DVS system work, coordinate a pre-installation conference at the Project site to comply with requirements in Book 2. Attendees shall include representatives from CPS Office of School Safety and Security, CPS Office of Information Technology Services, Facilities and Operations, the Public Building Commission, the Architect, the Installer, and representatives of other trades whose work must be coordinated with the camera work. Review methods and procedures related to the DVS system installation including, but not limited to, the following:

1. Review construction schedule and verify availability of materials, equipment, installer personnel, and facilities needed to make progress and avoid delays.
2. Review preparatory work and procedures, including roughing-in of electrical and data wiring, to be performed by other trades.
3. Review and confirm locations for cameras, both interior and exterior, and all other devices that are part of the system.
4. Confirm camera platform, camera models, and mounting hardware.
5. Review requirements for MDF and/or IDF room(s) and equipment installation.
6. Review routing of conduit and locations of concentrator boxes.
7. Review required testing, inspections, and certifying procedures and anticipated dates.
8. Review training procedures for the Board's designated personnel and coordinate dates/times for training sessions.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside, protected from weather, in a secure location, and according to manufacturer's written instructions. Protect materials from construction activity and other potential sources of damage.

1.9 FIELD CONDITIONS

A. Do not deliver or store materials until building is enclosed and mechanical systems are operational and maintaining interior environment in accordance with manufacturer's requirements.

B. Do not install DVS system components exposed to view until after finish work, including painting, is complete.

C. Interruption of Existing Security Service: Do not interrupt security service to facilities occupied by the Board or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Architect and Board Authorized Representative no fewer than ten working days in advance of proposed interruption of security service.
2. Do not proceed with interruption of security service without Architect's and Board Authorized Representative's written permission.

1.10 Guard Services shall be provided for 24 hours each day for the duration of the Security system interruption. Security watch personnel shall make rounds on hourly intervals.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form, executed by the manufacturer and installer, in which the manufacturer agrees to repair or replace components of the digital video surveillance system that develop defects in materials or workmanship within the specified warranty period. Warranty period shall begin on date the system is approved, and noted as complete, by the designated representative of CPS Office of School Safety and Security.

1. Warranty Period for DVS System Components (except cabling/wiring): 3 years from date of Substantial Completion.
2. Warranty Period for System Cabling/Wiring: 25 years from date of Substantial Completion.

1.12 EXTRA MATERIALS

A. Deliver extra of the components indicated below, packaged with protective covering and identification labels, to the CPS Office of School Safety and Security. Provide a quantity equal to three percent (3%) of the quantity installedof each item to the CPS Student Safety Center, located at 125 S. Clark Street, 15th floor.

1. Fixed cameras.
2. Uninterruptible power supplies.

1.13 MAINTENANCE SERVICE

A. Continuing Maintenance Proposal: Beginning at date of acceptance of installation by CPS Office of School Safety and Security, provide a continuing maintenance proposal from the Installer for extended service and maintenance for the DVS system, starting on date initial maintenance service is concluded. Include the following:

1. Format: The continuing maintenance proposal shall be in the form of a standard 3-year maintenance agreement. The agreement shall clearly outline services, obligations, conditions, and terms for agreement period and future renewal. Include all necessary parts, labor and service equipment. Include the following basic services:

a. Repair: Repair or replacement of any equipment that fails to perform as initially installed, as specified, or as determined by the manufacturer’s performance criteria.
b. Preventive Maintenance: Semi-annual preventive maintenance on the installed equipment including, but not limited to, cleaning, realignment, inspection, and testing of all devices. The Board shall receive a written report of these inspections that identifies each device’s status and, if required, a list of all required repairs or replacements.

c. Software Maintenance: Installer shall install and configure, at no cost to the Board, any software updates that the manufacturer provides. Any additional software features, upgrades, or enhancements purchased by the Board shall be installed. The cost of Board requested software upgrades shall be outside of this service contract.
d. Firmware Upgrades: Provide flash, EEPROM or other firmware upgrades as required.

2. The Installer shall be compensated for any repairs or maintenance provided as a result of abuse, misuse, intentional damage, or accidental damage by either the Board or the Board's personnel, or power fluctuations exceeding specified equipment tolerances.
3. System defects or failures shall be corrected within four (4) hours on the same business day if the Board makes a service request before 11:00 a.m. or before 12:00 p.m. the next business day if the Board makes the request after 11:00 a.m. If requested by the Board, the Installer shall respond or remain at the site after normal business hours, and the Board shall reimburse the Installer for the incremental cost difference between premium labor rates and standard labor rates. This reimbursement applies to premium labor rates that do not exceed time-and-one-half rates after normal business hours, and double-time rates for Sundays and holidays. The Installer's services shall be performed in a professional manner and remain free from defects for a period of one (1) year.

B. Provide complete terms and conditions of warranty and services.

PART 2 - PRODUCTS

2.14 CAMERAS

A. Interior Fixed and PTZ Camera and Housing:

1. Fixed Camera:

a. General: The camera shall be a fixed, vandal-resistant, megapixel dome camera with HD capability.
b. Basis-of-Design Product: Provide Arecont AV3155DN 3MP Day Night Camera with integrated 4.5mm to 10mm lens, or one of the following:

1) Axis; P3304/V fixed dome network camera with 2.8 to 10mm varifocal lens.
2) 3Megapixel.

c. Features: Fixed cameras shall include the following features for optimal performance within a school environment:

1) Power-over-Ethernet (PoE) IP Camera: Providing power and data transmission via a single Category 6 cable (up to 295 feet).
2) Vandal-Resistant Dome: IP66 weatherproof hardened enclosure with security screws.
3) Integrated Sensor: 1/2-inch sensor for low light capabilities and sharper imagery.
4) Resolution: Up to 3 Megapixels of resolution for facial identification at 30 feet.

5) Streaming: Multiple streaming (up to eight) at variable resolutions and frame rates.
6) Compression: H.264 compression.

2. PTZ Camera: Provide one of the following:

a. Axis; M5014 PTZ dome network camera.
b. Axis; P5534 PTZ.
c. SNC-RH164 PTZ.

3. Housing: Vandal-resistant, low profile, mini-dome enclosure, with smoke-colored dome.
4. Mounting: Cameras shall be wall-mounted.

a. Ceiling-mounted cameras are allowed only with prior review and approval, in writing, by CPS Office of School Safety and Security.

5. All cameras shall be capable of electronic light control for low light (day /night) conditions. Cameras shall provide color images when sufficient light is present and automatically provide black and white images during low light and night conditions.
6. All cameras shall have the ability to auto back focus.
7. All cameras shall have automatic iris control with manual override.
8. All cameras shall have intelligent video motion detection feature.

B. Exterior Fixed Camera and Housing:

1. Basis-of-Design Product: Provide Arecont AV3155DN-1HK 3MP Fixed Vandal-Resistant Megapixel Dome Camera, or one of the following:

a. Axis; P3346-VE.
b. 3Megapixel.

2. Housing: Vandal-resistant, low profile, mini-dome enclosure, with clear domes.
3. Mounting: Cameras shall be installed with wall-mounted brackets.
4. Features:

a. Provide camera manufactures recommended heating and fan elements.
b. Provide power supply if the camera and/or heater/cooler are not completely powered over PoE, or High PoE.

C. Specialty Fixed Camera:

1. SNC-DH260 E Series. Location/Use: MDF room surveillance.
2. IP66 1080p HD camera with IR illuminators. Location/Use: MDF room surveillance.
3. SNC-DH/CH140, with 130dB of wide dynamic range. Location/Use: Exits/entrances and extreme lighting conditions.
4. SNC-DH120. Location/Use: Use in well-lit areas.
5. SNC DH210 compact and discreet camera.
6. SNC-DH180 fixed outdoor rated with intuitive IR Illuminator and 130dB wide dynamic range. Location/Use: Use in extreme lighting conditions.
7. SNC_DH169 fixed outdoor rated, with intuitive IR illuminators. Location/Use: Use in areas that have extreme lighting conditions.

8. SV-16 device.
9. Sensor Size and Normal Field of View:

Sensor Size	Normal Field of View
1”	25mm
2/3”	16mm
1/2”	12mm
1/3”	8mm
1/4”	6mm

D. Outdoor IP PTZ Cameras:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the Axis Q6032-E HD PTZ dome cameras, or one of the following:

   a. Axis; P5534 PTZ.
   b. SNC-RH164 PTZ.

2. Camera for License Plate Recognition: Provide Arecont Vision AV310 5DN 3MP Day Night Camera with an M5018-MP 50 mm MP lens.

   a. Housing: Vandal-resistant, low profile, mini-dome enclosure with clear dome. Exterior enclosures shall have a heater element and sun shields.
   b. Mounting: Cameras shall be installed with gooseneck mounts as required to provide a 270-degree field of view at building corners.
   c. 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.
   d. All cameras shall have automatic iris control with manual override.
   e. All lenses shall be selected based on the application and view angle for maximum coverage as located in the Drawings.
   f. Provide Power-over-Ethernet or High Power-over-Ethernet with significant voltage to power the internal heating and cooling functions.

2.15 POWER AND GROUNDING REQUIREMENTS

A. Power Supplies:

1. General: All power supplies shall be UL listed and labeled, recommended by the camera manrer, and provided as required to support the cameras shown on the Drawings. Provide rack mounted 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.
2. PTZ Cameras: Provide power supply if the camera and/or heater/cooler are not completely powered over PoE, or High PoE. Provide the required gauge wire (according

to manufacturer's specifications) for low-voltage power if the camera and/or heater/cooler are not completely powered over PoE, or High PoE.

a. Provide 120V, single-phase power within 75 feet of all PTZ as required by camera or midspan device specified. Where outdoor cameras are to be mounted in close proximity, as determined by the manufacturer, a combined local power supply for up to four outdoor cameras may be provided.
b. Power supplies for PTZ cameras shall be installed indoors, above the acoustical panel ceiling of the corresponding floor, and shall be secured to the interior face of the wall (wall-mounted).

B. Uninterruptible Power Supply (UPS):

1. General: Uninterruptible power supplies shall be Contractor provided and installed.
2. Provide uninterruptible power supply(s) with sufficient capacity to power all DVS system head-end components including camera power supplies located in MDF rooms for a minimum of 15 minutes.
3. Submit test report stating UPS at time of project completion complies with 15 minutes of backup.
4. Contractor shall confirm the final backup power requirements, which 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: Rack-mounted UPS with surge protector as required by the power requirements shown in the Contract Documents. Provide the following, as required for the Project:

1) Nine or Fewer Cameras: Provide Tripp-Lite Smart1200LCD (700W Capacity) rack-mounted unit to support nine (9) or fewer PoE cameras and switch.
2) Ten or More Cameras: Provide Tripp-Lite Smart1500RM2U (1000W Capacity) rack-mounted unit to support ten (10) or more PoE cameras and switch.

b. UPS for MDF Server Rack: Rack-mounted UPS. Provide one of the following:

1) APC; Smart UPS 5000VA (208V or 120V).
2) Tripp-Lite; SMART5000RT3U (208V or 120V).

C. Surge Protection Devices – Outdoor Cameras:

1. Location: Provide surge protection devices at all outdoor cameras. Protection devices shall be placed either in the camera housing or in a separate weatherproof enclosure.
2. Mounting: 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. Basis-of-Design Manufacturer: Ditek DTK-PVPIP, DTK-MRJPOE or integral built in surge protector.

D. 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 Buss bar.
5. Provide ground from MDF ladder tray to MDF Main Grounding Buss bar.
6. Comply with Division 27 Section, "Communications Cabinets, Racks and Enclosures," for grounding requirements.

2.16 HARDWARE

A. Viewing Workstations: Hardware provided and programmed by User Agency (CPS).

1. Client Station Requirements:

a. Processor: Intel® Core® 2 Quad Processor Q9400 (2.66Ghz, 1333MHz FSB).
b. Memory: 4 GB DDR2 Non-ECC SDRAM.
c. Storage: 2 x 250 GB Hard Drive.
d. Video Card: 256MB ATI Radeon HD3450 Dual Monitor Video Card.
e. Monitor: 17-inch UltraSharp 1708FP flat panel monitor; with integrated Gigabit and 1600 x 1200 or higher screen resolution.
f. LAN/WAN Card: 10/100/1000 Ethernet network Interface Card, wireless card.
g. Accessories:

1) 16x DVD +/- RW Drive.
2) AX510 Sound Card.
3) Win XP Pro; MS Office 2003; CPS Image; Keyboard; and optical mouse.

2. Quantity/Locations: Contractor installed, User Agency (CPS) provided viewing workstations at locations indicated below:

a. Elementary Schools:

1) Principal's Office.
2) Secretary/Engineer's Office.
3) Security Station/Desk.

b. High Schools:

1) Principal's Office.
2) Secretary Station/Desk.
3) Security Office.
4) Police Office.

3. Viewing workstations shall be connected to local data outlet connected to either a local concentrator (CRE) or to the MDF room.

B. Switches: Hardware installed and programmed by User Agency (CPS).

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.

C. DVS Concentrator Remote Enclosure (CRE):

1. General: Concentrator remote enclosures shall be wall-mounted, metal enclosures that house, secure, and protect remotely located DVS equipment. CRE's shall be located and installed as required to limit cable runs to a maximum of 295 feet. Provide accessories as required for a fully functioning system.
2. Concentrator enclosures shall serve as the CRE for the DVS system. Refer to Division 27 Section, "Communications Cabinets, Racks and Enclosures," for enclosure requirements.

    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 20 amp, single pole breaker.
5. Provide master key for lockable cabinet. All CRE's shall be keyed alike, for use with single master key. Master key shall be delivered directly to the Board by the Installer, upon acceptance of the installation by CPS Office of School Safety and Security.
6. The CRE's shall be primarily located in storage rooms or offices. Classroom locations are not allowed.
7. Refer to Division 27 Section, "Cabinets, Racks, and Enclosures," for additional requirements.

D. Equipment 4-Post Rack:

1. Refer to Division 27 Section, "Communications 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, twelve (12) isolated ground duplex receptacles and one isolated ground simplex receptacle connected to five 20-amp circuits, single pole breaker and dedicated power connection to support the equipment rack UPS from the MDF panel board to MDF Security Systems Rack. (See MDF Rack Detail)

2.17 SOFTWARE AND SERVERS

A. Software:

1. Salient: The Salient Complete view is the Video Management System software to manage all the cameras, and connections. There is no base license and there are no limitations on client/user connections and the quantity of device licenses is determined by the number of camera connections.

2. Archiving: Physically separate server required; 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 archive 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. Required Licenses: Include the following:

    a. Salient Enterprise IP license:

        1) Based upon specified number of cameras.
        2) Gateway - 8 camera connections – 4 client/user connections.
        3) Maps/Procedures – Camera Sequences - Audio Support – Web pack.
        4) Virtual Matrix.
        5) Macros.
        6) Keyboard connection.
        7) Alarm Management Module.
        8) Local Archiving.
        9) Offline archiving.
        10) Time Zone Support.

    b. Additional Camera Licenses based upon the number of camera connections.

5. Provide latest version of Salient software at time of Bid submittal.
6. The DVS system shall be capable of receiving signals from the Board's intrusion detection system. Software shall have alarm video monitoring and external alarm capabilities.
7. 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): SQL Server 2008 Express/Standard/Enterprise.
    c. Browser (CPS Preferred Browser): Internet Explorer 7(for Web Clients).

B. Server (Gateway Directory) and Archive Server (s) Hardware: Hardware provided under allowance, installed by Contractor. Software furnished, installed, and programmed by Contractor.

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 Salient 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 requirements per camera based upon calculations. 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 Salient Systems and shall be coordinated with CPS ITS Representative.
8. Recommended Server Specifications:

    a. Salient Complete: (2U IP Only Server)

        1) Basis of Design Product: Salient RM 3000.
        2) General Server Features:

            a) The video server shall be integrated into a server-class computing platform ('PC'). The PC shall be available in a rack-mount chassis and shall fit in an EIA-standard 19-inch equipment rack utilizing no more than two units (2U) of rack space.
            b) The server Operating System shall be Microsoft Windows Web Server 2008 R2.
            c) Server shall have front accessible, hot-swap hard-disk trays.

        3) Server System Components:

            a) Server shall utilize Dual (two) Intel Xeon Quad-core CPU, 2.4GHz.
            b) Server shall utilize Intel 5500 series chipset.
            c) Server shall have at least 4GB of DDR3 system memory.
            d) Server Storage Controller shall be a PERC H700.
            e) All hard disk components used by the system shall be designed specifically for enterprise storage applications in disk dense environments.
            f) Server hard drives shall be Seagate Constellation ES SATA.
            g) Server shall provide between 4tb and 20tb RAID5 of internal storage for video event data.
            h) Server shall have two Gigabit network controller ports.
            i) Server shall have RS0232C serial port, for communications with pan-tilt-zoom cameras and other auxiliary devices.
            j) Server shall have High-Speed USB 2.0 serial ports, for the attachment of external storage, digital I/O and archive devices.

9. Archive Servers: A minimum of one Gateway Directory Server and one Archive Server shall be required. 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.Max throughput of about 308 Mbps or 3.86 Mbps per camera.
    b. Storage:

1) 26.5 TB for 13 hours overnight.
2) 44 TB for 11 hours daytime.
3) 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.
11. Additional Archive servers may be required to meet the needs of the installation.

2.18 SIGNAL TRANSMISSION COMPONENTS

A. DVS-UTP Cable:

1. General: Provide Category 6 cable. Refer to Division 27 Section, "Communications Horizontal Cabling."
2. 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.

3. Jacket Color: Purple.

B. DVS Power Cable: For outdoor camera installations only.

1. Provide a power cable with minimum No. 16 AWG 2-conductor, stranded copper conductor construction. Size of cable shall be based on voltage drop and camera requirements. Cable feeds 24 VAC from a local power supply and shall be provided for each outdoor camera.

C. DVS Backbone Cable: Subject to compliance with requirements in Division 27 Section, "Communications 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. Use for interior applications only.

1. Strand Count: 6 (MDF to enclosures).
2. Minimum OFL Bandwidth: 700 MHz-km at 850 nm; 500 MHz-km at 1300 nm, as characterized by OFL (overfill launch) measurement per EIA/TIA-455-204.
3. Cable shall meet or exceed the OM3 standard.
4. Sheathing Color: Aqua.

D. DVS Backbone Cable: Subject to compliance with requirements in Division 27 Section, "Communications 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. Use for interior applications only.

1. Strand Count: 6 (MDF to enclosures).
2. 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.
3. Cable shall meet or exceed the OM3 standard.
4. Sheathing Color: Aqua.

E. DVS UTP Connecting Hardware:

1. DVS Jacks: Category 6.

   a. DVS jacks shall be modular and not a permanent element associated to a faceplate.
   b. DVS Jack Color: Purple.

2. DVS Patch Panels: Category 6.

   a. 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.
   b. Patch cable length determined by rack layout.
   c. Provide one patch cord for each information outlet.
   d. Color requirements:

      1) DVS Jacks for insertion into DVS patch panels shall be purple in color.
      2) Mounting Plate: Black with purple RJ45 jacks.

3. DVS Work area Patch Cords: Category 6.

   a. 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.

   b. Provide 6 foot work area patch cable length.
   c. Provide one patch cord for each information outlet.
   d. Provide one patch cord for each port.

F. DVS Backbone Connecting Hardware, Patch Cords and Optical Cable Connectors:

1. Comply with Fiber Optic 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: Refer to Division 27 Section, "Communications 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: Refer to Division 27 Section, "Communications 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.
   d. Patch cable length determined by rack layout.

4. Optical Cable Connectors:

   a. Optical Fiber Connecting Hardware: Refer to Division 27 Section, "Communications Optical Fiber Backbone Cabling."

2.19 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A.

B. Ladder Rack Runway: Refer to Division 27 Section, "Communications Cabinets, Racks and Enclosures."

   1. Used for routing of communications cabling within MDF and IDF rooms.

C. Conduit and Boxes: Refer to Division 26 Section "Raceways and Boxes for Electrical Systems." 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

3.20 WIRING METHODS AND INSTALLATION OF PATHWAYS

A. General: Refer to Division 27 Section, "Communications Cabinets, Racks and Enclosures" For ladder rack runways, cabinets, and racks. Drawings indicate general arrangement of pathways and fittings.

   1. Conduit Installation: Raceways and conduit shall be fully concealed.

      a. Where exposed raceways or conduit are proposed, those installations shall be reviewed and approved, in writing, by CPS Office of Safety and Security prior to the start of the Work.

B. Wiring Method: Install cables in existing dedicated, existing concealed raceways, cut and patch wall/floor or surface mounted raceway for DVS System cabling.

1. Comply with requirements for raceways and boxes and their installation specified in Division 26 Section "Raceways and Boxes for Electrical Systems."
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.

C. Wiring within Enclosures: 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 as required. Provide and use lacing bars and distribution spools.

D. Wiring within MDF and IDF: 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 as required. Utilize overhead ladder rack runway for cable routing within room(s).

1. Coordinate installation of dedicated floor-mounted rack for DVS system equipment. Coordinate location adjacent to existing structured cabling floor-mounted racks.
2. Coordinate with contractor on installation of dedicated wall-mounted rack for DVS system equipment. Coordinate location with CPS Office of School Safety and Security (OSSS) and CPS Office of Information Technology before mounting.
3. Where raceways or conduit are proposed to be exposed, those installations shall be reviewed, and approved in writing, by CPS Office of Safety and Security prior to the start of the Work.

3.21 GENERAL INSTALLATION

A. Install all equipment and components in accordance with manufacturer’s written instructions, in compliance with NEC, 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. 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.

D. 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.

E. Labeling:

1. Identify system components, wiring, cabling, and terminals. Subject to compliance with requirements in Division 27 Section, "Identification for Communications Systems," and Division 26 Section, "Identification for Electrical Systems."
2. Power supply and equipment used shall 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.

F. Cable Schedule: Post in a prominent location in each CRE and the MDF room. List incoming and outgoing cables and their designations, origins, and destinations. Provide a disc copy of final comprehensive schedules for the project in the software and format selected by the Board.

G. Programming/Configuring Coordinate with CPS Office of School Safety and Security at (773) 553-3001 or (773) 553-5136 for general programming requirements. Use manufacturer's programming form and system layout work sheets provided by CPS.

1. Configure cameras using IP scheme.
2. Configure network switch.
3. Load software.
4. Install and configure servers and storage.
5. All cameras shall be recorded in MDF on Storage Array Servers. All PTZ cameras to be programmed to tour outside areas as required by CPS Office of School Safety and Security. Tour of duty shall be interrupted by any computer loaded with software and shall resume after two minute idle time delay.
6. DVS System shall be connected to CPS's LAN and WAN network through static IP addressing via the administration network side. IP addresses shall be provided by CPS ITS and programmed into the DVS Software Solution by the Contractor. Contractor shall provide the CPS Office of School Safety and Security emergency control center with new IP addresses.

H. Mounting:

1. Camera locations and mountings shall be determined by CPS Office of School Safety and Security.
2. Exterior cameras (both fixed and PTZ) shall be mounted at a second floor level where possible, minimum of 15 feet above finished grade. Wiring and cables must enter the building within 12 inches of mounting location.
3. Interior cameras shall be wall-mounted, 10-inches below finish ceiling.
4. Where back boxes, raceways or conduit are proposed to be exposed, those installations shall be reviewed, and approved in writing, by CPS Office of Safety and Security prior to the start of the Work.

I. Sealing of Penetrations: All penetrations for and at wiring, cabling, conduit, raceway, and outlets shall be tightly sealed with elastomeric sealant or firestopping compound, as required, at the completion of the Work. No gaps or openings shall remain.

1. Refer to Division 07 Section, "Joint Sealants," for elastomeric sealant.
2. Refer to Division 07 Section, "Penetration Firestopping," for firestopping compounds and materials.

3.22 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 and provide a copy of programming on CD-ROM disk in format required for downloading.

C. Adjust or replace system devices until all cameras are aimed and focused as directed by CPS Office of School Safety and Security. Installer's technicians shall be available for adjustments for a period of 30 days following acceptance of installation.

3.23 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. Refer to Division 27 Section, "Commissioning of Communications," for DVS-UTP cable testing procedures.

3.24 COMMISSIONING

A. Refer to Division 27 Section “Commissioning of Communications” for performance tests, inspections, correction of deficiencies, and preparation of test and inspection reports.

3.25 DEMONSTRATION/TRAINING

A. General: Training shall be coordinated with CPS Office of School Safety and Security and school Principal, as required, and shall be provided at mutually agreed on times, with not less than 7 day's notice provided prior to each training session. An outline agenda for each training session shall be provided and names of attendees recorded.

B. Provide a minimum of two (2) four hour sessions of technical training for designated CPS Office of School Safety and Security personnel. Training shall include system programming, operation and maintenance procedures, and delivery of required manuals.

C. Provide one four hour training session for the school Principal and designated staff members. Training shall include proper methods of live view, retrieval, setting PTZ tour patterns, printing photos, and saving crucial video.

D. Provide a minimum of two (2) hours of refresher technical training sessions for designated CPS Office of School Safety and Security representatives 30 days after the initial training session. Training shall include system programming, operation and maintenance procedures.

E. Provide a minimum of two (2) hours of Operator/User training sessions for designated CPS Office of School Safety and Security representatives. Training shall include system operations programming and configurations.

F. Provide a minimum of two hours of Operator/User training sessions for designated CPS Office of School Safety and Security representatives 30 days after the initial training session. Training shall include system operations programming and configurations

3.26 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 Preliminary Acceptance / 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.

3.27 CONTRACTOR STARTUP AND REPORTING

A. Installer shall set outdoor PTZ cameras for tours of duty (medium speed, medium distances). Tours shall have the ability to be set and interrupted by any computer loaded with Salient software (per Principal's direction) and resume tours after two minute idle time.

B. Installer shall obtain and program IP addresses as well as all camera alpha descriptors into Salient Platform and verify connectivity to CPS Student Safety 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 head end equipment with this information.

C. Installer shall load up to four (4) administrative school computers (the designated viewing workstations) with latest version of Salient software (per Principal's direction) and leave copy of Salient software with Chicago Public School’s Student Safety Center located at 125 S. Clark Street.

END OF SECTION