SECTION 28 23 00

VIDEO SURVEILLANCE SYSTEM

**BASED ON DFD MASTER SPECIFICATION DATED 03/01/23**

Notes to A/E:

This section has been written to cover most (but not all) project conditions that you will encounter. Depending on the project, you may need to add material, delete items, or modify what is currently written.

Edit all areas as applicable to meet the requirements of the project. Common options or features recognized by the DFD, or items where A/E input is needed are enclosed in [brackets] and/or <less-greater brackets>.

Editing instructions are included throughout the document (italic text; red if viewed/printed in color). These instructions should be hidden or deleted for printing. Text can be hidden by modifying the MS-WORD Style “A/E Instructions” to use “Hidden Text” as part of the Font type. To display Instructions formatted as “Hidden Text”, configure MS-Word File Options /Display to “Show” Hidden Text on Screen.

Supplementary editing instructions which cover agency-specific information are available in a companion document, also available on the DFD website.

This document is structured to automatically update the Table of Contents when printed or in response to an “Update Field” command (right mouse click on TOC opens menu) in MS-Word. Confirm that changes to the document outline are reflected in the TOC. TOC entries are Hyperlinks and can be used to navigate the document.

Revision History:

In the on-line “DFD Document Library” Under “Master Specifications/Design Guidelines / 28 – Electronic Safety and Security”, see “Division 28 Revision History”.

1. GENERAL

Scope

This section covers the equipment, hardware and cabling requirements of a Video Surveillance System (VSS) for the project. Included are the following topics:

Provide bullet point list of sole source items including manufacturer and model or product series. Use generic terms such as “Network Electronics”, Recording Equipment”, &c. Do not include technical details or specific part numbers., specified options, etc.

Delete Notice if not used.

CLASS 1 NOTICE:

Notice is hereby given in accordance with Section 16.855(10), Wisconsin Statutes, that the Division believes it is in the best interests of the State to contract the following work from only one source, without the usual statutory procedures:

* [Product type – Manufacturer; Product Series]

[PART 1 - GENERAL](#_Toc536693047)

[Scope](#_Toc536693048)

[Related Work](#_Toc536693049)

[References](#_Toc536693050)

[Quality Assurance](#_Toc536693051)

[Submittals](#_Toc536693052)

[PART 2 - PRODUCTS](#_Toc536693053)

[Cameras](#_Toc536693054)

[Cabling](#_Toc536693055)

[Display Monitor](#_Toc536693056)

[Video and Network Electronics](#_Toc536693057)

[Miscellaneous Items](#_Toc536693058)

[PART 3 - EXECUTION](#_Toc536693059)

[General](#_Toc536693060)

[Continuity of Existing Services and Systems](#_Toc536693061)

[Cable Installation](#_Toc536693062)

[Camera Installation](#_Toc536693063)

[Miscellaneous Items](#_Toc536693064)

[Testing and Acceptance](#_Toc536693065)

[Training](#_Toc536693066)

[Operating and Maintenance Manuals](#_Toc536693067)

[Warranty and Support](#_Toc536693068)

Major features of the Video Surveillance System and responsibilities to furnish and/or install are as follows:

Edit the following (3) lists to match project requirements. Hardware and cabling might include the following. Move each item to the applicable list.

* Cameras.
* Camera Housings
* Camera Mounts
* Camera Power Supply/Supplies (if other than Power-over-Ethernet)
* Video Encoders
* Display Monitors and related cabling
* Patch Cords at Camera locations
* Cabling (Signal, Power, Control) and Termination Hardware
* Cable Support Hardware
* Display Monitor Support Hardware
* Network Electronics (Routers, switches, etc.)
* PoE Injectors (as applicable; may be integrated into network electronics)
* Media Converters (e.g., Fiber-to-Copper; if not integral to network electronics)
* Recording Equipment, related hardware and software
* Equipment Racks
* UTP Receiver Hubs with integral Camera Power
* Power distribution and conditioning equipment (UPS’s, Power Strips, Surge Suppressors).

See the related DFD Div. 28 document “Supplementary Instructions to A/E” for agency-specific requirements.

Agency-furnished, Contractor-installed

Enter items from above list as applicable.

<ADD ITEMS>

Contractor-furnished, Contractor installed

Cabling - Signal and camera Power (if applicable)

Cable Pathways

Camera Rough-in

Enter additional items from above list as applicable.

<ADD ITEMS>

Agency-furnished, Agency-installed

Enter items from above list as applicable.

<ADD ITEMS>

Include the following sentence if applicable. Otherwise delete.

[The system is also to be integrated with security alarms and other devices.]

All equipment, cables and related termination, support and grounding hardware, bonding as required for a full and functioning system, shall be installed, wired, tested, labeled, and documented by the Contractor, as detailed in this and related section(s).

Related Work

Applicable provisions of Division 1 govern work under this Section.

Edit as applicable to match project requirements. Delete reference to sections that do not appear in the project documents. Add other sections that apply.

Section 01 91 01 or 01 91 02 – Commissioning Process

Section 26 05 26 – Grounding and Bonding for Electrical Systems

Section 26 05 29 – Hangers and Supports for Electrical Systems

Section 26 05 33 – Raceway and Boxes for Electrical Systems

Section 26 05 36 – Cable Tray for Electrical Systems

Section 26 05 53 – Identification for Electrical Systems

Section 27 05 53 – Identification for Communications Systems

Section 27 10 00 – Structured Cabling

Section 27 11 00 – Communications Equipment Room Fittings

Section 27 11 13 – Communications Protection

Section 27 16 19 – Communications Patch Cords, Work Area Cords, and Cross Connect Wire

References

All materials shall be listed by UL and shall bear the UL label. If UL has no published standards for a particular item, then other national independent testing standards shall apply and such items shall bear those labels. Where UL has an applicable system listing and label, the entire system shall be so labeled.

Add other requirements as applicable to contractor-furnished equipment.

Other applicable standards are as follows:

* ANSI/IEEE C2 - National Electrical Safety Code
* SPS Chapter 316 – Wisconsin Dept. of Safety and Professional Services Electrical Code
* FCC Part 15 as applicable to the equipment type(s) included

Quality Assurance

Manufactured Items

The manufacturer(s) of cabling and devices components shall be a company specializing in and having a minimum of two years documented experience in producing products similar to those specified in this and related sections.

Bidder Qualifications

The contractor shall have been in this line of business for a minimum of five (5) years and have successfully completed one or more projects of scope 50% or more of the magnitude specified by these documents.

Contractor shall have necessary certifications to provide for Guarantees as specified herein.

Submittals

Submit the following for approval prior to ordering any equipment in accordance with requirements of Division 1, General Conditions:

* Product data for all equipment, hardware cabling and miscellaneous components proposed,
* Floor plan drawings showing equipment and device locations with proposed conduit wiring, pull box and junction box locations,
* Camera mounting details specific to location,
* Schematic drawings - specific to project - of all circuits from the field devices to the required connection points. The diagrams shall show schematic wiring of equipment and all connections to be made to devices. Terminal connections in the equipment shall be numbered to correspond to the diagrams for use in making connections. Wiring diagrams shall be coordinated so that terminal numbering, circuit designation and equipment or device designations are the same on all drawings. All drawings must be submitted and approved by the Engineer before installation starts, but such approval will not waive any specification requirements unless specifically stated.

Mark submittal package with specification section number. Do not mix sections in a single submittal.

Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents.

* Markings shall be reproducible (arrow, underlines, circled, checkmark, etc.).
* Where sheet or drawing includes options, mark proposed option(s).
* When manufacturer's reference numbers are different from those specified, provide explanation and cross-reference number for each item.

Work shall not proceed without Engineer approval of the submitted items.

No substituted materials shall be installed except by written approval from the Engineer.

Mockups

On request, provide mockups for cameras, mounts, protection and related hardware as applicable to demonstrate configuration and aesthetics and to set quality standards for fabrication and installation.

The Owner reserves the right to make changes to descriptive information, component selection and nomenclature during shop drawing review without incurring any additional cost.

1. PRODUCTS

The following articles cover most equipment types that will be required. Add any other equipment applicable to the project. Regardless of whether cameras are to be agency- or contractor-furnished, A/E should confirm compatibility of the camera model(s) with planned or existing camera control and video recording systems.

Where a sole-source procurement is allowed, each item must be listed in the Class 1 Notice in the specification section which includes the item. Coordinate with the lead A/E to also list the sole source item(s) in the Class 1 Notice which must appear in Division 1. Here in PART 2, identify Manufacturer/Model by part number and all required options. Performance and construction specifications are not needed for such items.

Where a “Basis-of-Design” product is indicated (equals must be allowed), include all pertinent performance and features for the product. Such content will be the basis on which equals are determined. Features of a “basis-of-design” product not included in the technical language might not be considered.

Note: Where a "Basis of Design" product is identified, this is done to identify a known-compliant product and to aid in contractor understanding of intent. Equals are allowed where Basis-of-Design products are identified.

Cameras

General

If contractor is to provide hardware, select the following paragraph and edit as applicable. Otherwise, Delete. Cameras are typically not sole-source spec'd on DFD Projects.

Provide cameras, camera housings and camera mounts as follows:

<ADD CAMERA SPECIFICATIONS HERE>

If hardware is to be Agency-Furnished, Contractor-Installed, select the following paragraphs and edit as applicable. Include applicable camera types or reference drawings. For the Department of Corrections projects, the DOC will provide cameras for contractor installation. Identify camera models here or on Camera Schedule which is part of project drawings. Use same terminology in plans and specs to describe camera types.

Cameras, camera housings and camera mounts shall be furnished by the Agency for installation by the Contractor. For purposes of bidding, [refer to the Camera Schedule which is part of the project drawings for the camera types to be assumed.] [the following makes/models should be assumed:

* Camera Type 1
* Camera Type 2
* Camera Type 3

Prior to construction, the Agency shall update camera makes/models to current product available at that time. Confirm intended products prior to construction.

Mount

As required for camera type and location. Refer to project drawings

Power Supply

Edit for powering methods applicable to project. Powering of Outdoor and PTZ models using PoE or manufacturer-specific is increasingly common. Confirm preference and capabilities with Agency and manufacturers. Add specification for mid-span injector if applicable.

Except where otherwise noted, cameras are powered via network connection (e.g., Power-over-Ethernet; PoE). Exceptions include:

Enter environment and, if applicable, Make/Model. Examples may include Outdoor locations where camera is equipped with an environmental package (e.g., heater, fan) and PTZ models. If not applicable, delete content re: “Exceptions”.

Include the following where camera supply other than PoE is noted. Edit to add performance specifications for required power supplies as applicable. Edit to identify Agency-furnished model if applicable (or delete this reference).

<ADD Performance Specifications here if applicable.>

If agency-furnished, include the following. Otherwise, delete.

For purposes of bidding, contractor shall assume power supply to be <ENTER MAKE/MODEL> or equivalent.

Cabling

Horizontal Cabling

Coordinate with Division 27 designer to ensure that content of specification Section 27 10 00 and drawings match Video Surveillance System requirements.

Include F/UTP as applicable. Many agencies are requiring this, especially for outdoor camera locations.

Refer to specification Section 27 10 00 – Structured Cabling for cable and termination requirements for horizontal links designated for video surveillance camera locations.

Power Cabling

Edit per requirements of the project. If power cabling is required, retain the following paragraph. Otherwise, delete the paragraph and add “Not applicable.”

Per manufacturer’s recommendations for camera type, power supply and cable length.

Camera (Work Area) Cords and Patch Cords

Refer to project drawings and specification Section 27 16 19 - Communications Patch Cords, Work Area Cords, and Cross Connect Wire.

Display Monitor

If contractor is to provide hardware, select the following paragraph and edit as applicable.

Display and Mounting hardware as follows:

<DISPLAY AND MOUNT SPECIFICATIONS HERE>

If hardware is to be Agency-Furnished, Contractor-Installed, select the following paragraph and edit as applicable. Add any requirement for base and/or mounting brackets.

For purposes of bidding, assume [22-inch] <SIZE> Flat Panel. Exact make/model shall be identified by the Agency prior to construction.

Video and Network Electronics

Recording, Control and Storage Equipment

Edit to match requirements of project. This will typically be provided by the Agency. Consult with DFD Engineer for specification language if applicable to project.

[By Agency.] [Not applicable to this project.] <ADD specifications here if applicable>

Network Electronics

Edit to match requirements of project. Responsibility for this by the Agency is typical. Consult with DFD Engineer for specification language if applicable to project.

[By Agency.] [Not applicable to this project.] <ADD specifications here if applicable>

Media Converters

Edit to match requirements of project. Consult with DFD Engineer for specification language if applicable to project.

[By Agency.] [Not applicable to this project.] <ADD specifications here if applicable>

Video Encoders and other Analog Video Equipment

Edit to match requirements of project. The use of Analog Cameras is unusual for DFD projects. Consult with DFD Engineer for specification language if applicable to project.

[By Agency.] [Not applicable to this project.] <ADD specifications here if applicable>

Miscellaneous Items

Protection

Identify Surge Protector needs for outdoor cameras served by copper cabling. Surge protection is not required where fiber optic cabling is used from camera to network electronics. Edit the referenced specification section to include the required content. Otherwise delete or indicate “Not applicable to this project”.

See specification Section 27 11 13 – Communications Protection.

Uninterruptable Power Supply (UPS)

Include where required by the Agency. If retained, edit to identify equipment to be served at each location and duration of protection, and confirm that Input power as identified is correct for UPS capacity specified. Otherwise, delete.

UPS features:

* Capable of providing voltage and current as required to operate <ENTER EQUIPMENT SERVED> equipment for no less than [(15)] <ENTER DURATION> minutes duration.
* Protects connected loads from surges, spikes, lightning, and other power disturbances.
* Incorporates audible alarm to indicate change in site power and UPS status.
* Automatic self-test provides early indication when battery replacement is required.
* Incorporates hot-swappable batteries.
* Includes a protection indicator light and master power switch.
* Input: 120V/60 Hz. AC cord with NEMA5-15P straight-in plug connection. Re-settable circuit breaker.
* Minimum 3-year product warranty.

1. EXECUTION

General

The complete installation shall be done in a neat, workmanlike manner in accordance with Division 26 of these documents and manufacturer's recommendations.

The installation shall conform to site requirements for security, privacy and care. Temporary or permanent installations, which conflict with site operations, security, privacy and/or care guidelines, shall be immediately corrected by the contractor with no additional compensation.

Security guidelines for working within the secure areas of the facility shall be followed by the contractor.

Continuity of Existing Services and Systems

No outages shall be permitted on existing systems except at the time and during the interval specified by Agency and site representatives. Obtain written approval for any outages.

Schedule any outage scheduled when the interruption causes the least interference with normal site schedules and business routines. No extra costs will be paid to the Contractor for such outages which must occur outside of regular weekly working hours.

Choose reference to General Requirements for small project using Simplified Procedures. Choose reference to Supplementary General Conditions for major project. Make sure these sections are edited to include requirements of the site.

Refer to [General Requirements] [Supplementary General Conditions].

Restore any circuit interrupted as a result of this work to proper operation as soon as possible.

Cable Installation

General

Install cable in accordance with the project drawings and Section 27 10 00 – Structured Cabling.

Camera Installation

General

Attach camera mounts securely to structural members. Cameras located on lay-in ceiling shall not be supported by the ceiling tile. Provide support from structural building members utilizing threaded rod and strut metal framing, tile bridge, or other approved means.

Install cameras, mounts, power supplies, control equipment, monitors, [recording equipment] and related hardware as applicable per manufacturer recommendations.

Coordinate requirements with Agency and edit or delete as applicable. For the Department of Corrections projects, this work is performed by the Agency.

[Configure Pre-sets and Programmable Tours function (PTZ only if applicable).]

Connect Alarms Input(s) / Alarm Output(s) and/or connections to other systems as specified.

Power Supply

If all cameras are PoE-powered, confirm that Agency is to be responsible for network electronics (PoE-capable switches or PoE-injectors). Select the following sentence if this is the case. Consult with DFD Engineer if Agency is not providing this equipment and specification language is needed.

Not applicable to this project. All cameras are PoE-powered.

If there are cameras that require separate power supply, include the following paragraphs and edit to match project requirements.

[Provide] [Install Agency-furnished] Power Supply(s) for the camera(s) identified as requiring a separate power supply. Locate per project drawings.

Power supply(s) at each location shall be served by a dedicated, [emergency] 120 VAC circuit. Coordinate circuit assignment with Agency and Electrical system designer.

Calculate Conductor Gauge in cable from power supply to camera per manufacturer’s recommendations and actual cable length.

Network Settings

Coordinate network plan with Agency.

Where IP (Network) type cameras are installed, coordinate network addresses and camera settings with Agency.

[Contractor] [Agency] is responsible for configuring camera.

Provide documentation horizontal cabling identifying on which Patch Panel port each camera cable is terminated (e.g., Camera X = port Y).

Consider adding a reference to this content on project drawings. This important step if often overlooked during construction.

Positioning and Lens Adjustment - Preliminary

Prior to rough-in at camera locations, the contractor shall demonstrate all camera locations for the purposes of making final camera position and lens adjustments. Contractor shall provide 14-day notice (minimum) to allow for participation by DFD, Agency staff and Engineer.

Demonstration of the camera view at each location shall be as follows:

* Place representative camera at the given location and display the video on a temporary monitor or workstation. Provide laptop computer or other suitable display as required to perform this work.
* Camera placement may be by temporary support or by holding the camera in place by hand. (The Technician should not be visible in the image.)
* Agency representative and/or the DFD Construction Representative will direct the contractor to the desired field of view at that location.
* Document the approved field of view by saving the image electronically (preferred), taking a still photo of the viewing monitor or other approved means.
* No agency staff, inmate, resident, student, etc. shall be visible in the recorded images. Contractor personnel‑with face or other identifying features obscured‑ may be visible in an image if required for purposes of scale.
* At locations where Pan-Tilt-Zoom capabilities are called for, the movement of the camera shall be simulated and the views at the extents of this movement documented.

For purposes of bidding, contractor shall assume the responsibility to provide temporary power supply, PoE injector or other means to power camera for this demonstration.

The Contractor shall include in his estimate, minor adjustments in camera location/placement relative to plan to account for unanticipated obstructions to the field of field, mechanical interferences with new raceway and lighting fixture obstructions. There shall be no additional cost for this adjustment. Minor adjustments are considered those that do not change the housing type or mounting conditions and either a) decreases the distance from the camera to the wiring hub, or b) increased the distance from the camera to the wiring hub by no more than ten (10) feet when compared to the location shown on the drawings.

Miscellaneous Items

Protection

Edit to match requirements of the project. Otherwise delete or indicate “Not applicable to this project”.

Where outdoor cameras are served by copper cabling, provide Surge Protection in the path from camera to network electronics.

See specification Section 27 11 13 – Communications Protection.

Uninterruptable Power Supply (UPS)

Edit to match requirements of the project. Otherwise delete or indicate “Not applicable to this project”.

Provide Uninterruptable Power Supply (UPS) as follows:

<IDENTIFY location(s) and capacity as required at each>

Install per manufacturer’s recommendations.

Testing and Acceptance

General

Conduct tests upon completion of all work or during course of construction when identifiable portion(s) of overall work are complete.

Sequence of Acceptance Testing shall be as follows:

* Submit Acceptance Test Plan
* Plan Accepted
* Perform Pre-Test Inspection
* Perform Acceptance Tests

DFD Construction Representative, Agency and site representatives, and Engineer may be in attendance to witness testing. Provide minimum one (1) week advance notice as to allow for such participation. Failure to provide notification shall be grounds for the Owner/Engineer to reject any or all documentation of results on related testing and to require a repeat of the affected test.

Test plan shall be established as to not delay project schedule. Obtain approval of schedule with the above parties before commencing with Acceptance Tests. Schedule shall allow time for correction of defects and remedial work.

Supply all equipment and personnel necessary to conduct acceptance tests.

Perform tests related to connected equipment of others only with permission and presence of Contractor(s) responsible for that equipment.

Should it be found by the Engineer that the materials or any portion thereof furnished and installed under this contract fail to comply with the specifications and drawings, with the respect or regard to the quality, amount of value of materials, appliances or labor used in the work, it shall be rejected and replaced by the Contractor and all work distributed by changes necessitated in consequence of said defects or imperfections shall be made good at the Contractor's expense.

Document all tests.

At the request of the Engineer, provide copies of the original test results.

Use of equipment for actual testing that is different than that submitted shall be cause for rejection of all tests performed with that equipment.

Acceptance Test Plan

Prior to Acceptance Testing, submit a summary of the proposed test plan to DFD Construction Representative, Agency and site representatives, and Engineer.

Test plan shall include – at minimum – proposed schedule, list of tests to be performed, equipment to be used, set-up, expected results and documentation format.

Testing shall not proceed without approval by the Engineer.

Pre-Test Inspection

Prior to commencement of the Acceptance Tests, inspect equipment, hardware and cabling.

At minimum, verify the following:

* Cameras of the specified type are installed at the specified locations.
* Cameras are secured as required to protect against operational damage.
* Signal, power and control cabling (as applicable) are installed and terminated as specified.
* External cameras are provided with adequate protection against moisture and other environmental conditions.
* Cameras, operator workstation equipment and cabling are properly labeled.
* Associated equipment such as power supplies are connected correctly and secured appropriately.
* Agency-provided equipment is in place and operational. (Confirm with Agency).

Include the following if applicable. Otherwise delete. (For the Department of Corrections projects, this is the responsibility of the Agency.)

* [Operator workstation equipment is installed at the specified location. Interconnecting cables are routed in a neat and workmanlike manner, protected from mechanical damage and permanently connected.]

Prior to the commencement of the Acceptance Tests, verify the installation and configuration of software related to the operation and control of the VSS.

Include the following bulleted items only if monitoring and/or recording software is included in the project. Otherwise, delete.

[At minimum, verify the following:

* Software specified in the design documentation and/or modules required to perform all specified operation functions are installed and configured.
* The latest release version of all software modules including patches and upgrades have been provided.
* The control equipment hardware has sufficient capacity to support the software routines and functions under worst-case demand conditions.
* Cameras, system reports, screens and menus have been correctly configured.
* Software has been registered to the Agency.]

Acceptance Tests

The contractor shall obtain written approval of the documentation from Agency and DFD representatives before commencing the Acceptance Tests.

Perform tests to assess overall functionality of the VSS as per the project documents.

Edit List as applicable to project.

Equipment and Sub-system specific testing requirements are as follows:

Cameras

Verify the following for each Camera:

* Camera produces a clear picture and is aimed per site requirements.
* Camera maintains a clear picture and automatically compensates for changing light conditions including day/night change.
* Camera has wide dynamic range installed where specified and operate to prevent camera blinding.
* Camera provides complete and correct coverage of the area specified.
* Pan, Tilt and Zoom (PTZ) function (as applicable) is fully controllable and functions correctly.
* PTZ Cameras (if applicable) can perform call to preset positions by simulating an event alarm.
* Cameras are fitted with anti-tamper devices where specified.
* Simulated tamper alarm is transmitted to the operator workstation.
* Functioning of Alarms Input(s)/Output(s) and/or connections to other systems as specified.

Include the following bullets as applicable. Otherwise, delete.

* [Areas of the camera view can be masked to prevent unwanted alarm activation.]
* [Simulated video feed fault transmits correct signal to the operator workstation.]

Operator Workstation / Control

Verify the following:

* Display orientation/position, camera/view identification.
* Display and/or notification of alarm condition (if applicable).
* Manual control of cameras (if applicable).

Include the following bullets as applicable. Otherwise, delete.

* [Automatic sequencing and control of cameras (pre-sets, tours; if applicable).]
* [Real time video data analysis functions (such as movement detection) are performed in real time and the corresponding view displayed on the monitor.]
* [VSS interfaces with the electronic monitoring and access control system and/or the intercom system to display the correct camera view on the monitor when the corresponding signal is received.]

Recording and Playback Functions

If Recording and playback functions are the responsibility of the Agency, include the following sentence.

Not applicable to this project.

If Recording and playback functions are the responsibility of the contractor, include the following list.

Verify the following:

* Data storage capacity has been installed on the workstation as specified.
* System hardware supplied is per specification.
* Correct video data is recorded by the system in response to simulated alarms.
* Manual Record function operates correctly.
* Playback functions operate correctly including Play, Stop, Pause, Rewind, Fast forward, Frame by frame view.
* Retrieval of stored video.
* Export of stored video.

Retain copies of test results for inclusion in documentation at project completion.

Training

Provide training to DFD, Agency and site staff, and/or contract maintenance personnel on an overview of the system and on operation and maintenance of equipment installed by the contractor.

Coordinate with DFD Construction Representative, Agency and site staff, and Engineer to schedule session(s). Provide adequate notification to allow Agency to schedule staff.

Training to include:

* Overview of System Topology and General Concepts
* Overview of Product Used
* Overview of Monitoring/Control Layout
* Overview of Labeling Formats
* Camera control functionality (if applicable)
* Overview of Test Results and their meaning
* Overview of Documentation

Training shall be held at Project Site and shall be conducted during normal working hours.

Discuss number of Training Sessions with Agency to accommodate staff schedules. For Corrections projects, require minimum of (2) Training Sessions.

For purposes of bidding, assume [#] Training Session(s). Coordinate training with Agency to accommodate staff schedules.

Training session duration shall be not less than two (2) hours.

Number of Students per session shall be 6 or less.

Provide training materials for each student plus (2) additional copies.

Owner reserves the right to videotape session(s) for use as future refresher materials for Agency technical staff.

Operating and Maintenance Manuals

General

Submit quantities required by Division 1 and Section 26 05 00.

Provide documents in hard copy and in electronic form.

Submit product and test data as Adobe Acrobat (.pdf) files.

Submit drawings and schematics as Adobe Acrobat (.pdf) files and AutoCAD (.dwg) files.

Submit images of individual camera views as JPEG (.jpg; preferred) or Adobe Acrobat (.pdf) files.

As a minimum, O&M Manuals shall include:

* Drawings annotated to show as-installed camera locations, cable routes and major equipment locations
* Cabling Schematics
* Approved Submittals
* Test plan and test report sheets
* Programming documents (pre-sets, tours, etc.)
* Hardware and software technical manuals
* Troubleshooting Guidelines
* Equipment Rack Elevations

All documentation, including hard copy and electronic forms shall become the property of the State.

Warranty and Support

Warranty

This Contractor shall guarantee the following for a period of two (2) years from date of substantial completion of this work:

* All provided materials and equipment
* Installation of all equipment, hardware, cabling and related components.

Warranties shall include labor, materials and travel time.

See Division 1, GENERAL CONDITIONS, and GENERAL REQUIREMENTS - Guarantee Documents and the individual technical sections for further requirements.

Contractor shall repair, replace or alter systems or parts of systems having failed, or found defective or not meeting specified performance requirements. This shall be at no cost to the State.

If while fulfilling requirements of this warranty, the Contractor disturbs other work, the Contractor shall arrange for such disturbed work to be restored to its original condition by the responsible Contractor. This shall be at no cost to the State.

END OF SECTION