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CCTV System Upgrade Beaver Creek Institution

STATEMENT OF TECHNICAL REQUIREMENTS



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**Correctional Service Canada
Technical Services Branch
Electronics Systems**

Issue 2

MAY 31, 2018

**STATEMENT
OF
TECHNICAL REQUIREMENTS**

UPGRADE

of

INTERNAL (SIDS) CCTV SYSTEMS

at

BEAVER CREEK INSTITUTION

AUTHORITY

This Statement of Technical Requirements is approved by the Correctional Service of Canada for the upgrade of the existing Hybrid CCTV System at Beaver Creek Institution.

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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	4
TABLE OF CONTENTS	5
ABBREVIATIONS	7
DEFINITIONS	9
1.0 INTRODUCTION	10
1.1 General	10
1.2 Scope	10
1.3 Requirements	10
1.4 Technical Acceptability	10
2.0 APPLICABLE DOCUMENTS	11
2.1 Applicability	11
2.2 Applicable Statements of Work, Specifications and Standards	11
2.3 Language	11
3.0 OPERATIONAL CRITERIA	12
3.1 General	12
3.2 System Specifics	13
4.0 TECHNICAL REQUIREMENTS	14
4.1 Concept of Operation	14
4.2 Existing System Verification	14
4.3 Removal of Equipment and Cables	15
4.4 System Installation	15
4.5 Cameras and Lens	17
4.6 Camera Power Supplies	21
4.7 Network Architecture	21
4.8 Network Video Recorder	26
4.9 Integration	28
4.10 Network Video User Station (client)	29
4.11 KVM (Keyboard, Video, Mouse) Extensions	30

4.12	Monitors	31
4.13	Uninterruptible Power Supply	31
4.14	Electronic Equipment Cabinet	32
4.15	Expandability	33
4.16	Finishing	33
5.0	ADDITIONAL REQUIREMENTS	34
5.1	Operator Training	34
5.2	Maintenance Training	34
5.3	Manuals	35
5.4	As-Built Drawings	35
5.5	Software	36
5.6	Testing	36
5.7	Operational Down-Time	37
5.8	Institutional Operations	37
5.9	Institutional Address	37
5.10	Security	38
5.11	Safety	38
5.12	Spares	38
5.13	Communication Responsibility	39
5.14	Design Change Procedure	39

Annex A - Maintenance Handover Report Form

Annex B - Safety Regulations for Security Electronics Contractors Working at CSC Institutions

Annex C - Site Specific Requirements and System Layout

Annex D – Camera Totals

Annex E – Camera Assignment Tables

Annex F – Monitor and Client Assignment Tables

Annex G – Node and Fibre Layout

Annex H – Site Maps

Annex I – Specifications and Standards

ABBREVIATIONS

The following abbreviations are used in this specification:

CER	Central Equipment Room
CD/DVD	Compact Disk/Digital Video Disk
CMBR	Crisis Management Boardroom
CMO	Correctional Manager Operations
CSC	Correctional Service Canada
CSA	Canadian Standards Association
CCTV	Closed Circuit Television
CFM	Cubic Feet / Minute
DA	Design Authority
EIS	Electronic Image Stabilization
EVI	Educational Vocational Institute
FOV	Field of View
GB	Gigabit
IP	Internet Protocol
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LOF	Laser Optimized Fibre
Mbps	Megabits per second
MCCP	Main Communication Control Post
NTSC	National Television System Committee

NVUS	Network Video User Station
NVR	Network Video Recorder
PIU	Perimeter Integration Unit
PoE	Power over Ethernet
PSIM	Physical Security Information System
PTZ	Pan/Tilt/Zoom
RTO	Regional Technical & Electronics Officer
SAT	Site Acceptance Test
SATA	Serial ATA (Advance Technology Attachment)
SEG	Segregation
SIO	Security & Intelligence Officer
SOW	Statement of Work
STR	Statement of Technical Requirements
TB	Terabyte
TtT	Train the Trainer
UPS	Uninterruptible Power Supply
UTP	Unshielded Twisted Pair
VMS	Video Management Software

DEFINITIONS

The following definitions are used throughout this specification:

Design Authority: Director, Engineering Services, Correctional Service Canada (CSC)

Contract Authority: Public Works & Government Services Canada

Contractor: The Company selected as the successful bidder on the contract.

1.0 INTRODUCTION

1.1 General

The Correctional Service of Canada (CSC) has a requirement to upgrade the existing analogue/digital – Closed Circuit Television (CCTV) equipment installed at Beaver Creek Institution. The existing analogue CCTV equipment is to be upgraded and integrated into a Genetec Security Center VMS digital CCTV video recording system. In certain areas where additional CCTV coverage is required new network cameras will be installed. This Statement of Technical Requirements (STR) will cover the technical requirements for the required work.

The Beaver Creek Institution is a medium/minimum security facility located near Gravenhurst, Ontario. Work will have to be accomplished with minimum disruption to the daily operation and security of the institution. To satisfy this requirement, the existing system must remain operational as long as possible to ensure the integrity of the perimeter security. The contractor will be required to work afterhours on major changes of the infrastructure.

1.2 Scope

The contractor must supply, install, test, and provide operational and maintenance training on the CCTV system, as described in this STR. The contractor must provide acceptable documentation for the operation and the maintenance of this system. The replacement of existing CCTV equipment will be 100% integrated into an upgraded Genetec Security Center VMS software.

1.3 Requirements

The purpose of this STR is to define the technical aspects and describe specific work requirements for the upgrade of the CCTV system at the Beaver Creek Institution. This STR will indicate the extent to which both general and particular CSC specifications are applicable to the implementation of this requirement.

1.4 Technical Acceptability

The CSC operational environment is unique for its diversity of locations, climate exposures and the physical restrictive construction techniques of correctional institutions. Maintaining national security, the safety of staff and offenders alike is CSC's commitment to the government and public. Electronic security systems operating in this unique environment must maintain very high standards of dependability and reliability.

The CSC Engineering Services Division has established Statements of Work (SOW), technical specifications and standards for security electronic systems, which are based on very specific, and restrictive operational performance criteria. Technical acceptability of these systems means that the systems equipment and components comply with the pertinent CSC SOWs, specifications and standards.

2.0 APPLICABLE DOCUMENTS

2.1 Applicability

The provisions contained in the documents listed in the following paragraphs will apply to all aspects of this requirement, unless these provisions have been exempted or modified by this STR.

2.2 Applicable Statements of Work, Specifications and Standards

- A. ES/SOW-0101 Electronics Engineering Statement of Work – Procurement and Installation of Electronic Security Systems
- B. ES/SOW-0102 Electronics Engineering Statement of Work – Quality Control for Procurement and Installation of Electronic Security Systems
- C. ES/SOW-0110 Electronics Engineering Statement of Work – Structured Cable Systems for Electronic Security Systems
- D. ES/SPEC-0006 Electronics Engineering Specification – Conduit, Space and Power Requirements for Security Systems for use in Federal Correctional Institutions
- E. ES/STD-0205 Electronics Engineering Standard, Fixed Outdoor Camera Enclosure, Closed Circuit Television
- F. ES/STD-0221 Electronics Engineering Standard, Fixed Network Colour Camera for Enclosure, Closed Circuit Television
- G. ES/STD-0223 Electronics Engineering Standard, Pan/Tilt/Zoom Network Colour Dome Camera, Closed Circuit Television
- H. ES/STD-0227 Electronics Engineering Standard, LCD Colour Computer Monitor, Closed Circuit Television
- I. ES/STD-0228 Electronics Engineering Standard, Network Video User Station, Closed Circuit Television
- J. ES/STD-0229 Electronics Engineering Standard, Network Video Recorder, Closed Circuit Television
- K. ES/STD-0232 Electronics Engineering Standard, Fixed Network Colour Dome Camera, Closed Circuit Television
- L. ES/STD-0233 Electronics Engineering Standard, Indoor No-Grip Corner Mount Network Colour Camera, Closed Circuit Television
- M. ES/STD-0235 Electronics Engineering Standard, Indoor Panoramic Network Colour Camera, Closed Circuit Television

2.3 Language

The language at the Beaver Creek Institution is English. All CCTV system display and control indicators and information will be in English only. The operator manuals, maintenance manuals and as-built documents will be provided in English only. Documentation will be provided as per Paragraphs 5.1 through 5.4.

3. OPERATIONAL CRITERIA

3.1. General

- 3.1.1. The contractor must supply and install new CCTV equipment to upgrade an existing CCTV to a 100% digital CCTV system with the most current VMS software to ensure compatibility with future systems. The VMS software will be integrated from 2 separate sites into a single site with centralized storage at the medium security site. Work will include replacement of all analogue CCTV cameras and cabling, replacement of some existing 62.5/125µm (OM1) fibre optic cabling and installation of 50/125µm (OM2) and 9/125µm (OS2) fibre optic cable, replacement of all Ethernet network switches, new fibre optic and CAT5 or CAT6 termination bays and all necessary fibre-optic media converters, network switches, client computers, monitors, brackets, towers and uninterruptable power supplies to provide a complete CCTV network throughout the institution. The contractor must provide and install new CCTV equipment cabinets that meet the requirements detailed in section 4.14 and detailed in Annex C of this STR. The contractor must provide and install a new CCTV archive array as detailed in this STR into existing electronics equipment cabinets in the CER. The contractor will provide and install the most current version of Genetec Security Center VMS and configure the software to provide all alarm outputs to the PIDS/FAAS Perimeter Integration Unit (PSIM) in the Main Communications and Control Post.
- 3.1.2. The system upgrade will consist of the provision of 188 new digital CCTV cameras, 29 network video user stations (clients), 39 monitors, directory servers, video archivers, network attached video storage appliances, electronic equipment cabinets, network switches, camera mounting assemblies, tilt-down/swing back camera towers and roof gantries, uninterruptable power supplies, fibre-optic cabling, category 6 cabling and patch/termination bays. In addition, the upgraded Genetec VMS software will be expanded to accommodate both medium and minimum sites into a single Genetec system recording all cameras associated with Beaver Creek Institution. The operational parameters of the installed equipment shall meet or exceed the performance and operational requirements in accordance with the SOW's, Specifications and Standards listed in paragraph 2.2.
- 3.1.3. The system upgrade will require an expansion of the existing Genetec VMS software and additional Genetec camera licenses. The system expansion will require that all network and camera hardware be properly programmed to be 100% compatible on a Genetec Security Center VMS platform. All Work on the VMS software, video storage solution, network support equipment and (but not limited to) CCTV cameras must be integrated by a certified Genetec reseller employing trained and certified Genetec installation/integration technicians. Installation technicians Genetec certifications qualifications will be confirmed with Genetec.

3.2. System Specifics

3.2.1. This project will see a turn-key digital CCTV system installed into the Beaver Creek Institution at Gravenhurst Ontario. This system will be complete with all necessary mounts, cable dressing brackets and straps. All conduit and cable provided will meet CSC – Electronics standards and specifications. All new equipment provided must seamlessly integrate into existing digital CCTV equipment and the project will result in an expansion of the existing Genetec Security Center Video Management System.

3.2.2. Specifics of operation for all new CCTV equipment are detailed in Annex C of this STR.

3.2.3. Installation of this upgrade will not interfere with the operation of existing equipment and video recording at the Institution without the explicit written permission of the contract authority. Existing digital CCTV cameras that are not being replaced in this project will be integrated by the contractor into the new contractor provided Genetec VMS system. These cameras include:

- **191 AXIS P3343-VE Cameras (Buildings E, F, G, H, I & T)**

3.2.4. Provision of a fully redundant video archive system as detailed in section 4.7 of this document.

3.2.5. All Genetec Omnicast camera licenses will be upgraded to Genetec Security Center licenses and all necessary new camera licenses will be provided to allow capacity for integration and recording of up to 400 CCTV cameras on the VMS platform.

4. TECHNICAL REQUIREMENTS

4.1. Concept of Operation

- 4.1.1. Video surveillance of certain sensitive areas is required to maintain a safe and secure environment for both staff and inmates. CCTV cameras will be installed at various locations on a number of buildings to provide the required video surveillance. Existing Analogue cameras will be replaced with digital cameras; CAT6 cable will be installed to support these cameras. All new digital cameras will be powered via PoE.
- 4.1.2. All control functions such as selection and control of the Pan/Tilt/Zoom (PTZ) and spot monitor selection of a camera will be through the use of a mouse. Playback, recording, searching or archiving of video to external media will be accomplished through the use of a mouse and keyboard on NVUS clients as specified in Annex C of this document.

4.2. Existing System Verification

- 4.2.1. Prior to commencing any new work, the contractor must test the operational characteristics of all existing equipment and systems, whose equipment is in proximity to where work will be carried out or which will be reused, prior to removal or installation of any equipment and provide a written record of these tests to the Crown.
- 4.2.2. The contractor must identify any operational deficiency of equipment or be held accountable for any systems deficiencies during the commissioning period.
- 4.2.3. The contractor is to take digital images of all Field of Views (FOVs) for reference when installing replacement cameras. A copy of these images will be provided to the project authority 2 weeks **prior** to removing any existing equipment. The lenses supplied with the new cameras will be adjusted to provide the same or better FOVs. Any changes to any FOV will be provided to the contractor in writing from the project authority. Any unauthorised FOV changes will be rectified at the contractor's expense.
- 4.2.4. The contractor must test all existing fibre optic cabling to be reused in this project and provide detailed light budget analysis and OTDR readings for all fiber strands. Test results will include the following:
- 4.2.4.1. Origin and destination of cable
 - 4.2.4.2. Light loss in dB over cable – pass/fail – dB
 - 4.2.4.3. Length of cable – in meters
 - 4.2.4.4. Pass/fail

4.2.5. The contractor must test all existing structured cabling to be reused in this project with a certified CAT6 LAN Analyzer and provide detailed analysis and LANCAT readings for all cables.

- 4.2.5.1. Wire map - pass/fail
- 4.2.5.2. Propagation Delay – pass/fail
- 4.2.5.3. Cable Length – pass/fail – length
- 4.2.5.4. Insertion Loss – pass/fail – dB
- 4.2.5.5. Return Loss – pass/fail
- 4.2.5.6. NEXT – pass/fail
- 4.2.5.7. ELFEXT – pass/fail

4.3. **Removal of Equipment and Cables**

4.3.1. The contractor must remove all of the redundant cables, conduit and equipment located in and on various buildings. Care must be taken to ensure that any cables and conduits of other systems are not damaged. All electronic equipment must be handed over to CSC in good condition. The contractor must dispose of all of the removed cables and conduit off site in an environmentally friendly way.

4.3.2. The contractor must provide, to the Design Authority, a list of all equipment to be removed 2 weeks **prior** to any equipment removal. This list will contain the following information as a minimum; location, make, model and serial number. The contractor must return all removed equipment to the local ADGA electronic maintenance workshop, where it will be inventoried and tagged for disposal. This information will be used to ensure the removal of the equipment from the maintenance contract, and its proper disposal.

4.4. **System Installation**

4.4.1. The contractor must provide, install and test a complete and fully functional IP based CCTV system. The CCTV system must meet or exceed all of the performance and operational requirements contained in the SOW's, specifications and standards listed in Section 2.2. Where there is a conflict between a published specification and this STR; this STR will be the document of reference.

4.4.2. The contractor must avoid, as much as possible, the use of conduit in inmate accessible areas. The contractor must utilize existing pipe chases, existing conduit in the walls, etc., where possible. New lengths of conduit must be of the minimum necessary length. All newly installed conduits carrying video for this project must be identified, except in inmate accessible areas, by prominent labels with **BRIGHT GREEN** wording. The contractor must use only rigid threaded conduit in inmate accessible areas. These labels must be located at each end of the conduit run, on both sides of any penetration of a wall,

and at 3.5 metre points along its length. All junction box covers and conduit joints will be painted bright green except where installed in inmate accessible areas.

4.4.3. The contractor must test all new fibre optic cabling installed in this project and provide detailed light budget analysis and OTDR readings for all fiber strands. Test results will include the following:

- 4.4.3.1. Origin and destination of cable – information
- 4.4.3.2. Light loss in dB over cable – pass/fail – Db
- 4.4.3.3. Length of cable – in meters
- 4.4.3.4. Pass/fail

4.4.4. The contractor must test all existing structured cabling to be reused in this project with a certified CAT6 LAN Analyzer and provide detailed analysis and LANCAT readings for all cables.

- 4.4.4.1. Wire map - pass/fail
- 4.4.4.2. Propagation Delay – pass/fail
- 4.4.4.3. Cable Length – pass/fail – length
- 4.4.4.4. Insertion Loss – pass/fail – Db
- 4.4.4.5. Return Loss – pass/fail
- 4.4.4.6. NEXT – pass/fail
- 4.4.4.7. ELFEXT – pass/fail

4.4.5. The use of flex conduit will only be permitted by written authorisation from the project authority on a case by case basis; the use of flex conduit is not permitted in inmate accessible areas.

4.4.6. In secure office areas where drywall construction is used the contractor must fish associated cabling to support KVM extension devices through the walls. The walls will be finished with an appropriate CAT6 termination plate, labeled to the device. ALL visible CAT6 RJ 45 plugs will be **BRIGHT GREEN**. When fishing cable into a wall the contractor may use flex conduit. Where it is impossible to fish the cable into a hollow wall or the wall is solid (e.g. cinderblock) the contractor may use a decorative wire mold to run the necessary cables to the defined location of the equipment with written permission from the project authority. Wire mold will meet the Ontario Electrical Code when supporting power.

4.4.7. All category 6 Ethernet data cables and data jumper cables (minimum 23 gauge), jacks and connector boots installed as part of this project, must be **BRIGHT GREEN** in colour. All cables must be FT4 rated except where cable is not protected in a conduit or in a plenum ceiling, such cable must meet a FT6 fire rating. All Fibre optic cabling and fibre optic patch cords must be labeled at both ends.

- 4.4.8. All cabling in equipment cabinets, termination trays, cable trays, junction boxes, and at edge devices will be neatly dressed using Velcro style “hook and loop” re-useable straps. Cable straps must encircle all the cables in a given bundle. Any cable secured with a tie-wrap will require replacement of the entire cable.
- 4.4.9. All cabling in equipment cabinets will be dressed throughout the cabinet. Cables entering a cabinet from the top will be routed to the base of the cabinet and then return to the designated equipment height, the reverse for cables entering the bottom. Vertical cable runs in the cabinet will be in the side panel areas of the cabinet. Vertical cable runs will be strapped every 12 inches. Cable straps must encircle all the cables in a given bundle. Vertical cable bundles will route from the cable riser across the width of the equipment cabinet and loop back to the termination point on the patch panel. This will provide enough slack to permit any patch panel to be removed, reversed and re-punched.
- 4.4.10. An installed cable is any cable that is run through a conduit, run from one area in a building to another area, any cable that travels further than the adjacent equipment cabinet in a series of cabinets. Note: Equipment cabinets must be abutting without side panels to open connection to be considered adjacent.
- 4.4.11. All category 6 structured cabling will be punched onto a high density CAT6 patch field or panel or a CAT6 keystone jack in a single gang box. RJ45 connectors will not be permitted as terminations for CAT6 structured cabling, except where the CAT6 cable is supporting a CCTV camera or the termination is specifically authorised by the project authority in writing. Where CAT6 structured cable is terminated with an RJ45 connector, the connector must be rated specifically for a CAT6 connection directly to a CAT6 premise cable (solid conductor) and the RJ45 jack must be shielded.

4.5. **Cameras and Lenses**

- 4.5.1. All cameras to be provided fall into 6 categories. Each camera provided must meet all operating specifications listed associated Electronics Engineering Standards unless specifically otherwise stated in this statement of technical requirement.
- 4.5.2. All cameras provided must provide a minimum of 1 x H.264 video stream in 1920x1080 pixels resolution unless specifically detailed otherwise below.
- 4.5.3. All new CCTV cameras must be powered via PoE, PoE+ or PoE++ over the interconnecting Ethernet cable. Separate PoE+ or PoE++ injectors will only be permitted on a case by case basis by the project technical authority. If more than 4 PoE injectors are necessary in a cabinet, they will be mounted into a manufacturer designed chassis designed specifically to host the injectors and reduce cabinet density.

4.5.4. All CCTV lenses provided must be recommended by the manufacturer of the camera, or approved by the camera manufacturer. Unproven third party lenses are not acceptable.

4.5.5. There are 2 sub categories of camera type #1, fixed network colour dome camera. All fixed network colour dome cameras must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0232 unless specifically detailed differently in this Statement of Technical Requirements.

4.5.6. Camera type #1A (Fixed Dome 9mm)

The provided camera must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0232 unless specifically detailed differently in this Statement of Technical Requirements. The contractor must provide a fixed dome colour network CCTV camera with an integrated varifocal 3-9mm F1.3 lens providing a 105°-36° Horizontal field of view. The Camera must be equipped with an automatically removable infrared-cut filter for Day/Night operation, low light sensitivity will not exceed 0.11 lux. The camera will have electronic image stabilization, remote focus and remote zoom capability. The camera will provide 1920x1080 resolution at up to 30 fps with wide dynamic range sensitivity (WDR-Forensic Capture and zip stream compression). The integrated enclosure will support a ¾" threaded conduit port or a pendant wall mount with internal space for premise cable termination or a service loop. The camera will be IP66 and NEMA 4x rated, IK10+ rated, impact resistant to 50 joules and will support cold start-up down to -40°C and an operational temperature range from -40°C to +40°C.

4.5.7. Camera type #1B (Fixed Dome 22mm)

The provided camera must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0232 unless specifically detailed differently in this Statement of Technical Requirements. The contractor must provide a fixed dome colour network CCTV camera with an integrated varifocal 9-22mm F1.6 lens providing a 36°-15° Horizontal field of view. The Camera must be equipped with an automatically removable infrared-cut filter for Day/Night operation, low light sensitivity will not exceed 0.11 lux. The camera will have electronic image stabilization, remote focus and remote zoom capability. The camera will provide 1920x1080 resolution at up to 30 fps with wide dynamic range sensitivity (WDR-Forensic Capture and zip stream compression). The integrated enclosure will support a ¾" threaded conduit port or a pendant wall mount with internal space for premise cable termination or a service loop. The camera will be IP66 and NEMA 4x rated, IK10+ rated, impact resistant to 50 joules and will support cold start-up down to -40°C and an operational temperature range from -40°C to +40°C.

4.5.8. Camera type #2 (PTZ - Pan/Tilt/Zoom)

The contractor must provide a PTZ colour network CCTV camera that meets all of the requirements detailed in Electronics Engineering Standard ES/STD-0223 unless

specifically detailed differently in this Statement of Technical Requirements. The camera must be equipped with a 4.3-129mm F1.6-4.7 30x power zoom lens providing a 66.7°–2.36° Horizontal field of view, with endless 360° pan. The camera will have electronic image stabilization. The Camera must be equipped with an automatically removable infrared-cut filter for Day/Night operation, low light sensitivity will not exceed 0.15 lux. The camera will provide 1920x1080 resolution at up to 30 fps with wide dynamic range sensitivity (WDR-Forensic Capture and zip stream compression). The camera will have a fully rounded dome (Sharp dome) to provide better views up to 15° above the horizon and will be equipped with laser focusing. The camera will be IP66 and NEMA 4x rated, IK08 rated and will support cold start-up down to -40°C and an operational temperature range from -40°C to +40°C.

4.5.9. Camera Type #3 (Anti-Ligature Corner Mount High Security Camera)

The provided camera must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0233 unless specifically detailed differently in this Statement of Technical Requirements. The contractor must provide an Indoor anti-ligature corner mount colour network CCTV Camera equipped with an integrated varifocal 2.5-6mm F1.2 lens providing a 105°–49° Horizontal field of view with remote focus and remote zoom capability. The Camera will be equipped with an automatically removable infrared-cut filter for Day/Night operation, low light sensitivity will not exceed 0.1 lux. The camera will be equipped with a PoE powered IR Illuminator providing up to 10M illumination at 940nm. The camera will provide up to 1280x960 resolution at up to 30 fps. The camera will be equipped with a minimum of 1 digital output to trigger an external function or power a LED indicator. The camera will be IP66 and NEMA 4x rated, IK10+ rated, impact resistant to 50 joules. The camera casing will be stainless steel with front mounted recessed security screws for maintenance access. The camera enclosure will have a gasket sealed rear conduit port.

4.5.10. Camera Type #4 (360° Panoramic Dome)

The provided camera must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0235 unless specifically detailed differently in this Statement of Technical Requirements. The contractor must provide a fixed dome colour network CCTV camera with an integrated 1.27mm F2.0 lens providing a 187° Horizontal field of view. The Camera must be equipped with an automatically removable infrared-cut filter for Day/Night operation, low light sensitivity will not exceed 0.3 lux. The camera will stream Up to 4 individually cropped out and de-warped view areas and a 360 panoramic view simultaneously. The camera will provide up to 2592x1944 resolution at up to 12 fps. The integrated enclosure will support a ½" threaded conduit port, a pendant mount or a wall mount with internal space for premise cable termination or a service loop. The camera will be IP66 and NEMA 4x rated, IK10+ rated, impact resistant to 50 joules.

4.5.11. Camera Type #5 (Multi-Sensor)

The provided camera must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0232 unless specifically detailed differently in this Statement of Technical Requirements. The contractor must provide a fixed dome colour network CCTV camera with 3 integrated 5MP sensors providing a 180° Horizontal field of view. The Camera must be equipped with 3 automatically removable infrared-cut filters for Day/Night operation, low light sensitivity will not exceed 0.3 lux. The camera will have factory focused lenses. The camera will provide 3x5MP 3x(2560x1920) resolution at up to 20 fps with wide dynamic range sensitivity (WDR-Forensic Capture and zip stream compression). The camera will require only 1 IP address and 1 camera license. The integrated enclosure will support a threaded pendant mount. The camera will be IP66 and NEMA 4x rated, IK10+ rated, impact resistant to 50 joules and will support an operational temperature range from -40°C to +40°C.

4.5.12. Camera Type #6 (Fixed Box Camera)

The provided camera must meet all of the requirements detailed in Electronics Engineering Standard ES/STD-0221 unless specifically detailed differently in this Statement of Technical Requirements. The contractor must provide a fixed box colour network CCTV camera suitable to install into an outdoor rated enclosure. The camera will be equipped with an i-CS lens mount to support remote focus and remote zoom. The camera will support P-Iris lenses. The contractor will provide with each camera a 12.5-50mm F1.4 CS mount IR corrected P-Iris type lens as recommended by the camera manufacturer. The camera with the provided lens will have a Horizontal field of view of 25°–7°. The Camera must be equipped with an automatically removable infrared-cut filter for Day/Night operation, low light sensitivity will not exceed 0.11 lux. The camera will have electronic image stabilization, remote focus and remote zoom capability. The camera will provide 1920x1080 resolution at up to 30 fps with wide dynamic range sensitivity (WDR-Forensic Capture and zip stream compression). The cameras operating temperature range will not less than 0°C to +40°C. The contractor will provide and install a new outdoor heated box camera enclosure for each type #6 camera provided in this STR. The enclosure will be equipped with a thermally activated heater and blower and a window wiper. The contractor will replace the existing enclosure where identified in this STR with the new enclosure and will fully integrate the new enclosure to the existing power and wiring, enabling control of the window wiper from the MCCP console. The provided enclosure will meet or exceed the operational specifications detailed in ST0205R3E Outdoor Camera Enclosure, in Appendix I of this STR.

4.5.13. All CCTV cameras will be powered via PoE over the interconnecting Ethernet cable from the closest available node or electronics equipment cabinet to the camera. If an existing conduit from the camera routes directly to a different node the contractor

may request an exception from the project authority. It is preferred all equipment is powered via PoE directly from the supporting network switch.

Analogue cameras are NOT acceptable for any new installation.

4.6. Camera Power Supplies

Wherever possible all PoE camera power will be provided from PoE equipped network switches located in the electronics equipment cabinets (nodes) specified for the camera as defined in Annex C of this document. Where separate PoE, PoE+ and PoE++ injectors are necessary they will be securely rack mounted, if more than 4 separate PoE injectors are necessary in a cabinet, they will be mounted into a manufacturer designed chassis designed specifically to mount the injectors and reduce cabinet density. If the associated power supply has multiple outputs for several cameras, the supplied supply will be equipped with separate fused outputs for each camera, and an indicator panel on the front of the rack mounted supply indicating the status of each power output port.

The contractor must supply and install new power supplies that will provide the required voltage and amperage to power to all cameras detailed in this document. The power supplies must be installed in the electronic equipment rooms or in secure locations identified in this document or by the project authority.

4.7. Network Architecture

The Beaver Creek CCTV system requires an upgraded network infrastructure which must be capable of providing integrated support for multiple Electronic Security System (ESS) sub systems. Initially, for this deployment, this network infrastructure must support the deployment of CCTV cameras and associated client computers. The system must be expandable to scale to support additions to this CCTV network infrastructure and/or addition of further ESS sub-systems within the institution as required in the future. This network infrastructure must provide an integrated, end-to-end “virtualized” architecture for the systems connected to it, using state of the art techniques for the network operation and configuration as described in sections below.

The contractor must supply new network switches replacing all existing network switches, with the exception of cases where the same core switch and cabling requirements have been fulfilled prior to this project. Network switches shall be replaced or installed on a location to location basis as per the attached drawings.

The new network switching infrastructure must be sourced by one switch vendor with the ability to interface in a multi-vendor manner to other vendor’s equipment should future requirements deem this necessary.

CSC, ESS systems network traffic is predominantly streaming video from CCTV camera operation. The provided network infrastructure must be optimized for (H.264) multicast video operation for both cameras covered by this deployment and the addition of further cameras which may be added in the future; optimization including the perspectives of:

- 4.7.1. simplicity and efficiency of protocols involved;
- 4.7.2. efficient video streaming with required low latency, high bandwidth and network resiliency for predictable, always on connectivity
- 4.7.3. connectivity to the associated video management system (VMS), storage and viewing stations (NVUS).

The system must be capable of supporting thousands of independent streams. The system must be configured with readiness for sub-second failover recovery in the event of any failure, with no visible loss of data. The faster recovery is to maintain connectivity, avoid data or packet loss and minimize pixilation of video data.

The network infrastructure must provide an open system, multi-vendor capable, communication environment utilizing IEEE 802.1aq Shortest Path Bridging (SPB) to forward and control traffic between switches.

To achieve VLAN segregation between the new CCTV system and all the other existing ESS (narrowband) services, the new CCTV system will be deployed with a new 10.0.0.0/8 or 192.168.0.0/16 IP range (as per RFC1918), broken into 24-bit routed networks with two routed subnets per switch (one for CCTV, the other for the rest of the ESS systems).

The new network switches to be provided will replace existing switches deployed for the support of the Beaver Creek CCTV cameras.

The contractor is responsible to ensure the new switching infrastructure is fully integrated into the FAAS and PIU alarm and display systems.

The network infrastructure must consist of a Core network infrastructure in the building FBA-103 (the main CCTV archive, also referred to in this documentation as Home Node) and Edge 2-tier network infrastructure and edge switches to be built primarily from 48-port switch devices (with smaller network devices only where specified in external, small capacity locations requiring a robust outdoor switch).

The contractor is responsible for taking all steps to minimize the number of network equipment device types/models required to minimize sparing requirements.

All switches must include QoS (Quality of Service) and security management capabilities. Each switch must have the ability to classify, mark and prioritize traffic into priority queues, and/or weighted round robin queues on every port, and maintain QoS across the virtual / stack backplane. Classification controls and ACL (Access Control List) strategies

must include the ability to sort traffic based on: MAC Address, 802.1Q VLAN Identification (VID), IP Address, TCP/UDP Ports, CoS (Class of Service), ToS (Type of Service), and DSCP (Differentiated Services Code Point).

The network infrastructure will provide a layer 2 SPB VID environment in which each ESS subsystem has its own allocated VID to provide for secure traffic segregation for each subsystem and thus ease of monitoring, troubleshooting and maintenance. Each VID will be logically separate from any other and thus allow multiple services and systems to operate independently on the same wired infrastructure.

The network infrastructure must be capable of supporting flexible topology configurations e.g. star, full or partial mesh or ring topology to allow for optimal use of additional data paths as these become available and thus provide extra resiliency and readiness for redundancy in network connectivity connections.

The contractor is responsible to confirm that all network switches within the network infrastructure are mountable in 19" mounting rail racks, and that the switches do not exceed the depth of communication racks and cabinets.

The contractor is to supply network switches to meet the needs of all ESS network requirements.

For network access control and security, the network system must provide software for automatic edge device authentication to ensure edge devices are compatible devices for installation, manage device permissions and monitor the health of connected devices.

All network switches must be capable of network access control (NAC) via device authentication and IEEE802.1x Port-based NAC, and include a management GUI interface for maintenance equipment.

Where deployment of the NAC authentication mechanism requires the installation of a server for its functionality this MUST be provided by the contractor.

Each switch must support end-to-end (system-wide) network infrastructure support for a flexible and robust, optimally high availability and reliable (Best in class mean time between failure) network (that is always on), with high throughput (10Gps with edge switches dual-connected to the core switches) and providing a lossless environment with lowest latency (<4ms) for an evolving, high performance CSC ESS network infrastructure and Data Centre.

The network architecture is required to support zero down time for maintenance to core switches allowing for the continuous operation of video surveillance and other connected ESS subsystems and services.

Switch Technical requirements:

4.7.4.350 W, 120 V power supply; POE switches must be able to concurrently deliver up to POE+ per port

4.7.5. Must support up to 50 Ethernet ports (48 port version)

4.7.6. Must provide software support for Ipv4 and Ipv6

Temperature range of operation: 0°C to 40°C

Operating humidity range: 0 to 95% relative humidity

4.7.7. **Core network**

The core network must consist of a switch cluster, with a minimum of two 10Gb shortest path bridging (SPB) switches acting as one logical switch (with 40 GE connectivity using multi-chassis link aggregation (MC-LAG) between them), providing active-active switch operation and linkage capability (to be located in building FBA-103 (Home Node)).

This switch cluster must provide high availability connectivity and performance utilizing active-active links to the edge switching equipment. Thus, if one core switch becomes inoperable (maintenance update, equipment failure) bandwidth is dropped by a factor of 50%, but the second unit maintains 100% of the connectivity requirement and maintains uninterrupted operation of the overall network.

Core Switches must include clustering capabilities, whereby the physical core switches can be logically combined to appear as a single switch (using MC-LAG), from the perspective of any edge switch, and from any multi-NIC equipped server or appliance. These 'virtual' links between the edge and the core cluster must be Active-Active (with spanning tree, and other loop avoidance or hot-standby methods must be disabled), load sharing, and capable of scaling up to 8 physical interfaces bound into a single virtual trunk. It is imperative that service outages normally associated with network disruption, such as the restart, module alteration, power outage, or software/firmware reload of a single core switch does not disrupt the flow of traffic through the entire virtual / clustered core.

This switch cluster will be made up of 19" rack mountable 1RU switches providing the capability to be configured with Layer 2 and layer 3 switching features.

The core switches and network infrastructure will support ease of provisioning via edge only device and service provisioning, providing ease of configuration at the edge devices automatically informing the network infrastructure of a move, add or change and not require core configuration when changes to the network are required. The edge only provisioning will be capable of adding a new device to the associated VID.

Each of the core-switch cluster switches must provide hot-swappable power supplies and replaceable redundant fans.

4.7.8. **Edge network**

The edge switches must be 48 port network switches utilizing 802.1aq SPB allowing for ease of future expansion of the network infrastructure and the capability for multiple connections into different switches utilizing load balanced network paths to provide an extra level of resiliency within the network in case of any switch failure. For more remote site locations with low port capacity requirements, a SPB-compatible 8-port switch must be used.

The edge switches must provide:

- 4.7.8.1. Minimum of L3 switching
- 4.7.8.2. 10/100/1000 Mbps switching
- 4.7.8.3. Dual 1/ 10 Gbps SFP+ uplinks (as required for link capacity requirements, with migration readiness option for 10Gb future uplinks) resilient, always on connectivity
- 4.7.8.4. Wire-speed performance and non-blocking throughput to support a variety of applications including requirements for low latency, high bandwidth, reliable video surveillance
- 4.7.8.5. Field replaceable redundant power supplies for increased resilience
- 4.7.8.6. Maximum POE wattage to support CCTV surveillance cameras deployed with capacity for further additions; must be able to concurrently deliver up to POE+ per port
- 4.7.8.7. Flexibly support for IEEE 802.3af POE and IEEE 802.3at POE+ devices per port, optimized for video surveillance (including PTZ devices, HD)
- 4.7.8.8. Provide one-touch edge provisioning for edge devices with any move, add or change communicated automatically throughout the network infrastructure
- 4.7.8.9. Capability (via stackable functionality) to add further network capacity as required without impacting current operational switching
- 4.7.8.10. Support IEEE 802.1aq SPB
- 4.7.8.11. Advanced QOS and prioritization
- 4.7.8.12. Support for both Ipv4 and Ipv6 management addresses

The Edge switches must provide for edge only –provisioning natively, automatically informing the rest of the network of the change/ addition, eliminating the need, when changes are made, for manual configuration of the core switches and inter-switch trunks.

4.7.9. **Fibre Cabling**

The initial deployment of this new CCTV switching infrastructure will utilize existing on-site Fibre cabling connections between buildings and/or switches and new contractor provided fibre optic cable where identified in appendix C of this STR.

Full deployment and benefits of the core with active-active links must use 2 Multi-mode fibre strand pairs, one pair connected to each of the core switches **or** 2 Single mode fibre strands in bi-directional mode, one strand each to each of the core switches, as is detailed in Appendix C of this STR. This will provide active-active links from each of the connected Nodes to the core switches.

This significantly minimizes single points of failure and dependencies of the network on any individual switch or link.

4.8. **Network Video Recording System**

The term “NVRs” will refer to a “Network Video Recording System” consisting of a video directory, video archivers and video storage. RAID redundancy may be used in the directories, archivers or for virtualization of both directories and archivers over redundant appliances. Video storage is detailed below.

- 4.8.1. The contractor must provide and install a Network Video Recording System (NVRs) into existing equipment cabinets located in FBA-103 as detailed in Annex C map FBA (1st floor). The environmental, power, mechanical and technical requirements for the NVRs is specified in ES/STD-0229. Where this document differs from the specification this document will be the document of reference.
- 4.8.2. The NVRs will meet but not be limited to the following criteria:
- 4.8.3. The provided NVRs must be a Genetec certified storage solution
- 4.8.4. The provided NVRs must be IP attached storage with redundant Gigabit Ethernet interfaces;
- 4.8.5. The provided NVRs must record using Mirrored Write to Overlapping Pairs of Disks;
- 4.8.6. The provided NVRs must allow for duplication of data to two separate storage systems
- 4.8.7. Data must be duplicated on each storage system
- 4.8.8. Must be a redundant mirrored array
- 4.8.9. Separate storage systems must together use less than 180 watts of power per mirrored storage array pair.
- 4.8.10. The provided NVRs must have automatic failover in case of appliance failure (RAID configurations are NOT considered redundant archiving).
- 4.8.11. Mirrored storage array pair must be able to use any type of 3.5” or 2.5” SATA hard drives in any capacity and from any disk manufacturer and must be able to mix

different hard drive sizes, makes and models across the mirrored storage array; all hard drives must be of the same form factor.

- 4.8.12. The provided NVRS must be SATA based; all video archiver drives must be spinning drives, SSD are not acceptable for video storage.
- 4.8.13. The provided NVRS must provide up to 150TB raw storage per 3U vertical rack space
- 4.8.14. The provided NVRS must allow hardware replacement without interrupting data access including replacing disk drives, power supplies, fan modules, whole appliances and network switches;
- 4.8.15. The provided NVRS must include a system by which equipment can be monitored remotely via a software client on the CCTV network. Remote monitoring must identify both the array and the disk that has failed, arrays in write mode and arrays that are idle.
- 4.8.16. The provided NVRS must allow any single disk drive to be removed from the array and connected to a designated client computer to allow raw video to be extracted from the removed drive. The array must allow any other make, model or capacity of SATA HD to be used as a replacement for a removed drive.
- 4.8.17. The provided NVRS will write the same video to 2 disks simultaneously e.g., drive 1&2. When the disks reach capacity, the system will begin to write in the same pattern on disks 2&3 cascading until all disks in the unit are full, then the process will repeat. These strings of drives will be referred to as arrays.
- 4.8.18. The provided NVRS will be controlled by contractor provided, installed and integrated dual redundant directory servers operating the Genetec Security Center VMS. Each directory will mirror the sister directory and in the event of a directory failure, the mate directory will seamlessly continue to manage all video from the CCTV network to the video archivers. Each directory will be equipped with as a minimum :
- 4.8.18.1. Dual redundant power supplies, each supply to be hot swappable.
 - 4.8.18.2. Minimum Intel Core i7 3770 4 core processor or better
 - 4.8.18.3. Minimum 16GB DD3 RAM
 - 4.8.18.4. Minimum 2 x 256GB SATA3 SSD configured in a RAID 1 array for redundancy
 - 4.8.18.5. Minimum 2 x 1Gb Ethernet NICs
 - 4.8.18.6. Minimum 1x 16x DVD+/- RW drive
- 4.8.19. The provided NVRS will utilize the Genetec failover feature. A failover array will be provided at a ratio of 2:10 (2 failover arrays for every 10 active arrays). If an array experiences a failure or if more than 33% of the drives in an array experience failure,

or more than 33% of the drives are removed or switch to off-line status, the entire array will automatically switch to off-line status and all cameras being recorded on the array will seamlessly switch to a failover array with no loss of video recording.

- 4.8.20. The provided NVRS will have sufficient capacity to record up to 400 cameras using H.264 compression at 1280x1024 pixels minimum, assuming a data rate of ~2Mbps, at a frame rate of 30 fps for a minimum time period of 168 hours. The contractor will account for 4 multi-sensor cameras each with an approximate bandwidth of ~24Mbps and 6 panoramic cameras with an approximate bandwidth of ~3.7Mbps. The compression method must be H.264 Compression and will be 70% where 100% is highest quality. Cameras with zip stream capacity will have this function engaged.
- 4.8.21. The contractor must provide and integrate to each of the SIO clients (M23, M24 & M25 of this document) a disk drive docking station will allow direct playback of stored video on the client from any single drive that has been removed from the NVRS storage array. This will allow the crown under serious circumstances to obtain and retain an “original” version of the video recording from an event.
- 4.8.22. The contractor must provide an additional 120 Genetec camera licenses to provide capacity to integrate up to 400 cameras into the digital video archive.

4.9. **Integration**

- 4.9.1. The contractor must integrate all hardware provided into the upgraded Genetec Security Center VMS, providing additional licensing where necessary. The contractor must integrate alarms for the VMS into the PIU (Perimeter Integration Unit). The contractor must program the maps displays into the FAAS display of the Senstar 100 PIU. The PIU will provide live status, and alarm annunciation of the following system alarms:
- 4.9.1.1. Camera video loss (all cameras connected to the Genetec VMS)
 - 4.9.1.2. Remote switch failure (all switches connected to the CCTV network)
 - 4.9.1.3. Network switch power supply failure
 - 4.9.1.4. Network link loss (all nodes)
 - 4.9.1.5. UPS failure (all UPS units in all equipment cabinets)
 - 4.9.1.6. UPS AC loss (all UPS units in all equipment cabinets)
 - 4.9.1.7. Archiver failure, including but not limited to:
 - 4.9.1.8. Network connection loss
 - 4.9.1.9. Video storage array failure
 - 4.9.1.10. Hard drive warning & hard drive failure
 - 4.9.1.11. Directory failure
 - 4.9.1.12. Directory power supply failure
 - 4.9.1.13. Archiver failure

4.9.2. The contractor must integrate all cameras detailed in this statement of technical requirements and all other digital CCTV cameras at the Beaver Creek Institution site.

These include,

- 4.9.2.1. All cameras associated with the minimum security unit (53 cameras)
- 4.9.2.2. All cameras associated with the medium security unit (98 cameras)
- 4.9.2.3. All cameras associated with the perimeter (37 cameras)

4.10. **Network Video User Station**

4.10.1. Network Video User Stations (NVUS) must be located in the areas identified in Annex C of this document. The contractor must provide a new NVUS (Client) for all video displays detailed in this document.

4.10.2. Client Types 1, 2 & 3 will meet or exceed the following specifications as a minimum:

- 4.10.2.1. EIA-310 Compliant rack mount chassis
- 4.10.2.2. Maximum 1RU space
- 4.10.2.3. 8GB DDR3 RAM memory
- 4.10.2.4. 256GB SATA 3 6Gb/s solid state hard drive
- 4.10.2.5. Dual DVI output video card with 1GB RAM memory and DirectX 9.0 support.
- 4.10.2.6. Intel i7 quad core 3.4 GHz processor with 8MB cache memory.
- 4.10.2.7. 10/100/1000 Ethernet Network Interface Card

4.10.3. Client Type 4 will meet or exceed the following specifications as a minimum:

- 4.10.3.1. Tower style PC (mini format PCs will not be acceptable).
- 4.10.3.2. 50db sound pressure @ 24" maximum.
- 4.10.3.3. 12GB DDR3 RAM memory
- 4.10.3.4. 256GB SATA 3 6Gb/s solid state hard drive
- 4.10.3.5. 4TB 3.5", SATA 6Gb/s, 7200 RPM, 64MB Cache hard drive
- 4.10.3.6. Dual DVI output video card with 1GB RAM memory and DirectX 9.0 support.
- 4.10.3.7. Intel i7 quad core 3.4 GHz processor with 8MB cache memory.
- 4.10.3.8. 10/100/1000 Ethernet Network Interface Card
- 4.10.3.9. Internal 24X DVD Writer - SATA Interface, 48X CD-R Write Speed
- 4.10.3.10. Keyboard and Mouse Combo - 1000 DPI, Spill-resistant, Durable keys, Plug-and-play, USB

4.10.4. **Type 1 NVUS client – Static Operational Display:**

The provided NVUS will display up to 12 images on two monitors or a maximum of 9 images on a single monitor. The monitors will be fed video signal directly from the associated NVUS or via a video extension device. The provided NVUS will display only live images. No playback or video extraction will be possible from an operator display NVUS. The operator will not have any access or control over the display of the NVUS.

4.10.5. **Type 2 NVUS client – Dynamic Operational Display:**

The provided NVUS will display up to 12 images on two monitors or a maximum of 9 images on a single monitor. The monitors will be fed video signal directly from the associated NVUS or via a video extension device. The provided NVUS may require a mouse for PTZ control and/or display change or switching on/off of display of specific images on the monitor as defined in the **Monitors and Associated NVUS Clients**” section in Annex C of this document. All provided mouse devices will be USB wired directly to the NVUS or via a USB extension device. The provided NVUS will display only live images. No playback or video extraction will be possible from an operator display NVUS.

4.10.6. **Type 3 NVUS client – Advanced Operator / V&C and Food Services Clients:**

The provided NVUS will display up to 8 images on two monitors or a maximum of 9 images on a single monitor. The monitors will be fed video signal directly from the associated NVUS or via a video extension device. The provided NVUS will be equipped with a mouse for PTZ control and/or display change or switching on/off of display of specific images on the monitor as defined in the **“Monitors and Associated NVUS Clients”** section in Annex C of this document. All provided mouse devices will be USB wired directly to the NVUS or via a USB extension device. The provided NVUS will display live images and recorded video from cameras assigned to this client for up to 24hours. No video extraction will be possible from a Type 3 NVUS.

4.10.7. **Type 4 NVUS client – Advanced Operator / SIO Investigations:**

The provided NVUS will display up to 16 images on one The monitor will be fed video signal directly from the associated NVUS or via a video extension device. The provided NVUS will be equipped with a mouse and keyboard as defined in the **Monitors and Associated NVUS Clients**” section in Annex C of this document. All provided mouse and keyboard devices will be USB wired directly to the NVUS. The provided NVUS will display live images and recorded video from cameras, it will allow storage of extracted video onto a designated spinning hard drive and will permit the extraction of video via DVD/CD optical RW drive or via USB port to a portable hard drive.

4.10.8. All Type 1, 2 & 3 NVUS Clients will be supported by the associated UPS in the designated Node as identified in Annex C of this document.

4.10.9. All Type 4 NVUS Clients will be supported by portable UPS to be located with the client as identified in Annex C of this document.

4.11. **KVM (Keyboard, Video, Mouse) Extensions**

The contractor must provide new video, USB or combination KVM extension units to all equipment requiring such as defined in Annex C of this document or by distance from electronics equipment cabinets that will require an extension device.

All extension units providing signal to monitors will be mounted via a bracket to the VESA mount on the back of the monitor. The provided bracket will hold extension devices securely and provide a mounting solution for a VESA compliant monitor mounting arm. The provided bracket will include Velcro cable management straps to neatly dress all excess cable at the bracket. All provided extension devices must be immune to RF interference from VHF portable radios emitting up to 6 watts' energy at a distance of no less than 1 meter.

4.12. **Monitors**

The monitors provided must meet the environmental, power, mechanical and technical requirements for the monitors as specified in ES/STD-0227.

- 4.12.1. Type 1 Monitor – Control Post Monitor 22" LED
- 4.12.2. Type 2 Monitor – Advanced User Monitor 27" LED
- 4.12.3. Type 3 Monitor – Power User Monitor 32" LED

Monitors provided will meet the following criteria:

- 4.12.4. Have a minimum resolution of: 1920x1080
- 4.12.5. Aspect Ratio: 16:9
- 4.12.6. Response Time: 5ms or better
- 4.12.7. Contrast Ratio: 3000:1
- 4.12.8. Input Connectors: D-Sub & HDMI
- 4.12.9. 178° / 178° Viewing Angle (Horizontal / Vertical)
- 4.12.10. VESA compliant mount

4.13. **Uninterruptible Power Supplies**

The contractor must supply rack-mounted, uninterruptible power supplies (UPS) or provide expansion to the existing UPS as specified in Appendix C of this statement of technical requirements or approved by the project authority in writing. All UPS must be installed in the equipment cabinets unless specifically detailed otherwise in this document or by the project authority in writing. The UPS must be of sufficient capacity to provide 20 minutes of emergency back-up power unless specifically detailed otherwise in this document or by the project authority in writing.

All UPS units provided will report UPS status over the CCTV network, all alarm condition reporting will be integrated into the S100 PIU. UPS will report alarms on the following conditions:

- 4.13.1. UPS is on battery
- 4.13.2. UPS capacity is overloaded.
- 4.13.3. UPS has failed the battery self-test.
- 4.13.4. UPS is on battery, and in a low-battery state (battery is almost discharged)
- 4.13.5. All UPS units provided are to be rack mount unless otherwise specified in Annex C of this document.

4.14. **Electronic Equipment Cabinets**

The contractor must supply and install electronic equipment cabinets as is detailed in Annex C.

4.14.1. **Full height floor mount cabinets will meet the following criteria:**

Power distribution within a cabinet or rack must be via three power outlet strips, as provided by the original cabinet or rack manufacturer. 2 x Horizontal power strips will have at least 5 outlets on the rear and at least 1 outlet on the front of each strip. Each strip must have at least six outlets. 1 x vertical 20A power strip equipped with a twist lock plug and a minimum of 16 outlets.

The Cabinet will be equipped with a dimmable, retractable front light for component illumination the light will have 8 rear outlets, spaced to accommodate plug-in power supplies, it will be of a clean ground surge suppressor design will not pass noise contamination to the ground, and will also have two rear USB ports for use with the optional LED gooseneck work light (model # LT-GN)

Vertical power strips must be connected to "Emergency Power". This strip will be connected to the nearest emergency generator supported AC panel on an independent circuit. The circuit will be identified in the AC panel as "Electronic Security Systems – CCTV"

Raised top for ventilation; Where a cabinet is installed into an electrical or mechanical room the cabinet will be equipped with cooling fans in the top or sides of the cabinet. These fans will provide a minimum of 150 CFM free air movement per 72" of cabinet height.

- Metal doors front and rear. Both doors fitted with locks, both locks keyed alike;
- Removable sides, where cabinet sides are accessible they will be equipped with keyed locks matching the keyway of the front and rear cabinet doors.
- Four adjustable levelling feet;
- Adjustable side rails for mounting equipment. EIA standard 19" width;
- Minimum usable depth of 33.5", (36" outside depth). Minimum usable height of 73.5" with an overall height of 80". Minimum 42 usable rack spaces. Middle Atlantic WMRK-4236SVR or equivalent.
- Except where otherwise specified differently in Annex C of this document.

4.14.2. Wall mount cabinets will meet the following criteria:

The contractor must supply and install wall mount electronic equipment cabinets as is detailed in Annex C. The cabinet must be provided with power distribution within the cabinet via an installed power strip connected to "Emergency Power". This strip will be connected to the nearest emergency generator supported AC panel on an independent circuit. The circuit will be identified in the AC panel as "Electronic Security Systems – CCTV". The cabinet will have a louvered front door for equipment airflow; the cabinet will be equipped with cooling fans in the top or sides of the cabinet. These fans will provide a minimum of 70 CFM free air movement. All doors fitted with locks, all locks keyed alike. Adjustable side rails for mounting equipment. EIA standard 19" width; equipment will mount vertically into the cabinet. Rack rails will be 180 degrees adjustable for ease of equipment installation and maintenance.

4.15. **Expandability**

It must be possible to expand the system beyond the originally installed capacity through the installation of additional hardware. The system expandability must not be limited in his regard.

It must be possible to use the digital backbone for other applications in the future, such as Voice Paging, Voice Intercom, Access Control, Door Control, etc. These systems may be installed by a different manufacturer than installed the original IP video system.

4.16. **Finishing**

Where walls are cut, opened or damaged the contractor must repair the wall to its original appearance, including taping, sanding and colour matching existing paint.

Where the contractor must use wire mold or expose conduit in office areas or other work areas the contractor must paint the exposed conduit to colour match the office where it is installed.

5. **ADDITIONAL REQUIREMENTS**

5.1. **Operator Training**

The contractor must prepare and present a training course (TtT) for individuals responsible to train staff for the operation of the system in accordance with the specification ES/SOW-0101 Statement of Work. The training course must concentrate on the features and proper operation of the installed system. The course must be presented on the site within two weeks of the successful acceptance testing of the system. The course must consist of two, three-hour sessions for basic users and one full day session for advanced (SIO) users. Each session must be presented in English to a group of up to six persons. Training sign-in sheets must be included in the final documentation package and they must clearly identify; name of training, date of training, location of training(institution), printed name of attendee, signature of attendee, and attendee's comments on training.

5.2. **Maintenance, Training and Certification**

The contractor must prepare and present a four-day training course, in English, for up to five persons responsible for the maintenance of the equipment. The course must concentrate heavily on the material contained in the technical and site manual and as-built drawings. The course must be presented on the site within two weeks of the successful acceptance testing of the system. The course syllabus will be presented to the project authority for approval no later than 30 days after approval of the FDR. Training sign-in sheets must be included in the final documentation package and they must clearly identify; name of training, date of training, location of training(institution), printed name of attendee, signature of attendee, and attendee's comments on training.

The contractor is responsible to ensure that CSC maintenance technicians receive training to be able to provide 1st level monitoring equipment for all new switching infrastructure.

In the event of any failure of equipment under this STR, including the network switching infrastructure, the contractor is responsible for immediate resolution for resumption of full system operation. This must include provision of a three-year warranty including a response time to a service call of within 4 hours. The contractor, if necessary with an appropriate arrangement with the equipment vendor, will provide next business day shipment of an advanced replacement unit for failed hardware and full software support, for the lifetime of the product, as well as basic technical support during normal business hours for the lifetime of the product, and as access to self-service downloads of service packs/ maintenance loads for software updates.

In order to facilitate this, the contractor must be required to ensure appropriate maintenance support agreements are in place with the switch vendor to provide immediate support in the event of equipment or software failure. The contractor must provide proof of the availability of certified maintenance support.

5.3. **Manuals**

The contractor must provide the operator and technical manuals in accordance with the specification ES/SOW-0101 Statement of Work. The contractor must provide two printed copies of the operator manual in English, and two printed copies of the maintenance manual in English to the site. The contractor must provide one copy of the operator manual in English and one copy of the maintenance manual in English in an electronic format to each of following: The Design Authority, the Regional Electronics Officer (RTO), the local CSC Authorized Service Contractor workshop, and the CSC Authorized Service Contractor Headquarters. Maintenance manuals must all include completed Acceptance Test Program (ATP) forms and completed training sign-in sheets. All manuals are to be delivered in electronic format CD, DVD or USB flash drive. All manuals are to have an interactive index that will link the table of contents to documents within the manual. All documents within the manual are to be presented in Adobe Acrobat PDF format.

5.4. **As-Built Drawings**

The contractor must provide as-built drawings of the site installation in AutoCAD 2000 format and in accordance with specification ES/SOW-0101 Statement of Work. The contractor must provide two copies of the as-built drawings to the site, one to the Design Authority, one to the RTO, one to the local CSC Authorized Service Contractor workshop, and one to the CSC Authorized Service Contractor Headquarters.

As-Built drawings will include as a minimum.

- 5.4.1.A Logical diagram of the upgraded CCTV system differentiating between existing equipment and new equipment provided in this project.
- 5.4.2.A Physical diagram of the installation based on CSC provided Auto-CAD floor plans of buildings. Showing locations of equipment cabinets, devices, conduit, cable trays and junction boxes.
- 5.4.3. Installation Tables Including:
 - 5.4.3.1. Network Switch Port Assignment
 - 5.4.3.1.1. Switch, Model, Location, Port, Assignment
 - 5.4.3.2. Camera details
 - 5.4.3.2.1. Camera, Designation, Model, Lens, IP Address, Switch
 - 5.4.3.3. PoE Power Assignment
 - 5.4.3.4. NVUS Details
 - 5.4.3.5. User Station, Location, CPU, Serial #, IP Address, Monitors, Switch, Port
 - 5.4.3.6. Monitor Assignment
 - 5.4.3.7. Make & Model, Assignment, Camera Assignment, Serial Number
 - 5.4.3.8. UPS Details
 - 5.4.3.9. Make & Model, Location, Serial Number, Battery type and quantity
 - 5.4.3.10. CAT6 Patch Panel Assignment
 - 5.4.3.11. Location, Port, Assignment

5.5. **Software**

The contractor must provide CD copies of any system software in accordance with specification ES/SOW-0101 Statement of Work. The contractor must provide two copies of the software to the site, one to the Design Authority, one to the RTO, one to the local CSC Authorized Service Contractor workshop, and one to the CSC Authorized Service Contractor Headquarters.

5.6. **Testing**

- 5.6.1 The contractor must provide a detailed ATP to the DA, or his designated representative, by fax or email, for approval at least two weeks prior to the start of installation of the CCTV equipment and system.
- 5.6.2 The contractor must complete one hundred percent of the tests outlined in the ATP prior to the ATP testing being carried out by the DA.
- 5.6.3 The contractor must provide a fully completed and signed copy of the ATP to the DA, or his designated representative, by fax or email, at least two working days prior to the start of the final ATP testing. This copy of the ATP must include all of the results of the tests carried out in Section 5.6.2.
- 5.6.4 In the case where subcontractors have been used, the contractor must provide written confirmation that the work of their subcontractor has been inspected and verified. This verification must be sent to the DA or his designated representative, by fax or email, at least two days prior to the start of the ATP.
- 5.6.5 Testing may be carried out by the DA, a designated representative or a third party contractor.
- 5.6.6 The DA may repeat all of the ATP tests done by the contractor or a percentage of them. If the project authority determines that an unacceptable level of tests have failed during the ATP, the project authority may halt the testing procedures for a minimum of 2 weeks. The Project Authority and the contractor will re-convene in a minimum of 2 weeks to continue testing. The 2 week minimum window may be decreased solely at the projects authority's discretion and with the agreement of the contractor.
- 5.6.7 If the DA during the ATP testing finds a minor deficiency that does not affect the operational effectiveness of the CCTV equipment or system, the ATP testing may continue. If a major deficiency is found during the ATP testing that does affect the operational effectiveness of the CCTV equipment or system; the testing must cease until the deficiency has been corrected.

- 5.6.8 ATP testing must be done during normal working hours, 08:00 to 16:00, Monday to Friday. ATP testing at other times will only be done in an emergency situation.
- 5.6.9 The DA or designated representative will sign-off on the ATP, upon the successful conclusion of the testing. Any minor deficiencies noted during the testing will be indicated on the ATP form. This signature indicates the Conditional Acceptance of the system.
- 5.6.10 The system will be subjected to operational testing for a period of two (2) weeks following the Conditional Acceptance of the system. CSC will formally accept the system from the Contractor at the end of this two (2) week period, but only if ALL deficiencies have been corrected.
- 5.6.11 Any deficiencies noted by CSC during this two (2) week operational testing period will be communicated to the Contractor, who will then be required to correct the deficiencies. The two (2) week operational testing period will begin again after all deficiencies have been cleared.
- 5.6.12 The equipment warranty period will start on the date the system is formally accepted.

5.7 **Operational Down-Time**

Equipment and systems operational down time must be kept to a minimum. All scheduled down time will be approved in writing by the project design authority or designate. All approved down time will be coordinated with the Correctional Manager Operations (CMO) on site. The contractor's staff may be required to work during evenings, nights and/or weekends to reduce the amount of down time and to meet operational requirements.

5.8 **Institutional Operations**

The contractor must take every precaution to minimize any disturbance to institutional operations. The contractor and his staff on site must cooperate fully with operational staff and conform to all security requirements.

5.9 **Institution Addresses**

Beaver Creek Institution
5775 Gravenhurst Road
P.O. Box 280
Gravenhurst, Ontario, K0H 1G0

Project Authority:

Daniel Smith

National Headquarters Project Leader
443 Union Street / PO Box 1174
Kingston, ON. K7L 4Y8

Tel. (613) 449-1597

daniel.smith@csc-scc.gc.ca

Institutional Contact:

David Raithby
Chief Plant Maintenance
Beaver Creek Institution
2000 Beaver Creek Drive
P.O. Box 1240
Gravenhurst, Ontario, P1P 1W9

Tel. (705) 687-1865

5.10 **Security**

The Contractor must submit completed CPIC forms for all staff who will be working at the Institutions. The CPIC forms must be submitted to the Regional Electronics Program Officer (RTO), ten (10) working days prior to the start-up date.

5.11 **Safety**

The Contractor must comply with the document titled "Safety Regulations for Security Electronics Contractors Working at CSC Institutions" attached as Annex B.

5.12 **Spares**

The bidder's proposal will include provision of the following spares: When percentage is less than 1 spare quantity is less than 1 spare quantity will be rounded up to 1. When spare quantity is greater than 1 the quantity will be rounded down to the nearest whole number.

5.12.1 Spare cameras will be provided at a ratio of 2.5% of each quantity provided.

5.12.2 Spare network switches will be provided at a ratio of 5% of each quantity provided.

5.12.3 Spare fibre optic converters will be provided at a ratio of 5% of each quantity provided.

5.12.4 Spare SFP devices will be provided at a ratio of 5% of each quantity provided.

5.12.6 Spare KVM extension devices will be provided at a ratio of 10% of each quantity provided.

5.12.7 Spare Monitors will be provided at a ratio of 5% of each quantity provided.

5.12.8 Spare power supplies will be provided at a ratio of 10% of each quantity provided.

For sparing purposes these will be defined as any power supply that is not attached or installed to the device in question. This applies specifically to AC-adaptor power supplies.

5.12.9 1 x Spare Type 1 NVUS client will be provided. Spare NVUS will all be provided complete with keyboard and mouse.

5.12.10 5 x spare hard drives compatible with the storage arrays will be provided.

A complete list of all spares, make, model, quantity and serial numbers will be confirmed and signed off by the project authority upon delivery. An electronic version of the list will also be provided which will also include project number; cost and warranty information. Spares will be delivered directly to the ADGA electronic maintenance workshop at Beaver Creek Institution within two weeks of the start of equipment installation. The contractor may only remove delivered spare equipment to replace a defective component during installation with the expressed written consent of the project authority. Spares will be deliverable on the day of final acceptance testing. The crown will not be responsible for any spare equipment delivery prior to the final acceptance testing.

5.13 **Communication Responsibility**

The contractor is responsible for briefing institution staff prior to leaving the work site every day. The briefing must be given to CPM, or designate and must include, as a minimum:

- Work performed that day
- Operation status of the system, including any limitations in functionality or peculiarities
- Contact name and number in the event of a system failure
- Emergency contact numbers of installation technicians

5.14 **Design Change Procedure**

The contractor must address all requests for change or deviation from this STR with the Project Authority before any on site discussions, to ensure all changes are consistent with National Policy and Technical Standards, and to ensure the crown maintains a complete awareness of the project expectations and time-line.