NALANDA UNIBVERSITY, RAJGIR

CORRIGENDUM – II

Ref No: NU/Engg/2018-19/Ph1/ELV/5A/24/Ele Date: 08th October, 2018

NIT No: *NU/Engg/2018-19/Ph1/ELV/5A/6 dated 18.09.2018*

NAME OF WORK: Supply, Installation, Testing & Commissioning of Data, Networking, CCTV, Fire Alarm System, and Access Control system for all the Building and the overall Infrastructure for the Permanent Campus of Nalanda University (NU), Nalanda, Rajgir, Bihar.

Document Reference, Clause No & Page No	**Existing Provision as per Document**	**Provisions to be read as**
Technical Specification - ELV Works (Package 5A) Page #5 1.1 F/UTP CAT6A - Construction and mechanical details	Polyethylene insulation, LSZH jacket, each pair to be individually foiled.	Polyethylene insulation, LSZH jacket.
Technical Specification - ELV Works (Package 5A) Page #5 F/UTP CAT6A CABLING SYSTEM	The containment system for F/UTP CAT6A cabling shall consist of PVC conduits and multi-compartment raceways. PVC conduits shall be dedicated for all IT/ELV related cabling. Wherever multi-compartment raceways are to be used, the F/UTP cabling for IT/ELV shall be laid in one of the dedicated compartments. Exposed F/UTP cables in horizontal runs are not acceptable. F/UTP cables bunched together with electrical distribution cables or other ELV cables such as fire detection, pubic address and IBMS signal/communication cables are not acceptable. Proper earthing/grounding arrangement shall be provided by the ELV System Integrator. Sharp bends such as at 90 degrees are to be avoided – the integrator shall follow OEM guidelines for maintaining bending radii.	F/UTP CAT6A CABLE LAYING PROCEDURE: 1. The containment system for F/UTP CAT6A cabling shall consist of PVC conduits and multi-compartment raceways. PVC conduits shall be dedicated for all IT/ELV related cabling. Wherever multi-compartment raceways are to be used, the F/UTP cabling for IT/ELV shall be laid in one of the dedicated compartments. 2. An axial spacing of 50 mm (minimum) shall be maintained between power and network cable. 3. If crossing each other, they should be at Right angles. These cables have to be properly tagged & labelled 4. TIA/EIA-569/609 standards have to be followed, while cable laying, considering the conduit fill in ratio, No. of bends, bending radius. 5. Exposed F/UTP cables in horizontal runs are not acceptable. 6. F/UTP cables bunched together with electrical distribution cables or other ELV

		cables such as fire detection, pubic address and IBMS signal/communication cables are not acceptable. 7. Proper color coding for I/O identification, has to be followed for field termination. The patch panels & patch cords are supposed to be color coded/Tagged/ identified with stickers (e.g. Blue for data, Yellow for Voice, Violet for IP Surveillance, & Green for Wi-Fi (Stickers on patch panels). 8. Proper earthing/grounding arrangement shall be provided by the ELV System Integrator. 9. Sharp bends such as at 90 degrees are to be avoided – the integrator shall follow OEM guidelines for maintaining bending radii. 10. Cable shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack. 11. Each cable shall be clearly labelled on the cable jacket behind the patch panel at a location that can be viewed clearly without removing the bundle support ties. Cables shall be properly marked and distinctively coloured for ease of identification.
Technical Specification - ELV Works (Package 5A) Page #7 SPECIFICATIONS FOR PIGTAILS (SINGLEMODE):	LC style, SM OS2. Simplex, 1 meter, compliant to ITU-G657.B - Bend Insensitive Fiber	LC style, SM OS2, Simplex, 1 meter, compliant to ITU-G652.D
Technical Specification - ELV Works (Package 5A) Page #7 SPECIFICATIONS FOR	LC-LCstyle, SM OS2 as required. Available as either 1.6mm or 3mm simplex or duplex patch cord. Compliance to ITU-G657.B - Bend Insensitive Fiber	LC-LCstyle, SM OS2, available as either 1.6mm or 3mm duplex patch cord. Compliance to ITU-G652.D

FIBER OPTIC CABLE PATCHCORDS		
Technical Specification - ELV Works (Package 5A) Page #7 SPECIFICATIONS FOR 19" RACK MOUNTED FIBER OPTIC PATCH PANELS: (viii) Construction	Complete Aluminium alloy housing, fully powder coated.	Complete Aluminium alloy or CRCA housing, fully powder coated, minimum 1.6mm thick.
Technical Specification - ELV Works (Package 5A) Page #8 FIBER OPTIC CABLE AND COMPONENTS	While laying FO cables, excessive sharp bends shall be avoided – as a guideline a bending radius of not less than 15 x cable diameter shall be maintained, however, integrator shall follow the OEM's cable laying guideline for the same wherever they are available. Spare cable loop having length of 12-15 feet shall be left spare inside the manhole chamber for any future jointing, maintenance and extension of branches.	FO CABLE LAYING GUIDELINES: 1. Outdoor FO cables shall be buried at a depth of 1200 mm by digging the soil (soft soil as well as hard soil); digging of soil shall be within the scope of ELV contractor; it shall be responsibility of ELV contractor to remake the soil after digging. 2. Where FO cable needs to travel below a road section, the FO cable shall be pulled or laid in pre-laid/existing RCC Hume pipes. 3. While laying FO cables, excessive sharp bends shall be avoided – as a guideline a bending radius of not less than 15 x cable diameter shall be maintained, however, integrator shall follow the OEM's cable laying guideline for the same wherever they are available. 4. Spare cable loop having length of approx. 20 meter shall be left spare inside the manhole chamber for any future jointing, maintenance and extension of branches. 5. The concrete FO route markers shall be specified after every 200m and wherever bends or turns are there in FO route. 6. Each Indoor & Outdoor OS2 Single mode "loose tube" of fiber cable should be properly labeled & marked at all Man holes/ Traps/ Shafts/ LIU end.

Technical Specification - ELV Works (Package 5A) Page #13 2.2. TYPE-2 EDGE SWITCH (ACCESS SWITCH) Layer 2 Features	Layer 2, 24 x 10/100/1000Base-Tx Ports, PoE+, minimum 4 dedicated or shared SFP Ports	Layer 2, 24 x 10/100/1000Base-Tx Ports, PoE+, minimum 4 dedicated SFP Ports. All 28 ports should be active simultaneously
-do- Switch Architecture	Switch should have minimum 4 dedicated or shared SFP ports.	Switch should have minimum 4 dedicated SFP ports.
-do- Layer 2 Features	Support for minimum 8k MAC addresses.	Support for minimum 16k MAC addresses.
Technical Specification - ELV Works (Package 5A) Page #18 & 19 2.5.2. WIRELESS CONTROLLER WLAN controller security features	-	• WLC should detect if someone connects a Rogue Access Point in network and should be able to take appropriate action to contain rogue Access point. • WLC should detect and protect an Ad-hoc connection when a connected user attempts forming a network with other system without an AP or try enabling bridging between two interfaces. • WLC should detect and take appropriate containment action if a smartphone user uses tethering to connect other device. • WLC should detect and protect if a user attempts to spoof MAC address of valid client or AP for unauthorized access/authentication.
Technical Specification - ELV Works (Package 5A) Page #19 & 20 2.5.3. WIRELESS LAN MANAGEMENT	Customizable view listing security events by type, detected by APs, with time detected, mac address of device and SSID	Customizable view listing security events by type, detected by APs, with time detected, MAC address of device and SSID or AP name.
Technical Specification - ELV Works (Package 5A) Page #20 2.5.4. ACCESS POINT	RFC 2246 TLS protocol version 2.0	RFC 2246 TLS protocol version 1.0

Security:		
Technical Specification - ELV Works (Package 5A) Page #20 2.5.4. ACCESS POINT Encryption:	WEP – 64 and 128 bit, TKIP-MIC: RC4 40 bit, 104 bit and 128 bit, SSL & TLS: RC4 128-bit	TKIP-MIC: RC4 40 bit, 104 bit and 128 bit, SSL & TLS: RC4 128-bit
Technical Specification - ELV Works (Package 5A) Page #20 2.6. CENTRALISED NETWORK MANAGEMENT AND MONITORING SOFTWARE Network Discovery	Auto - discovery on Physical and logical basis	Auto - discovery
Technical Specification - ELV Works (Package 5A) Page #21 2.6. CENTRALISED NETWORK MANAGEMENT AND MONITORING SOFTWARE Performance Management	System should provide facility to track the performance matrix on subnet basis, VLAN basis and protocol basis	System should provide facility to track the performance matrix on subnet or VLAN basis and protocol basis
Technical Specification - ELV Works (Package 5A) Page #21 2.6. CENTRALISED NETWORK MANAGEMENT AND MONITORING SOFTWARE Performance	System should support specific protocol level performance characteristics	"System should support specific protocol level performance characteristics" – IS DELETED

Management		
Technical Specification - ELV Works (Package 5A) Page #22 3. VIDEO SURVEILLANCE SYSTEM	-	**Description ADDED as follows at the end of last paragraph:** **"All cameras shall be UL listed/certified"**
Technical Specification - ELV Works (Package 5A) Page #23 3.1. FULL HIGH DEFINITION, TRUE DAY/NIGHT, INDOOR NETWORK RAPID PTZCAMERA/GENERAL REQUIREMENTS	The camera shall be a Full HD Rapid Dome PTZ camera supporting triple streaming of codecs; simultaneously generating and transmitting JPEG and two independent H.264High Profile video streams different in resolutions and frame rates.	The camera shall be a Full HD Rapid Dome PTZ camera supporting triple streaming of codecs; simultaneously generating and transmitting JPEG/MJPEG and two independent H.264High Profile video streams different in resolutions and frame rates.
-do-	The PTZ camera shall be able to send and receive trigger commands from any other camera even if the VMS is offline.	"The PTZ camera shall be able to send and receive trigger commands from any other camera even if the VMS is offline." – IS DELETED
-do-	The camera shall support JPEG and H.264 high profile compression. The minimum resolution for each codec shall be 1920 x 1080.	The camera shall support JPEG/MJPEG and H.264 high profile compression. The minimum resolution for each codec shall be 1920 x 1080.
-do-	The camera shall have the capability to stream JPEG and H.264 high profile video in TCP protocol H.264 in UDP (unicast/multicast) protocol.	The camera shall have the capability to stream JPEG/MJPEG and H.264 high profile video in TCP protocol H.264 in UDP (unicast/multicast) protocol.
Technical Specification - ELV Works (Package 5A) Page #24 3.1. FULL HIGH DEFINITION, TRUE DAY/NIGHT, INDOOR NETWORK RAPID PTZCAMERA/GENERAL REQUIREMENTS	The camera shall incorporate a built-in algorithm for intelligent motion detection capability. The camera shall offer this feature with minimum four configurable areas per scene and ten sensitivity levels adjustments.	The camera shall have built-in motion detection capability.
-do-	The camera shall have 2-way audio features, i.e., the camera shall have built-in audio input and output jacks and be capable of transmitting and receiving full	The camera shall have 2-way audio features, i.e., the camera shall have built-in audio input and output jacks and be capable of transmitting and receiving full duplex audio

	duplex audio stream on the same Ethernet connection as the video. The audio shall be encoded using the G.726 or equivalent ADPCM standard.	stream on the same Ethernet connection as the video. The audio shall be encoded using the G.726 or equivalent 16KHz sampling rate standards such as AAC.
-do-	The camera shall have 4 external I/O Terminals for external alarms or controls.	The camera shall have minimum 2 external I/O Terminals for external alarms and/or controls.
Technical Specification - ELV Works (Package 5A) Page #24 3.1. FULL HIGH DEFINITION, TRUE DAY/NIGHT, INDOOR NETWORK RAPID PTZCAMERA/CAMERA LENS SPECIFICATIONS	Focal length shall be 4.3 to 129 mm with field of view coverage of 2.4° to 63.5°.	Focal length shall be 4.3 mm (+/- 10%) to 129 mm (+/- 10%) with field of view coverage of 2.4° (+/- 10%) to 63.5° (+/- 10%).
-do-	The aperture range for the lens shall be F1.6 to F4.7.	The aperture range for the lens shall be F1.6 to F4.7 (+/- 10%).
Technical Specification - ELV Works (Package 5A) Page #25 3.1. FULL HIGH DEFINITION, TRUE DAY/NIGHT, INDOOR NETWORK RAPID PTZCAMERA/VIDEO ELECTRICAL REQUIREMENTS	Power consumption for the camera shall be 20 watts maximum.	"Power consumption for the camera shall be 20 watts maximum." - IS DELETED.
Technical Specification - ELV Works (Package 5A) Page #25 3.1. FULL HIGH	The camera shall support bi-directional audio, using G.711 (64kbps) and G.726 (32kbps) codecs.	The camera shall support bi-directional audio, using G.726 or equivalent 16KHz sampling standards such as AAC.

DEFINITION, TRUE DAY/NIGHT, INDOOR NETWORK RAPID PTZCAMERA/AUDIO REQUIREMENTS		
Technical Specification - ELV Works (Package 5A) Page #25 3.2. FULL HIGH DEFINITION, TRUE DAY/NIGHT, OUTDOOR NETWORK RAPID PTZ CAMERA/GENERAL REQUIREMENTS:	The camera shall be a Full HD Rapid Dome PTZ camera supporting triple streaming code simultaneously generating and transmitting JPEG and two independent H.264 High Profile video streams different in resolutions and frame rates.	The camera shall be a Full HD Rapid Dome PTZ camera supporting triple streaming code simultaneously generating and transmitting JPEG/MJPEG and two independent H.264 High Profile video streams different in resolutions and frame rates.
Technical Specification - ELV Works (Package 5A) Page #26 3.2. FULL HIGH DEFINITION, TRUE DAY/NIGHT, OUTDOOR NETWORK RAPID PTZ CAMERA/GENERAL REQUIREMENTS:	The camera shall have the capability to stream JPEG and H.264 high profile video in TCP protocol H.264 in UDP (unicast/multicast) protocol.	The camera shall have the capability to stream JPEG/MJPEG and H.264 high profile video in TCP protocol H.264 in UDP (unicast/multicast) protocol.
-do-	The camera shall incorporate a built-in algorithm for intelligent motion detection capability. The camera shall offer this feature with minimum four configurable areas per scene and ten sensitivity levels adjustment capabilities.	The camera shall have built-in motion detection capability.
-do-	The camera shall have 2-way audio features, i.e., the camera shall have built-in audio input and output jacks and be capable of transmitting and receiving full duplex audio stream on the same Ethernet connection as the video. The audio shall be encoded using the G.726 or equivalent ADPCM standard.	The camera shall have 2-way audio features, i.e., the camera shall have built-in audio input and output jacks and be capable of transmitting and receiving full duplex audio stream on the same Ethernet connection as the video. The audio shall be encoded using the G.726 or equivalent 16KHz sampling rate standards such as AAC.

-do-	The camera shall have 4 external I/O Terminals for external alarms or controls.	The camera shall have minimum 2 external I/O Terminals for external alarms and/or controls.
Technical Specification - ELV Works (Package 5A) Page #27 3.2. FULL HIGH DEFINITION, TRUE DAY/NIGHT, OUTDOOR NETWORK RAPID PTZ CAMERA/CAMERA LENS SPECIFICATIONS:	Focal length shall be 4.3 to 129 mm with field of view coverage of 2.4° to 63°.	Focal length shall be 4.3 mm (+/- 10%) to 129 mm (+/- 10%) with field of view coverage of 2.4° (+/- 10%) to 63.5° (+/- 10%).
-do-	The aperture range for the lens shall be F1.6 to F4.7.	The aperture range for the lens shall be F1.6 to F4.7 (+/- 10%).
Technical Specification - ELV Works (Package 5A) Page #27 3.2. FULL HIGH DEFINITION, TRUE DAY/NIGHT, OUTDOOR NETWORK RAPID PTZ CAMERA/VIDEO ELECTRICAL REQUIREMENTS	Power consumption for the camera shall be 20 watts maximum.	"Power consumption for the camera shall be 20 watts maximum." - IS DELETED.
Technical Specification - ELV Works (Package 5A) Page #27 3.2. FULL HIGH DEFINITION, TRUE DAY/NIGHT,	The camera shall support bi-directional audio, using G.711 (64kbps) and G.726 (32kbps) codecs.	The camera shall support bi-directional audio, using G.726 or equivalent 16KHz sampling standards such as AAC.

OUTDOOR NETWORK RAPID PTZ CAMERA/AUDIO REQUIREMENTS		
Technical Specification - ELV Works (Package 5A) Page #28 3.3. FULL HIGH DEFINITION, TRUE DAY/NIGHT, MINIDOME NETWORK CAMERA (3-8mm) /GENERAL REQUIREMENTS:	The camera shall be a Full HD dome network camera supporting three codecs, JPEG and 2 nos. H.264 high profile, any two of which can be used simultaneously. The camera shall utilize a 1/3" type CCD/MOS/CMOS sensor of approx. 2.0 Megapixels and have a true day/night capability.	The camera shall be a Full HD dome network camera supporting three codecs, JPEG/MJPEG and 2 nos. H.264 high profile, any two of which can be used simultaneously. The camera shall utilize a 1/3" type CCD/MOS/CMOS sensor of approx. 2.0 Megapixels and have a true day/night capability.
-do-	The camera shall support JPEG format and H.264 high profile compression. The camera shall be able to select the high quality mode in JPEG 1920x 1080 at minimum 25fps. The camera shall also be able to support full HD mode of 1920 x 1080 in H.264 compression mode with 60fps.	The camera shall support JPEG/MJPEG format and H.264 high profile compression. The camera shall be able to select the high quality mode in JPEG/MJPEG 1920x 1080 at minimum 25fps. The camera shall also be able to support full HD mode of 1920 x 1080 in H.264 compression mode with 30fps.
-do-	The camera shall provide minimum 4 streams in H.264.	The camera shall provide minimum 3 streams, namely, 1 x JPEG/MJPEG and 2 x H.264 High Profile.
Technical Specification - ELV Works (Package 5A) Page #29 3.3. FULL HIGH DEFINITION, TRUE DAY/NIGHT, MINIDOME NETWORK CAMERA (3-8mm) /VIDEO ELECTRICAL REQUIREMENTS:	Power consumption for the camera shall be 11 watts maximum.	"Power consumption for the camera shall be 11 watts maximum." - IS DELETED.

Technical Specification - ELV Works (Package 5A) Page #29 3.3. FULL HIGH DEFINITION, TRUE DAY/NIGHT, MINIDOME NETWORK CAMERA (3-8mm) /VIDEO ELECTRICAL REQUIREMENTS:	The IR range shall be upto 30 mtrs.	The IR range shall be upto 20 mtrs.
Technical Specification - ELV Works (Package 5A) Page #29 3.3. FULL HIGH DEFINITION, TRUE DAY/NIGHT, MINIDOME NETWORK CAMERA (3-8mm) /MECHANICAL REQUIREMENTS:	The camera shall have compliance to IEC 60529 standard. Also, it shall have IK10 rated vandal resistant body for reliability.	The camera shall have IK10 rated vandal resistant body for reliability.
Technical Specification - ELV Works (Package 5A) Page #29 3.4. FULL HIGH DEFINITION, TRUE DAY/NIGHT, MINIDOME NETWORK CAMERA (5-50mm)/GENERAL REQUIREMENTS	Section 3.4. FULL HIGH DEFINITION, TRUE DAY/NIGHT, MINIDOME NETWORK CAMERA (5-50mm) Page No. 29 to 31	**ENTIRE SECTION 3.4 IS DELETED**
Technical Specification - ELV Works (Package 5A) Page #31 3.5. FULL HIGH DEFINITION, OUTDOOR FIXED CS-MOUNT/BOX CAMERA/ GENERAL REQUIREMENTS:	The camera shall be a Full HD fixed-type CS-mount network camera supporting codecs – JPEG, MPEG4 and H.264 high profile streams. Camera shall have a 1/3" type CMOS/MOS sensor and have a resolution of approx. 2.0 MP and have a True day/night capability.	The camera shall be a Full HD fixed-type CS-mount network camera supporting three codecs – 1 x JPEG/MJPEG and 2 x H.264 high profile streams. Camera shall have a 1/3" type CMOS/MOS sensor and have a resolution of approx. 2.0 MP and have a True day/night capability.

-do-	The camera shall support JPEG and H.264 high profile compression. The camera shall be able to select the high quality mode in JPEG 1920 x 1080 at minimum 25fps. The camera shall also be able to support full HD mode of 1920X1080 in H.264 compression mode with 30fps.	The camera shall support JPEG/MJPEG and H.264 high profile compression. The camera shall be able to select the high quality mode in JPEG 1920 x 1080 at minimum 25fps. The camera shall also be able to support full HD mode of 1920X1080 in H.264 compression mode with 30fps.
-do-	The camera shall incorporate a built-in algorithm for intelligent motion detection capability. The camera shall offer this feature with minimum four configurable areas per scene and ten sensitivity levels adjustment capabilities.	The camera shall have built-in motion detection capability.
Technical Specification - ELV Works (Package 5A) Page #32 3.5. FULL HIGH DEFINITION, OUTDOOR FIXED CS-MOUNT/BOX CAMERA/ VIDEO ELECTRICAL REQUIREMENTS:	Power consumption for the camera shall be 10 watts maximum.	"Power consumption for the camera shall be 10 watts maximum. " - IS DELETED.
Technical Specification - ELV Works (Package 5A) Page #32 3.6. FULL HIGH DEFINITION, INDOOR FIXED CS-MOUNT/BOX CAMERA/ GENERAL REQUIREMENTS:	The camera shall be a Full HD fixed-type CS-mount network camera supporting codecs – JPEG, MPEG4 and H.264 high profile streams. Camera shall have a 1/3" type CMOS/MOS sensor and have a resolution of approx. 2.0 MP and have a True day/night capability.	The camera shall be a Full HD fixed-type CS-mount network camera supporting three codecs – 1 x JPEG/MJPEG and 2 x H.264 high profile streams. Camera shall have a 1/3" type CMOS/MOS sensor and have a resolution of approx. 2.0 MP and have a True day/night capability.
-do-	The camera shall support JPEG and H.264 high profile compression. The camera shall be able to select the high quality mode in JPEG 1920 x 1080at minimum 25fps. The camera shall also be able to support full HD mode of 1920X1080 in H.264 compression mode with 30fps.	The camera shall support JPEG/MJPEG and H.264 high profile compression. The camera shall be able to select the high quality mode in JPEG/MJPEG 1920 x 1080at minimum 25fps. The camera shall also be able to support full HD mode of 1920X1080 in H.264 compression mode with 30fps.

Technical Specification - ELV Works (Package 5A) Page #33 3.6. FULL HIGH DEFINITION, INDOOR FIXED CS-MOUNT/BOX CAMERA/ GENERAL REQUIREMENTS:	The camera shall incorporate a built-in algorithm for intelligent motion detection capability. The camera shall offer this feature with minimum four configurable areas per scene and ten sensitivity levels adjustment capabilities.	The camera shall have built-in motion detection capability.
-do-	The camera shall have a CS-mount 2MP IR corrected type vari-focal lens (3-8 mm/5-50mm) as standard accessory.	The camera shall have a CS-mount 2MP IR corrected type vari-focal lens 3-8 mm as standard accessory.
Technical Specification - ELV Works (Package 5A) Page #33 3.6. FULL HIGH DEFINITION, INDOOR FIXED CS-MOUNT/BOX CAMERA/ CAMERA LENS SPECIFICATIONS:	The camera shall have a CS-mount DC auto-iris type vari-focal lens - focal length shall be 5-50mm.	The camera shall have a CS-mount DC auto-iris type vari-focal lens - focal length shall be 3-8mm.
Technical Specification - ELV Works (Package 5A) Page #33 3.6. FULL HIGH DEFINITION, INDOOR FIXED CS-MOUNT/BOX CAMERA/ VIDEO ELECTRICAL REQUIREMENTS	Power consumption for the camera shall be 10 watts maximum.	"Power consumption for the camera shall be 10 watts maximum. " - IS DELETED.

Technical Specification - ELV Works (Package 5A) Page #34 3.6. FULL HIGH DEFINITION, INDOOR FIXED CS-MOUNT/BOX CAMERA/ MECHANICAL REQUIREMENTS	The camera lens supplied with the camera shall be IR corrected lens supplied by the camera OEM or other reputed makes of lens such as Tamaron or Fujinon or equivalent and having focal length 5-50mm, F1.2 to F1.9, DC auto-iris type vari-focal lens.	The camera lens supplied with the camera shall be IR corrected lens supplied by the camera OEM or other reputed makes of lens such as Tamaron or Fujinon or equivalent and having focal length 3-8mm, F1.2 to F1.9, DC auto-iris type vari-focal lens.
Technical Specification - ELV Works (Package 5A) Page #37 3.7. VIDEO MANAGEMENT SOFTWARE (VMS)	Playbackat:1x,2x,4x,6x,8x,10x,20x,40x,100x	Playback at:1x,2x,4x,6x,8x,10x,20x,40x (at least up to 40x)
Technical Specification - ELV Works (Package 5A) Page #37 3.7. VIDEO MANAGEMENT SOFTWARE (VMS) SMART PHONE AND TABLET APPS	The VMS shall support mobile apps for various popular smart phones and tablets, including e.g., Apple iPod Touch, iPhone, and iPad., RIM BlackBerry smart-phones, Android-compatible smart-phones and tablets.	The VMS shall support mobile apps for various popular smart phones and tablets, including e.g., Apple iOS based devices and Android based devices
Technical Specification - ELV Works (Package 5A) Page #58 LIST OF APPROVED MAKE Serial No. 3	**Item Description** F/UTP CAT6ACabling System – Cable and components **Specified Brand/Make/Manufacturer** COMMSCOPE-SYSTIMAX, PANDUIT-PANNET,TYCO-NETCONNECT	**Item Description** F/UTP CAT6ACabling System – Cable and components **Specified Brand/Make/Manufacturer** COMMSCOPE-SYSTIMAX, COMMSCOPE-NETCONNECT, PANDUIT-PANNET,SCHNEIDER-ACTASSI
Technical Specification - ELV Works (Package 5A) Page #58 LIST OF APPROVED MAKE	**Item Description** Fiber Optics Components (Data & Voice/Telecom, Single Mode) – Cables, LIUs, Shelves, Pigtails, Patch-cords, Connectors, Couplers, Splices **Specified Brand/Make/Manufacturer** COMMSCOPE-SYSTIMAX, PANDUIT-PANNET,TYCO-NETCONNECT	**Item Description** Fiber Optics Components (Data & Voice/Telecom, Single Mode) – Cables, LIUs, Shelves, Pigtails, Patch-cords, Connectors, Couplers, Splices **Specified Brand/Make/Manufacturer** COMMSCOPE-SYSTIMAX, COMMSCOPE-NETCONNECT, PANDUIT-

Serial No. 4		PANNET,SCHNEIDER-ACTASSI
Technical Specification - ELV Works (Package 5A) Page #58 LIST OF APPROVED MAKE Serial No. 5	**Item Description** IP66 rated 96 core External Splicing Kit for outdoor fiber optics cable **Specified Brand/Make/Manufacturer** 3M, RAYCHEM, TYCO	**Item Description** IP66 rated 96 core External Splicing Kit for outdoor fiber optics cable **Specified Brand/Make/Manufacturer** 3M, COMMSCOPE, PANDUIT, RAYCHEM, SCHNEIDER, TYCO
Technical Specification - ELV Works (Package 5A) Page #58 LIST OF APPROVED MAKE Serial No. 11	**Item Description** VMS Software Platform **Specified Brand/Make/Manufacturer** GENETEC, MILESTONE, NICE	GENETEC, MILESTONE, QOGNIFY (NICE)
Technical Specification - ELV Works (Package 5A) Page #58 LIST OF APPROVED MAKE Serial No. 14	Industrial Ethernet Switch incl. Power supplies	Industrial Ethernet PoE+ Switch incl. Power supplies
Tender BoQ Item Sl. No. 3	SITC of F/UTP CAT6A angular patch panel pre-loaded with 24 ports in 1U form factor, with universal A/B labeling and 110 connector terminations on rear of panel allowing for quick and easy installation of 22 to 24 AWG cable, inclusive of termination of F/UTP CAT6A cables at all 24 ports.	SITC of F/UTP CAT6A patch panel pre-loaded with 24 ports in 1U form factor, with universal A/B labeling and 110 connector terminations on rear of panel allowing for quick and easy installation of 22 to 24 AWG cable, inclusive of termination of f/UTP CAT6A cables at all 24 ports.
Tender BoQ Item Sl. No. 3	SITC of F/UTP CAT6A angular patch panel pre-loaded with 24 ports in 1U form factor, with universal A/B labeling and 110 connector terminations on rear of panel allowing for quick and easy installation of 22 to 24 AWG cable, inclusive of termination of F/UTP CAT6A cables at all 24 ports. Qty = 367 Nos.	SITC of F/UTP CAT6A patch panel pre-loaded with 24 ports in 1U form factor, with universal A/B labeling and 110 connector terminations on rear of panel allowing for quick and easy installation of 22 to 24 AWG cable, inclusive of termination of f/UTP CAT6A cables at all 24 ports. Qty = 386 Nos.

Tender BoQ Item Sl. No. 13	FIBER OPTIC CABLE & COMPONENTS SITC and Laying of fiber optic cable of various capacities to be laid in prelaid conduits/RCC hume pipes/HDPE/DWC/cable trays/trenches/in underground soil, as applicable, excluding the cost of soft-soil or hard-soil digging.	FIBER OPTIC CABLE & COMPONENTS SITC and Laying of fiber optic cable of various capacities to be laid in prelaid conduits/RCC hume pipes/HDPE/DWC/cable trays/trenches/in underground soil, as applicable, including the cost of soft-soil or hard-soil digging and remaking of soil.
Tender BoQ Item Sl. No. 42	TYPE-1 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 8 # 10/100/1000Tx ports, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 350 Watts, minimum 2 dedicated SFP ports.	TYPE-1 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 8 # 10/100/1000Tx ports, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 120 Watts, minimum 2 dedicated SFP ports.
Tender BoQ Item Sl. No. 42	TYPE-1 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 8 # 10/100/1000Tx ports, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 350 Watts, minimum 2 dedicated SFP ports. Qty = 98 Nos.	TYPE-1 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 8 # 10/100/1000Tx ports, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 120 Watts, minimum 2 dedicated SFP ports. Qty = 68 Nos.
Tender BoQ Item Sl. No. 43	TYPE-2 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 24 # 10/100/1000Tx ports, stacking, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 350 Watts, minimum 4 dedicated or shared SFP ports.	TYPE-2 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 24 # 10/100/1000Tx ports, stacking, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 350 Watts, minimum 4 dedicated SFP ports.
Tender BoQ Item Sl. No. 43	TYPE-2 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 24 # 10/100/1000Tx ports, stacking, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 350 Watts, minimum 4 dedicated or shared SFP ports. Qty = 337 Nos.	TYPE-2 (ACCESS SWITCH) SITC of Layer 2 manageable networking switch, 24 # 10/100/1000Tx ports, stacking, all ports capable of providing PoE+ as per 802.3at, switch having a PoE power budget of minimum 350 Watts, minimum 4 dedicated SFP ports. Qty = 318 Nos.
Tender BoQ Item Sl. No. 51	SITC of wireless controller capable of supporting min. 1000 access points, inclusive of licence costs for 1000 Access Points. Centralized Hardware Controller based architecture. The system shall operate in High Availability (HA) mode providing redundancy for controller hardware. Qty = 1 No.	SITC of wireless controller capable of supporting min. 1000 access points, inclusive of licence costs for 1000 Access Points. Centralized Hardware Controller based architecture. The system shall operate in High Availability (HA) mode providing redundancy for controller hardware. Qty = 2 Nos.
Tender BoQ Item Sl. No. 57	SITC of Full High Definition Network Cameras, Fixed Dome, 1/3" CMOS/MOS/CCD sensor, 3-8 mm lens,	SITC of Full High Definition Network Cameras, Fixed Dome, 1/3" CMOS/MOS/CCD sensor, 3-8 mm lens, minimum resolution 2MP

	minimum resolution 2MP (1920X1080), 1080p resolution at frame rates 30fps or better, H.264 High Profile, JPEG support, True Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f.	(1920X1080), 1080p resolution at frame rates 30fps or better, H.264 High Profile, JPEG/MJPEG support, True Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f.
Tender BoQ Item Sl. No. 57	SITC of Full High Definition Network Cameras, Fixed Dome, 1/3" CMOS/MOS/CCD sensor, 3-8 mm lens, minimum resolution 2MP (1920X1080), 1080p resolution at frame rates 30fps or better, H.264 High Profile, JPEG support, True Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f. (Qty = 148 Nos.)	SITC of Full High Definition Network Cameras, Fixed Dome, 1/3" CMOS/MOS/CCD sensor, 3-8 mm lens, minimum resolution 2MP (1920X1080), 1080p resolution at frame rates 30fps or better, H.264 High Profile, JPEG/MJPEG support, True Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f. (Qty = 723 Nos.)
Tender BoQ Item Sl. No. 58	SITC of Full High Definition Network Cameras, Fixed Dome, 1/3" CMOS/MOS/CCD sensor, 5-50 mm lens, minimum resolution 2MP (1920X1080), 1080p resolution at frame rates 30fps or better, H.264 High Profile, JPEG support, True Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f. (Qty = 556 Nos.)	SITC of Full High Definition Network Cameras, Fixed Dome, 1/3" CMOS/MOS/CCD sensor, 5-50 mm lens, minimum resolution 2MP (1920X1080), 1080p resolution at frame rates 30fps or better, H.264 High Profile, JPEG support, True Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f. (Qty = 0 Nos.), NIL (BOQ ITEM IS DELETED)
Tender BoQ Item Sl. No. 59	SITC of Full High Definition Network Cameras, Outdoor CS-Mount type, 1/3" CMOS/MOS/CCD sensor, 5-50mm varifocal lens, minimum resolution 2MP (1920x1080), 1080p resolution at frame rates 30fps or better, H.264 High profile, JPEG support, Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant and IP66 rated outdoor housing and Power on Ethernet (PoE) based on 802.3a/f.	SITC of Full High Definition Network Cameras, Outdoor CS-Mount type, 1/3" CMOS/MOS/CCD sensor, 5-50mm varifocal lens, minimum resolution 2MP (1920x1080), 1080p resolution at frame rates 30fps or better, H.264 High profile, JPEG/MJPEG support, Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant and IP66 rated outdoor housing and Power on Ethernet (PoE) based on 802.3a/f.
Tender BoQ Item Sl. No. 60	SITC of Full High Definition Network Cameras, indoor CS-Mount type, 1/3" CMOS/MOS/CCD sensor, 5-50mm varifocal lens, minimum resolution 2MP (1920x1080), 1080p resolution at frame rates 30fps or	SITC of Full High Definition Network Cameras, indoor CS-Mount type, 1/3" CMOS/MOS/CCD sensor, 3-8mm varifocal lens, minimum resolution 2MP (1920x1080), 1080p resolution at frame rates 30fps or better, H.264 High

	better, H.264 High profile, JPEG support, Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f.	profile, JPEG/MJPEG support, Day/Night operation, ONVIF Profile S compliant, complete with IK10 rated vandal resistant housing and Power on Ethernet (PoE) based on 802.3a/f.
Tender BoQ Item Sl. No. 61	SITC of Video Management Software with ONVIF Profile S compliance having licenses for 1000 cameras and scalable to additional 50% cameras in future by adding appropriate licenses, inclusive of 10 client licenses.	SITC of Video Management Software with ONVIF Profile S compliance having licenses for 1000 cameras and scalable to additional 50% cameras in future by adding appropriate licenses, i.e., without adding any hardware or software and inclusive of 10 client licences.
Tender BoQ Item Sl. No.68	FIBER COMPONENTS FOR OUTDOOR CCTV SITC and Laying of outdoor 12 core armoured single mode fiber optic cable for outdoor connectivity where ever required in prelaid conduits / RCC hume pipes/HDPE/DWC, whichever maybe available.	FIBER COMPONENTS FOR OUTDOOR CCTV SITC and Laying of outdoor 12 core armoured single mode fiber optic cable for outdoor connectivity where ever required in prelaid conduits / RCC hume pipes/HDPE/DWC, whichever maybe available, including the cost of soft-soil or hard-soil digging and remaking of soil.
Tender BoQ Item Sl. No.74	SITC of 5 port Industrial PoE+ Switch with 2 ports populated with mini GBIC SM SFP ports & 3 nos. 1000MbpsTx ports, inclusive of external DC adaptor/power supply as per OEM requirements.	SITC of 5 port Industrial Ethernet PoE+ Switch with 2 ports populated with mini GBIC SM SFP ports & 3 nos. 1000MbpsTx ports, inclusive of external DC adaptor/power supply as per OEM requirements.
NIT Document 2. SCOPE OF WORK Page#174	----	**FOLLOWING CONTENTS ARE ADDED UNDER "SCOPE OF WORK" from Page #174 onwards**
		a) Main NCC (Network control center) would be at Main Server Room.
		b) All the blocks & facilities considered in Phase 1 shall have two HUME trunking of 150mm would be provisioned around the NU Campus in a ring (for redundancy) from day one.
		c) The BOQ is tentative actual quantity shall be decided during engineering stage.
		d) Following Service facilities shall have dedicated FO ring & shall be separate network: i. Electrical SCADA - on 12 core SMFO cable ii. FDA, IBMS - on 12 core SMFO cable iii. CCTV(indoor & Out Door) - on 12 core SMFO cable

		iv. Converged Data Network(intranet services, Data, IP Telephony, Door Access points, Audio video clips, Video Conferencing, Attendance recording system) - on 48 core SMFO cable) Only LAN IOs are considered for Electrical SCADA, CCTV, FDA &IBMS in ELV package 5A
		e) A 48 Core Single Mode Fiber Optic (SMFO) (Consisting of 8 Loose tubes of 6 cores each) cable shall be laid in rings for each zone. Maximum facilities/units/zones are limited to 8, so one loose tube of SMFO cable caters to one facility/unit/zone. Eventually, there would be Eight zones of Fiber cable (48 core – 8 loose tubes with 6 cores each, independent rings), laid through the HUME pipe (refer master plan fiber distribution scheme).
		f) Different Hume pipes should be used if the same cable is returning from any tap off point. One Hume pipe is used for laying the cable till the destination and other Hume pipe is used for return path.
		g) All the nearby buildings shall be connected to the nearest facility/unit/zone switch (i.e. Distribution switch -refer master plan fiber distribution scheme) will be through 12 core/24 core single mode armoured fiber. All the nearby Buildings shall be shall be connected directly with the distribution switch dedicated for the Zone. The list is mentioned below: i. Academic Spine Zone shall provide connectivity to Block A, Block B, Block C, Block D, Block E, Block F, Lab 1, Lab 2,Class Rooms, IRO, Campus Inn, International Centre

		ii. Out-reach Centre & Extension Zone shall provide connectivity to Out Reach Extension1, Outreach Centre, Out Reach Extension2 iii. Campus Amenities Zone shall provide connectivity to Faculty Club and Medical Infirmary Centre, Cricket Pavilion, Commercial Market, Campus Amenities, Football ground & Sports centre school iv. School & Crèche Zone shall provide connectivity to Crèche building, Primary School, Secondary School v. Student Housing Part 1 (Hostel) Zone shall provide connectivity to Dining Block 1,Hostel Block A, Hostel Block D, Hostel Block E, Hostel Block G, Hostel Block H vi. Student Housing Part 2 (Hostel) Zone shall provide connectivity to Dining Block 2, Hostel Block B, Hostel Block C, Hostel Block F, Block I vii. Faculty Housing 1 Zone consisting of Apartment Nos. 1 to 19 viii. Faculty Housing 2 Zone consisting of Bungalow Nos. 1 to 49
		h) All the riser cables connecting the floor switches shall be on Fiber optics cable only and shall be terminated in floor racks.
		i) All passive components including I/O patch panels, pig tails, patch cord etc. as required for structured cabling shall be provided.
		j) All pipe and cable laying including termination accessories like PVC/conduits/Channels/Cable trays/racks/supporting structure, clamps, identification tags/labels etc. as required for laying of cables shall

		be provided.
		k) Supply and laying of specified make F/UTP CAT6A cable in pre-laid PVC conduits or pipes or raceways or cable trays, but without the cost of conduits or pipes or raceways or cable trays. The cable is to be drawn from individual workstation area/device/IO to the nearest distribution rack or networking rack. It shall be within the scope of integrator/bidder to carry out and submit scanner readings for all IOs meeting the requirements of relevant EIA/TIA standards as per CAT6A cabling requirements. The integrator/contractor shall submit a detail IO maps, labelling and documentation related to terminations.
		l) Storage of all equipment in proper environmental condition by the bidder.
		m) Supply of all special tools and tackles as required for erection, testing, commissioning and warranty, maintenance of system at bidder own cost.
		n) The following work to be coordinated at the time of execution by the successful bidder with the consent of NU. i. All the ducting, conduit, cable trays, raceways, trenching, Hume pipes, will be laid by Electrical/ Civil Contractor & will not be part of IT Contractors scope. ii. Electronic earth pit (As per requirements) will be in scope of Electrical contractor. iii. HVAC, Air-conditioning for Network rack locations will be in scope of Electrical/ Civil/ HVAC Contractor iv. UPS supply (as per requirements) will be in scope of Electrical Contractor. v. The above mentioned

		requirements (as per load/ location/ quantity) will have to be coordinated by successful bidder with the respective vendors/ contractors' consultants. The above will be coordinated onsite with respective agencies.
NIT Document **CLAUSE.5.25: Special Conditions – ELV SYSTEMS.** **1. GENERAL** 1.13. Tools, Tackles, Equipment's & Scaffolding: Page #169	----	**FOLLOWING CONTENTS ARE ADDED UNDER "1.13. Tools, Tackles, Equipment's & Scaffolding:"**
		The following minimum tools and tackles shall be provided i. Cable Analyzers -2nos ii. Optical Loss Test Set – 2 no. iii. Fiber cable splicing equipment. – 1no iv. Impact tools -2nos v. Jack Rapid Punch Down Tools. – 2 nos. vi. Cable Cutters – 2 nos. vii. Jack Termination Tools -2 nos viii. Copper Wire Snipping Tools -2nos ix. Cable Jacket Stripping Tools -2nos
NIT DOCUMENT List of Spares		List of spares and inventory to be provided and maintained by the bidder is added as Annexure 1.