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CLIENT: **TAKEDA/BAXALTA**	
PROJECT **BURITI EPCMV PROJECT**	

SECURITY CCTV SYSTEM

TECHNICAL SPECIFICATION

REV	DATE	DESCRIPTION	EXEC	CHECK	APPROV.
1	01DEC2021	ISSUE FOR CONSTRUCTION CONSIDERING COMMENTS	MAV	MAF	RSP
0	18OCT2021	ISSUE FOR CONSTRUCTION	MAV	MAF	RSP
B	24SEP2021	90% DD ISSUE	MAV	MAF	RSP
A	19FEB2021	30% DD ISSUE	MAV	MAF	MAJ

INDEX

1. REVISION HISTORY

Rev.	Reason for change
A	ORIGINAL ISSUE – FOR APPROVAL
B	• General review in index numbering because of the new table 1 (revision history) • Inclusion of the Emergency Generator building in item 3.1 (Scope). • Updated item 6.3 • Updated item 7.2.1, 7.4.4.21, 7.5.3.1 • Added item 7.5.1.12
0	• Updated item 3.2 • Updated item 4 • Updated item 7.3.1.1, 7.4.2.1, 7.4.2.2, 7.4.4.7, 7.5.2.2 • Update item 11.1, 12.1, 12.2, 12.3, 12.4, 13.2, 15.1, 15.3 and 15.4
1	• Deleted item 12.4 • Added items 15 and 16

2. PROJECT DESCRIPTION

2.1 Takeda has re-negotiated a licensing and tech transfer agreement (LTTA) with the Brazilian state- owned company Hemobrás (HB) to transfer the technology of Takeda's recombinant FVIII (rFVIII) product ADVATE from Takeda to Hemobrás. Hemobrás is planning to construct a vertically integrated facility for manufacturing of rFVIII at the Hemobrás owned site at Goiana, Pernambuco (PE), Brazil (Project Buriti).

2.2 The scope of Project Buriti is to design, build and qualify a new vertically integrated rFVIII Manufacturing facility, and includes implementation of all needed support buildings and Systems (Warehouse, QC Lab, Administration, Cafeteria and Utilities) on an existing brownfield site. It is expected that the new facility is completely self-contained, and the existing Goiana site provides only basic utility supply (city water, gas, power) and logistics (access road, site security). The project also must account for operation's waste management (specifically process waste). The site's capacity layout for ADVATE manufacturing shall be based on three 2500L chemostat bioreactors, even though only equipment for a two bioreactor operation should be implemented at first.

2.3 To guarantee an optimal integration with current facility operations, a complete functional telecommunications systems connection between the new building and the existing buildings will be designed.

3. SCOPE.

3.1 This document has been prepared to define the specifications and minimum requirements for the supply of the Security CCTV System to be installed on the facilities of buildings B07A- Drug Product, B07B-Drug Substance, B07C-Boilers and B07F-Emergency Generators

3.2 A system compatible with the existing system on site is required.

4. ACRONYMS.

AC	Alternate Current
ANSI	American National Standard Institute
AWG	American Wire Gauge
CCTV	Closed Circuit Television
DC	Direct Current
DMZ	Demilitarized Zone
ER	Equipment Room
FAT	Factory Acceptance Test
FDU	Fiber Distribution Unit
GB	Gigabit
HDPE	High Density Polyethylene
hz	Hertz
IP	Internet Protocol
IR	Infrared
LAN	Local Area Network
LED	Light-emitting diodes
LSZH	Low Smoke Zero Halogen
Mbps	Megabyte per Second
MVRP	Multiple VLAN Registration Protocol
NID	Network Interface Device
OS	Operative System
OSAT	Operative Site Acceptance Test
PDU	Power Distribution Unit
PoE	Power Over Ethernet
PSTN	Public Switched Telephone Network
RAM	Random Access Memory
RJ-45	Physical Interface
SAT	Site Acceptance Test
SFP	Small form-factor pluggable
SP	Service Provider
TE	Telecom Enclosure
TO	Telecom Outlet
TR	Telecom Room
UPS	Uninterruptible Power Supply
U	Rack Unit
USB	Universal Serial Bus
VAC	AC Voltage
VLAN	Virtual Local Area Network
VMPS	VLAN Management Policy Server
W	Watts
WLAN	Wireless LAN

5. REGULATIONS AND STANDARDS.

5.1 Systems design, equipment, materials, and procedures, considered in this project, must fulfill the next regulations and standards:

Generic Telecommunications Cabling for Customer Premises	ANSI/TIA-568.0-D
Commercial Building Telecommunications Cabling	ANSI/TIA-568.1-D
Balanced Twisted-Pair Telecommunications Cabling and Components	ANSI/TIA-568.2-D
Optical Fiber Cabling Components	ANSI/TIA-568.3-D
Telecommunications Pathways and Spaces	ANSI/TIA-569-D
Structured Cabling Infrastructure Standard for Intelligent Building Systems	ANSI/TIA-862-B
Telecommunications Infrastructure Standard for Data Centers	TIA-942-A
A Telecommunications Infrastructure Standard for Industrial Premises	ANSI/TIA–1005A
Design of Electrical Substation Automation	IEC 61850
International Standard Optical Fiber Cables	IEC 60794
Generic Cabling for Customer Premises	ISO/IEC-11801
Salas limpas e ambientes controlados associados	ABNT NBR ISO 14644-4
Instalações Elétricas em Baixa Tensão	NBR 5410
Proteção de Estruturas contra descargas Atmosféricas	NBR 5419
Cabeamento estruturado para edifícios comerciais e Data Centers	NBR 14565

6. PROJECT DELIVERABLES.

6.1 Drawings and documents for conceptual design, that follow Hemobrás's requirements and standards.

6.2 Drawings will be issued in AutoCAD and Documents will be issued in Microsoft Office.

6.3 Reference drawings:

7A-I-0-7-05	Riser Diagram	Drug Product	Telecom - CCTV
7B-I-0-7-05	Riser Diagram	Drug Substance	Telecom - CCTV
7A-I-1-3-14	Ground floor	Drug Product	Telecom - CCTV
7B-I-1-3-14	Ground floor	Drug Substance	Telecom - CCTV
7A-I-2-3-24	First floor	Drug Product	Telecom - CCTV
7B-I-2-3-24	First floor	Drug Substance	Telecom - CCTV
7A-I-3-3-34	Second floor	Drug Product	Telecom - CCTV
7B-I-3-3-34	Second floor	Drug Substance	Telecom - CCTV
7C-I-1-3-01	Ground floor	Boiler	Telecom - CCTV
7F-I-1-3-14	Ground floor	Emergency Generators	Telecom - CCTV

6.4 Reference documents:

PRD-AIC-TSP-016	Security CCTV System Design Basis
PRD-AIC-TSP-017	Security CCTV System Technical Specification
PRD-AIC-LIS-041	Bill of materials - CCTV

7. ENGINEERING INFORMATION.

7.1 General definitions

7.1.1 The project shall fully comply with ABNT standards, and in the absence or omission thereof, the internationally recognized standards mentioned above shall be observed.

7.1.2 All electronic equipment must meet the requirements of regulations on radio frequency electromagnetic interference.

7.2 Subject Areas Covered

7.2.1 The new Security CCTV System shall be installed in the following buildings described below belonging to the Buriti project,

BUILDING TAG	DESCRIPTION
B07A	DRUG PRODUCT (FDP)
B07B	SUBSTANCE PRODUCT (BDS)
B07C	BOILERS
B07F	EMERGENCY GENERATORS

7.3 Security CCTV System

7.3.1 General specifications

7.3.1.1 The Security CCTV system consists of a set of connectivity products employed by according to specific engineering rules whose main characteristics are:

a) Open architecture.
b) Standardized means of transmission and physical arrangement.
c) Customized design and installation.
d) Compliance with international standards.
e) Compatible with Hemobrás' existing system.

7.3.1.2 The Data Transmission Network defined for the project should maintain its performance even when subjected to a stress condition caused by events such as those listed below:

a) Equipment stops for maintenance, upgrade, or replacement of components.
b) Equipment failures or part of them.
c) Faults in physical links.
d) Attacks and failures in network security and the need to disconnect points from the network for propagation containment.

7.3.1.3 The cabling infrastructure of the system must meet all data communication systems, Security CCTV basically used in corridors, main entrance of the buildings and support areas.

7.3.1.4 The project shall be use existing infrastructure of fiber optic loop. Connection point near proposed location for new buildings. The site infrastructure assumed as ready to manage additional CCTV requirements and drops.

7.3.2 System Requirements

7.3.2.1 The systems listed below will be provided for continuous operation, 24x7 (twenty-four hours a day and seven days a week):

a) Asset Security System – CCTV.

7.3.3 Redundancy of physical links

7.3.3.1 Basically, the communication between new Buildings B07A & B07B & B07C & B07F and the existent Datacenter will occur via a General Data Network, called Data Transmission Network - RTD, this convergent network that will provide the interconnection of all buildings using existent fiber optic links.

7.3.3.2 For the Buriti project the network backbone will be implemented through the concrete encased underground duct banks in the format of ring distribution to ensure local

interventions/interruptions, such as a disruption of a conduit and, consequently, a cable in such a way that they do not cause degradation of the network.

7.3.3.3 The Optical Distribution Ring of the converged data network will depart from the existent Datacenter, following the duct banks in the site and entering the Automation room in each of new buildings.

7.3.4 Logical Network Redundancy

7.3.4.1 Each of the buildings will have specific VLANs, thus using the MSTP and PVST+ protocol. Thus, the network can be managed in a simple way, ensuring high availability and resilience.

7.3.4.2 Specific VLAN should also be used for automation systems (AT) using industrial protocols. The use of DMZ's and Firewalls will also be adopted to segregate the networks.

7.3.5 Virtual Networks (VLANs)

7.3.5.1 A virtual LAN (VLAN) corresponds to one or more broadcast domains partitioned and isolated in a computer network at the data link layer (OSI layer 2). VLANs work by applying tags to network packets and manipulating these tags on network systems, creating the appearance and functionality of network traffic that is physically on a single network, but acts as if it were split between separate networks. In this way, VLAN can keep network applications separate even though they are connected to the same physical network and do not require multiple sets of cabling and network devices to are implanted.

7.3.5.2 The protocol that should be used to configure VLANs will be 802.1Q - Creating Virtual Local Area Networks within an Ethernet Network.

7.3.5.3 The two common approaches to assigning participation in the VLAN should be available:

a) Static VLANs
b) Dynamic VLANs

7.3.5.4 Static VLANs are also called port-based VLANs. Static VLAN assignments are created by assigning ports to a VLAN. When a device enters the network, the device automatically assumes the port VLAN.

7.3.5.5 Dynamic VLANs are created using software or by protocol. With a VLAN management (VMPS – VLAN Management Policy Server), the administrator can assign ports of dynamically switch to VLANs based on information such as the source MAC address of the device or network authentication process through the Multiple VLAN Registration Protocol (MVRP). The architecture of the access control and port interlock system should be scalable, decentralized and provide for redundancy mechanisms.

7.4 Office Data Network (LAN & WAN)

7.4.1 General specifications

7.4.1.1 The data network system should consist of a set of systems integrated with each other, so as to manage all corporate activities of the units that will be defined later by the area of Takeda/Hemobrás´s IT department, obeying the organization's centralized corporate policy.

7.4.1.2 The corporate network is basically subdivided into 02 (two) types of networks:

a) LAN Network
b) WAN network

7.4.1.3 The telecommunications network infrastructure includes all data and voice systems (LAN network) to be used inside offices, conference rooms, production, and support areas. These systems are divided into two categories: service-based enterprise communication system Internet service provider (e.g. IP telephony service based on Internet Protocol called VOIP) and LAN, WAN data communication to be used inside and outside buildings.

7.4.2 LAN Network

7.4.2.1 LAN network architecture should be focused on connectivity, critical need and performance and, for this, high speed backbone and sub-networks should be deployed with TCP/IP protocol, connected by the backbone campus that will interconnect all the new buildings B07A & B07B & B07C & B07F.

7.4.2.2 Due to the criticality of Takeda/Hemobrás´s equipment, the Automation Room should be dedicated to IT assets, considering the access control aspects, camera monitoring, fire alarm systems against humidity and cooling system and temperature control.

7.4.2.3 The integration with the existing facilities at Hemobrás will continue with the use of conventional structured cabling. That is, adopting this topology, should be considered two Core Switches (redundant), placed in the existing Data Center, interconnected to the switches, which will be placed internal to the Telecom Racks of the Automation Rooms of buildings B07A and B07B, through a fiber optic ring network via underground.

7.4.3 WAN Network

7.4.3.1 The definition of the technology adopted for the WAN (external communication to the site) will be of Hemobrás/Takeda´s responsibility together with the local operator.

7.4.4 Automation Room

7.4.4.1 The IT Room and Automation room, to be in the Technical floor of buildings B07A & B07B respectively, will be destined to concentration of equipment responsible for the integration of data, voice and video among all the users of the buildings. These rooms also provides access with the public network / Internet through the area destined for the arrival of optical cables of the existent Hemobras´s backbone.

7.4.4.2 All data processing equipment will be installed at this location corporate, centralized VOIP Telephony system, centralized CCTV system, back-up systems, optical cabinets, between others.

7.4.4.3 The IT room and Automation room should only be dedicated to the allocation of equipment from Telecommunications. The equipment of the Telecommunications includes but are not limited to Telephony, Data, CCTV, Control of Access, CCTV and Fire Alarm equipment. No other electrical equipment should be installed. This includes electrical panel, HVAC control equipment and other type of similar controller equipment unless the equipment is dedicated to serving room.

7.4.4.4 The Automation room must be of a suitable size for installation of all IT cabinets and necessary equipment and an extra space for future expansion. You must have accessibility for entry and exit of large equipment.

7.4.4.5 Being at a safe distance from places where there are large interference generators electromagnetics such as electric power transformers, large motors, equipment X-ray, radio transmitters and radars.

7.4.4.6 The Automation room should not have external windows so there is no greater thermal influence with the external environment.

7.4.4.7 Anti-static elevated floor and rails for distribution of data and power cables under him. The raised floor must be at least 25 cm from the floor.

7.4.4.8 FA / FF-FE System (Fire Alarm Detection System and Fire Fighting and Fire Extinguishing) with crossover technology; smoke detection and firefighting system with specific agents for this environment.

7.4.4.9 For the protection of the Automation room against fire there are specific solutions, both for smoke detection as for automatic fire suppression.

7.4.4.10 For smoke detection, "suction smoke detectors" detect of invisible, odorless smoke up to 24 hours in advance. Together, the conventional smoke detectors, which already detect a real fire situation and through the fire panel trigger the combat system.

7.4.4.11 The Fire Fighting System uses the Clean Agent NOVEC 1230, which are the most used worldwide.

7.4.4.12 Temperature and humidity monitoring and control system, this system must be capable of sending alerts in case of degradation of configured parameters.

7.4.4.13 Access control associated to card reading by proximity and/or password, destined to only for authorized employees according to access schedule.

7.4.4.14 Monitoring cameras to control and limit access to the room.

7.4.4.15 Electrical system designed to support the load of the equipment and a surplus for future expansion. The circuit must be exclusive for electrical supply the IT room and Automation room.

7.4.4.16 Electrical system should have an adequate grounding scheme for protection of the equipment, in view of the high cost of the equipment that the IT room and Automation room its hosts.

7.4.4.17 The IT room and Automation room must have outlets in the walls to serve equipment of maintenance, cleaning etc. These outlets must be on separate circuits from those which feed the IT and Automation racks.

7.4.4.18 Uninterruptible Power System (UPS), composed of a set of no-breaks with autonomy to support the environment in a power blackout for at least 15 min.

7.4.4.19 The Automation room must be at least 2.6 meters high from the finished floor to any obstacle like sprinklers, luminaries, or cameras.

7.4.4.20 Climate-controlled environment containing air conditioning system guaranteeing the conditions ideal temperature and humidity, equipped with a reliable redundant system. Temperature environment between 18 and 24 degrees Celsius with relative humidity between 30% and 55%.

7.4.4.21 Lighting with a minimum of 540 lux with independent electric circuit and a minimum of 3 outlets, 220 VAC, duplex, 3-pole (2P+T) with grounding; To have the input infrastructure to provide telecommunications services (VoIP) for the room.

7.4.4.22 The main interconnection box in the vicinity of the respective building should be adequately positioned to allow from this box the network of concrete encased underground duct-banks for main and redundant wiring. Exclusive and external access to facilitate the maintenance and operation processes of telecommunications.

Note: All protection systems, such as power, doors, temperature, should be monitored remotely through the BMS system.

7.5 CCTV Security System

7.5.1 General specifications

7.5.1.1 The CCTV system to be adopted in the new buildings will be IP type and will depend on the requirements specific operations for each service area.

7.5.1.2 The CCTV System must be composed of equipment platforms, devices and software that allow their migration and continuous updating from the same platform without major impacts to the operation and maintenance of the entire system, considering the state of the art in the entire IP CCTV System.

7.5.1.3 The CCTV management software used by Hemobrás is recommend, considering server with enough processing for video analytics (LPR, direction, speed, concentration of people, etc.).

7.5.1.4 All the structure of the centralized CCTV equipment foreseen in the project, such as servers and storages, will be installed in the Automation Room.

7.5.1.5 In this location will be installed all backbone distribution racks and peripherals that will also serve the NVRs and servers of the CCTV System.

7.5.1.6 The data of the CCTV System should be in Storages that will be allocated in this Room. Components of Other systems such as conduits, cable trays and/or HVAC ducts should not be routed through this room, unless these systems are dedicated to the operations of the Telecommunications.

7.5.1.7 All activities of Asset Security, Access Control, CCTV and Alarm monitoring perimeter will be in a specific CCTV room, inside the existent Guardhouse Building, where Security staff will monitor the entire site.

7.5.1.8 The storages must be able to store 30 (thirty) days of recording, considering RAID5, minimum resolution 2MP, minimum rate 20 FPS, CODEC H264.

7.5.1.9 As the conventional structured cabling system is being adopted, the CCTV network should be segregated from the Telecom network (data and voice).

7.5.1.10 The CCTV system should be integrated with the access control and alarm system existing perimeter (to be confirmed).

7.5.1.11 The CCTV System will be designed for continuous operation, 24x7x365 (24 hours a day and seven days a week, three hundred and sixty-five days a year), being necessary the retention of the images generated by the video monitoring cameras according to the needs of each area within the building, also requiring redundancy in the storage of information generated by video monitoring cameras.

7.5.1.12 The CCTV System will have its own system for control and monitoring of surveillance cameras and their monitor and from these connected to the BMS system for alarm signaling purposes.

7.5.2 Equipment protection

7.5.2.1 Equipment essential to the operation of the IP CCTV System, such as: video camera IP monitoring, image storage server, or PoE switch, Media converter, shall be fitted with devices to protect against direct or induced lightning discharges into the AC power network or data communication network.

7.5.2.2 The equipment will be protected against power failures and fluctuations considering that the supply voltage is coming from a UPS. Protection against lightning discharges will consider the use of lightning captors (in outdoor chambers installed on poles), already considered in the electrical design.

7.5.3 Electrical requirements

7.5.3.1 All IP CCTV System equipment must be supplied for power supply at 220 VAC UPS, including power supply unit if necessary, except when using IP cameras with power supply in the PoE technology.

7.5.3.2 Basically, bullet and domus cameras will be used, the cameras should contain infra-red and software driven digital motorization where applicable.

7.5.3.3 Internal PoE fixed cameras will use the power supply from the switches's PoE ports.

7.5.3.4 Mobile PoE cameras and fixed PoE external cameras shall support appropriate PoE power supply, when PoE injectors that meet the specific standard for the camera model (IEEE802.3af/ IEEE802.3at).

7.5.3.5 The power supply to the switches will come from a local automation panel which will be powered by an UPS electrical circuit, so that in the event of a power blackout the system can be maintained in operation for a certain time.

7.5.3.6 All circuits that supply power to the Automation Rooms should not be shared with other charges outside this room. The electrical panelboard that serves these circuits should not also serve for motor and other heavy mechanical equipment, to avoid problems with power quality.

7.5.3.7 All the elements belonging to the system should be grounded and connected to the grounding network.

8. EQUIPMENT SPECIFICATIONS

8.1 Supply, installation, interconnection, tests: FAT, SAT, OSAT and startup of the CCTV System, mentioned in this document are contractor's liability.

8.2 Data Switch PoE 48 ports. Data access commuter equipment.

a) 48 Ethernet 10/100/1000 ports with PoE
b) 4 SFP modules Gigabit Ethernet. Multimode optical fiber ports
c) LC connectors
d) 1 rack unit
e) 32 Gbps forwarding bandwidth
f) Forwarding rate based on 64-byte packets: 38.7 Mpps
g) 128 MB DRAM
h) 32 MB Flash Memory
i) 100BASE-TX PoE ports: RJ-45 connectors, four-pair Category 6A FTP cabling, power on pins 1,2 (negative) and 3,6 (positive)
j) 1000BASE-T SFP-based ports: RJ-45 connectors, four-pair Category 6A FTP cabling
k) Configurable up to 12,000 MAC addresses
l) Configurable up to 11,000 unicast routes
m) Configurable up to 1000 IGMP groups and multicast routes
n) Dimensions: 1.73 x 17.5 x 16.1 in (44 x 445 x 409 mm)
o) Weight: 15.5lb (7.0kg)
p) Operating temperature: 32 to 113 °F (0 to 45 °C)
q) Acoustic noise: 38 - 44 dB
r) Mean time between failure: 147,000 hours
s) Included power supply capacity: 1100W
t) PoE: Maximum power supplied per port: 15.4W. Total power dedicated to PoE: 370W
u) Max Power Consumption Switch no PoE: 130W / 443BTU/hour
v) Max Power Consumption Switch and PoE: Switch: 534W, Poe: 370W / 559BTU/hour
w) AC Input Voltage and Current: 100-240 VAC (auto ranging), 8.0 - 4.0A, 50-60Hz

x) Standards: IEEE 802.1s, IEEE 802.1w, IEEE 802.1x, IEEE 802.3ad, IEEE 802.3af, IEEE 802.3x, full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports, IEEE 802.1D Spanning Tree Protocol, IEEE 802.1p CoS Prioritization, IEEE 802.1Q VLAN, IEEE 802.3 10BASE-T specification, IEEE 802.3u 100BASE-TX specification, IEEE 802.3ab 1000BASE-T specification, IEEE 802.3z 1000BASE-X specification.
y) Safety certifications: UL 60950-1, First Edition, CUL to CAN/CSA 22.2 No. 60950-1, First Edition, TUV/GS to EN 60950-1, First Edition, CB to IEC 60950-1 with all country deviations, AS/NZS 60950-1, First Edition, NOM (through partners and distributors), CE Marking.
z) Includes: Tools, accessories, and materials (screws, rack handlers, etc.) for installation.

Reference: HP Aruba (802.11ac technology)

8.3 CCTV Cabinet (sharing with Data&Voice Cabinet)

8.3.1 CCTV Cabinet

a) Cabinet with 180° hinged door
b) Two 19" (482.6 mm) mounting frames, front and rear, depth-variable
c) Carbon Steel structure
d) Glazed aluminum door with 3 mm single-pane safety glass
e) Surface finish: Dip coat-primed
f) Dimensions: 79 x 31 x 31 in (2000 x 800 x 800 mm)
g) 42 U
h) Locked front door
i) Color: Housing frame and panels: RAL 7035 Interior installation: RAL 9005
j) Protection category IP to IEC 60 529: IP 55 only in conjunction with baying seal or screw-fastened side panels
k) Floor mounting with keys
l) Ventilation kit included
m) Grounding kit and grounding bar
n) 2 Power distribution units' bars with 6 electric outlets (120VAC @ 60hz)
o) Horizontal and vertical steel cable managers included
p) Approvals: UL + C-UL
q) Includes: Tools, accessories, and materials for installation

Note: Telecommunication Grounding Bar (TGB) installed inside the cabinet

8.3.2 PTZ Camera

a) Interior and Exterior environment.
b) Opaque Dome.
c) Pan, Tilt and Zoom.
d) Protection: IP66.
e) Impact Evaluation: IK09.
f) Pendant Mounting Kit.
g) CMOS 1/2.8" Sensor.
h) 2MP Resolution (1920 H X 1080 V).
i) 0.4 Lux Minimum Illumination Color Mode and 0.04 Lux Nocturne Mode.

j) Objective: 4.7 – 9.4MM,
k) Zoom: 20X Autofocus.
l) 30 FPS.
m) Dynamic Range: 100DB.
n) H.264 and JPEG Compress Video Format.
o) Integrated Movement Detection.
p) Audio Input/Output.
q) Alarm E/S Terminals.
r) RJ-45 Connector Ethernet 100BASE-TX.
s) Power supply: 24VAC, POE (IEEE 802.AT) @ 25.5W.
t) Power Consumption: 55VA IN AC / 44W IN DC.
u) Operation Temperature: -49 TO 122°F (-45° TO 50°C).
v) Relativity Humidity no condensation: 20 TO 80%.
w) Certifications: UL 60950, CSA 60950, CVW, C-TICK, CB SCHEME.

8.3.3 IP Minidome Camera

a) Interior Use.
b) Opaque Dome.
c) Ceiling Mounting Kit.
d) Protection: IP66.
e) Impact Evaluation: IK10.
f) CMOS 1/3.6” Sensor.
g) 2MP Resolution (1920 H X 1080 V).
h) 0.6 Lux Minimum Illumination.
i) 30 FPS.
j) Vision Angle 86°.
k) H.264 AND JPEG Compress Video Format.
l) Integrated Movement Detection.
m) Audio Input/Output.
n) Alarm E/S Terminal.
o) RJ-45 Connector Ethernet 100BASE-TX.
p) Power Supply: POE (IEEE 802.AF).
q) Power Consumption: 4 WATTS.
r) Operation Temperature: 14 TO 122°F (-10° TO 50°C).
s) Relativity Humidity no Condensation 95%.
t) Certifications: UL, UL 60950-1, CUL, KC, CE, ROHS, WEEE, RCM, EAC, CSA60950-1, IEC/EN60950-1.

8.3.4 Network Video Recorder (NVR)

a) 8 TB of Storage included up to 12TB.
b) Up to 128 Channel IP Cameras can be connected.
c) Supports Decoding H.265+/H.265/H.264+/H.264/MPEG4/MJPEG Video Formats.
d) Up to 12 MP High-Definition Live View, Storage and Playback.
e) Up to 768 Mbps High Incoming Bandwidth Ensures IP Cameras can be connected.
f) 2 HDMI Interfaces (Different source), 1 VGA Interface, and 1 Decoding board.
g) 16 HDD can be used for continuous video recording.

h) Compatible with Third-Party Network Cameras.
i) Redundant power supply to improve system stability,
j) Advanced Streaming Technology enables smooth Live View in poor network conditions.
k) Supports RAID 0, 1, 5, 6, 10 and N+1 hot spare for more reliable Data Storage, effectively avoids Data Loss risks.

8.3.5 WORKSTATION

a) Intel Core I7 VPRO Processor @ 2.70GHZ.
b) RAM: 16 GB.
c) Hard Drive: 2 TB.
d) 64 Bits Operating System.
e) NVIDIA Quadro M2000M Video Display Card.
f) Operating System Windows 10.
g) 2 HDMI Ports.
h) 3 USB 3.0 Ports.
i) 1 RJ-45 Connector Ethernet 1000BASE-T.
j) Wireless Network Adapter.
k) Power Supply: 100-240VAC @ 50-60HZ
l) Power Consumption: 350 Watts.
m) Operation Temperature: 32° to 104°F (0° to 40°C).
n) Relative Humidity no Condensation 10-80%.

8.3.6 VIDEO MONITOR

a) LED Technology.
b) Screen Size 40 IN.
c) 1920 X 1080 Full HD Resolution.
d) Aspect Ratio: 16:9.
e) 16.7 Million Colors.
f) Ports: 2 USB, 1 HDMI, 1 DVI, 1 VGA.
g) Ethernet R-45 and Wi-Fi connection.
h) Response Time: 8ms.
i) NTSC / PAL.
j) Approximate Dimensions: 907 X 525 X 50mm.
k) Power Supply: 100-240VAC @ 50-60HZ.
l) Power Consumption: 121 Watts.
m) Operation Temperature: 32° to 104°F (0° to 40°C).
n) Relative Humidity no Condensation 10-80%.

8.3.7 Fiber Distribution Unit

a) 24 ports multimode optical fiber
b) Rack mounting
c) 1 rack unit
d) Color: Black
e) 12 Duplex LC connectors
f) Equipped: Fiber connections set, pigtail, sleeves, organizer, tray

g) Includes: Tools, accessories, and materials for installation.

8.3.8 Patch panel FTP 48 ports RJ-45

a) 48 ports RJ-45 Cat 6A jacks T568A / T568B standard
b) Rack mounting
c) 1 rack unit
d) Flame retardant material, thermoplastic
e) RJ-45 modular connector 8 positions, color code pin label
f) Minimum connection attenuation
g) Includes: Tools, accessories and materials for installation

8.3.9 Cables

8.3.9.1 FTP cable CAT 6A 4 pairs

Contractor must present FTP cable's FAT and SAT tests before installation.

a) Category 6A
b) Bandwidth frequency: 250 MHz
c) Color: Gray (Voice and Data) and blue (CCTV, Access Control)
d) 4 pairs 23 AWG HDPE isolated
e) LSZH jacket
f) Nominal Diameter: 0.224in (5.7mm)
g) PoE compliance: IEEE 802.3af and IEEE 802.3at
h) Install strain: 25lbf (110N)
i) Operation temperature: 32 to 112°F (0 a 50°C)
j) Includes: Tools, accessories, and materials (labels, Velcro, etc.) for installation

8.3.9.2 Multimode Optical Fiber 6 strands

a) Interior use
b) Jacket color: Black
c) Loose tube dry
d) 6 strands
e) Core: 50/125µm
f) Jacket: LSZH
g) Category OM4
h) External diameter: 0.47in (12mm)
i) Install strain: 3000N
j) Wavelength: 850 – 1300nm
k) Optical attenuation: 850nm: 3.5dB/km / 1300nm: 1.5dB/km
l) Operation temperature: -4 to 158°F (-20 a 70°C)
m) Includes: Tools, accessories and materials (labels, Velcro, etc.) for installation

8.3.9.3 Multimode Optical Fiber Patch Cords

a) Category OM4
b) Color: yellow
c) Multimode 50µm
d) Duplex Tight Patch Cord
e) Duplex LC connectors in both ends
f) Length: 118.11in (3000mm)
g) Exterior Jacket: LSZH.
h) Tensile strength: 100N
i) Operation temperature: -13 to 167°F (-25 a 75°C)
j) Nominal Diameter: 0.232in (5.9mm)
k) Includes: Tools, accessories, and materials (labels, Velcro, etc.) for installation

8.3.10 Female RJ-45 Connector

a) Category 6A
b) Color: White: data, black: voice, blue: CCTV, orange: access control
c) For FTP Cat 6A 23 AWG cable
d) IDC terminal
e) T568A and T568B standards
f) Connector body material: thermoplastic UL 94V-0
g) Terminal material: Bronze with 50 microns of gold
h) Operation temperature: -14 to 140°F (-10 a 60°C)
i) Isolation resistance: 500MΩ
j) Includes: Tools, accessories, and materials for installation

8.3.11 2 ports Face Plate

a) 2 ports capable
b) Color: White
c) Type: Rectangular
d) Material: Thermoplastic
e) 2 different label area
f) For female RJ-45 connector
g) Standard: IEC 60603-7
h) Includes: Tools, accessories, and materials for installation

9. OPTICAL FIBER INSTALLATION

9.1 Before cabling optical fiber is Contractor's liability to present FAT and SAT tests.

9.2 Optical fiber installation minimum requirements:

a) A 3-meter cable spare length must be considered in connection points.
b) Fasten optical fiber with plastic ties every 1.5 meters from entrance point to back, to liberate cable without jacket from mechanical stress.
c) Remove optical fiber jacket and cover and route each strand to their connection point considering 1 meter cable spare length in the interior.
d) Identify optical fiber cable pathways using fastened ID labels at every 20 meters of cable and in connection points. These IDs will help in installation, maintenance and relocation process.
e) Each strand must be identify placing one label not further than 5 cm away from strand jacked remove point. TX or RX legend and assigned pair must be on the label.
f) Optical fiber connectors must be LC.

9.3 Is Contractor's liability to perform a technical evaluation to each optical fiber link to guarantee fulfillment of regulations and stablished parameters.

9.4 To guarantee fulfillment of regulations in optical fiber links, contractor must perform and present test methods for optical fiber links, these test methods must be performed from cable fabrication to the last operation test.

9.5 During installation two different kind of metering, with very different scopes must be identified:

a) Construction metering: Its scope is to verify received materials quality and condition and to verify quality of works through each phase of the project, if any work is not made with the stablished quality Contractor must fix it before moving to the next phase.

b) Final metering: More exhaustive metering, will be used when installation is finished, will be performed over a complete section of the project, and verifying results within stablished regulations.

9.6 Test methods for Optical Fiber engulfs fabrication method measuring concentricity, core, cover, attenuation, bandwidth, dispersion, and many others.

9.7 Contractor's minimal optical fiber test:

9.7.1 On site cable drums: Verifies received materials with no transport damage. Tests:

a) Deficiency detection
b) Previous checkups

9.7.1.1 Physical cable inspection and optical fiber attenuation check through OTDR (Optical Time Domain Reflectometer). These tests are performed in site warehouse in the presence of TAKEDA/BAXALTA technical staff.

9.7.1.2 Cable drums condition is reviewed, and cabling is not allowed if any fault is detected.

9.7.1.3 Retro disperse signal test is performed to each cable drum for future reference. Test results must match manufacturer cable data sheet. Retro disperse attenuation check must be performed in each optical fiber strand. This test must be performed; manufacturers data sheet is not enough.

9.7.2 2. Laid cable: Verifies laid cable, reviewing applied tension to the cable to guarantee optimal cable conditions without any break or tearing. Tests:

a) Deficiency detection
b) Retro disperse attenuation

9.7.2.1 Physical cable inspection and retro disperse attenuation check through OTDR (Optical Time Domain Reflectometer). These tests are performed when cable is laid in the presence of TAKEDA/BAXALTA technical staff. Retro disperse attenuation check must be performed in each optical fiber strand and results must be compared to on site cable drum test results to review the loss of attenuation.

9.7.3 Final metering: When cable installation is finished, final metering must be performed

a) Deficiency detection
b) Retro disperse attenuation
c) Insertion losses attenuation

9.7.3.1 These tests must be performed to each optical fiber strand in operational wavelength with one OTDR (Optical Time Domain Reflectometer). This equipment reviews optical fiber condition and splices. OTDR sends an optical pulse and measures time since pulse was sent until pulse reflection is received. OTDR measures attenuation in each splice and fusion or mechanical connector to verify results against regulation data.

10. CABLE PATHWAYS

10.1 Cable pathways for Buriti project will provide CCTV services to project areas. Contractor must supply cable pathways with complete mechanical supports, accessories, and materials to deliver a complete and functional CCTV System. Two different kind of cable pathways will be used: Conduit and Cable tray.

10.1.1 Conduit

10.1.1.1 Inside the buildings cabling will be routed in galvanized steel cable tray and galvanized steel conduit thick wall outdoor and thin wall in indoor according to the different areas in the plant and proper accessories such as: connectors, monitors, curves, pull boxes, etc. in filling packing lines areas shall be used stainless steel 304/316 rigid metallic conduit (RMC) shall be considered accessories for grounding for the tray and/or conduit and the proper accessories according the classification of areas.

10.1.1.2 Conduit cable pathways installation highlights:

a) Complete conduit section must be used when distances allow it, using parts of conduit sections with connectors is not recommended this practice weakens pathways.
b) Conduit ends must be smooth and without any cutting edge.
c) Mechanical supports for conduits must be installed in distances not further than 2 meters from each other and separated 50 cm to a pull box in each conduit connected. Mechanical supports must be conduit manufacturer approved. No cable or wood made supports will be allowed.
d) Conduits will never be supported to existing pipping or other installations elements such as process pipping, HVAC ducts, dropped ceiling fixtures, etc.
e) Conduit hand tool bends, threads and lubricants are considered in conduit installation prices.
f) Non-proper hand tool bends are allowed.
g) Conduits must be clean in the inside to maintain these plastic lids must be installed.

10.1.1.3 Cable pathways must follow parallel or perpendicular routes to walls, columns, beams, pipe racks, etc. For conduits running in parallel routes mechanical supports will be installed every 2 meters when there is no pull box or register.

10.1.1.4 Conduit bend radius chart:

Conduit Diameter	Interior radius
21 mm Ø (3/4”)	160 mm
27 mm Ø (1”)	200 mm
41 mm Ø (1 1/2”)	300 mm
41 mm Ø (1 1/2”)	490 mm

10.1.1.5 Contractor must consider all rigid and intermediate metallic conduit installation’s works and must follow next directions:

10.1.1.6 Type: Rigid and Intermediate metallic conduit.

10.1.1.7 Diameters: 27 and 53 millimeters.

10.1.1.8 Threaded ends.

10.1.1.9 Contractor must consider all accessories, materials, and tools to perform conduit installation.

10.1.2 Cable Tray

10.1.2.1 Cable tray must be used as CCTV System cable pathway, sharing with Data&Voice system.

10.1.2.2 Cable tray will be galvanized steel, contractor must install factory made cable tray fittings. Handmade fittings are not allowed.

10.1.2.3 Contractor must consider all rigid and intermediate metallic conduit installation's works and must follow next directions:

10.1.2.4 Type: galvanized steel.

10.1.2.5 100 millimeters width.

10.1.2.6 Factory made fittings.

11. TELECOMMUNICATION SYSTEMS ACCEPTANCE PROTOCOLS

11.1 The telecommunication's contractor must provide the Factory Acceptance Test for CCTV system (FAT) 30 days before placing them for review, approval and monitoring during their development. Contractor will present the certificate of FAT tests.

11.2 Site Acceptance Tests (SAT) are contractor's responsibility to verify the correct equipment operation and interconnection. Test protocol must be delivered 30 days before test to be reviewed and evaluated. The results will show correct equipment function with real field tests in accordance to specification document and manufacturers own specifications.

11.3 System test will be in accordance to equipment manufacturer statements and the results will be indicated in the test protocol.

11.4 Before performing any test, contractor will be sure that all components are complete, identified and properly connected prior to test the entire system.

11.5 All special tools, test equipment, parts and spare parts required to perform these tests will be provided by the contractor.

12. SYSTEM STARTUP

12.1 Once CCTV System is interconnected with CCTV Existing System, Contractor must perform and deliver Operational Site Acceptance Tests (OSAT) to corroborate operational features and functionality of equipment in accordance to this technical specification, equipment operation and maintenance manuals.

12.2 Any fault, damage or prejudice occurred during supply, installation or interconnection of cabling, tests and system startup must be solved by the Contractor in a time frame less than

15 natural days since proper TAKEDA/BAXALTA notification this solution will not be an expense for TAKEDA/BAXALTA.

12.3 If during cable, cable pathways, accessories or material installation Contractor wants to change original proposal in any mean, he must present a complete report with the explanation of the change to be evaluated and approved by TAKEDA/BAXALTA.

12.4 Is Contractor's liability to perform startup and performance tests to CCTV System. Contractor must provide all materials, accessories and installation consumables for startup and final tests of CCTV System.

12.5 Is Contractor's liability to perform integral performance tests to Telecommunications Systems, presenting operational procedures, equipment's wiring diagrams, nominal signal levels, monitoring points and adjustment points to be verified and measure, indicating accurate expected values, delivering these results hardcopy and electronic document.

12.6 All infrastructure (FO cables, FO fusion terminations, UTP cables, connectors) shall be certified.

13. SPARE PARTS

13.1 Contractor must elaborate a spare part price chart for maintenance of the CCTV System basing this chart on system knowledge, provided equipment and level of expected repairs.

13.2 Listed spare parts must have manufacturer item number and description. Item number must match part number in the complete system. Spear part price chart must be validated and approved by TAKEDA/BAXALTA.

14. DOCUMENTATION

14.1 Technical documentation must be in English and Portuguese.

14.2 Contractor must deliver to TAKEDA/BAXALTA a work schedule program including: supply, reception, installation and startup of CCTV system's equipment and accessories including concept and location, including the next listed minimum documentation in the indicated phases:

14.3 Contractor must deliver next electronic documents within the technical proposal:

a) System Architecture Network Diagram
b) System Topology
c) System functional description
d) Software and hardware system elements data sheets
e) Detailed bill of materials
f) Startup and 2-year maintenance spare parts schedule

14.4 Contractor must deliver next electronic documents (PDF and Source file) for approval after the order is placed:

a) Hardware and Software data sheets
b) System Topology
c) Detailed bill of materials including all equipment, accessories and materials
d) Startup and 2-year maintenance spare parts schedule
e) Quality certification manufacturer issued
f) Acceptance tests protocols
g) Inspection arrangement and tests
h) Quality control arrangement

14.5 Contractor must deliver next electronic (PDF and Source file) and hard copy documents for final and reception:

a) Hardware and Software data sheets
b) Bill of materials
c) Installation details
d) Quality certification manufacturer issued
e) Acceptance tests protocols
f) Startup and 2 year maintenance spare parts schedule
g) Electrical calculations report
h) Wiring diagrams and equipment location drawings
i) Heat dissipation calculation report
j) Installation and maintenance manuals
k) Photographic report including installation, interconnection, tests and startup.
l) Equipment and documents inventory
m) the certificate of FAT tests.
n) Installation, interconnection, tests, startup, and quality control procedures
o) Installation applied regulations
p) Guaranty procedure (telephone number and direction of technical support responsible)
q) Red lines drawings
r) As-built drawings

14.6 Contractor must deliver electronical documentation in the next software latest:

a) Auto CAD 2019
b) Microsoft Office Word and Excel 2019 or last version
c) PDF for manuals, catalogs, etc.
d) Revit 2019 or last version

15. TRAINING

15.1 Training courses for the personnel must be included, so they can achieve the correct and safe operation and management of the system.

15.2 The courses shall include didactic materials and the required reference manuals in Portuguese.

15.3 Courses for Operators, for Operation Engineers and for Maintenance Engineers must be implemented.

15.4 The courses shall cover the following areas:

a) Operation.
b) Maintenance.
c) Configuration.
d) Administration.

15.5 Contend and duration of the courses must be sent to the client for approval.

15.6 Place will be designated by the client, 10 persons per course must be at least considered.

16. VENDOR SERVICES

16.1 Vendor system shall present a proposal including installation, configuration, programming, testing, commissioning, repair and service to the entire system, and must also include training services for operation and maintenance personnel.

16.2 Any detail omitted in this document does not relieve the vendor of his obligation to provide a complete system operating satisfactorily.

16.3 The contractor is responsible to complete pending work.

17. WARRANTIES

17.1 Contractor must deliver operational and maintenance manuals, licenses, passwords, programming keys, warranties, assistance time frames, homologation certifications and manufacturer certified documents of all equipment, components, hardware, software, cables and third party equipment of the CCTV System. All documents hardcopy and electronical will be incorporated to CCTV System's project book one construction and reception phases are completed and approved by TAKEDA/BAXALTA.

17.2 Contractor must guarantee equipment is fault free in materials and workforce installation in accordance to type and quality mentioned in this technical specification.

17.3 CCTV System's equipment warranty time is no less than 36 months since startup and acceptance of CCTV System.

17.4 Any fault or malfunction of the CCTV System during warranty time is Contractor's liability. Is Contractor's obligation to repair, correct, change, or substitute elements, materials, or even

complete equipment until achieving complete CCTV System functionality with no cost to TAKEDA/BAXALTA.

17.5 Contractor must present a comply warranty proposal considering fast response times.