	
DOC NUMBER: 569-DB07-AIC-400-001		CLIENT NUMBER: PRD-AIC-CLC-001	
CLIENT: TAKEDA/BAXALTA			
PROJECT BURITI EPCMV PROJECT			


SECURITY CCTV SYSTEM CALCULATION REPORT

0	01OCT2021	ISSUE FOR CONSTRUCTION	MAV	MAF	RSP
B	30AUG2021	90% DD ISSUE	MAV	MAF	RSP
A	19FEB2021	30% DD ISSUE	MAV	MAF	MAJ
REV	DATE	DESCRIPTION	EXEC	CHECK	APPROV.

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 2 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

INDEX

1.	REVISION HISTORY	3
2.	PROJECT DESCRIPTION	3
3.	SCOPE.....	3
4.	ACRONYMS.....	4
5.	DEFINITIONS	5
6.	REGULATIONS AND STANDARDS.....	6
7.	REFERENCE DOCUMENTS.....	7
8.	CONTRACTOR'S OBLIGATIONS	7
9.	CCTV HIGHLIGHTS:.....	8
10.	DESING AND CALCULATIONS CONSIDERATIONS	10
11.	CALCULATIONS	11

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE: SECURITY CCTV SYSTEM CALCULATION REPORT			SHEET 3 of 12
			REV.: 0

1. REVISION HISTORY

Rev.	Reason for change
A	30% BD ISSUE
B	<ul style="list-style-type: none"> General review in index numbering because of the new table 1 (revision history) Inclusion of the Emergency Generator building and Wastewater Treatment plant in item 3 (Scope). Updated item 7.1 Added items 8.1.5 and 8.1.6 Updated tables in item 11.1 and 11.2
0	<ul style="list-style-type: none"> Updated item 7.2 Updated item 9.11 and 9.12 Updated item 10.2.2 Updated item 10.2.7 - quantity of cameras Added item 11.3

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. Criteria included in this document establishes engineering directions for determine the capacity of the bandwidth and storage required by the recording equipment to be implemented in the CCTV System.
- 3.2. Security CCTV System to be installed on the facilities of buildings B07A- Drug Product, B07B- Drug Substance, B07C-Boilers, B07F - Generator Building, and WWT-Wastewater Treatment.

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 4 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

- 3.3. Is Contractor's liability to supply CCTV System equipment that fulfill functionality, connectivity, interoperability, integration with existing equipment, interconnection with existing equipment, security and performance mentioned in this document. Is Contractor's liability to configure and startup CCTV system to deliver a complete and functional system to Takeda/Baxalta.

4. ACRONYMS.

AC	Alternate Current
ANSI	American National Standard Institute
AWG	American Wire Gauge
CCTV	Closed Circuit Television
DC	Direct Current
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
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
W	Watts
WLAN	Wireless LAN

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 5 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

5. DEFINITIONS

- 5.1. **Administration System.** Hardware and Software integration and coordination for monitoring, configuring, analyzing, evaluating, and controlling system's resources to get real production requirements, operational performance and service quality.
- 5.2. **Cabinet.** Active equipment, cabling and connection accessories container.
- 5.3. **CCTV.** Closed Circuit Television system. Surveillance cameras and monitors connected to the facility local area network (LAN) for process and personnel monitoring.
- 5.3. **Connection accessories.** Mechanical devices, such as patch panels, Telecom outlets, IDC wiring blocks, etc.
- 5.4. **Data Switch.** Interconnects two or more network locations, operating as a data bridge for data commutation.
- 5.5. **Equipment.** Electronic Telecommunications equipment for transmission, reception, management and storage of data such as data switches, access points, cameras, watchman tour stick.
- 5.6. **Local Area Network (LAN).** Interconnects network locations separated in a relative small and well defined area.
- 5.7. **Main Grounding bar.** Earthing connection point, located in Telecommunications equipment room.
- 5.8. **Power supply.** Electric power supply. Direct current (DC) or alternate current (AC).
- 5.9. **Resolution.** Image detail and is related to the number of pixels that compound the image.
- 5.10. **Software.** Programs and operating information used by computers and electronic devices.
- 5.11. **Star Topology.** Each Telecom outlet is connected to a distribution frame.
- 5.12. **Structured Cabling System.** Unique and complete cable network including: copper and optical fiber cabling, racks, patch panels, wiring blocks, terminal cables, connectors and adaptors.
- 5.13. **Telecom outlet.** Horizontal cabling end.
- 5.14. **Topology.** Physical or logical Telecommunications system setup.
- 5.15. **Frames Per Second (FPS).** It is the frequency (rate) of consecutive images called frames, which is most often expressed in frames per second.
- 5.16. **Pixels.** It is the smallest homogeneous unit in color that is part of a digital image, be it a photograph, a video frame or a graphic.
- 5.17. **Video recording and storage system (DVR, NVR, NAS and SAN, among others).** Set of elements that digitally record and store video and application images only on CCTV.


 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 6 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

6. REGULATIONS AND STANDARDS.

6.1. All CCTV System equipment, accessories and materials in this project must be manufactured in accordance with international and local regulations and manufacturer directions. International regulations must have and homologue in local regulations when there is no local regulation.

6.2. Precedence order must be local regulations, manufacturer regulations and international codes.

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
National Telecommunications Agency	ANATEL
Electronic Industries Alliance	EIA
Institute of Electrical and Electronics Engineers	IEEE
International Telecommunication Union	ITU

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 7 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

National Electrical Manufacturers Association	NEMA
National Fire Protection Association	NFPA
Occupational Safety and Health Administration	OSHA
Underwriters Laboratories	UL

7. REFERENCE DOCUMENTS.

7.1. 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-1-3-24	First floor	Drug Product	Telecom CCTV
7B-I-1-3-24	First floor	Drug Substance	Telecom CCTV
7A-I-1-3-34	Second floor	Drug Product	Telecom CCTV
7B-I-1-3-34	Second floor	Drug Substance	Telecom CCTV
7C-I-0-3-01	Ground floor	Boiler	Telecom (VoIP&Data&CCTV)
7F-I-1-3-14	Ground floor	Generator Building	Telecom CCTV

7.2. Documents:

PRD-AIC-TSP-008	Data Voice Design Basis - Appendix - Hemobrás topology
PRD-AIC-TSP-016	Security CCTV System Design Basis
PRD-AIC-TSP-017	Security CCTV System Technical Specification

8. CONTRACTOR'S OBLIGATIONS

- 8.1. All project information is confidential, and Contractor is not allowed to share any information without Takeda/Baxalta authorization.
- 8.2. This document governs during bidding and acquisition process for CCTV System. Any equipment, material or accessory not mentioned in this document or in reference documents does not loose Contractor's liability to supply and install them to have a complete and functional CCTV System, gaining Takeda/Baxalta full satisfaction.
- 8.3. Contractor must follow strictly Takeda/Baxalta safety regulations established on site. Contractor must acquire and wear all personal protective equipment (PPE) and required clothing with his own logo to be easily identified.
- 8.4. Contractor must elaborate and deliver a critical route work schedule, highlighting supply, installation, transport, integration to existing equipment, interconnection with existing equipment, test, and startup CCTV System equipment dates.

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 8 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

- 8.5. At any time when a damage or not complying specifications, equipment, material, or accessory is found, Contractor must change it immediately without any cost to Takeda/Baxalta.
- 8.6. Contractor must coordinate with all the CCTV System manufacturers to have technical assistance at any time during CCTV System implementation.
- 8.7. Contractor must have specialized personnel manufacturer certified to install CCTV System. Contractor must present actual and updated personnel certifications. Takeda/Baxalta can accept or reject certifications and/or personnel in accordance with their work supervisor criteria.
- 8.8. Every CCTV FTP data cable must be installed inside structured cabling system's cable tray and conduit cable pathways.
- 8.9. Contractor must consider working on day or night hours in accordance with plant schedules and must adjust his schedule to working supervisor directions.
- 8.10. Contractor must deliver a technical report with installation details, equipment location, CCTV cameras, power supply system, photographic report, wiring diagrams and CCTV equipment identification tags.


9. CCTV HIGHLIGHTS:

- 9.1. The buildings to be considered that require CCTV cameras are:

- 9.1.1. Building B07A – Main entrance and corridors. 24 cameras, IR Fixed Mini Dome Anti-Corrosion Network Camera are considered.
- 9.1.2. Building B07B – Main entrance and corridors. 20 cameras, IR Fixed Mini Dome Anti-Corrosion Network Camera are considered.
- 9.1.3. Building B07C – Main entrance. One camera, IR Fixed Bullet Anti-Corrosion Network Camera is considered.
- 9.1.4. External area – One camera, PTZ type, anti-corrosion proof Network Speed Dome is considered.
- 9.1.5. Building B07F – Main entrance and Electrical room entrance. One camera, IR Fixed Mini Dome Anti-Corrosion Network Camera is considered.
- 9.1.6. External area WWT – One camera, PTZ type, anti-corrosion proof Network Speed Dome is considered

- 9.2. CCTV cameras must operate under IP protocol and must be integrated to the LAN through Security Access & CCTV data switches and Automation Distribution data switch, captured video must be sent from local NVR in B07 to existing video management server. Existing video management server must process and storage video streaming in Takeda/Baxalta standards during the established time frame.

- 9.3. Live streaming in 1MP 30FPS resolution.

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 9 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

- 9.4. Storage: 4CIF 10FPS for storage resolution during normal conditions and 1MP 20FPS during alarm status.
- 9.5. Monitor, analyze and configuration of the CCTV system will be performed in existing Monitoring Room through a workstation, joystick keyboard and 2 LED monitors.
- 9.6. Existing video management system must have the capability to handle all existing and new cameras indicated in Takeda/Baxalta project and considering a 30% up growth. Video images will be storage for 30 days. 24x7 365 days' operation in the existing storage server.
- 9.7. Video compression will be H.264 in the latest version.
- 9.8. Existing software must be updatable for Takeda/Baxalta project expansion demands such as licenses, users, etc.
- 9.9. Existing storage data server EMC2 and HP storage hard disk drives units located in existing MDF room must have the capability to increase storage in order to handle this expansion.
- 9.10. Cameras' power supply will be PoE Plus (IEEE 802.3 at) in distances not further than 90 meters from assigned patch panel to Telecom outlet. Data switches considered in this project are PoE Plus capable.
- 9.11. IP PTZ Cameras power supply will be a through an external power supply 220 VAC@60Hz to 12 VDC, with outdoor protection, IP65 grade, mount an electrical outlet (220 VAC@60Hz) installed next to the camera, this electrical outlet must be powered through an UPS. UPS supply, cable, cable pathway from electrical board to the electrical outlet shall be included in the scope of supply.
- 9.12. If the camera is in a distance further than 90 meters from assigned patch panel to Telecom outlet, electric power supply will be through an electrical outlet (220 VAC@60Hz) installed next to the camera, this electrical outlet must be powered through an UPS. UPS supply, cable, cable pathway from electrical board to the electrical outlet shall be included in the scope of supply. Video signal will be sent through multimode optical fiber category OM4, 6 strands, video media converters in IT_CCTV cabinets or TE's and inside a cabinet located next to the camera will be used. Optical fiber will be connected to the FDU located in IT_CCTV cabinets or TE's and a local FDU will be installed inside the cabinet.
- 9.13. Multimode optical fiber cable, cable pathway, media converters, cabinet and media convert rack for IT_CCTV cabinets at Automation rooms are in CCTV system scope.

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 10 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

10. DESING AND CALCULATIONS CONSIDERATIONS

10.1. CCTV System must be and extension of existing and operating CCTV System in Hemobrás facility. Equipment must be same brand and fully compatible (100%) with existing systems. If existing equipment is not able to support CCTV services considered in this project is Contractor's liability to present a technical proposal including updates or new equipment to deliver a complete and functional CCTV System to Takeda/Baxalta.

10.2. The calculations are developed considering the following values:

10.2.1. Recording Period: 24 hrs. for 30 days, to 100% of the total time of the cameras.

10.2.2. Image size: 1080 x 720.

10.2.3. Sampling Frequency: 30 FPS.

10.2.4. Video format (compression): H.264.

10.2.5. Compression factor for transmission: 80%.

10.2.6. Compression factor for storage: 90%

10.2.7. Number of cameras:

10.2.7.1. 2x PTZ (external area)




10.2.7.2. 30x fixed cameras building 7A

10.2.7.3. 20x fixed cameras building 7B

10.2.7.4. 1x fixed cameras building 7C

10.2.7.5. 1x fixed cameras building 7F

10.3. Calculations must be reviewed and adjusted by vendor, according with the characteristics of the final equipment.

 			 		
DOC NR: 569-DB07-AIC-400-001			CLIENT NR: PRD-AIC-CLC-001		
TITLE: SECURITY CCTV SYSTEM CALCULATION REPORT				SHEET 11 of 12	
				REV.: 0	

11. CALCULATIONS

11.1. BANDWIDTH CALCULATION

11.1.1. Bandwidth (Mbs) = (bits*FPS*(1 – Compression factor))/1000000


11.1.2. Total Bandwidth (Mbs)= Bandwidth * Number of cameras

Location	Camera type	Image size	Pixels	bits	FPS	Compression H.264	Bandwidth (Mbs)	Number of Cameras	Total Bandwidth (Mbs)
				(Pixels*8)		(transmission)			
External	PTZ	1080 x 720	777,600	6,220,800	30	80%	37.32	2	75
B07A 2nd floor	FIXED	1080 x 720	777,600	6,220,800	30	80%	37.32	19	709
B07A ground floor	FIXED	1080 x 720	777,600	6,220,800	30	80%	37.32	11	411
B07B 2nd floor	FIXED	1080 x 720	777,600	6,220,800	30	80%	37.32	16	597
B07B ground floor	FIXED	1080 x 720	777,600	6,220,800	30	80%	37.32	4	149
B07C	FIXED	1080 x 720	777,600	6,220,800	30	80%	37.32	1	37
B07F	FIXED	1080 x 720	777,600	6,220,800	30	80%	37.32	1	37

11.1.4. The size of the image is determined by the type of camera and can be decreased to limit the required bandwidth.

11.1.5. The number of frames per second can be decreased to limit the bandwidth.

11.1.6. The value of the H.264 compression factor is an estimate since the compression by this method is based on the movement of the video images.

 		 	
DOC NR:	569-DB07-AIC-400-001	CLIENT NR:	PRD-AIC-CLC-001
TITLE:			SHEET 12 of 12
SECURITY CCTV SYSTEM CALCULATION REPORT			REV.: 0

11.2. STORAGE CAPACITY CALCULATION

$$11.2.1. \text{Total Storage (TB)} = ((A * B * (1 - C) * D * E * F)) / 1000000000000$$

11.2.1.1. A = Bytes of image.

11.2.1.2. B = FPS

11.2.1.3. C= Compression factor.

11.2.1.4. D= Days of recording.

11.2.1.5. E = seconds in a day (86400)

11.2.1.6. F = number of cameras.

Camera type	Image size	Bytes	FPS	Compression H.264	Days of Recording	Number of Cameras	Total Storage TB
				(storage)			
PTZ	1080 x 720	777,600	30	90%	30	2	12
FIXED	1080 x 720	777,600	30	90%	30	52	314
					Total storage		327
					40% for storage		131

11.2.2. The size of the image can be update depending on the monitoring area.

11.2.3. The number of frames per second can be decreased.

11.2.4. Time of recording can be decreased according with the events in the monitoring areas.

11.2.5. It is considered 40% of the total storage due to the compression method that could reduce even more the factor presented in images without movement.

11.3. POWER CALCULATION (worst case)

11.3.1. Switch Aruba 2930F – POE+, Power 740W

11.3.2. Camera Fixed type, Power 6.5W

	Camera type	Power (W)	Quantity (u)	Total (W)	Switch POE+ (Aruba 2930F) (W)
B07A 2nd floor	FIXED	6.5	19	123.5	740