

## **Centre for Higher Secondary Education Male'**

### **ICT Requirements for the 7 storey Concept Drawing of May 2025 (to be referred to the drawing)**

The below requirements are specifically written for the Concept Drawing for Centre for Higher Secondary Education Male' as in early May 2025. These requirements are custom to the stated Concept Drawing and shall not be used as baseline or reference to other buildings without written consent and approval of the ICT Section of the Ministry of Education.

All items stated in this document shall be approved by the client before finalizing.

#### **1. Data Cables - General**

- a) All data cables used in the building shall be CAT6 UTP cables. Cables shall be of high quality and verified and approved by the client.
- b) While crimping, the sheath covering the cables shall be inserted into and secured with the RJ45 jack with the wires unexposed and be properly secured.
- c) If pulling cables through conduits, caution must be executed to ensure the sheathing and cables are not damaged.
- d) Rubber boot must be applied with the RJ45 jacks. Where possible a relevant colour coding shall be used.
- e) No data cable shall exceed the length of 80m (meters).
- f) Data cables for computer connections will be used for telephone communications.
- g) All data cables must be wired to the standard of EIA/TIA 568-B.
- h) All data cables must be tested on all 8 wires for proper and error free connection and termination. Documentation of proper testing shall be provided to the client.
- i) A slack length must be provided at both ends of the cable such that in the even the cable may have to be re-crimped, enough length is available for it to be reused.
- j) All termination boxes shall be flush with the wall. The face plate shall be outside the flush wall. The face plate shall be labelled.
- k) General fixing height of wall outlets are at 300mm height from finished floor levels, except in Kindergarten and special needs room where they should be at a height where children cannot easily access them.
- l) All data points must be appropriately and properly labelled.
- m) A wiring diagram shall be provided at the end of the project.
- n) All items must be verified and approved by the client.

#### **2. Power Sockets for ICT Equipment**

- a) All power sockets for computer equipment and IT peripherals shall be of 13 amperes and shall have either a UK or Universal face plate, unless otherwise stated or required.
- b) It is preferable that the face plate have an LED indicating power on/off, with a switch to power on and off the power socket.
- c) All computer terminals must have 2 power sockets, one for the terminal and one of the monitor.
- d) Each network enclosure shall have 2 power sockets next to it, unless otherwise stated.
- e) Power sockets shall be available in rooms at locations where a peripheral device may be used.

### **3. Network enclosures**

- a) Shall be as show in the drawing. Each enclosure shall have adequate volume to accommodate all items required in it and space for air circulation.
- b) All network enclosures shall have ventilation gaps. The door shall be a removable toughened glass door. Side panels shall be removable. While fixing, ensure proper gaps are provided around each network enclosure.
- c) All network enclosures shall be placed in a location where it is secured from student access and shall be either airconditioned or where adequate air circulation is available. If in a room where it is not airconditioned mechanical ventilation shall be provided such that heat shall not build up and stay stagnant within the room.
- d) All network enclosures shall be lockable.
- e) All cables coming in to the network enclosure shall be terminated on to patch panels. 48 port patch panels cables can be used.
- f) Each network enclosure shall be firmly fixed on the wall to ensure its own weight and the weight of the items within the enclosure are properly supported.
- g) Proper cable management must be ensured within the network enclosures. The following order is preferred and repeated until all cables are properly managed. ;
  - i. Patch panel
  - ii. Cable management
  - iii. Network switch
- h) All network enclosures shall be powered through an Uninterrupted Power Supply (UPS) of adequate capacity (preferably 1000vA). The UPS shall be connected to a Power Distribution Unit (PDU). All equipment shall be connected to the PDU and thus powered through the UPS.

### **4. Telephone Units**

- a) Desk phone units shall be Grandstream digital and compatible with 3CX PABX system.
- b) Shall be obtained from client approved vendor in order to maintain streamlined connectivity, service, after sales service, warranty, configuration, troubleshooting and overall compatibility with the items on the rest of the network and for the stability and compatibility with the network.
- c) For all services and other matters required for the configuration and management, the client will approach the vendor with whom the client has an agreement with.

### **5. Network Switches and WiFi Access Points**

- a) The client runs a customized Wide Area Network across all its schools and requires specific Alcatel equipment at all its schools to maintain streamlined connectivity, service, after sales service, warranty, configuration, troubleshooting and overall compatibility with the items on the rest of the network. The client also needs to ensure smooth connectivity with the configuration it requires to be the same at all its schools. Hence network switches and WiFi Access Points shall be obtained from client approved vendor in order to fulfil the above requirements.
- b) For all services and other matters required for the configuration and management, the client will approach the vendor with whom the client has an agreement with.

- c) Each room, common areas and school compound including the terrace shall have WiFi Access Points.

#### **6. Uplink Cables from Server Room to Switches in Network Enclosures and Service Provider Terminals**

- a) Shall be of 6 core Single mode non-armoured fibre optic cable, unless otherwise stated.
- b) All locations shall have dual cables laid for contingency, preferably from alternate paths.
- c) Each network enclosure shall have a uplink cable wired from the main rack in the server room.
- d) The fibre cables shall be spliced with Single mode 1 Gbps transceivers compatible with Alcatel switches.
- e) All cables shall be tested and documentation provided to the client.

#### **7. CCTV Camera System**

- a) CCTV cameras shall be IP based.
- b) Shall be of the same brand and compatible with the existing CCTV system in the school.
- c) Shall be placed in all common areas within the building, including school compound.
- d) Indoor cameras shall be fixed view 4MP dome cameras with night vision.
- e) Outdoor cameras shall be fixed view 4MP bullet cameras with night vision that are weatherproof.
- f) Video feeds shall have H.265 compression to ensure smaller storage
- g) CCTV cameras shall cover entrance to toilet areas.
- h) CCTV cameras shall be placed on the school boundary.
- i) Coverage shall not have any blind spots
- j) CCTV cameras shall be operated through the data network.
- k) CCTV feed shall be supported and recorded to the existing Network Video Recorder (NVR).
- l) CCTV recording shall be continuous (24/7).
- m) NVR shall have the capacity to hold past 30 days' recording. Beyond 30 days' recording shall be overwritten.
- n) NVR shall be accessible over the network to play video footage.
- o) Shall have the ability to view recorded footage.
- p) Shall have the ability to download recorded footage.
- q) Shall have 55 inch screens(s) to display live feed from cameras in the Administrative Office and/or Guard Room.
- r) Each room shall have a network provision on the ceiling at a back corner to fix a CCTV camera in the future. The storage capacity of 30 days shall be calculated including these cameras.

#### **8. Public Address (PA) System**

- a) Each room occupied by staff or students, including toilets, and all common areas such as corridors, compound, terrace, etc. shall have a speaker from the PA system to ensure all announcements reach everyone within the building. Hence each room would act as a separate zone.
- b) Shall have high quality speakers that have crisp audio with less echo and clear sound.
- c) System shall have the capacity to be used in an emergency.

- d) Shall have the ability to switch each speaker on and off individually.
- e) Shall have the ability to control volumes of zones.
- f) Main controls for the PA system shall be at the Administrative Offices on the Ground Floor.
- g) Shall be provided with a computer system to play required audio.
- h) Main controls shall have;
  - i. 1 table top microphone.
  - ii. 2 cordless microphones.
  - iii. 2 microphone stands.
  - iv. Range to cover the school compound.
  - v. Provision to control treble and bass.
  - vi. Provision to input auxiliary audio.
  - vii. Provision to plug in a cable with 3.5mm jack.

## **9. Classrooms**

- a) Each classroom shall have
  - a. Wired data points behind the Teacher's Desk as indicated.
  - b. 1 wired data point on the ceiling for a WiFi Access Point.
  - c. Wired data points to connect to the Smart Board as indicated.
  - d. 1 Smart Board of 86 inches.
  - e. 1 desktop computer system with add-on graphics card supporting 2 HDMI outputs of at least full High Definition.
- b) HDMI cable connecting the computer system to the TV/Smart Board.
- c) Small sized stereo wall speakers connected to the computer system to play audio/files to ensure good quality audio is heard at the back of the classroom.

## **10. Fingerprint Access**

- a) Shall have units as indicated on the drawing.
- b) Shall be compatible with the existing system and units already being used at the school.
- c) Shall support 200 users.
- d) Shall support fingerprint and RFID card.
- e) Shall be synchronized over the network, including time.
- f) Shall be powered through an Uninterrupted Power Supply (UPS) to keep the device working in the event of utility power failure.
- g) Shall have a web based software bundled with the machine that is locally installable to manage users, user records, salary calculations, etc. and shall support shift based users.

## **11. Security Door Locks**

- a) Shall be present on all access doors as indicated in the drawing.
- b) Appropriate locks shall be fixed (eg: bolt type, electro-magnetic type).
- c) All locks and readers shall be powered through an Uninterrupted Power Supply (UPS) to keep the devices working in the event of utility power failure.
- d) A bypass switch to keep locks engaged or disengaged shall be available on the inside if needed.

- e) Entry to doors shall be through fingerprint or RFID card. Exit shall be through a push button, fixed on the inside.
- f) All access (fingerprint or RFID record) from the fingerprint access machine shall be synchronizable over the data network.
- g) Provision to monitor real-time access logs shall be available through a software.

## **12. Server Room**

- a) Is located in the Ground Floor Hall Block. Refer to the School Compound drawing for location.
- b) Shall have uplink cables from Server Room to the 2 network enclosures shown in the drawing.
- c) Cabling shall be of indoor CAT6 cables.
- d) All items must be approved by the client.

## **13. General Specification - Main Router**

- a) Required quantity: 1
  - Corporate level device
  - Customizable rules
  - CPU Count: 1
  - CPU Frequency: 650 MHz
  - Storage: 16MB, Flash
  - 5 to 10 Gigabit ports

## **14. General Specification - Tower Type Server**

- a) Below is a generalized minimum specification and not the exact specification;
- b) Required quantity: 1
  - Intel Xeon Processor E-2200 family
  - 16 GB RAM
  - 2 x 6TB SATA HDD
  - Onboard Graphics and Sound
  - 1 x Gigabit Ethernet Network Interface
  - Hardware RAID controller supporting RAID 1, 5, 10, configured to RAID 1
  - Windows Server 2025 Standard Edition
  - 18.5 inch monitor
  - Wired US English Keyboard and Wired Mouse
  - Minimum 1 year parts and service warranty

## **15. General Specification - Backup Server**

- a) Below is a generalized minimum specification and not the exact specification;
- b) Required quantity: 1
  - Intel Core i5 12th Generation or later
  - 16 GB RAM
  - 1 x 512GB M.2 SATA

- 1 x 8TB 3.5 inch SATA Hard Disk
- Onboard Graphics and Sound
- 1 x Gigabit Ethernet Network Interface
- Windows Server 2025 Standard Edition
- 18.5 inch monitor
- Wired US English Keyboard and Wired Mouse
- Minimum 1 year parts and service warranty

#### **16. General Specification - Desktop Computer System (General areas)**

- a) Below is a generalized minimum specification and not the exact specification;
- b) Required quantity: For each staff table, PA system, Hall Sound, Fingerprint Access management.
  - Intel Core i5 12th Generation or later
  - 16 GB RAM
  - 1 x 512GB M.2 SATA
  - Onboard Graphics and Sound
  - 1 x Gigabit Ethernet Network Interface
  - Windows 11 Professional Edition
  - 24 inch monitor
  - Wired US English Keyboard (with English characters only) and Wired Mouse
  - Minimum 1 year parts and service warranty

#### **17. General Specification - Desktop Computer System (Specific Locations)**

- c) Below is a generalized minimum specification and not the exact specification;
- d) Required quantity: For each all classrooms.
  - Intel Core i5 12th Generation or later
  - 16 GB RAM
  - 1 x 512GB M.2 SATA
  - Add-on Graphics card with 2 HDMI output ports, supporting at least Full High Definition
  - 1 x Gigabit Ethernet Network Interface
  - Windows 11 Professional Edition
  - 24 inch monitor
  - Wired US English Keyboard (with English characters only) and Wired Mouse
  - Minimum 1 year parts and service warranty

#### **18. General Specification - Photocopiers**

- a) Below is a generalized specification and not the exact specification;
- b) Required quantity: Approximately 2
  - Functions Needed: Copy, black and white print and colour scan
  - Copy speed: 30 ppm
  - Memory: 2 GB
  - Print resolution: 600 x 600dpi
  - Multiple copies: 1 to 999

- Magnification: 25 – 400%
- Paper size: A3, A4, A5
- Interface: USB, Ethernet
- Network printing: Yes
- Print/copy features: Reversing automatic document feeder, Double sided printing (Automatic), Electronic sorting
- Scan features: Colour scanning, Network scanning, Save to file (stored in the printer hard disk storage), Save to USB
- Format: JPEG, PDF
- Paper supply: 2 x Standard cassette (500 Sheets total), 100-Sheet Bypass cassette
- Accessories: Stand
- Warranty: 1 year parts and service

#### **19. General Specification - Printers (Laser based)**

- a) Below is a generalized specification and not the exact specification;
- b) Required quantity: Approximately 3
  - Type: Monochrome (black and white) Laser printer
  - Functions: Printing
  - Speed: 25 ppm
  - Processor: 400 MHz
  - Memory: 128 MB
  - Duplex Printing: Automatic
  - Paper size: A4, A5
  - Connectivity: USB, Ethernet
  - Network Protocols: TCP/IP
  - Network Interface: Integrated ethernet
  - Resolution: 600 x 600 dpi
  - Paper Input Capacity: 250 sheets
  - Paper Trays: Multipurpose input trays
  - Compatibility: Windows 11
  - Warranty: 1 year parts and service

#### **20. General Specification - Printers (Ink based)**

- a) Below is a generalized specification and not the exact specification;
- b) Required quantity: Approximately 3
  - Type: Colour ink printer with colour scan
  - Speed: 25 ppm / 30ppm (Colour)
  - Memory: 256 MB
  - Display: In-built display with touch screen
  - Duplex Printing: Automatic
  - Borderless Printing: Yes
  - Paper Size: A3, A4, Envelope
  - Scan Type: Flatbed, Automatic Document Feeder (ADF)
  - Scan Formats: JPG, PNG and PDF

- Scan Features: Scan to PC
- Connectivity: USB, Ethernet, Wi-Fi
- Network Protocols: TCP/IP
- Network Interface: Integrated Ethernet, Built-in Wi-Fi 802.11 a/b/g/n
- Resolution: 1200 x 4800 dpi
- Paper Input Capacity: 250 sheets (Multipurpose input tray), 50 sheets (Automatic Document Feeder)
- Paper Tray: Multipurpose input tray
- Duty Cycle (monthly): 2,500 pages
- Compatibility: Microsoft Windows
- Warranty: 1 year parts and service

## **21. General Specification - Document Scanner**

- a) Below is a generalized specification and not the exact specification;
- b) Required quantity: Approximately 2
  - Scanning Speed: 40 ppm (grayscale: 200 dpi) or higher
  - Optical Resolution: Minimum 600 dpi (optical)
  - Depth: 24-bit colour, 8-bit grey-scale, 1-bit B/W
  - Document Size: A4, Letter
  - Duplex Scanning: Automatic
  - Scanning Method: Single/Duplex pass
  - Duty Cycle: Minimum 100 scans per day
  - Interface: USB, Ethernet
  - Scanning Modes: Black and White, 24-Bit Color, Advance Text Enhancement I & II
  - Compatibility: TWAIN; Windows
  - ADF Capacity: Minimum 50 pages
  - Drivers: All drivers for Microsoft Windows
  - Warranty: 1 year parts and service

## **22. General Specification - Digital Duplicator**

- a) Below is a generalized specification and not the exact specification;
- b) Required quantity: Approximately 1
  - Speed: 130 pages/minute
  - Resolution: 300 x 300dpi
  - Original Type: Book/ Sheet
  - Printing Area: A4 only
  - Feeder Capacity: 1000 Sheets (80 gsm)
  - Paper Weight: Support 80 gsm A4 paper
  - Image Type: Text, Photo
  - Warranty: 1 year parts and service

## **23. Smart Board**

- a) Below is a generalized specification for the Smart Boards to be fixed in the classrooms.



- b) Boards shall be fixed/installed as per shown in the drawing.
- c) All cables required are to be installed and ready for connection.
- d) Required quantity: For all classrooms
  - Backlight Type: LED
  - Resolution: 3840 X 2160
  - Colour Depth: 10 bit (1.07B)
  - Max. Brightness: 450cd/m2
  - Contrast Ratio: 5000:1
  - Viewing Angle: 178 degrees
  - Life Time: 50,000 Hours
  - Frame Rate: 60 FPS
  - Response Time: 8ms
  - Sensing Type: Infrared Touch
  - Protection: 4mm Anti-Glare
  - Surface Hardness: >H7
  - Touch Points (Android): ≤ 30 Points
  - Touch Points (Windows): ≤ 40 Points
  - Max. Share Screen: Up to 9 Split Sharing
  - Compatibility: Windows, Mac, iOS, Android, Chrome and Linux
  - CPU: 8-Core A55, 1.2GHz
  - GPU: Quad-core MaliG52 600MHz
  - RAM: 4G(DEF)/6G/8G DDR4
  - Memory: 32G(DEF)/64G/128G EMMC
  - Versiion: Android 12
  - Camera: Optional
  - Network: Wi-Fi (6G) /Hotspot (6G)
  - Bluetooth: 5.0
  - Updates: Over-the-air (OTA)
  - CPU: i5
  - RAM: 8G
  - HDD: 128G SSD
  - Graphic: Integrated
  - WLAN: Atheros AR9285 802.11b/g/n/WiFi
  - Power Requirement: AC 110V-240V, 50HZ/60HZ
  - Power Consumption: 400W
  - Front interfaces: 1 x USB 1.0, 1 x PC USB 3.0, 1 x Touch USB, 1 x HDMI In, 1 x Power, 1 x USB Type-C
  - Rear Interfaces: 2 x HDMI In, 1 x Touch USB-B, 1 x RJ45 In, 1 x YPBPR In, 1 x Earphone, 1 x AV In, 1 x AV Out, 1 x VGA, 1 x RS232 Uart, 1 x Spdif Out, 1 x USB 2.0, 1 x USB 3.0
  - Items Required with the Smart Board: 2 x Stylus Pen, 1 x Remote Control, 1 x Power Cable, 1 x Wall Mount Bracket
  - Warranty: 2 year parts and service