**ANNEX** **D: ELV requirement**

**MINIMUM REQUIREMTENT FOR ELV (ELECTRIC LOW VOLTAGE SYSTEM)**

# Central Lighting Control and Monitoring System

* Dimmable Lighting: All the lighting fixture used should be dimmable and have a flicker free operation with the lighting control system
* Addressable Drivers: Drivers for lighting fixture should be either DALI or equivalent addressable to save cost of wiring for lighting control
* Sensor Based Common Areas: All common areas should be equipped with sensors and should control the lights based on the occupancy of that areas
* Central Monitoring and Control: The lighting control system should be centrally controlled and monitored by the engineering team housed in control room
* Reports: System should be capable of generating reports for power consumption analysis for cost efficiency
* Scenes Based Ambience: All the lights in the areas should be controlled as part of scenes instead of independent switching like Day Scene, Night Scene, Meeting Scene etc.
* Architectural Keypads: Keypads used should be aesthetically good and blend in with the architecture and design of building

# Centralized HVAC Control and Monitoring

* VRF: Centralized VRF or equivalent type HVAC should be used with dedicated units per floor
* Control & Monitor: This air conditioner system should be controlled and monitored centrally by the engineering team housed in control room.
* Occupancy Based Operation: HVAC system should be smart enough to be integrated with the occupancy status provided by the lighting control system and should be able to automatically adjust according to the status of the room

# IP-Based Public Announcement

* Public Announcement: The Building should be equipped with an intelligent De-Centralized Public announcement system that can integrate with Fire Detection and Alarm System
* EN-54 Complaint: All the components used in this system should be EN-54 complaint i.e. approved for use with fire alarm systems
* Redundant Operation: The system should be equipped with back-up power in case of power outage. Auto Failover amplifier capability allows an un-interrupted operation
* Multi-Zone Paging: The system should be capable enough to page any specific zone or multiple zone or all zones.
* No Single Point of Failure: The system should be De-Centralized and there should be no single point of failure for the whole system and reliable enough to run in an emergency condition
* Audio over IP: Communication of Audio over IP (CobraNet or AVB) allows the system to be scalable and support multiple audio channel running on IEEE approved standards
* BGM: Sources for BGM might include a local audio player, PC, AM/FM Tuner, Internet Radio and online streaming services like Deezer etc that can provide curated background playlists for workplace environment

# Fire Detection and ALARM System

* Smart Fire Alarm System: Intelligent Addressable Fire Alarm Shall be designed to cover the entire building in order to provide complete end to end Life Safety Strategy in case of fire.
* Integrate-able: The system should be managed from the same software as cameras and access control operated by IT team housed in Control Room. The system should be smart enough to integrate with the other services of the building including following
* Public Announcement System
* Lighting Control System
* HVAC System
* Redundant: All used components should have a redundant power supplies in case of power failure
* EN-54 Compliant: All the components used in this system should be EN-54 Complaint

# Central Access Control

* Access Control: Access Control of the building should be managed centrally with all the main door of every floor equipped with access control panel
* Access Method: Access Method should be RFID based. All the database should be maintained centrally by the security team housed in control room
* Turnstile Gate: Main Access to building should be through a turnstile gate connected to the access control system to maintain the flow of people in and out of the building
* Boom Barrier: Flow of vehicles in parking area should be maintained by boom barrier installed at Entrance and Exit of the building
* Guest Access: Main reception should have card cutting machine to give access to any guest to a specific area depending on the clearance level
* **Elevator Access:** All the Main and Service elevators should be accessible through RFID based on the allowed floor level
* **Critical Rooms:** All the MEP, ELV, Control, Server or any other room with highly sensitive level should be equipped with access control panel
* **Service Entry:** All the Service entry doors should be equipped with access control and only accessible to service people.
* **Integrate-able:** The system should be managed from the same software as cameras and Fire Detection system operated by IT team housed in Control Room.The access control system should be integrate-able with Fire Alarm and detection system and should unlock all main and service doors in case of fire.

# IP Based Surveillance System

* Cameras: The building should be equipped with cameras covering all the entrances, exits, common areas, lifts, offices and service rooms.
* IP-Based: All the cameras should be IP based and sit on a separate Network to avoid any kind of interruption from the other systems.
* Night Mood: All the cameras should be equipped with IR and should be operate-able in night mood
* Outdoor Cameras: All the cameras used for outdoor should be weather and vandal proof
* **Back Up:** All the cameras should be able to record locally in case of disconnection from the network. The backend should have enough storage to store video up to 45 days for all the cameras with smart recording based on motion detection. All cameras should support H.265 compression.
* **Monitoring:** All the cameras should be monitored by the security team housed in control room.
* **Integrate-able:** The system should be managed from the same software as Fire Detection and access control operated by IT team housed in Control Room.

# IP Based Telephony

* IP Based: All the telephony inside the building should be IP based and should sit on a separate network.
* End point: Each room should be equipped with UC system or IP Phone for communication through the building
* IP PBX: An IP PBX should be installed to manage the telephony and should be maintained by IT Team housed in the control room

# IPTV and Digital Signage

* IP Encoder: All the TV Channels should either come in as IP streams encoded in H.264/H.265 or an IP Head-End (Modular) should be installed to transmit all the channels over the existing network to each TV.
* STB: A Set-top Box should be installed behind each TV with customized GUI for the workplace TVs
* IPTV Server: There should be one server to maintain and program all the STBs of the building
* Digital Signage: Main reception should have a ultra-narrow bezel 2x2 video wall (55” displays) and every floor should have wall mounted 32” digital signage display in front of every lift. All the digital signage displays should be 24/7 operations and IPS displays. These displays should be manageable by the IT team housed in Control Room
* Wireless Presentation for Minister’s Office: All Minster Rooms should have a 55” UHD IPS display equipped with wireless presentation feature.

# Managed Meeting Rooms

* Wireless Presentation: Every Meeting Room should have wireless presentation feature with low latency for Windows/iOS/Mac OS/ Android
* Camera: Every meeting room should be equipped with an HD camera for video conferencing with a PC for Soft Codec
* Display: The meeting room should be equipped with 65” UHD IPS display that should integrate with existing system in the room with the feature of auto turning on when someone enters the room.
* Speaker Phone: There should be an integrated speaker phone in the system that can connect via Bluetooth to make calls.
* SIP Phone: The system should also be capable of connecting to the existing IP Telephony system to make local calls in the building
* Touchscreen: A 7” touch screen should be installed outside the meeting room to show the room status like schedule or running meeting
* Scheduling: All the meeting rooms should be bookable through the touchscreen and should be manageable through out the building by IT Team housed in Control Room

# Seminar Halls and Conference Rooms

* Seminar Halls and Conference Rooms: All Seminar Halls should be equipped with Hi-Fi Audio/Video Equipment designed as per the dimensions and layout of the room.
* Displays: The room should be equipped with fixed 98” UHD IPS display (Integrate-able).
* Wireless Presentation: The room should be equipped with wireless presentation feature as well as multiple HDMI Input for local input
* Audio System: The installed audio system for Seminar Hall should be able to do echo cancellation natively with advanced Digital Signal Processor
* Speakers: All the speakers installed should be passive surface mounted with appropriate amplifiers to match the impedance and power accordingly.
* Provisions: There should be XLR input/output provisions for installing external audio setup
* Touchscreen: A 10” touch screen should be installed in the room for controlling the AV equipment of the room.
* **Wireless Microphones:** There should be at least one wireless microphones of each of the following type
  + **Hand-Held**
  + **Lavelier**
  + **Headmic**
  + **Table Top**

# Gigabit network Backbone

* Network Backbone: This is the most important part of all the mentioned services. There should be a well-designed network that caters needs for today and future provisions as well. All the edge switches should be Layer 3 switches
* Structured Cabling: All the copper cables used for Local Area Network should be Category 6A whereas the uplink from Server Room to Floor ELV rooms should be optical fiber based. All the cabling should be properly documented and tagged.
* Services: All the services should ideally sit on separate network or separate VLAN.
* Core Switch: The core switch should be capable enough to handle the existing services and should have extra provisions for future expansions
* Passive Optical fiber: Each floor should have a passive optical fiber patched between floor and the server room to enable that floor to utilize any external service provider of choice and to make sure that it does not combine with the existing building network
* Wireless Access Point: The whole building should have a complete and secure Wi-Fi (2.4GHz and 5GHz) coverage through-out the building. The Wireless Access Points should be managed by the same software as the network backbone

# Central Operations and Control Room

* Central Control Room: There should be one control room for the whole building to house Security, IT and Engineering team to help them coordinate together and run the daily operations. It should be large enough so that multiple teams can be accommodated in it along with all the services equipment being installed there.
* Video Wall: The room should be equipped with a high-end video wall for monitoring of the whole building including Lighting, Metering, HVAC, Blinds, Network, PA, Fire Detection, Meeting rooms, Multipurpose Hall, Access Control, Telephony and Surveillance
* Security: The room should be highly restricted area with strict access to authorized personnel only.
* Control Equipment and Servers: This room should also separate area to house all the equipment for all the services.
* Maintained Temperature: As highly sensitive electronic equipment is to be installed here so the temperature of the room should be maintained.

# Floor MEP and elv room

* MEP Room: Every floor should have a separate room to house the MEP equipment of that floor
* ELV Room: Each floor should have a separate room to house all the Extra Low voltage equipment
* Security: These two rooms should have highly restrictive access control

# Metering

* Electrical and Water Supply: Electricity should be metered separately for the four tenants that may or may not change. All the electrical distribution should be designed accordingly to standards approved by Maldives Energy Authority and STELCO. Main water supply system should be design to standards approved by MWSC.
* Services and Public Area:Power supply for Fire Detection and Alarm, Access control System, Surveillance System, Public Announcement System, Network Backbone, other ELV services along with Electricity for Public Areas should be metered separately.All the electrical distribution should be designed accordingly.