



H- Hotel Development Re- Masterplan Bel Ombre, Seychelles

SCHEMATIC DESIGN REPORT
February 2024





Report Content

1. Architecture
2. Landscape Design
3. Lighting Design
4. Signage & Wayfinding
5. Structural & Civil Engineering
6. MEP, ICT, AV & Bldg. Security
7. Fire & Life Safety
8. AOR





6

MEP , ICT ,AV & Bldg. Security

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6.1 DOCUMENT CONTENT

1.1- INTRODUCTION

This Schematic Design report is intended to provide the stake holders with a general overview about the MEP systems elaborated for this stage of design for the Fisherman Cove & Story hotels and resorts.

It will also provide, technical descriptions and parameters, to which, will form the 'basis of design' throughout the later stages of the design for the MEP, ELV and infrastructure services.

At this stage and based on the comments received on the CD report along with the different discussions and decisions agreed upon during the different meetings held with the Clients, Architects, Client Representatives & the Operators the SD drawings and report will include the following:

- Design will be developed to meet Authorities' requirements.
- Design will be developed taking into consideration any existing infrastructure that should be used to serve the new development including utility connections. For the story Hotel the existing infrastructure will be used to serve the new buildings.
- Design will be developed to meet the operator's general requirements.

This report covers the following:

1.2- MECHANICAL

- Plumbing
- Gas System
- Fire Protection
- Heating, Ventilation, and Air Conditioning

1.3- ELECTRICAL

- Electrical Power
- Electrical Lighting
- Low current systems
- IT structured cabling
- Electronic Security
- Fire Alarm
- Building Automation and Control (BMS)
- Audio-Visual Systems

1.4- PROJECT CONFIGURATION

The development is the H Hotel located at the Beau Vallon Bay in Mahe Island, Seychelles. The Hotel consists predominantly of an existing project where part of it namely the "Fisherman Cove" will be fully demolished and a fully new construction will be conducted and another part namely Story Hotel will be reserved with its MEP services but adding some villas as a new construction.

The project in this case is virtually divided into two construction wings the left wing which will be totally new and the right wing which will be mainly reserved with some new construction.

Accordingly, the project will consist of the following:

•Fisherman Cove:

- o Arrival Lounge.
- o Terrace Building 1.
- o Terrace Building 2.
- o Terrace Building 3.
- o All Day Dining.
- o SPA.
- o Kids Club.
- o Small Villas (10 Units).
- o Large Villas (10 Units).
- o Specialty Restaurant.
- o Conference Room.
- o BOH areas

•Story Hotel:

- o Guest building with GM apartment.
- o Guest building standard (2 Blocks).
- o Staff accommodation 1.
- o Staff accommodation 2.
- o Small villas (6 units).
- o Grand villas (2 units)
- o Royal villa (1 unit).

The current report includes refined estimations for MEP services based on the latest Architecture drawings and data collected from the site visits conducted to the development.

These calculations will be further developed during the Design Development stage and will include the following:

1. HVAC cooling and heating load calculations.
2. Plumbing water supply and drainage calculations.
3. Fire suppression and protection necessary calculations.
4. Gas system and network calculations.
5. Power Calculation



Fig. 1: Project Location

6.2 STANDARDS AND CODES

The following is a list of the codes and standards adopted as a minimum for the MEP design work relevant to each MEP system in the project to each MEP system in the project.

2.1- AIR CONDITIONING AND VENTILATION

- ASHRAE Standard 62.1-2022 – Ventilation for Acceptable Indoor Air Quality
- ASHRAE Standard 90.1-2022 Energy Standard for Buildings Except Low-Rise Residential Buildings
- ASHRAE Handbooks
- ASHRAE Standard 55 – Thermal Environmental Conditions for Human Occupancy
- SMACNA Standards
- NFPA 88A Standard for Parking Structures
- NFPA 90A Standard for the Installation of Air-Conditioning and Ventilation Systems
- NFPA 92-2012 Standard for Smoke Control Systems
- NFPA 96 Standard for Ventilation Control And Fire Protection of Commercial Cooking Operation

2.2- PLUMBING AND DRAINAGE

- PUC: Public Utilities Corporation
- UPC: Uniform Plumbing Code
- NPC: National Plumbing Code
- IPC: International Plumbing Code
- ASPE: American Society for Plumbing Engineers Handbooks

2.3- ELECTRICAL

- PUC" Public Utilities Corporation
- CIBSE Lighting Guides
- BS7671 Requirements for Electrical Installations

2.4- FIRE DETECTION AND ALARM

- NFPA 72 National Fire Alarm Code
- NFPA 101 Life Safety Code
- Fire and Life safety consultant requirements

2.5- EMERGENCY LIGHTING

- BS 5266 Emergency Lighting, Code of Practice for the Emergency Lighting of premises
- NFPA 101 Life Safety Code
- Fire and Life safety consultant requirements.

2.6- ELV SYSTEMS

- ANSI/TIA-568.0-D, Generic Telecommunications Cabling for Customer Premises;
- ANSI/TIA-568.1-D, Commercial Building Telecommunications Infrastructure Standard;
- ANSI/TIA-569-D, Telecommunications Pathways and Spaces;
- ANSI/TIA-606-B, Administration Standard for Telecommunications Infrastructure;
- ANSI/TIA-607-B, Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises;
- ANSI/TIA-758-B, Customer-Owned Outside Plant Telecommunications Infrastructure Standard
- ANSI/TIA-942 Telecommunications Infrastructure Standard for Data Centers.
- BICSI – TDMM Telecommunications Distribution Methods Manual, 13th edition.
- 802.3af Power over Ethernet
- 802.3at Power over Ethernet Plus
- ANSI/TIA-568-C.0 Generic Telecommunications Cabling for Customer Premises
- ANSI/TIA-568-C.1 Commercial Building Telecommunications Cabling Standard
- ANSI/TIA-568-C.2 Balanced Twisted-Pair Telecommunication Cabling and Components Standard
- ANSI/TIA-568-C.3 Optical Fiber Cabling Components Standard.
- ANSI/TIA-568-C.4 Broadband Coaxial Cabling and Components Standard, Ed. C, 07-2011
- ANSI/TIA-569-C Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA-570-B Residential Telecommunications Infrastructure Standard
- ANSI / TIA / EIA-606-A Administration Standard for Commercial Telecommunications Infrastructure
- ANSI-J-STD-607-A Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
- ANSI / TIA-758-A Customer-Owned Outside Plant Telecommunications Infrastructure Standard
- ANSI / TIA / EIA-862 Building Automation Systems Cabling Standard for Commercial Buildings
- ANSI / TIA-1005 Telecommunications Infrastructure Standard for Industrial Premises
- ANSI/BICSI 002-2011 Data Centre Design and Implementation Best Practices
- Cat 6a Cable standard for Gigabit Ethernet
- EN 50174-1:2001 Cabling Standards
- EN 50174-2:2001 Cabling Standards
- EN 50174-3:2003 Cabling Standards
- H.323 Call Signaling Protocol

- IEEE 802.3 Ethernet
- IEEE 802.3an Physical Layer and Management Parameters for 10Gbps Operation Type 10GBASE-T
- IEEE 802.3z Gigabit Ethernet
- IETF – RFC 791 & IETF – RFC 2460 IPv4, IPv6
- IETF – RFC 3031 & RFC 3032 Multi-Protocol Label Switching (MPLS)
- IETF – RFC 4026 & RFC 2547 Virtual private Network (VPN)
- ISO/IEC 27001 & ISO/IEC 27002 Information Security
- ITU – G.652D & G.675B Single Mode Fibre
- RFC 3261 Session Initiation Protocol (SIP)
- RFC 3411 Simple Network Management Protocol Version 3 (SNMPv3)
- TIA-569-A Commercial Building Standard for Telecommunications Pathways and Spaces

2.7- FIRE PROTECTION

- NFPA 10 – Standard for Portable Fire Extinguishers;
- NFPA 12 – Standard on Carbon Dioxide Extinguishing Systems;
- NFPA 13 – Standard for the Installation of Sprinkler System;
- NFPA 14 – Standard for the Installation of Standpipe and Hose Systems;
- NFPA 20 – Standard for the installation of Stationary Pumps for Fire protection;
- NFPA 22 – Standard for Water Tanks for Private Fire Protection;
- NFPA 24 – Standard for the installation of Private Fire Service Mains and Their Appurtenances;
- NFPA 31 – Standard for the Installation of Oil-Burning Equipment;
- NFPA 54 – National Fuel Gas Code;
- NFPA 58 – Liquefied Petroleum Gas Code;
- NFPA 92 – Standard for Smoke Control System;
- NFPA 96 – Standard for Ventilation Control and Fire Protection Commercial Cooking Operations;
- NFPA 204 – Standard for Smoke and Heat Venting;
- NFPA 2001 – Standard on Clean Agent Fire Extinguishing Systems
- NFAP 5000 – Standard for Building Construction and Safety Code;

2.8- GAS SYSTEM

- NFPA 54 – National Fuel Gas Code
- NFPA 58 – Liquefied Petroleum Gas Code
- SEYPEC - Seychelles Petroleum Company

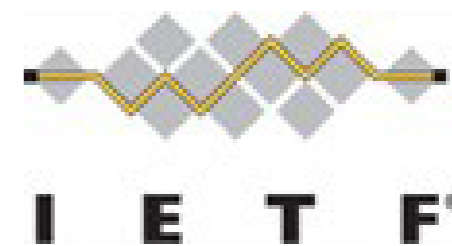


Fig.02: Different Adopted International Standards

6.3 INFRASTRUCTURE

3.1- INFRASTRUCTURE PHILOSOPHY

All utilities and infrastructure services supporting the existing project are being assessed in more details with the already received documents and as much as possible data collected from the site itself in order to decide how far the design should alter and/or modify the existing infrastructure.

The infrastructure networks for the "Fisherman cove" (Left Wing) will be designed from scratch taking into consideration the existing networks and tie-in points to the utility services.

However, demands estimation are conducted for the new space program and are verified to make sure that the existing infrastructure services are sufficient to serve the new construction with its relevant amenities and services.

Calculations for utility services demand will be estimated using common standards and codes, common engineering practice & local authorities guidelines and recommendations whenever available.

Utility	Demand Allocations	Comments
Sewage	TBC	The existing sewage strategy consists of collecting sewage effluents into multiple Lifting Stations transferring same to an existing PUC main lifting station (Beau-Belle Sewerage Station) located along the main coastal line. Same strategy will be adopted for the new construction "Fisherman Cove".
Rain Water	TBC	Rain water will be collected through a dedicated gravity network from all roofs and terraces and will be routed by gravity to discharge into the existing lagoon and where feasible discharged freely to the surrounding terrain.
Domestic Water	TBC	The domestic water strategy consists of the following: 1. Connection to the PUC. 2. Connection to the existing network in the Story Hotel fed from the existing
Cooling Production	No	The cooling, dehumidification & heating (where needed) will be mainly utilizing multiple pipe chillers along with VRF DX systems where feasible. More details about the cooling systems are elaborated throughout the context of this report.
LPG	No	LPG tanks will be provided on site mainly to serve the main kitchens in the project.
Power	TBC (MVA)	Capacity and the conditions of the transformers existing on site, in addition to the available load and whether it is sufficient to serve the new construction.
Communication	TBC (Gbps)	Connection from local provided shall be checked.

Table 01: Infrastructure Demand Allocations

The main target of the MEP design is to provide a sustainable and cost-effective system covering the different aspects of the project.

The guidelines and recommendations of the sustainability consultant will be adopted taking into consideration the targeted sustainability rating and the cost effectiveness and allocated budget for each system.

The following design approaches will be adopted in this regard:

4.1- ENERGY CONSUMPTION

The design of the main energy consuming systems namely the building HVAC and the lighting systems will be dedicated to allow for reduction in energy consumption. The design will follow the guidelines and requirements of ASHRAE Standard 90.1.

Air conditioning and mechanical ventilation efficient system performance is essential for the reduction in energy usage. The following measures should be adopted:

- Provide Efficient systems with equipment selected with high COP (Coefficient of Performance).
- Provide appropriate automatic control systems capable to adapt the systems to variations in loads.
- Use energy recovery systems with minimum 70% effectiveness where ever possible.

4.2- LIGHTING

- All rooms intended for common spaces and hallways or corridors will be controlled by motion sensors.
- GRMS with lighting control based on occupancy shall be provided in the hotel

4.3- VENTILATION

Proper ventilation will be adopted to ensure acceptable indoor air quality and healthy living environment in accordance with the minimum requirements of the adopted codes and standards. Fresh air rates shall comply with the minimum requirements of ASHRAE std. 62.1 latest edition or the operator's guidelines whichever is more generous.

4.4- WATER

Water consumption in the project will be metered and recorded to allow for better water management and saving measures to be taken, and losses. The meters should have a data logging capability connected to a central monitoring system.

Sub-meters will be provided on the following services as a minimum unless otherwise advised (refer to below Figure).

- Specialty Restaurants.
- Royal Villa.
- Each Terrace Building.
- BOH Buildings.
- Staff Accommodation.
- Gym.
- Irrigation Systems
- SPA
- Swimming Pools
- Water Features
- Kitchens
- Etc...

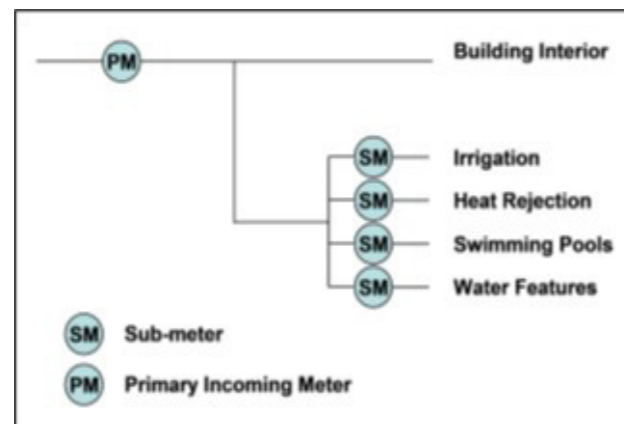


Fig.03: Sub Metering System

4.5- MATERIALS AND WASTE

Refrigerants and fire suppression systems will be selected with an ozone depletion potential (ODP) of zero and low Global Warming Potential (GWP).

4.6- LEGIONELLA CONTROL:

All necessary measures will be taken in order to prevent Legionella growth in all domestic water tanks: Filtration and chlorination will be adopted for the main domestic water supply.

Hot water tanks temperatures will be controlled to ensure that no legionella growth is possible.

5.1- WATER DISTRIBUTION

The Fisherman Cove will be fed with domestic water from two main sources:

1. From the existing utility network PUC.
2. From the existing RO plant in the Story Hotel.

The Fisherman Cove will be provided with a fully new water supply and distribution system including new storage tanks, filtration systems, booster pumps and piping network.

However, for the Story Hotel the new buildings (under MEP scope of work) will be connected to the existing water network and other infrastructure services.

The daily water demand for the project will be estimated for the new construction with the new space program including all buildings.

The following is the water demand estimation and storage water tank sizing for the new buildings and for the existing buildings:

A. Fisherman Cove Water Demand Calculation					
Application	Unit	Occu. Factor Per Room	Total Nb. of Capita	Daily Demand	Total Demand (L/day)
1 Resort Water Demand	101 Key	3	303	1000 Liters/Room	101,000
Total Domestic Water Demand (L./day)					101,000
Total Domestic Water Demand (m ³ /day)					101
		3	Days Cold Water Storage Tank (m ³)		303
		1.5	Days Cold Water Storage From Ro Water Tank (m ³)		152
		1.5	Days Cold Water Storage From PUC (m ³)		152

B. Story Hotel Water Demand Calculation					
Application	Unit	Occu. Factor Per Room	Total Nb. of Capita	Daily Demand	Total Demand (L/day)
1 Resort Water Additional Demand	61 Key	3	183	1000 Liters/Room	61,000
Total Domestic Water Demand (L./day)					61,000
Total Domestic Water Demand (m ³ /day)					61
		3	Days Cold Water Storage (m ³)		183

6.5 PLUMBING

Furthermore, the following systems will be adopted for the cold water supply:

1. Cooled water will be adopted to serve for the Lavatories and Showers in accordance with the operator's guidelines. This will be only adopted for the Fisherman Cove.
2. For the Story hotel cooled domestic water will not be adopted in-line with the existing systems.

Provision for water filtration is taken into consideration, however the level of filtration will be decided during the Design Development stage upon having a clear idea about the water supplied to the project from the existing utility network PUC.

5.2-IRRIGATIONSYSTEM

An independent irrigation system will be provided for the landscaped areas.

However, a new irrigation infrastructure will be designed for the new construction namely the "Fisherman Cove" including irrigation water storage tanks, irrigation booster pump set, piping network, etc...

The MEP design should be limited to providing the necessary capped connections with valve boxes at the locations indicated by the landscape designer.

The design criteria for the irrigation network including required storage capacity, daily water demands, flowrates, residual pressures, etc... should be provided by the landscape engineer in order to use it to assess the existing system capacity and performance.

N.B.: By considering that the climate in Seychelles is a Tropical Maritime climate the need for a complete irrigation system remains a question and this important factor should be taken into account, however this should remain as part of the landscape engineer design scope of work.

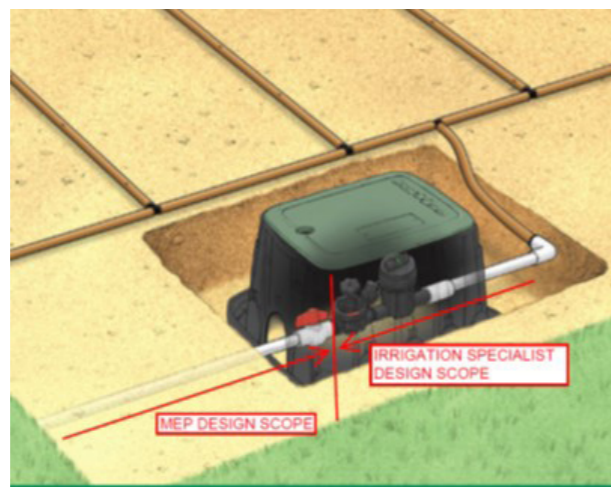


Fig.04: Irrigation Valve Box/chamber

5.3- DOMESTIC WATER TREATMENT

Necessary water treatment systems should be provided for the domestic water serving the whole project specifically the new buildings.

Assessment should be done to get a water analysis test for the different possible water sources feeding the project to confirm that the necessary water treatment level is provided for the new construction.

5.4- DOMESTIC HOT WATER

Domestic Hot water demand will be estimated using the ASHRAE Hot Water Demand Method and CIBSE Public Health Engineering.

ASHRAE Applications Handbook 2019 – Chapter 51, Table.10 will be used as a basis of design for domestic hot water system sizing.

Domestic hot water for the different buildings in the Fisherman Cove will be provided via decentralized domestic hot water tanks heated from the hot water generated by the multiple pipe chillers and boosted via electric water heating elements.

For the Story Hotel domestic hot water heat pumps will be adopted in a clustered configuration for the new buildings.

SOLAR SYSTEM (Optional):

A thermal flat plate or vacuum tubes solar heating system is kept as an option for domestic water heating where the allocation of the required solar panels should be discussed further with the Architects in order to make sure that panels are architecturally integrated in the project.

5.5- SOIL AND WASTE DRAINAGE

A two pipe drainage system is adopted for the Schematic Design stage which means one network for the soil drainage which includes

WCs and Urinals and another network for the waste drainage which includes lavatories, shower trays, bath tubs, etc...

Primary and secondary venting system will be considered for the drainage network in accordance with the same adopted Plumbing codes & Standards.

Piping lay-out for the toilets in the hotel and villas will be suspended below the slab (whenever possible) for ease of accessibility and maintenance.

Acoustic pipes or pipe lagging will be used and applied whenever drainage pipes are crossing an occupiable space.

It is recommended to use wall-hung WC's throughout the project with concealed flush tanks for the guest rooms and management suites. Flush tanks will be of the dual flush type (low flush/high flush) for water saving purposes.

Automatic Active Biological Grease interceptors in accordance with EN 1825-1 and equipped with an automated self-cleaning system as well as a pumping disposal system will be provided for all grease laden drainage networks from the kitchens and high cooking areas prior to connection to the main drainage network.

Grease interceptors should be strategically located in the project to allow for ease of maintenance accessibility and cleaning and to avoid the spread of odors throughout the premises.

The proper sizing of the grease interceptors should be based on the number of served meals per day which will be further assessed during the course of the different design stages.



Fig.05: Automatic Grease Interceptor

Parking areas (where applicable) shall be equipped with surface area drains connected to oil interceptor or HC separators to prevent any oil from reaching the main drainage network.

Drainage from Flower Beds and Landscaped areas should be connected to sand traps to avoid sand from being carried over to the main drainage network.

5.6- RAIN WATER DRAINAGE

Rain water system shall comprise several risers collecting all roof drains and drains from balconies, roofs and terraces.

Rain water pipes shall be routed by gravity to the existing lagoon where possible and to the nearest surrounding terrain in the vicinity of the project when connection to the existing lagoon is not possible.

Rain water channels, ditches, culverts, etc... shall be routed towards the lower points of the project to avoid flooding on roads and should be discharged to the sea side.

Storm water network will be designed based on 100mm/Hr storm rainfall rate, this design parameter should be further validated with the local authorities and common design practices in Seychelles.

Surface water drainage will be also provided for all paved areas and connected to the same storm water network if available, otherwise it will be freely discharged into the surrounding terrain.

5.7- LAUNDRY

It is confirmed that no central laundry is required for the new construction in the Fisherman cove, accordingly no specific design is required for this purpose.

5.8- Swimming Pools and Decorative Pools

Full water treatment system should be provided for the pools which should include but not limited to filtration, disinfection, make-up water, filters backwash, etc...

Each swimming pool will have its dedicated surge/compensation tank and the necessary technical room for circulation pumps, filter and heat exchangers located underneath it.

Furthermore, all swimming pools will be provided with water cooling and heating systems catered from the 4-pipe network coming from the multiple pipe chillers.

6.5 PLUMBING

5.9- MATERIALS

Below are listed the material that will be proposed for the plumbing items:

- Main cold and hot water pipes: Galvanized steel pipes and fittings.
- Cold & Hot water pipes in walls: PPR or multi-layer pipes.
- Hot water pipes Insulation: Polyolefin foam insulation.
- Valves: Brass, Bronze & Cast Iron for large sizes.
- Drainage pipes: UPVC
- Drainage pipes in Kitchen: HDPE
- Rain water pipes: UPVC
- Sundries (roof drains...): UPVC
- Condensate pipes: Pressure PVC pipes
- Pressure reducing valves: Adjustable, bronze, in parallel.
- Pumps: Stainless steel multi-stage.
- Hangers and Supports: Prefabricated hot dip galvanized with anti-vibration rubber.

6.1- LPG SYSTEM

SYSTEM DESCRIPTION

For the Fisherman Cove a new LPG system will be provided including 2 gas tanks one near the service building and another one near the specialty restaurant.

For the additional buildings in the Story Hotel no gas system will be foreseen. This will require a new gas system with new storage tanks and new distribution network with primary and secondary pressure regulators in addition to distribution gas panel, manifolds and appliance regulators.

The required gas storage and relevant gas network will be designed in accordance with NFPA 54 & NFPA 58 in addition to the local gas authority requirements.

Gas tanks will serve the cooking appliances in the kitchen.

Gas detectors will be installed in the kitchen area and near outlets. In case any leakage is detected, the automatic shut off valve will be closed.

The gas shut off valves will be connected to the fire alarm system, in case of fire detection, the valve will automatically close. The gas system will be connected to and monitored by the BMS.

Location of the gas tank should comply with the local requirements and the distance from cylinder surface to any point of structure, building, compound wall, Public road, other equipment, exit roads, fire truck access way, assembly points, parking lot, drains, shaft openings, pits, opening to basements, ramp openings should be as per Figures 06a & 06b.

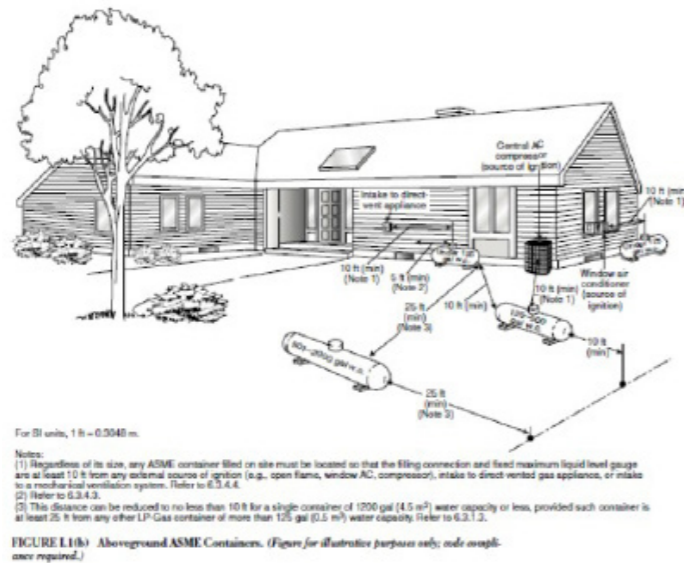


Fig.06 a: LPG Tanks Separation Distances

AGGREGATE LPG TANK CAPACITIES	SEPARATION DISTANCE	SEPARATION DISTANCE WITH 1-hour fire WALL	DISTANCE BETWEEN LPG TANKS
1. Less than 500 Gal.	3m	0.3m	1m
2. 500 Gal. — 1000 Gal.	3m	1.5m	1m
3. 1001 Gal. — 2,000 Gal.	7.6m	4m	1m
4. 2,001 Gal. — 30,000 Gal.	15m	7.6m	1.5m
4. 30,001 Gal. — 70,000 Gal.	23m	11m	1/4 of sum of the diameters of 2 adjacent Tanks
5. 70,001 Gal. — 90,000 Gal.	30m	15m	
6. 90,001 Gal. — 120,000 Gal.	38m	23m	
7. 120,001 Gal. — 200,000 Gal.	61m	No reduction	
8. 200,001 Gal. — 1000,000 Gal.	91m	No reduction	
9. More than 1000,000 Gal.	122m	No reduction	

Fig.06 b: LPG Tanks Separation Distances

The Fire protection for the gas cylinder will be done through a pre-action deluge valve water spray system as per Figure 7.

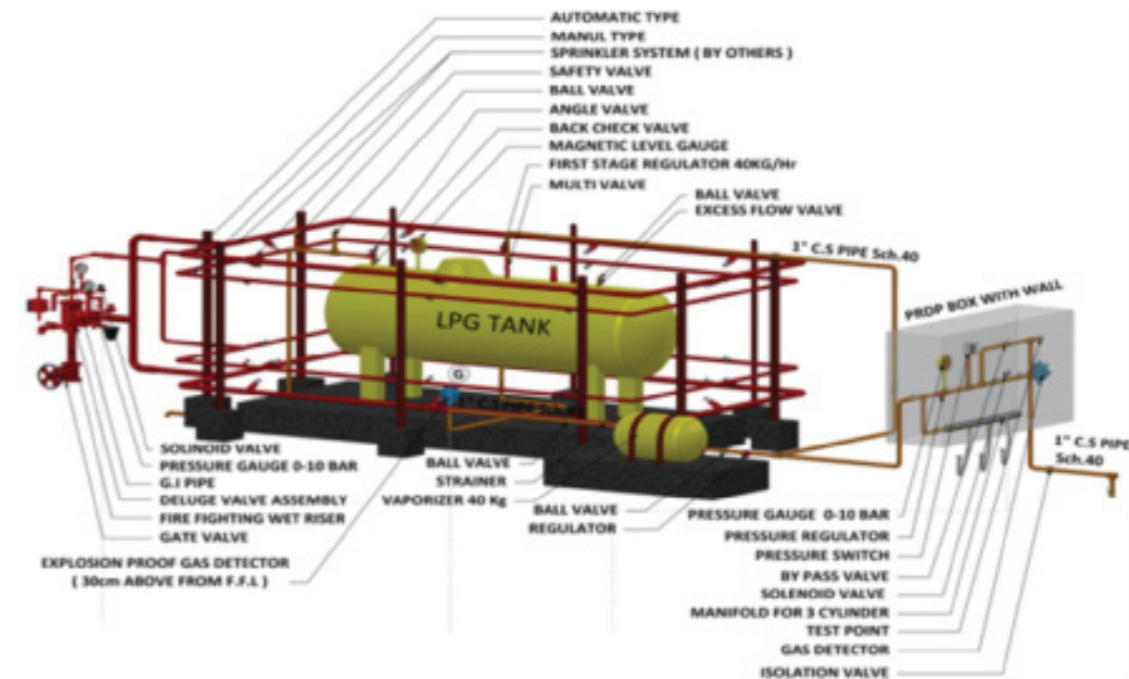


Fig.07: LPG Tanks Deluge System

6.6 LPG SYSTEM

6.2- MATERIALS

Seamless Carbon steel pipes with all welded connections will be used for all gas piping. All pipes running through occupiable areas shall be installed as pipe in pipe with gas detection in sleeves.

Gas risers (where applicable) shall be enclosed with dedicated vented shafts with gas leak detection connected to the fire alarm panel with the necessary cause and effect matrix to shut down emergency shutoff valves in order to isolate the hazardous areas.

7.1- FIRE PROTECTION

FIRE FIGHTING SYSTEM

The SD document is completed even though the FLS report is not ready, however with the new renovation design work and the new space program the FLS should advise and confirm the fire protection strategy to be adopted whether a complete fire protection system should be envisaged including fire fighting storage tanks, dedicated fire fighting pump set, sprinkler system, etc..., this system should be designed in accordance with the FLS requirements in addition to the local civil defence guidelines.

Yet in the absence of the FLS report the proposed fire suppression system should include but not limited to the following (to be confirmed by FLS):

- Full coverage of automatic sprinkler systems.
- Standpipe fire hose reel/rack system with Class II classification.
- Class III landing valves if being requested by the FLS Engineer and the local Authority Having Jurisdiction (AHJ).
- Clean agent fire suppression systems for main electrical rooms and other critical areas.
- Low expansion foam system for generator rooms.
- CO2 or FM200 gas suppression system for transformers room.
- Distributed hand held fire extinguishers.
- Wet chemical fire suppression system for kitchen hoods.
- Private fire service main (Fire Hydrant Network).

The different fire protection systems will be designed in accordance with the following NFPA codes and standards unless otherwise advised:

1. Automatic sprinkler system in all occupied spaces designed in accordance with NFPA 13.
2. Standpipe with 2 1/2" landing valves at each staircase combined with fire hose connections designed in accordance with NFPA14.
3. Private Fire Service Mains with distributed fire hydrants and hose cabinets, this network will be fed from a reliable utility network if available or from the dedicated fire fighting pump sets. The Fire Service Mains will be designed in accordance with NFPA 24.
4. Distributed hand held fire extinguishers designed in accordance with NFPA 10.
5. Clean agent fire extinguishing system for IT rooms, generators room, critical electrical rooms, UPS rooms.
6. Deluge Foam Water Sprinkler System for boiler house, fuel storage and wherever needed in accordance with NFPA requirements.

The different spaces will be classified for fire protection in accordance with NFPA requirements and as summarized below:

1. "Light Hazard" zone for guest rooms, entrance lobbies, restaurants seating areas and offices.
2. "Ordinary Hazard Group I" for kitchens, restaurants, and service areas.

A dedicated fire pump set with one electrically driven pump, one diesel driven pump and one jockey pump conforming to NFPA 20.

Alarm check valves will be installed on the Fire sprinkler system in accordance with NFPA 13 requirements.

Connection to each floor shall be provided with a floor control valve setup with monitored isolating valves, flow switch and test & drain valve.

Siamese connections will be provided at different locations on the boundary of the project, the number of connections and exact location shall be in accordance with the local authority requirements.

A main fire reserve tank should be provided with a minimum capacity of 227 m3 net reserve divided into two equal compartments. The tank will be sized for 60 minutes operation of the fire pump at full flow. A dedicated fire fighting pump room should be provided near the fire water tank to serve the whole project.

Each building should be connected to the network with the necessary fire hook-up and trim including monitored isolating valves, alarm check valves, audible alarm water motor gong, pressure gages, pressure reducing valves (where needed), etc...



Fig.08: Fire Hose Cabinet

6.8 SMOKE MANAGEMENT

8.1- SMOKE MANAGEMENT

In the absence of the FLS report no specific measures are being considered for the smoke management system.

8.2- MISCELLANEOUS :

Ducts crossing different fire zones will be provided with fire dampers. The smoke control system will be supplied from the UPS system.

Penetration of pipes and cables between different fire zones shall be sealed with fire rated intumescent seals.

8.3- MATERIALS

All fire fighting materials and equipment shall be UL Listed and FM Approved, and abiding by the requirements of the applicable local codes and standards.

9.1- DESIGN CRITERIA

AIR CONDITIONING

The project location is in MAHE ISLAND - SEYCHELLES with the following coordinates: Latitude: 4.67° S Longitude: 55.52° E
Altitude: 10m above sea level Outdoor Design Conditions:

- Outdoor dry bulb temperature DB: 31.9°C
- Outdoor Mean Coincident Wet Bulb MCWB: 26.3°C

Indoor design conditions will follow "H hotel" guidelines In addition to ASHRAE adopted standards and recommendations, below are the indoor design conditions for typical spaces.

Spaces	Design Data	
Space Type	Climate Conditions Indoor (° C DB)	Relative Humidity (%RH)
Guestrooms	23	55
Entrance Lobby	23	55
Dining Areas	23	55
Public Restrooms	23	55
Gestrooms Corridors	23	55
Retails / Shop	23	55
Offices	23	55
Conference /Meeting Rooms	23	55
Kitchen	24-26	60

Design condition, Fresh air and acoustic rating table as per Design guidelines:

Safety factor for sensible heat is assumed to be at 10% and for latent heat at 5%.

INTERNAL LOADS:

- Lighting loads should be taken from the lighting designer for each space, however for BOH areas the lighting load will be unified at a maximum of 12 W/m² unless otherwise advised by the operator.
- Occupancy will be as per ASHRAE 62.1 requirements wherever is not stated by the brand standard.
- Other electrical load will be calculated as per the furniture layout.

Design will be based on the U values provided below (to be checked and confirmed by the architect):

- Roof: 0.3W/m²/K
- Walls: 0.57 W/m²/K
- Windows: 2.1 W/m²/K SC=0.4
- Internal walls: 2.5 W/m²/K
- Internal slabs: 1.4 W/m²/K

NOISE CRITERIA:

Noise level inside spaces will be designed in compliance with the operator guidelines and Brand Standards.

All necessary measures should be considered to achieve the required noise levels for each space.

9.2- AIR CONDITIONING SYSTEM DESCRIPTION

During the Concept Design stage several options for the cooling and heating air-conditioning systems were proposed with the pros and cons of each system (kept in this SD report for quick reference).

During the different coordination meetings it was agreed upon the following systems to be adopted and consequently the SD document is being developed in accordance with the following:

1. Multiple pipe chillers to serve the different spaces in the Fisherman Cove with simultaneous chilled water and heating water.
2. VRF system for the staff accommodation areas.
3. DX units for electrical rooms, garbage rooms, IT rooms, etc...
4. VRF system serving the different spaces in the Story Hotel to be in-line with the existing systems.

6.9 HEATING VENTILATION AND AIR CONDITIONING

System	Advantages	Disadvantages
Central Chilled Water System	<ul style="list-style-type: none"> • A more efficient option with higher diversity factor leading to a reduced plant capacity. • Plantrooms away from the occupied areas. • Reduced noise pollution. • No aesthetic concerns regarding the outdoor units location. 	<ul style="list-style-type: none"> • More expensive option. • Chilled water pipes routed in a technical channel to serve the different areas.
VRF System	<ul style="list-style-type: none"> • Acceptable overall efficiency if outdoor units located close to the connected indoor units. 	<ul style="list-style-type: none"> • Noise level around the buildings should be taken care off and will be costly to eliminate. • Aesthetic concerns are high and should be resolved in an architectural and technical way. • Reduced diversity factors with less installed capacity versus connected load.
DX Split & Mini-Split systems	Cheapest system of all.	<ul style="list-style-type: none"> • Least efficient of all systems. • Noise level around the buildings should be taken care off and will be costly to eliminate. • Aesthetic concerns are high and should be resolved in an architectural and technical way. • No diversity factors with largest installed capacity.
Combination of all the above three systems.	<ul style="list-style-type: none"> • Chillers for main buildings. • VRF for larger villas. • Mini-split units for smaller villas, small annex buildings, offices, technical rooms, etc... 	Noise and aesthetic concerns where VRF and DX mini-split units are installed.

The space air-conditioning inside the main buildings is achieved through distributed air terminals mainly AHUs, FAAHUs, FCUs, DX indoor units where applicable.

Fresh air supplied to all rooms should be treated via compact 100% Fresh Air AHUs with integrated recovery units.



Fig.09: Fresh Air Energy Recovery Unit

The cooling load estimation for the new space program is summarized in the following table:

Cooling Capacity for Fisherman Cove	Cooling Capacity for Story Hotel
(KW)	(KW)
1660	380

KITCHENS AIR TREATMENT:

All kitchens for the Fisherman Cove will be provided with exhaust ecology units.

Hood make-up fresh air will not be treated since the outside air temperature is considered moderate all year round.

Kitchen space will be provided with proper air-conditioning via AHUs and FCUs fed from the 4-pipe network to ensure a maximum space temperature not exceeding 26 Deg.C.

The space air-conditioning inside the main buildings is achieved through distributed air terminals.

STAFF ACCOMMODATION AREAS:

Staff accommodation areas will be provided with proper ventilation and air-conditioning mainly through mini-split air-conditioners if outdoor units could be architecturally integrated to avoid noise and visual impacts, otherwise chilled water systems could be adopted if appeared to be more feasible and adequate.

9.3- AIR DISTRIBUTION DUCTWORK

All air distribution ducting networks will be designed following the ASHRAE equal friction method. Ducts should be constructed following the SMACNA Standards.

Friction loss and velocities will be generally as follows: Low Pressure, Low velocity Ductwork:

Friction loss through low pressure (LP) ductwork should not exceed 0.85 Pa/m of equivalent duct length.

LOW PRESSURE DUCTWORK:

Air velocities in the low pressure system should not exceed the following:

- LP main ducts - Return 7.00 m/s
- Kitchen exhaust hood duct up to 10 m/s

Secondary distribution ducts will be sized for a maximum pressure drop of 0.6 Pa/m or 6 m/s air velocity. Ductwork system shall be mainly galvanized steel ASTM A 653/A 653M, G90 or Z275 coating and will be provided with the necessary volume dampers for proper air balancing.

Black steel ductwork ASTM A 366/A 366M, will be provided for kitchen hood exhaust. Access panels should be provided each 6 m on the hood exhaust duct.

Ductwork crossing fire walls with 2 hours fire rating and above will be provided with fire dampers as recommended by NFPA.

Return air ducts to air handling units will be provided with smoke detector.

All supply, return, plenums and pre-treated fresh air ducts will be thermally insulated with glass fibre thermal insulation. The thermal insulation shall comply with ASTM C 612, Type IB and ASTM C 553, Type II.

All main kitchens exhaust ducts will be insulated with mineral-fibre board insulation. All ductwork inside mechanical rooms, or exposed to views shall be covered with Aluminium cladding according to height limitations within the mechanical rooms.

Exhaust and Fresh air intake locations should be carefully chosen in way to avoid cross contamination of fresh air supplied to the spaces.

Fire and smoke dampers will be provided at each point into the vertical shaft or when crossing the fire wall to control fire spread. Common zone corridors will be air conditioned using fan coil units and ducted air distribution controlled centrally from BMS. Spaces with high fresh air demands should be provided with 3-way mixing boxes and motorized dampers with an economizer system.

Kitchen hoods duct will be equipped with a degreasing & odour treatment system. Misting nozzles are placed intermittently inside the duct, from above the hood all the way to the duct extract point. These nozzles produce a fine degreasing mist, which disperses within the flow of air inside the duct. This degreasing mist follows the same path as grease particles, therefore reaching and eradicating all areas of grease deposits inside the duct.

Hood exhaust will reach the roof where an ecology unit will be installed to remove odour and grease before the air discharging to the surrounding. The ecology units will house electrostatic precipitators and UV filters in addition to carbon filter and odorizer.

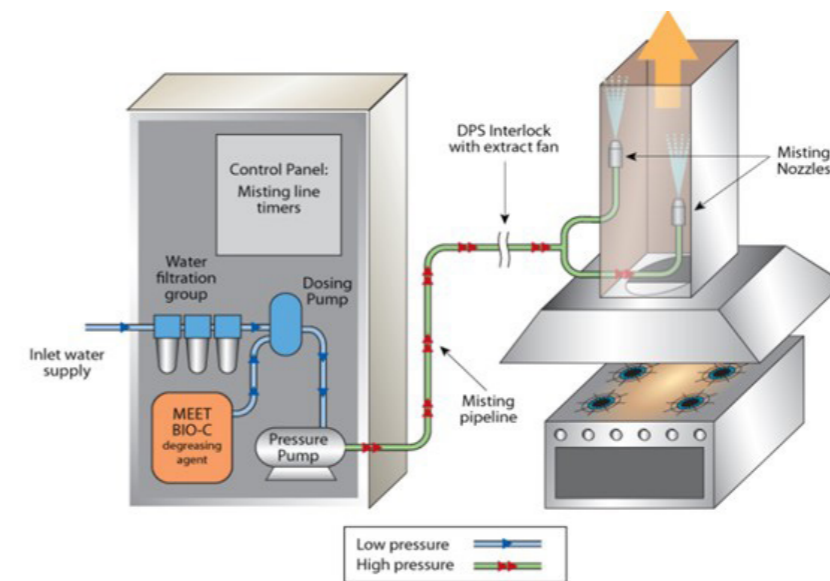


Fig. 10: Hood Degreasing System

6.9 HEATING VENTILATION AND AIR CONDITIONING

9.4- HEATING SYSTEM DESCRIPTION

In general space heating will not be required in Seychelles as the weather is considered moderate all year round.

HYDRONIC PIPING

The pipe work design will be made in accordance with ASHRAE recommendations and will be based on the following parameters:

Velocities - Maximum

- Mains 2.5 - 3 m/s
- Branches 1.8 m/s

Pressure loss - Maximum

- Chilled water 4-5 m/100m pipe length.

All chilled water piping network shall be thermally insulated.

0.1- CLIMATIC CONDITIONS

All equipment apparatus materials and accessories used in the electrical installations shall be suitable for the purpose intended and capable of operating with satisfactory performance in the climatic conditions of SEYCHELLES as follows:

- Altitude: 3 meters above sea level
- Maximum outdoor ambient Temperature (Shade): 45°C
- Maximum Humidity: 90%

10.2-ENERGY SAVING

The Network will be designed based on the latest technologies in energy saving and sustainability. The intent is to reduce the electrical and fuel bills by adopting the following:

- LED lamps.
- Electronic control gears for energy-saving purposes.
- All rooms intended for common spaces and hallways or corridors will be controlled by motion sensors.
- Where possible, variable-speed motor drives will be specified.
- Lighting control for parking and corridors.
- The systems will be controlled/monitored through a building management system (BMS) that is able to manage the building services efficiently and economically, moreover, the BMS system will regulate power transmission, identify energy leaks, and lower power at peak times this extends the lifespan of your appliances and assists in the preventive maintenance and repairs process.

10.3-ELECTRICAL NETWORK PARAMETERS

The nominal characteristics of power distribution are as follows:

- The Medium Voltage characteristics: 11KV.
- The nominal voltage at LV shall be 230 V single-phase or 400 V three-phase, 4 wires.
- Frequency: 50Hz
- The permissible variation from the nominal voltage shall be kept within + 10% and - 6%.
- The maximum voltage drop from the Connection Point to the remote end of any Final Circuit must not exceed 4%

The network shall generally:

- Meet or exceed the minimum local and international code.
- Requirements referenced in this report.

- Provide flexibility to modify the systems according to future functions and architectural modifications.
- Provide reliable and coordinated systems that could handle safely the project loads.
- The systems are specified based on their longevity and low maintenance factors.

10.4-ELECTRICAL LOAD ESTIMATION

The load in the fisherman side (left wing) is distributed on 3 dry-type transformers rated 1000kVA and 2+1 Generators 1000kVA each and 1+1 Generator 800kVA each as described in the following sections.

Spaces	Floor	TCL (kW)	D.F.	TDL (kW)	TDL (KVA)
Terrace Building 3	LG-01	67.46	0.55	37.20	46.50
	GF	60.73	0.55	33.38	41.73
	F1	52.54	0.55	28.76	35.95
	MECHANICAL LOADS	28.05	0.40	11.24	14.05
ALL DAY DINING	DINING AREA	202.69	0.53	107.30	134.13
	KIDS CLUB	5.03	0.69	3.48	4.35
	MEETING ROOMS	33.73	0.67	22.56	28.20
BACK OF HOUSE	LG-01	147.95	0.71	105.16	131.45
	GF	157.97	0.70	110.58	138.23
	MECHANICAL LOADS	909.80	0.66	601.84	752.30
MISC.	SECURITY EQUIPMENT	38.00	0.6	22.80	28.50
	SECURITY CONTROL ROOM	9.00	0.6	5.40	6.75
	SECURITY AND AV RACK ALONG THE SITE	7.00	0.6	4.20	5.25
	NETWORK DISTRIBUTION	12.00	0.6	7.20	9.00
	MOBILE SERVICE ROOM	6.00	0.6	3.60	4.50
	SERVER ROOM	72.00	0.6	43.20	54.00

SUMMARY FOR SUBSTATION 1	TOTAL CONNECTED LOAD (kW)	1,809.95
	TOTAL DEMAND LOAD (kW)	1,147.90
	DEMAND FACTOR	0.63
	TOTAL DEMAND LOAD (KVA) BEFORE CORRECTION	1,434.88
	TOTAL DEMAND LOAD (KVA) AFTER CORRECTION 0.95	1,261.43

6.10 POWER DISTRIBUTION

Spaces	Floor	TCL (kW)	D.F.	TDL (kW)	TDL (KVA)
Terrace Building 1	LG-01	73.31	0.55	40.32	50.40
	GF	66.56	0.55	36.48	45.60
	F1	59.42	0.55	32.54	40.68
	MECHANICAL LOADS	28.55	0.41	11.64	14.55
Terrace Building 2	LG-01	60.62	0.55	33.37	41.71
	GF	53.82	0.55	29.56	36.95
	F1	46.42	0.55	25.44	31.80
	MECHANICAL LOADS	26.85	0.38	10.28	12.85
SPECIALTY RESTAURANT	GF	159.13	0.60	95.76	119.71
ARRIVAL	LG-01	24.51	0.72	17.76	22.20
	GF	20.65	0.73	15.06	18.82
	MECHANICAL LOADS	10.00	0.64	6.40	8.00
SPA	GF	61.84	0.57	35.10	43.88
VILLAS	GF	190.27	0.54	102.29	127.86
	Emergency lighting	15.00	0.6	9.00	11.25

SUMMARY FOR SUBSTATION 2	TOTAL CONNECTED LOAD (kW)	896.94
	TOTAL DEMAND LOAD (kW)	501.01
	DEMAND FACTOR	0.56
	TOTAL DEMAND LOAD (KVA) BEFORE CORRECTION	626.27
	TOTAL DEMAND LOAD (KVA) AFTER CORRECTION	550.56

The calculated is just a rough estimate and will be finalized and optimized at the design development stage taking into consideration the interior architecture of the building and after receiving the electrical requirements from each entity specialist. (food & beverage, commercial, wellness ...)

The additional load required in the Story side (right wing) for the additional buildings will be catered from the existing substation knowing that after the site visit it was confirmed from the local operator that That the peak load is not exceeding a total of 750KVA on two transformers 1000kVA each for redundancy 1+1 Generators 640KVA will be provided.

Zone / Building	Quantity	Connected Load (kW)	Total Connected Load (kW)	D.F.	Demand Load (kW)	Total Demand Load (kW)	Total Demand Load (KVA)
Staff Accomodation 1	1	104.46	104.46	0.52	54.72	54.72	60.13
Staff Accomodation 2	1	104.46	104.46	0.52	54.72	54.72	60.13
Standard Suite Block 1	1	72.11	72.11	0.58	42.02	42.02	46.18
Standard Suite Block 2	1	74.61	74.61	0.58	43.02	43.02	47.28
General Manager Suite	1	102.27	102.27	0.59	59.85	59.85	65.77
Small Villas	6	13.30	79.82	0.65	8.70	52.19	57.35
Grand Villa	2	18.43	36.85	0.64	11.78	23.55	25.88
Late Checkin Changing Room	1	1.08	1.08	0.80	0.86	0.86	0.95
Big Pool Heat Pump	1	50.00	50.00	0.80	40.00	40.00	43.96
Big Pool Filtration Pump	1	7.50	7.50	0.80	6.00	6.00	6.59
New Booster for additional bldgs	2	5.50	11.00	0.80	8.80	17.60	19.34
Emergency lighting	1	15.00	15.00	0.60	9.00	9.00	9.89
FCU's	61	0.20	12.20	0.80	9.76	9.76	10.73
Dehumidifiers	61	1.50	91.50	0.50	45.75	45.75	50.27
F.COVE TOTAL			762.87	0.60		459.04	504.44

The calculated is just a rough estimate and will be finalized and optimized at the design development stage taking into consideration the interior architecture of the building and after receiving the electrical requirements from each entity specialist. (food & beverage, commercial, wellness ...)

10.5-MV POWER DISTIRBUTION

For the Fisherman side (Left wing) 2 substations (RMU & transformers in the same room) will be provided and connected to each other on the MV side.

Transformer rooms shall be directly accessible to the Electrical Authorities.

Redundant transformers will not be provided. On the other hand, 100% of backup generators will be connected to feed the full load of the transformers.

For the Story side (Right wing) current distribution will be used without any modifications.

10.6-LOW VOLTAGE POWER DISTRIBUTION

The low voltage output from the transformer's secondary winding will be connected to the Main Distribution Board (MDB) located in a separate main LV room adjacent to the transformer room inside the substation. The power factor at any connection point between the distribution company and the electrical installation will be maintained between 0.9 and unity.

Each Main Distribution Board shall feed sub-main distribution boards located in electrical rooms to cater to individual areas' power distribution. The main LV room shall accommodate a capacitor bank and surge protection devices for each MDB.

The Main Distribution Boards shall be form 4b type 6, and accommodate air circuit breakers or molded case circuit breakers.

Sub-main distribution boards shall house molded case circuit breakers. The distribution boards shall provide a flexible, reliable, expandable, and efficient sub-distribution system.

MDB shall feed (as applicable) the following:

- Sub-Main Distribution Boards feeding guestrooms on every floor level
- Sub-Main Distribution boards feeding Villas.
- Sub-main distribution boards feeding common areas, gym, pool... etc.
- Motor Control Centers for pumps and other mechanical equipment

The final branch circuit sub-main distribution boards shall house molded case outgoing circuit breakers and main incoming molded case circuit breakers. Earth-leakage protection shall be provided as per Local Power Authorities' requirements.

The sub-distribution panels will be constructed to IEC 61 439-1 & 2 Form 2B.

The panels shall be constructed and braced in which manner to handle 35kA for 1 second. The SMDBs ingress protection shall be IP 55 to IEC 60529

The electrical circuit breakers in the MDBs and SMDBs shall be sized and rated to withstand the calculated single and three-phase fault current to which it may be subject.

SMDBs shall feed (as applicable) the following:

- Landscape feeder pillars (if available).
- DBs for common areas, and DBs for guest rooms.
- MCCs.
- Equipment with loads more than 10KW.
- MCCs (MOTOR CONTROL CENTERS):

Mechanical equipment will be supplied by Motor Control Centers (MCCs) installed in technical rooms throughout the buildings. The MCCs will include the motor controllers and associated protections of the mechanical equipment

- Direct Online (DOL) starters will be provided for motors with power less than 10HP.
- Star/delta starters will be provided for motors with power between 10HP to 25HP.
- Soft starters' drives will be provided for motors with power of more than 25Hp.

Variable frequency drives shall be provided where needed to meet the required motor sequence of operation. MCCs will be totally enclosed, IP42 when installed in indoor dry areas, IP55 for indoor wet areas, and IP65 weatherproof for outdoor installations.

All MCCs will be specified with communicating multi-meters with all necessary controls and accessories for interfacing with other systems such as fire alarm system.

All panels (MDBs, SMDBs, SDBs, MCCs) located in plant rooms with the risk of a flood shall be raised at a minimum of 50cm from FFL in case room height allows for.

Electrical power meters will be of the type that can be used to totalize the units (not only instant reading), which are to be included in the main panels of the hotel.

10.7-POWER GENERATION

As per our current understanding, multiple power outages occur during the day, this would require full backup power ensuring no power interruption occurs.

For Fisherman side (left wing), N+1 generators will be provided as follows:

- Substation 1 located near the parking area on the left 1+1 generators 800KVA
- Substation 2 located near the BOH building on the right 2+1 generators 1000KVA
- For Story side (right wing), 1+1 generators 640kVA will be provided dedicated for the new buildings.

The generator set should be equipped with an integrated digital control system to ensure a consistent power supply and remote monitoring options. The Control panel shall provide expandable controller options, with management and diagnostic tools, and a user-friendly interface.

6.10 POWER DISTRIBUTION

Fuel tank size shall be calculated for 24 hours as per operator guidelines.

The generator system shall consist of the following:

- Diesel engine-driven electrical generator
- Protective panel (mounted on the generator) housing the protection and synchronizing devices
- Four poles automatic transfer switches (switching to the emergency generator when the electrical utility fails) Existing generators will be used and additional will be proposed if required.

10.8-UNINTERRUPTIBLE POWER SUPPLY SYSTEM

UPS shall have 60 minutes' autonomy as it's backed up by a generator.

The UPS system should serve the following:

- CCTV Rack
- BMS system.
- Access Control system.
- Reception desk sockets
- Security system.
- Security room sockets.
- Low current system.
- Lighting control panels

10.9-CONDUITS

The conduit construction shall be as per BS or UL requirements.

Unless otherwise specified by the Local regulations or Operator, metallic conduits shall be used for exposed dry locations that are subject to damage, conforming to BS 31, BS 4568, BS EN 60423, and BS EN 50086-1.

PVC conduits will be used for all below-grade or concealed installations in accordance with BS 4607, BS EN 60423, and BS EN 50086-2-1. GI conduits should be used for exposed installations.

Flexible PVC or flexible steel conduits, as appropriate, shall be used for terminating all connections to motors and vibrating equipment.

Cable trays, Ladders, or trunks may also be employed as appropriate. Cable trays, Ladders, and trunks with related supports shall be hot-dip galvanized when installed in wet areas.

10.10- CABLES

The LV feeders and sub-feeders will be of the single-core or multi-core type, as appropriate, with copper conductors, 600/1000 V XLPE/SWA/PVC sheathed, color-coded laid on cable trays or ladders, or in trenches, or clipped to ceiling, walls in electrical shafts. All cables shall be sized according to the IEE and Local Authority Regulations. The power cables shall be Low smoke fume LSF or low smoke zero Halogen LSOH.

Cables feeding the life safety equipment shall be fire-resistant LSOH/GALV WIRE/LSOH/MICA/GLASS/CU (Similar to FP400).

10.11-SMALL POWER

All single-phase plugs and socket outlets must comply with BS 1363 and be fitted with a switch. The use of any other type of single-phase plugs and sockets-outlets, such as BS 546 (3 round pins) is not permitted. All socket circuits shall be protected by a 30mA RCD.

No socket outlets shall be installed in a bathroom except for a socket outlet complying with BS EN 61558-2-5 (shaver socket outlet including a safety isolating transformer).

Socket outlets in kitchens must be positioned at least 30 cm away from the edge of the sink.

All socket outlets in one room or service area shall be connected to the same phase.

In kitchens and other areas where water is regularly used, switches shall not be mounted within 2 m of any water tap, wash basin or sink where possible.

UPS sockets shall be by construction (color, engraving...etc.) distinguishable from standard supply sockets.

Back-to-back power outlets are not permitted. Outlets in walls between rooms must be offset horizontally with a minimum of 6"/152 mm.

10.12-PHOOTOVOLIC SYSTEM

No photovoltaic system will be provided for the project.

10.13-EV CHARGERS

No EV chargers will be provided for the project.

11.1-INDOOR LIGHTING

The lighting design of all service areas (Back of house, parking, technical rooms, emergency staircases ...) will be according to the operator brand standards for the lighting system performance.

The general arrangement and type of lighting fixtures will be selected to suit the specific room requirements. The below Table shows the required Lux level for dedicated spaces as per the operator brand standards.

Area	Lux	Notes
Bedroom	200	400 at Desl
Bathroom	300	400 at Mirror
Guestroom Lobby	150	
Receptoon	200	300 at Reception Desk
Bar	100	300 at Counter
Meeting rooms	400	dimnable
Restaurants	300	dimnable
Public Toilets	150	
Lift Landings	150	
Kitchen	500	
Office/BOH	300	
Corridors	120	dimnable
Car Park	10	

Table 02: Minimum Illumination Levels Required for Each Space

Lighting for the special-purpose area and decorative effect lighting shall be designed in the guest rooms and all front-of-house (food & beverage, commercial, wellness ...), and lobbies. These will be done according to the specialist lighting designer's request and will be provided by Architect.

The lighting of the parking, technical, and service rooms is done with LED lighting.

All lighting fixtures in plant rooms should be surface-mounted dust and water-tight luminaries.

The Internal lighting design shall refer to the lighting power density assigned by the relevant standards, as baseline values, with the aim of targeting a reduced value and improving energy consumption.

11.2-EXTERNAL /FACADE/SIGNAGE LIGHTING DISTRIBUTION

The external, facade lighting (layout and selection by Architect) will be supplied from the general services panels located on the ground floor –this will be developed during future design stages.

The specialist shall provide lighting fixture types, implementation, and switching sequences in the Outdoor & Landscaping areas.

The external, facade and signage lighting will be controlled by Photocell/astronomical timer, and connected to the lighting control system.

The landscape lighting should be on a ring circuit.

The external illumination levels would be as follows (subject to Architect and maximum power densities specified below): The external lighting systems shouldn't exceed 80% of the exterior lighting power densities and 50% of the facade and landscape power densities indicated in "ASHRAE 90.1-2004 Lighting Power Densities for Building Exteriors -Table 9.4.5".

11.3-Lighting Control System

Lighting control panels (LCPs) are provided for public areas (Main Entrance lobby, waiting area, etc...) and supplied from their relevant adjacent Distribution Boards. The LCPs will house the programmable controlled relays/actuators, lighting control system network bridges, and other necessary equipment for the operation of the system.

Switching and controlling sequence shall be through a push button and presence detector combination. An override push button will be provided inside the electrical room and at every entrance/exit of the building.

Staircases are controlled via occupancy sensors with override switch located on every floor inside the staircase..

All back-of-house amenities, service rooms, technical rooms, and storages are controlled via conventional switching. Public lighting including corridors and lift lobbies shall also be controlled by LCPs for energy management purposes. Lighting in the parking is controlled by movement detectors.

Guest rooms and chalets shall be controlled via the GRMS system described in the GRMS section.

6.11 LIGHTING

Moreover, there will be, throughout the design, a significant reflection of lighting controls by Daylight sensors, occupancy sensors, Programmable time controls, and dimmable controls in order to reduce the connected lighting load in a reasonably uniform illumination pattern and to enhance the management of energy wattage by ensuring the light is not operational where not needed (for example unoccupied areas or areas that should not be operational during daylight...).

11.4-Emergency Lighting

The emergency Lighting levels and type shall be in accordance with the requirements and recommendations of the Civil Defense regulations and NFPA standard (NFPA-101).

A self-contained emergency lighting system with central monitoring panels shall be provided in the project to prevent panic in the crowded area during main power supply failure and emergency power supply transfer. Also, this system will maintain an adequate illumination level at exits, stairs, and escape routes, in case of emergency. Exit luminaires will be provided for all exits, stairs, and escape routes. Exit luminaires shall be equipped with LED lamps. The exit luminaires will be of the maintained type with an appropriate pictogram.

The emergency lighting levels shall be obtained from dedicated emergency luminaires.

The emergency lighting system shall consist of the following:

- Multiple central monitoring units will be located along the site to monitor the self-contained emergency lighting fixtures.
- Each central monitoring unit (CMU) shall be connected to the nearest data rack.
- The system shall be monitored from the security room or at a pre-selected location by the Engineer.
- Fire-resistant cables connecting the emergency lighting fixtures.
- The emergency lighting system shall comply with the requirements of the local Civil Defense Authorities.
- The initial lux shall not be less than an average of 10.8 lux and at any point not less than 1.1 lux.
- The system will be specified with a minimum of 3 Hr. autonomy battery backup.
- The system will be interfaced with the fire alarm system and the BMS system.

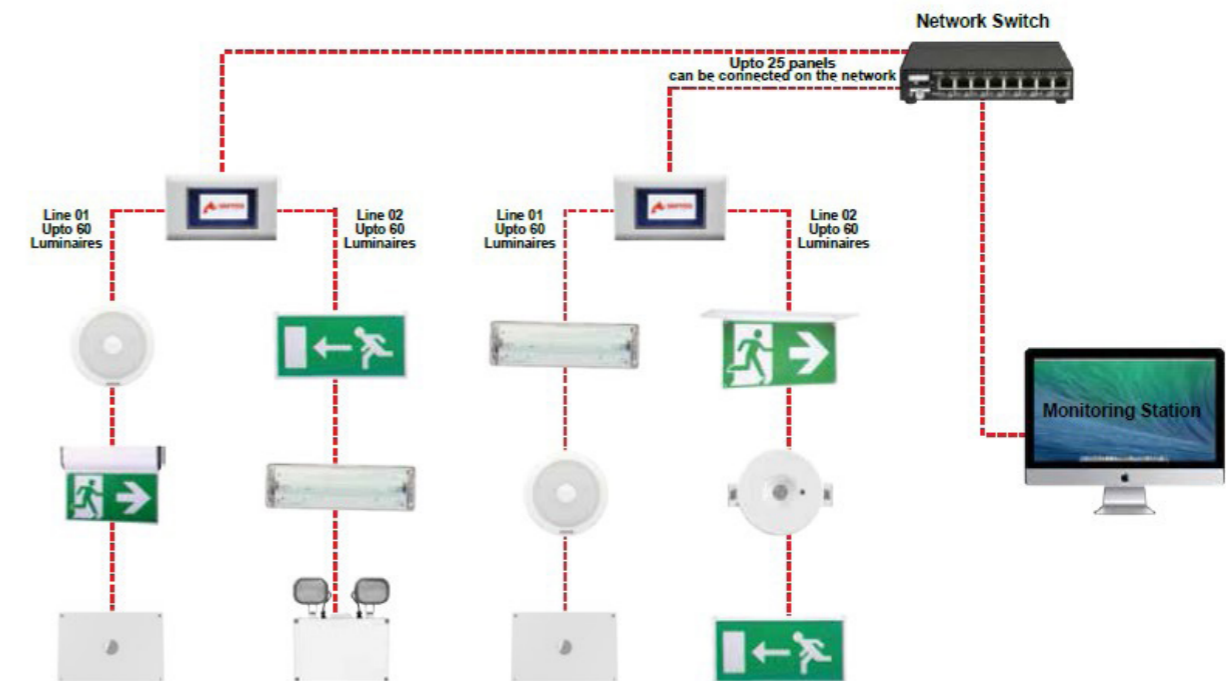


Fig. 11: Addressable Self-contained Emergency Lighting with Monitoring System

12.1-EARTHING AND LIGHTNING

The Earthing and bonding systems and earth continuity conductor sizes system are compliant with BS 7430.

The electrical earthing system is TN-S system as defined in BS 7671.

Separate power earthing network with a maximum permissible ground resistance value of 1 ohm at the main earth point for each income.

Separate clean Earthing network with a maximum permissible resistance value of 1 ohm for the telecommunication equipment, The lightning protection system is compliant with BS EN 62305.

The surge protection system will be based on lightning mesh class IV.

The surge protection system is compliant with BS EN 62305-4 "electrical and electronic systems within structure", IEC 61643 "Surge protective devices connected to low-voltage power distribution systems", IEC 61644 "Surge protective devices connected to telecommunications and signaling networks" and IEC 60364-5-534 "Electrical installations of buildings – Part 5: Selection and erection of electrical equipment – Section 534: Devices for protection against overvoltage".

Roof air terminals are connected to the copper mesh on the roof and interconnected to the grounding system via downconductors. The lightning protection grounding system consists of multi-earth pits interlocked with bare copper conductors directly in the ground and ensures an earth resistance less than 10 ohms.

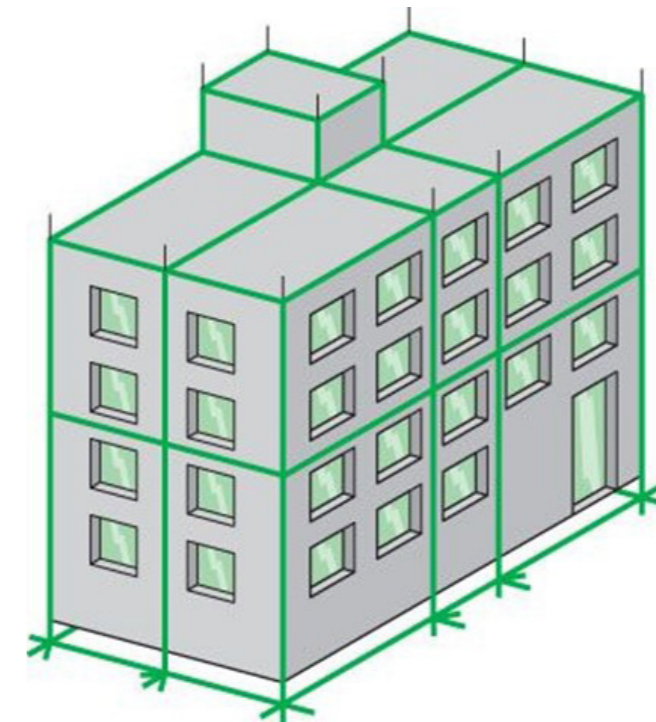
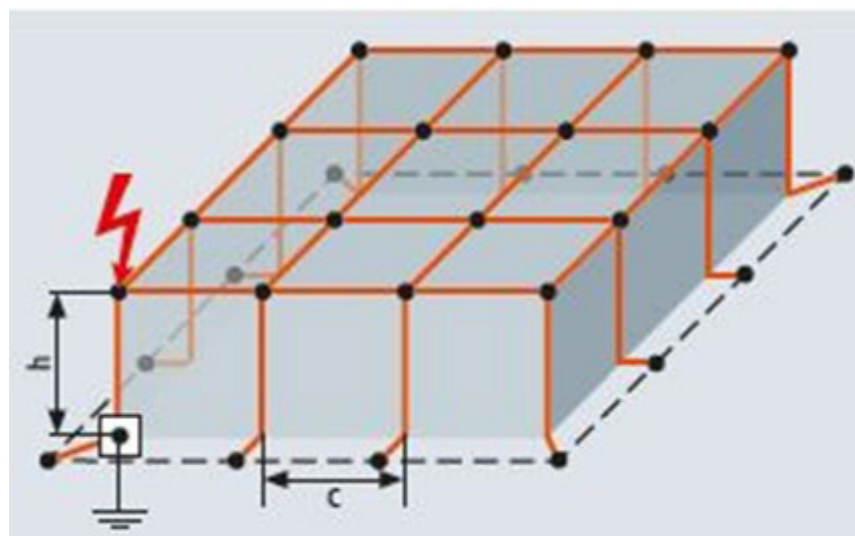


Fig. 12: Faraday Cage



6.13 FIRE ALARM AND VOICE EVACUATION SYSTEM

13.1-FIRE ALARM AND VOICE EVACUATION SYSTEM

Main Fire Alarm Control Panel for Fisherman’s Cove will be installed in the fire command center. Satellite interconnected Fire Alarm Control Panels will be installed where needed. Repeater panels will be installed in the chief engineer’s office and a mimic panel in the back reception. A connection between the two hotels is provided with a MIMIC panel on both sides.

Below is a general description of the system that might be provided.

The system shall be analog addressable and will be designed to meet the requirements of the civil defense and NFPA 101 & NFPA 72. The specifications of the system allow EN54-compliant and UL Listed products to be used.

The fire alarm system is an Interactive / Intelligent, analog-addressable system with manual and automatic alarm initiation; automatic sensitivity control of detectors.

The fire alarm system covers all buildings using differentiated detector types to suit the area usage, maximizing detection and reducing unwanted alarms.

- Smoke detectors are installed in public areas, Corridors, Stores, electrical rooms, LV rooms, bedrooms (with built-in sounder), living rooms, and hazardous voids above the false ceiling (for false ceiling exceeding 80cm) with a test switch.
- Heat detectors are installed in the Emergency (standby) power plants, pump rooms, kitchens, and pantries,

When technical rooms are equipped with fire suppression panels, only detectors connected to FSP are provided while detectors connected to the fire alarm control panel will be canceled and the FACP will monitor the status of the FSP.

A security control room will be provided and the following will be located inside:

- Main Fire Alarm Control Panel
- Fire Alarm Graphical Panel
- PC, Printer, Auto-dialer
- Fireman Control Panel
- Emergency lighting PC and printer

In addition, all existing fire alarm control panels and repeater panels will be connected to the main fire alarm control panel.

The fire alarm system has a one-way communication with the security system (unlocking of emergency doors where relevant), and a phone dialer to automatically connect to the fire brigade (or any other party selected by the Landlord).

A Strobe light will be provided in ADA public toilets & bathrooms, and in ADA sleeping areas.

The position of the strobe light and fire detector are in direct line of sight of guests in beds. In addition an emergency outlet for vibrating pillow will be provided.

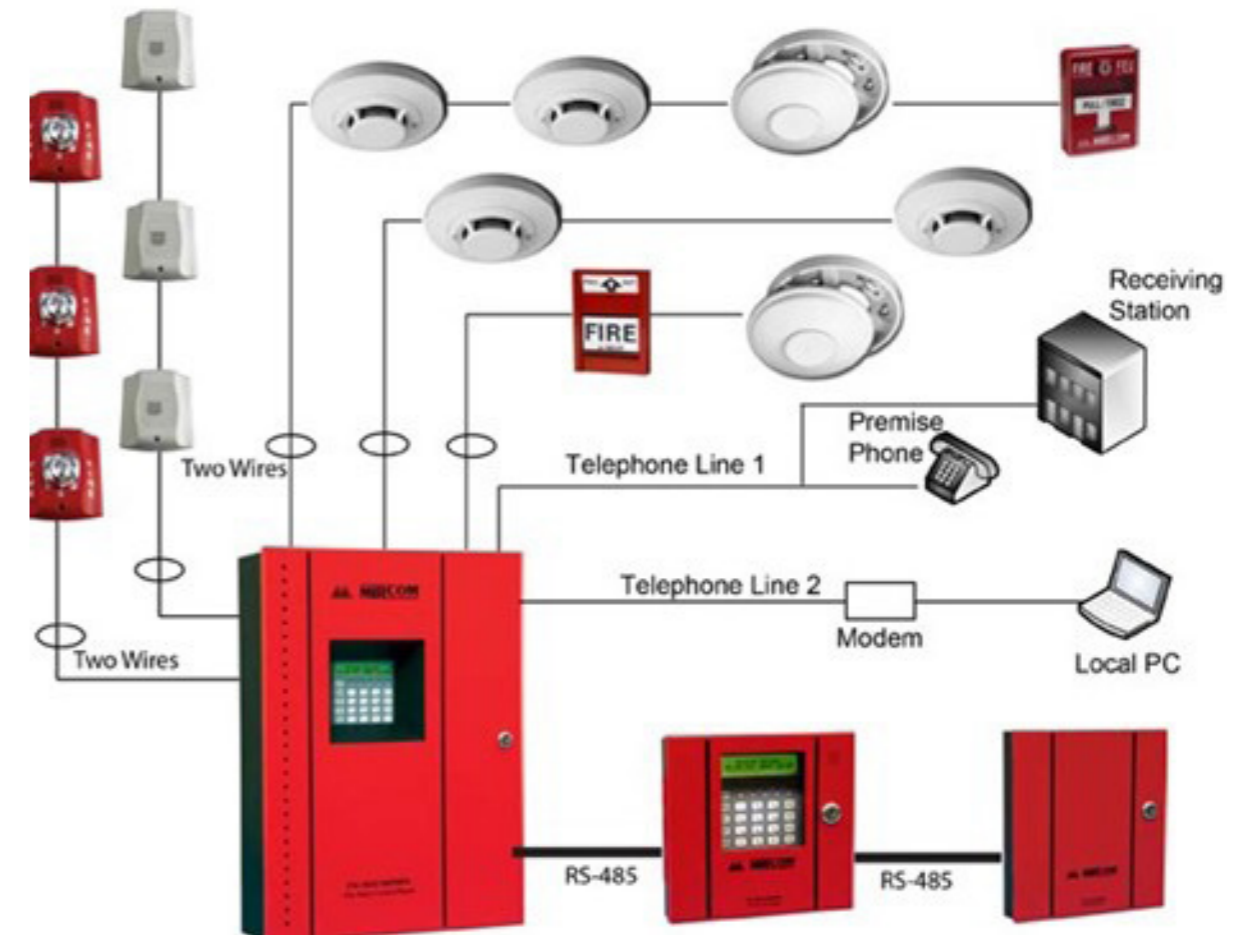


Fig. 13: Addressable Self-contained Emergency Lighting with Monitoring System

14.1-Introduction Telecommunication System

This section of the report details the Extra Low Voltage Systems including Information Communications Technology (ICT), Audio Visual (AV), and Security systems design principles that form the concept design for the Hotel.

A totally new infrastructure distribution will be provided for the fisherman side (left wing) as described in the following sections.

In the Story Hotel (right wing), connection to the existing network (server room) will be as follows:

Each IDF room will have 1 fiber optic primary and 1 fiber optic redundant for the ICT and the same for security. Therefore 4 cables for each IDF room will be provided:

- 1 IDF for 3 small villas and one grand villa
- 1 IDF for standard suite block x2
- 1 IDF for the GM suite
- 1 IDF for the staff accommodation 1
- 1 IDF for the staff accommodation 2

Therefore in total, there are 6 IDF rooms with 4 FO cables each which makes in total 24 FO cables to be connected to the existing story server room.

In addition, 2 fiber optic cables between the two hotels' server rooms one primary one redundant will be provided

The ICT, AV, and Security system design shall be based on international best practices and shall comply with both international standards and local regulations, ensuring optimal performance and function as is required for different project components.

14.2- Information Communications Technology (ICT)

It assumed that a bulk delivery connection is available on site from local telecom provided.

- The new main telecom room will be required to terminate the service provider network and redistribute the services internally within the resort. The hotel operator will be responsible to provide a connection between the MTR and the server room. The services will then be distributed to each guestroom, front-of-house, and back-of-house facility via the hotel network infrastructure. The developer should nominate a lead operator that should be engaged to provide mobile infrastructure for the hotel.
- A Server room will be required to host the systems.
- A Security Control Room will be required for 24/7 security management and monitoring purposes .
- The project will require independent IP Ethernet-based networks for various systems'connectivity and communications. The three IP networks currently identified are Admin Network, Guest Systems Network, and Security Systems Network.
- The hotel will require wireless network connectivity throughout the property including all the guestrooms, FoH and BoH areas.

- A high-speed internet access service will be required for the hotel
- The guestrooms will also require an Energy Management System and Occupancy/Motion Sensor
- An IPTV system is required
- The guestrooms will require an online access control system
- The hotel will require a CCTV system for security monitoring and management
- Security system backend servers shall be housed in the security server room

15.3- ICT TECHNICAL SPACES

Areas dedicated to accommodating all technical spaces related to ICT, AV, and Security systems are required. These rooms will be designed with appropriate security and necessary provisions to address the requirements of the Project.

SERVICE PROVIDER ROOM

Considered for the lead service provider. The Telecom Service Providers (TSP) will terminate all the services in the service provider room which will then get extended to the hotel server room for further distribution. A 3x3x3m room is proposed.

MOBILE NETWORK REINFORCEMENT

GSM room will be provided in order to serve the mobile coverage of GSM services inside the resort. It is assumed that respective service providers will utilize the rooms to host their hardware for mobile service distribution.

Lead operator to confirm the number of GSM rooms along the site.

SERVER ROOM

A Server Room (SR) is considered for the hotel. It will be designed to TIA 942 standards and an appropriate level of redundancy will be ensured considering the profile of the Project. Unless otherwise specified, the backend servers for all the systems covered under the design along with the hotel backend systems and servers will be located in the Server Room.

The cooling, power, environment, and fire safety requirements of the Server Room will be coordinated with the MEP and Fire Engineers. The raised floor requirement will be coordinated with the Architects and the Structural Engineers for consistency. Access to the server room will be restricted to hotel IT staff only. It will have no windows and no external walls.

6.14 TELECOMMUNICATION SYSTEM



IDF ROOMS

Telecommunications Rooms will be scattered on site to serve multiple buildings. The location shall meet the requirement for 90- meter maximum cable length to any voice/data outlet.

The room shall allow for equipment racks or cabinets with enough clearance around the accessible sides of the equipment racks or cabinets for service and maintenance.

Each IDF room shall house the equipment for the following systems:

- Data horizontal cabling terminations.
- Support for vertical building backbone cabling.
- Data and IP voice and video switching equipment.
- Local video surveillance system terminations or equipment.
- Local access control terminations or equipment.

BUILDING COMMUNICATION SYSTEMS

The Hotel will require a set of Building Communication Systems to cater to its various building services and communications requirements.

In general, The building communication systems will include components as identified below.

Building Communication Network (BCN) will consist of active and passive communication infrastructure which will have three IP Ethernet-based local area networks (LAN) for different types of systems and operational requirements. The active network incorporates the functionality of switching, routing, and network security. The main components will include switches, routers, firewalls, intrusion detection/prevention systems, and bandwidth management systems as appropriate.

There are three physically separate networks currently considered under the BCN;

Guest Network – The Guest network will serve as the communication network for Wi-Fi, IPTV, Guest IP phones, digital signage, Background Music, GRMS, and guest data network. communications

Admin network – The admin network will serve as the communication network for hotel systems which will include the admin VOIP, PCs, printers, POS , PMS and servers.

Security network – The Security network will include CCTV and Access Control

The architecture of all networks will be based on a two-tier layer topology core/distribution layer and access layer and it will comprise the central core switches located in the server room and connected to the access switches located in the IDF rooms via dual fiber uplinks.

14.3-STRUCTURED CABLING SYSTEM

The Structured Cabling System (SCS) will include vertical/backbone and horizontal distribution of cables and their supporting infrastructure. The vertical/backbone distribution will be fiber optic cables and the horizontal distribution will be Cat 6A copper cables.

The cabling infrastructure will support all expected IP-based applications and will comprise Cat 6a horizontal copper cabling and redundant fiber connectivity between IDF and Server Room.

2 F.O. cables will be used between the MDF and each IDF for redundancy with 2 separate routing.

14.4-TELEPHONE SYSTEM

A hybrid IP/PBX telephone system will be provided to serve the project. The head-end equipment will be installed in the server room and backed up by UPS.

All guest rooms and admin offices will be provided with an IP phone handset

Dedicated emergency telephones shall be provided in the following areas:

- Self-park parking areas
- Within each elevator/lift including service elevators/lifts.
- At the pool deck (push to talk type)
- In the fitness center and any associated locker room
- Spa reception desk, spa locker room and spa treatment rooms

Emergency telephones must have a red casing and directly dial the front desk and have an annunciator bell. If not picked up shall go to security

14.5-WIFI SYSTEM

The following areas will be covered by the WIFI system:

- Guest rooms and villas.
- Public areas.
- BOH areas.
- FOH areas.
- Outdoor areas including buggy routes and pathways
- Drop-off
- Parking
- Pool with signal bleed onto the beaches

14.6-BGM SYSTEM

The Background music system design will be based on a centralized multi-zone system in the common areas. It will be interfaced with the fire alarm system to turn off in case of fire based on zoning.

Volume control and source selector will be in a strategic location concealed from public view such as the front desk/reception area to enable the selection of music as per the desired zone. Controls are automatically reset to a predefined volume level and music source before morning activities begin.

Speaker types will vary according to the architecture and interior space design.

Areas to be provided with low-level BGM:

- Public assembly and circulation areas. (Not guestroom corridors)
- Lobby and front desk areas with independent volume control behind the front desk or immediately in the adjacent BOH area.
- Porte Cochere
- Public Restrooms
- Food & Beverages with at least one independent dedicated channel of music from the subscription music service
- Event spaces. With three independent selectable channels of music from the subscription services.
- Pre-function areas
- Outdoor circulation areas
- Walkways.
- Elevators
- Wellness area with independent amplifier connected to the centralized system.
- Pool deck with independent amplifier connected to the centralized system.

14.7-IPTV SYSTEM

An internet protocol television service will be provided to each guest room/chalet, reception, restaurant, bar, wellness center and other function spaces as required by the operator.

The IPTV options are:

- Welcome message.
- Guest directory.
- Electronic program guide.
- YouTube, Netflix.
- HD TV channels.
- Weather information.
- View bill.
- Messages
- Radio channels.
- Ability to take rooms service orders via TV or HTML page scanned via QR Code.

Channels are provided via multi-cast IP.

Satellite will be provided for the sports bar only. Location of the satellite dishes will be on the BOH building and to be connected to the ICT network.

6.14 TELECOMMUNICATION SYSTEM

15.10-GUESTROOM MANAGEMENT SYSTEM (GRMS)

A fully integrated GRMS will be provided to each guestroom/chalet to monitor and control the following systems.

- HVAC.
- Lighting control analog operated.
- Door lock.
- Temperature.
- DND/MUR/Doorbell.
- Curtain control (if any)
- Balcony, door status and interface through the FCU

Guest room doors will be fitted with wireless escutcheons with a built-in mobile key-certified RFID reader with BLE (Blue-tooth low energy).

An Online hotel guest access control system typically uses a wireless network to communicate card reader communications back to a central supervisory system, though depending on the product, the card reader installed on the guest room door may have some on-board memory and intelligence to continue operations in case the network fails.

No key card will be located in the guestroom/villa, presence detectors, door and window contacts will be provided in order to monitor and control the above-mentioned systems based on occupancy.



Fig. 14: Guestroom Management System

14.8 DISABLED/SECURITY PANIC ALARM SYSTEM

Disabled alarm system will be provided in public disabled toilets and accessible guest rooms. These shall provide a local audible and visual alarm and be connected to the security control room and main reception. Manual reset buttons shall be provided at each toilet/guest room.



Fig. 15: Disable Alarm System

Dedicated panic buttons are to be installed in the following areas:

- Sauna and steam rooms
- Cash handling areas (POS stations, cashier office, accounts office, human resources office, front office etc.) (Silent discreet type) (typically two button push under counter)
- Areas of potential gas release (kitchens, boiler rooms i.e. also known as 'gas knock off button') push button type (manual key reset) Gas emergency knock off/panic alarm shall also shut off the gas and any power under the cooking hoods.
- Front desk at each workstation (Silent type)

All signals from panic alarm devices are to be wired to an alarm annunciator panel located at the security control room.

15.1-INTRODUCTION

The proposed system in this section is subject to discussion with client ICT team to ensure compatibility with the existing systems and complementary to it.

For the fisherman side (left wing), new infrastructure distribution will be designed. For the Story Hotel (right wing) the existing infrastructure should be assessed in more detail to make necessary upgrades and modifications to cater to the new buildings.

The new security system shall be designed as per authorities' requirements. It includes the following:

- IP Closed Circuit TV (IP CCTV).
- IP Access Control System.

All these systems will be interfaced with each other and with the fire and life safety systems to ensure their proper operation and functionality.

The IP CCTV, and Access Control systems components installed throughout the development will be Internet Protocol (IP) based and transmitted via a security network comprised of Category 6A and single mode optic fiber cabling for the primary data transmission backbone connectivity. Where the distance to devices exceeds the maximum for copper transmission (typically 90m), fiber optic cabling shall be used.

Security Control Room SCR.

The security control room shall allow security system operators to view, monitor, and action the most appropriate alarms from a single point of control, monitoring the entire event from a video wall (with data input from video imagery, lift controllers, emergency routes, audio communications, and alerts, etc.). The SCR room shall be sized to house two security operator workstations, and a video wall of 2x2 wall-mounted 55" LCD/LED displays. Access to the SCR shall be restricted to security personnel only.

15.2- ACCESS CONTROL SYSTEM

The Access Control shall provide a credential to an authorized person accessing restricted areas.

All guests will be provided access through their smartphones and operator staff will be provided with a key card that will grant access to predefined secured areas. All critical areas and rooms will be protected by an electronic locking mechanism, and only personnel with the right privileges on their cards will access these secured areas.

The proposed approach to implementing electronic access control is to have a common system for guest rooms and staff-only BOH areas.

BOH areas will be secured using a conventional electric locking arrangement consisting of a card reader, electric lock, and door contact.

Guest room doors will be fitted with wireless escutcheons with a built-in mobile key-certified RFID reader with BLE (Bluetooth low energy). Mobile Key and the corresponding Mobile Key Station offer guests a complete mobile check-in experience using the hotel Mobile App.

An online hotel guest access control system typically uses a wireless network to communicate card reader communications back to a central supervisory system, though depending on the product, the card reader installed on the guest room door may have some onboard memory and intelligence to continue operations in case the network fails.

As a minimum, Electronic Lock-sets will be provided for the following areas:

- Indoor swimming pool entry and secondary entrances
- Each guest-room entry
- Fitness Center
- Guest Laundry
- Meeting rooms
- Boardroom
- Secondary guest entrances to the public corridors
- Linen room
- Executive Lounge
- beverage storage

As a minimum, an access control system will be provided for the following areas:

- Security server room
- Security control rooms
- Server room
- Lifts: the card swipe inside the lift
- Fire stair doors
- Car park entry near barriers
- Entrance to front office area

6.15 SECURITY SYSTEM

- Entrance to front office area
- Back office areas accessible from public corridors
- Team member entrance, if not monitored
- Meeting rooms service corridors
- Telephone operators room
- Cashiers office
- Count room
- Safety deposit boxes
- Paymasters office
- Exterior entrance doors
- Roof tops
- Luggage store
- IDF rooms
- Electrical rooms
- Alcohol store
- Dry store

15.3- VIDEO SURVEILLANCE SYSTEM

Video surveillance shall consist of high-resolution networked cameras fixed cameras providing clear and useable images during both day and night.

The following design approach has been taken regarding IP cameras:

IP camera cabling shall consist of a Cat6a cabling infrastructure from a network terminal near each camera to the nearest electrical room or telecom room, not to exceed 90 meters.

Surveillance cameras shall be Power-over-Ethernet (POE), from a POE switch or dedicated POE mid-span within the telecom/ electrical rooms.

VIDEO RECORDING

IP video will be recorded directly to a suitable network storage media such as (NAS, SAS, SAN or DAS) while allowing for future expansion of recording. All cameras shall be capable of simultaneously streaming multiple video compression standards, with a minimum video frame rate of 15 frames per second (fps).

At a minimum, the system shall provide 24 hours continuous recording frame rate of 15 frames per second (fps) at a resolution of 1 megapixel. To provide increased security, there shall be a continuous recording of entrances and exits to the building which are recorded at 25 frames per second at 4-megapixel resolution, H.264 or H.265 compression compatible, to allow for increased facial identification on recorded video.

The camera surveillance system will consist of remote cameras, both static and fully functional with telemetry receiver units, a central control, monitoring, and a recording facility.

The IP CCTV system is used to monitor the following:

- Main entrances and exits indoors and outdoors (Identification with wide dynamic range WDR enabled)
- Full coverage of lobby/entrance hall and client services areas such as the kitchen (75% of inside the kitchen), kitchen entrance door, laundry, housekeeping, etc. (Recognition) Front desk/reception desk (Identification)
- Elevators, elevator lobbies, and staircases. (Identification)
- Parking area and boundaries. (Detection)
- Entry and exit of vehicles. (indoor and outdoor automatic number plate registration-ANPR)
- Coverage at entrances of entertainment areas, such as spa/gym/swimming pool/play and game area/pre-function areas, etc. (Recognition)
- Full coverage of public open areas which is inclusive of all shop entrances, ATM areas, and loading areas (Recognition)
- Full coverage of emergency doors/exits, indoor and outdoor (Identification)
- Full coverage of security server/server/equipment room and CCTV Monitoring Room (Identification)
- Full coverage of retails, liquor storage room, liquor warehouses inside and outside, loading/unloading areas, entrances/exits of liquor warehouses (Recognition)
- Coverage of restaurants/dining area/bar, etc (Recognition)
- General view of swimming pool water area/kids pool (Provision only)• Full coverage of security control room.
- Waiting areas and lobbies (Recognition)
- Water tanks, electrical rooms. Gas cylinder areas (Detection)

The CCTV system includes IP CCTV cameras full HD and network video recorders (NVRs). The NVRs are accessible via the redundant data network such that any dedicated PC workstation on the network with the appropriate security settings and password located in the control room, can view any camera (live or recorded). Connected workstations are installed in the project's security control room.

The NVRs (rack-mounted) are in the control room and connected to the project's LAN. Video streams from the IP cameras are recorded in the NVRs based on activity detection or other defined parameters. The video archive or live video streams from the cameras are available via any computer station, having the proper credentials connected to the data network to which the NVR is already connected.

Field of View

- For use within a field-of-view classification system, the minimum shall be:
- Identification - 120% - 250 pixels/m
- Recognition - 50% - 100 pixels/m
- Detection - 10% - 20 pixels/m
- Monitoring - 5%
- Number Plate Recognition (NPR) view – 20%

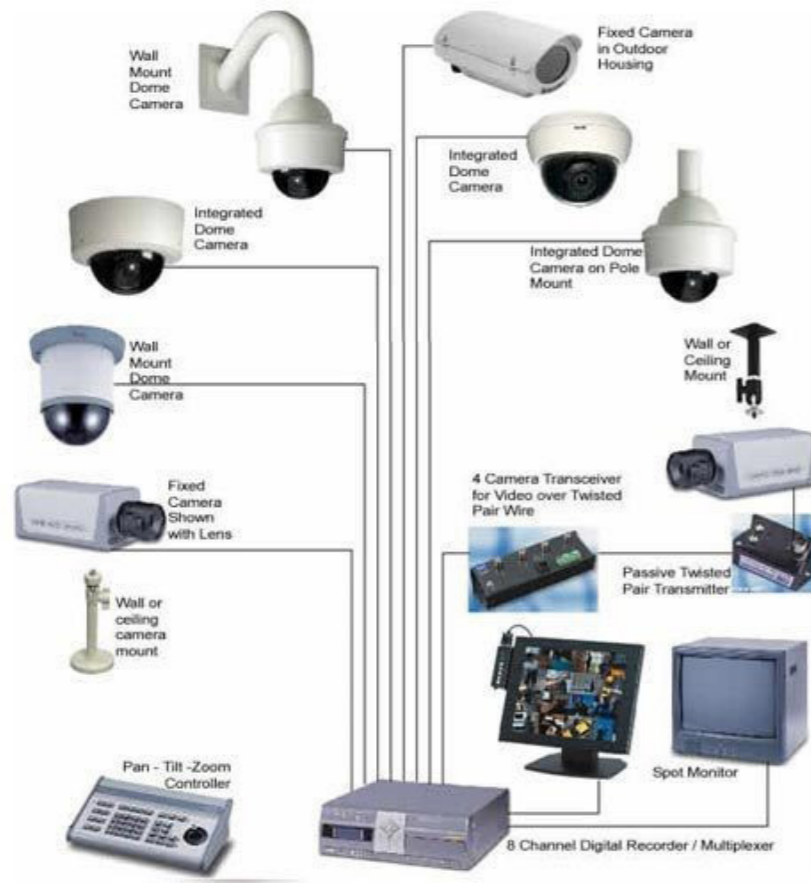


Fig. 16: CCTV System

6.16 BUILDING MANAGEMENT SYSTEM

161- BUILDING MANAGEMENT SYSTEM

The proposed system in this section is subject to discussion with client engineering team to ensure compatibility with the existing systems and complementary to it. A new system might be needed for the fisherman cove and upgrade to the current system of the H Hotel might be required.

The Building Management System “BMS” is intended to cover the MEP systems and devices located in the general services areas. The system is able to communicate with the MEP equipment that has built-in intelligence, such as UPS systems or variable speed drives; where required.

The BMS is provided to efficiently and economically manage the building services. The system is designed to assist in efficiently operating the building services, control its active components, assist in preventive maintenance and repairs, and be readily available for upgrades and expansion. The BMS system is specified to operate only with open or widely used protocols. BMS and minimum monitoring requirements are to be applied.

The systems and equipment which are monitored/controlled by the BMS are summarized as follows:

- All HVAC systems (Chillers, AHUs, FCUs, Pumps, Heat Pumps)
- Cooled cold water temperature control system
- Hot water system temperature control system
- Filtration system for water tanks and pools
- All plumbing pumps (booster, transfer and recirculation)
- All submersible pumps
- Digital power meters, installed for MDBs, SMDBs, and MCCs related to general services and UPS system communicate their electrical parameters to the BMS.
- Monitoring of water tank levels, control, and monitoring of water pump operation sequence. (Both lifting and booster).
- Lifts faults and alarms are communicated to the BMS.
- Simple monitoring is provided for the standby diesel generator status.
- Monitoring of standby generator fuel system.
- Fire alarm system and emergency lighting system status monitoring.
- Electrical fire pump and jockey pump condition monitoring.
- Fuel system and control monitoring of diesel fire pump.
- Smoke management system monitoring.
- Status monitoring for gate barrier system.
- The system assists in the preventive maintenance and repairs process.

- The system assists in the management process by transmitting the status of consumable items such as fuel or water to the operator.
- The system assists in the load management process by means of monitoring the electrical loads and shedding/ reconnecting the non-priority loads, when necessary, based on preset schedules.
- Faults and malfunctions are reported to the operator and logged in a database for further evaluation.
- The system executes pre-programmed sequences of operation in addition to overrides from the operator.



Fig. 17: Building Management System Schematic

Some MEP equipment that will be reused will need to be upgraded for it to be integrated with a new BMS system. That shall be looked carefully to ensure minimal cost impact and proper operation.



RFI Register

MEP

JT & Partners

JT-P22120 Project Name: H Hotel - Seychelles

No.	RFI Ref. Number	Rev	Subject and/or Description	Notes/Remarks	Request To/ Received from			Response Sent/ Received			Status/ Remarks
					Company	Person	Date	Response/ Description/ Comments	Person	Date	
1	RFI-001	0	GENERAL		STEP	Mohamad Takkouh	16-Jun-23				
			Below MEP's initial requirements that will be elaborated as per client responses and detailed architectural layouts.	For Info				noted.	CLIENT	17-Aug-23	CLOSED
			The project is a renovation project with many existing infrastructure and equipment elements that need to be tested and assessed to be re-used as part of the proposed systems.	TBC by client				noted.	CLIENT	17-Aug-23	CLOSED
			Fire and life safety report should be provided at early stages of the project as this will affect the coordination process and has its major impacts on the architecture documents.	TBC by client				its in the concept valuation report.	CLIENT	17-Aug-23	CLOSED
			Information regarding the existing utilities infrastructure will be needed especially the following: 1.Incoming utility network capacity and quality. 2.Capacity and general conditions of the storage water tanks, STP, RO, generators, Fire pump, Transformers... 3.As built of all infrastructure alongside equipment and panels schedules..	TBC by client				why if the hotel is being demolished and rebuilt?	CLIENT	17-Aug-23	CLOSED
			Provide operators/client applicable MEP design guidelines if any.	TBC by client / operator				already provided previously for both H-Dubai and Seychelles projects.	CLIENT	17-Aug-23	CLOSED
			The adopted norms and standards should be agreed upon prior to the commencement of developing the different design stages: HVAC: ASHRAE standards and design guidelines Plumbing: NPC, UPC, IPC Fire protection & life safety: NFPA, NF or BS	Please specify				YES	CLIENT	17-Aug-23	CLOSED
2	RFI-001	0	GAS		STEP	Mohamad Takkouh	16-Jun-23			17-Aug-23	
			Cooking appliances: Regarding the existing appliances is it gas or electrically operated? If gas system is adopted, then specify type of gas and how it is supplied to site. Or how it is stored on site.	TBC by client				kitchen designer to make recommendation.	CLIENT	17-Aug-23	CLOSED
3	RFI-001	0	HVAC		STEP	Mohamad Takkouh	16-Jun-23				
			Design conditions are to be considered as follow: A.Cooling 1.Outdoor conditions: 32°C DB, 26.5°C WB 2.Outside conditions for fresh air: 31°C DB, 27.5°C WB 3.Indoor conditions: 23°C±1°C 4.Indoor relative humidity: 50% ±5% 5.Safety factor: 10% on sensible and 5% on latent. B.Heating No space heating will be provided.	The data provided are within the recommendations of ASHRAE subject to agreement with the client.				please clarify.		17-Aug-23	CLOSED
			Is the existing system a chilled water system? If so are the chillers air cooled or water cooled chillers?	TBC				Story has package VRV and Fisherman split units.	CLIENT	17-Aug-23	CLOSED

6.17 APPENDICES



RFI Register

MEP

JT & Partners

JT-P22120 Project Name: H Hotel - Seychelles

No.	RFI Ref. Number	Rev	Subject and/or Description	Notes/Remarks	Request To/ Received from			Response Sent/ Received			Status/ Remarks
					Company	Person	Date	Response/ Description/ Comments	Person	Date	
			Is the existing system a decentralized DX system? If so, we will be proposing VRF and DX system depending on asset size.	TBC				NO	CLIENT	17-Aug-23	CLOSED
			Energy recovery will be adopted on newly proposed FA.AHUs wherever seems feasible.	TBC				OK	CLIENT	17-Aug-23	CLOSED
			Ecology units will be provided for the kitchen hoods extraction to avoid any source of nuisance odours to be spread over the surrounding areas.	TBC				OK	CLIENT	17-Aug-23	CLOSED
			Kitchen hood makeup will be through make-up fans or air handling units (with no humidity control) if supply air tempering would be required.	TBC				since the humidity is a serious problem in seychelles, humidity control is essential.	CLIENT	17-Aug-23	CLOSED
			Garbage rooms will have their own extract fan and will be cooled to 15°C	TBC				wet and dry and cooled garbage to be provided including garbage separation	CLIENT	17-Aug-23	CLOSED
			Pools: 1.Swimming pools will be provided with heating system if seems necessary. 2.Swimming pools will be provided with cooling system if seems necessary. 3.Swimming pools should be provided with the necessary water filtration and disinfection.	TBC by pool specialist/Client.				OK	CLIENT	17-Aug-23	CLOSED
4	RFI-001	0	SMOKE CONTROL		STEP	Mohamad Takkoush	16-Jun-23				
			Smoke control and ventilation system will be designed in accordance with the adopted codes and standards, following the guidelines of local civil defence requirements and in accordance with the guidelines of the FLS engineer.	TBC by FLS				OK	CLIENT	17-Aug-23	CLOSED
5	RFI-001	0	WATER SUPPLY		STEP	Mohamad Takkoush	16-Jun-23				
			Information regarding the existing water supply infrastructure will be needed especially the following: 1.Incoming water from utility network capacity and quality. 2.Capacity and general conditions of the storage water tanks, and whether these should be used for the new renovation works or new tanks should be anticipated. 3.Type of existing water treatment if any, and whether special water treatment would be required or not. 4.Information is needed about the existing water distribution topology to assess whether the same topology/network should be used or a completely new network should be envisaged.	TBC				this need to be discussed in more detail.	CLIENT	17-Aug-23	CLOSED
			No water cooling will be provided.	TBC				water cooling to be provided	CLIENT	17-Aug-23	CLOSED
			The available domestic water quality should be investigated in order to propose the proper water treatment system necessary for the project.	TBC				PUC water supply is ok, filter system is required.	CLIENT	17-Aug-23	CLOSED



RFI Register

MEP

JT & Partners

JT-P22120 Project Name: H Hotel - Seychelles

No.	RFI Ref. Number	Rev	Subject and/or Description	Notes/Remarks	Request To/ Received from			Response Sent/ Received			Status/ Remarks
					Company	Person	Date	Response/ Description/ Comments	Person	Date	
			Domestic Hot Water production: 1.Information is required regarding the domestic hot water production whether it is heated through fuel/gas hot water boilers or through electric heaters. 2.If fuel/gas boilers are existing then what is the current conditions of the boilers. 3.Is hot water distributed from a central domestic hot water tanks or through dedicated decentralized domestic water heaters. Maybe domestic water heat pumps could be proposed as a more sustainable option for the new renovated works.	TBC / Subject to further assessment				this was discussed in detail on the Thursday 10th August 2023 call. If any further clarification is required please arrange a face to fac meeting	CLIENT	17-Aug-23	CLOSED
6	RFI-001	0	STORM WATER							17-Aug-23	
			Information will be needed regarding the existing storm water network to decide whether storm water should be connected to an existing infrastructure network or just disposed off to the surrounding terrain.	TBC				all existing infrastructure will be demolished.	CLIENT	17-Aug-23	CLOSED
7	RFI-001	0	DRAINAGE		STEP	Mohamad Takkoush	16-Jun-23				
			Location and size of sewage drain connection to the available utility network should be provided to make sure that all necessary provisions are clearly foreseen.	TBC				to be checked on site	CLIENT	17-Aug-23	CLOSED
			The aim to have all drain water collected by gravity to the existing utility network, if available.	TBC				no pumps are rquird, this is not a high rise buidling	CLIENT	17-Aug-23	CLOSED
			Is there a sewage treatment plant serving the existing resort?, if not, should an STP be provided for the new renovation project.	TBC				new plants to be provided	CLIENT	17-Aug-23	CLOSED
			Kitchens drains to be connected to automatic grease interceptors prior discharging to network.	TBC				yes	CLIENT	17-Aug-23	CLOSED
			Laundry drains to be connected to lint trap prior connection to external network.	TBC				no laundry in the design	CLIENT	17-Aug-23	CLOSED
8	RFI-001	0	IRRIGATION		STEP	Mohamad Takkoush	16-Jun-23				
			Information will be required regarding the existing irrigation system. However, with the expected demand on domestic water it is advisable to propose a full or partial grey water collection and filtration to be re-used in landscape irrigation, where ever this is proven to be feasible and cost effective.	TBC				this was discussed in detail on the Thursday 10th August 2023 call. If any further clarification is required please arrange a face to fac meeting	CLIENT	17-Aug-23	CLOSED
9	RFI-001	0	FIRE FIGHTING		STEP	Mohamad Takkoush	16-Jun-23				
			The buildings classification should be in accordance with the FLS engineer.	TBC by FLS				To be forwarded to FLS.		17-Aug-23	CLOSED

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No.	RFI Ref. Number	Rev	Subject and/or Description	Notes/Remarks	Request To/ Received from			Response Sent/ Received			Status/ Remarks
					Company	Person	Date	Response/ Description/ Comments	Person	Date	
			Based on the building classification and the adopted fire code the required fire protection systems will be provided.	To be further assessed				To be forwarded to FLS.		17-Aug-23	CLOSED
			Fire water reserve tanks will be required if fire protection should be provided.	TBC by FLS				ok	CLIENT	17-Aug-23	CLOSED
			Yard hydrant network will be provided for the whole plot	TBC by FLS				ok	CLIENT	17-Aug-23	CLOSED
			Main Electrical rooms will be protected by FM200 System.	TBC by FLS				Ok	CLIENT	17-Aug-23	CLOSED
			Generator Room to be protected by foam system.	TBC by FLS				Ok	CLIENT	17-Aug-23	CLOSED
			FCC room to be protected by FM200 system.	TBC by FLS				ok	CLIENT	17-Aug-23	CLOSED
10	RFI-001	0	POWER		STEP	Mohamad Takkoush	16-Jun-23				
			Kindly provide us with existing network loads, infrastructure drawings, DB/ MDB loads. The availability of power and transformers shall be provided.	TBC				this was discussed in detail on the Thursday 10th August 2023 call. If any further clarification is required please arrange a face to fac meeting	CLIENT	17-Aug-23	CLOSED
			Information will be required regarding the existing power generators, if any, to assess if the condition of the existing generators could be relied on or a new generator house should be provided to serve the new renovated project. Generators will feed emergency loads only: <ul style="list-style-type: none"> • Pressurization fans • smoke management fans • make-up fans • elevators • GSM rooms • main telecom room • Car park ventilation fans • Motorised smoke and fire dampers • submersible pumps • 30% of kitchen loads • 20% of lighting • EDBs • Fire and Jockey pumps • UPS that is feeding All security systems including CCTV, BMS, Fire alarm, Access control system, etc. If the power sources are interrupted more than once per day, full on-site generator power will be provided.	General system description. TBC by client/operator				existing Story generator is a 1000KWA generator. Fishermans' cove generator is old and ned to be replaced	CLIENT	17-Aug-23	CLOSED
			Electrical load required for the landscape, SPA, gym, restaurants, pools, entertainment room, offices, and kitchens to be as per specialists requirements.	For Info				ok	CLIENT	17-Aug-23	CLOSED
			Floor electrical rooms will be provided on each floor	For Info				which building? Is it a room or a box? And what size is it ?		17-Aug-23	CLOSED
11	RFI-001	0	SECURITY		STEP	Mohamad Takkoush	16-Jun-23				
			CCTV system will be provided as per the latest authority's requirements.					ok	CLIENT	17-Aug-23	CLOSED
			Any special security requirement (CCTV, access control...)	TBC with Client/Operator				All pathways and resort to be covered with CCTV	CLIENT	17-Aug-23	CLOSED
			Centralized access control for the main entrances, stairs, elevator, and control rooms will be provided.	TBC with Client/Operator				ok	CLIENT	17-Aug-23	CLOSED
			Access control for housekeeping rooms to be provided					ok	CLIENT	17-Aug-23	CLOSED



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					Company	Person	Date	Response/ Description/ Comments	Person	Date	
			A security room and a security server room will be provided.	General system description. TBC by client/operator				ok	CLIENT	17-Aug-23	CLOSED
12	RFI-001	0	Telecommunication		STEP	Mohamad Takkoush	16-Jun-23				
			Full WIFI coverage for the resort will be provided including the outdoor/pool area. 3 networks will be adopted: Guest, Admin, and security.	General system description. TBC by client/operator				to be agreed with Corporate Director of IT	CLIENT	17-Aug-23	CLOSED
			IPTV system and telephony system will be provided. IP telephony in BOH/reception and analog in guest rooms.	General system description. TBC by client/operator				to provided agreed with Corporate Director of IT	CLIENT	17-Aug-23	CLOSED
			Confirmation from the client is needed regarding the need for satellite dishes as part of the IPTV system. We are considering connections from local service providers.	General system description. TBC by client/operator				Operator confirmed the need for satellite dishes for the recreational areas only. location above the BOH is acceptable			CLOSED
			A server room on the Hotel's ground floor will be provided	For info				to Hotel s ground floor will be provided by he Corporate director of IT	CLIENT	17-Aug-23	CLOSED
			Main Telecom Room for Hotel will be provided	For info				to will be provided by he Corporate director of IT	CLIENT	17-Aug-23	CLOSED
			A mobile service room will be provided	For Info				to be provided by he Corporate director of IT	CLIENT	17-Aug-23	CLOSED
			An online Guest room management system will be provided for the guest rooms controlling the lights and AC. The control will be through presence detectors, control panels, window contacts, and door contacts.	General system description. TBC by client/operator/ID				It is fine by the operator			CLOSED
			An online key card system will be provided with NFC capabilities.	General system description. TBC by client/operator/ID				to will be provided with NFC capabilities by he Corporate director of IT	CLIENT	17-Aug-23	CLOSED
13	RFI-001	0	BMS		STEP	Mohamad Takkoush	16-Jun-23			17-Aug-23	
			A full BMS will be provided for the project.	TBC by the Client				yes	CLIENT	17-Aug-23	CLOSED
14	RFI-001	0	EMERGENCY LIGHTING		STEP	Mohamad Takkoush	16-Jun-23				
			A central battery system emergency lighting by self-contained fittings will be provided for the project.	General system description. TBC by client/operator				yes	CLIENT	17-Aug-23	CLOSED
15	RFI-001	0	LIGHTNING PROTECTION SYSTEM		STEP	Mohamad Takkoush	16-Jun-23				
			Lightning protection will be provided as per the latest recommendation of BS EN 62305 & IEC 62305. Faraday cage for the main building and for all the villas.	For Info				RFI sent to the client.	CLIENT	17-Aug-23	CLOSED
16	RFI-001	0	FIRE DETECTION		STEP	Mohamad Takkoush	16-Jun-23				
			Fire detection, voice evacuation, and CO detectors will be provided. The fire Alarm Panel will be in the Security Control Room (SCR) and a Repeater panel will be provided at the reception desk	For Info / under verification by FLS				yes	CLIENT	17-Aug-23	CLOSED
17	RFI-001	0	LIGHTING		STEP	Mohamad Takkoush	16-Jun-23				
			Decorative lighting design for FOH areas should be provided by the ID.	General system description. TBC by ID				ok	CLIENT	17-Aug-23	CLOSED
			All lighting for service areas will be done as per CIBSE standard.	For info				ok	CLIENT	17-Aug-23	CLOSED

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					Company	Person	Date	Response/ Description/ Comments	Person	Date	
			The external, facade lighting layout and selection should be provided by the Lighting designer.	General system description. TBC by client				ok	CLIENT	17-Aug-23	CLOSED
			External lighting will be controlled by a photocell/timer	For info				yes	CLIENT	17-Aug-23	CLOSED
			All rooms intended for common spaces and hallways, or corridors will be controlled by motion sensors.	General system description. TBC by client/operator/ID				yes	CLIENT	17-Aug-23	CLOSED
			Back-of-house lighting will be controlled via conventional switches.	General system description. TBC by client/operator/ID				yes	CLIENT	17-Aug-23	CLOSED
			All curtains will be motorized	General system description. TBC by client/operator/ID				No motorized curtains will be provided as confirmed by operator and client	CLIENT	17-Aug-23	CLOSED
18	RFI-001	0	AUDIO VISUAL		STEP	Mohamad Takkoush	16-Jun-23				
			A centralized BGM system will be provided. This will be divided into zones controlled by each area of operation covering the following: Gym, F&B, Reception, SPA...					yes	CLIENT	17-Aug-23	CLOSED
19	RFI-001	0	HOTEL GUEST ROOM REQUIREMENTS		STEP	Mohamad Takkoush	16-Jun-23				
			1.steamer/iron 2.cooling unit/refrigerator required 3.Coffee/tea maker 4.Hair Dryer: Not wall mounted; no blocking required. No power outlet in the Bathroom. locate for guest use near a full-length mirror (location outside the toilet) 5.For suites: Refrigerator, Ice Machine, Coffee Brewer, Toaster. 6.Power outlets for equipment, housekeeping, and countertop food preparation 7.Power on the balcony: GFI power outlet and mounted near table location 8.Wireless LAN (Wi-Fi): In guestrooms and throughout guestroom areas. 9.Wired LAN: Access connection at desk 10.TV location: In suites with separate rooms, a TV will be provided in each sleeping room and living area. 1 TV in open suites 11.TV in toilet will not be provided 12.Minimum of one duplex outlet on each side of the bed including USB plugs were allowed. 13.2 power outlets (1 duplex) dedicated for wall mounted TV. 14.Is motorized window treatment provided?	General system description. TBC by client/operator/ID				yes will be refined in the design	CLIENT	17-Aug-23	CLOSED
20	RFI-001	0	GUEST ROOM CORRIDOR REQUIREMENTS		STEP	Mohamad Takkoush	16-Jun-23				
			1.Is self-serve ice dispensing required? If required, 1 ice dispensing on each guestroom floor. 2.Power outlet every 15m in guest lobbies	General system description. TBC by client/operator/ID				no guest can request ice from room service.	CLIENT	17-Aug-23	CLOSED