PROPOSED VILLA & RESIDENTIAL DEVELOPEMENT FOR ZUARI ADVENTZ, GOA PHASE # 1

SIGN-OFF DOCUMENT

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FOR RALYS CONSULTING ENGINEERS

FOR ZUARI INFRA WORLD

RALYS CONSULTING ENGINEERS



FOR SYNERGY

PROJECT DETAILS

Zuari Adventz, Bangalore is proposing villa & Low rise Residential development in Goa.

The development proposed consists of various types of apartments and with all the amenities.

PHE SERVICE

CONTENTS

I	Plumbing Systems
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Part IX September 2005

Design Data Book Volume I to IV

2007 Edition (Revised May 2008)

Design Data Book – 2002

2003 Edition

2008 Edition

Plumbing Systems

National Building Code of India

Codes & Design Guidelines :

Engineers(ASPE)

American Society of Plumbing

International Plumbing Code

Uniform Plumbing Code of India

Energy Conservation Building Code

Institute of Plumbing Engineers UK

Reference Standards 1.1

i.

ii.

iii.

iv.

ν.

vi.

vii.

SP 35

IS Codes

1.2 Approaches to Planning

The Plumbing services for the project shall be designed keeping in view the following:

1.2.1	Requirement of adequate and equal pressure of o
	kitchen and other designated areas. Cold water
	bodies shall also be ensured.

- 1.2.2. The water storage tanks capacity shall be adequate to ensure availability of water as required.
- 1.2.3 Recycling treated waste water (from sewage treatment plant) for, flushing & for horticulture use.
- 1.2.4 Implementation of requirements of MoEF relating to rain water harvesting, water conservation, solar energy use etc
- Formation levels of roads/ Pavements & invert levels of other services in the areas. 1.2.5
- 1.2.6 Drainage and water supply provision to suit Landscape layout.
- 1.2.7 Rain water harvesting system- subject to soil behaviour
- 1.2.8 Solid waste management
- 1.2.9 Use of Low Flow Fixtures in view of water conservation

1.2.10 Reticulated Gas bank is proposed

cold & hot water in toilets, and cold water for makeup supply to Swimming Pool & Water

System Requirements 1.3

- 1.3.1 Water treatment plant (WTP) to ensure that the chemical and bacteriological parameters of water supply in the premises are in accordance with World Health Organization (WHO) standards and confirming to IS 10500. WTP shall comprise of Sand filter, Activated Carbon Filter, Softener and UV units. However, WTP system design shall be verified for suitability prior to installation in accordance to latest source water analysis report.
- 1.3.2 Flushing water supply through Hydro pneumatic system for making water available at all toilets.
- 1.3.3 Domestic water shall function through <u>Hydro pneumatic system</u> making water available for all kitchen and toilet
- 1.3.4 Sewage and sullage collection & conveyance system based on ASPE standard and applicable guidelines by NBC.
- 1.3.5 Sewage treatment plant for treatment of sewage & sullage waste. The plant shall comprise of preliminary, secondary (chemical & biological) and tertiary treatment units. The treated effluent shall be recycled and reused for flushing and for horticulture requirement of the premises. The apacities as per the attached Annexure P01

Water Supply П

2.1 Water Demand

Water requirement has been calculated for the Residential development, villas and Clubhouse. Annexure - P01 will give the detailed break of Water demand

- The quantity of water required for various applications have been assessed, based on guidelines laid down in National Building Code of India and best industrial practices
- Total per capita water 135 lpcd as per NBC out of which domestic water demand is 90 lpcd & flushing water requirement is 45 lpcd. For the club house, domestic water demand is 50 lpcd & flushing water requirement is 20lpcd
- Total water requirement is anticipated to be with 30% reduction water demand by providing low fixtures to optimize the water consumption
- Treated waste water from STP used for flushing & irrigation system

2.2 Source of Water

It is expected that the daily potable domestic water requirement for the Service shall be met through Tanker Water supply until we get water from the Local Water supply board

The water drawn from each tube well shall be limited to a maximum of 5 hours operation per day. Potable tanker supply shall be resorted only if bore well yield is not sufficient to meet the water requirement.

Source of water from back water after thorough review, if feasible with suitable treatment (Viz Desalination process)

Desalination

- Projects is close to sea shore hence water is expected to be brackish
- Following are the features pertaining to the Desalination Treatment:
- Typical salinity level in sea water in India varies from 15000 PPM to 25000 PPM
- Brackish water cannot be used for domestic purposes without treatment.
- The water has the tendency to corrode /scale depending on the feed PH and TDS levels.
- After analyzing water sample analysis report suitable treatment Viz Desalination treatment shall be verified.
- Desalination System comprises of pretreatment followed by desalination module followed by final post treatment.
- Pretreatment system comprises of filtration System, iron filtration.
- Desalination system comprises of different types of dosing followed by high pressure pumps RO membrane modules.
- Post treatment could comprise of demineralization and disinfection systems.
- The detailed schemes shall be worked out based on the characteristics of the feed water sample.
- The approximate cost for the above said treatment would be about INR 35 per Cu.m (1000 liters) of brackish water.

2.3 Water Type & Treatment

Water treatment plant shall be provided in accordance with IS 10500 and the various requirements of use. The various types / quality of water and their water treatment plant are as follows:

Domestic Water: Water sourced from the Tanker and tube well shall be passed through basic water treatment plant comprising of multi grade filters, activated carbon filters, Softeners and UV Units. Further specialized treatment if required, may be provided based on the source water analysis report. Water shall be used for domestic usage in toilets (wash basin, Shower, health faucet), Kitchen, water body makeup, filter back wash and other areas where direct human contact / use is envisaged. Water softener shall be customized to ensure water hardness in accordance to drinking water Standards. Even though the water is treated to the level of drinking purpose, there could be a contamination due to long time storage and distribution lines (unless the copper or stainless steel is used). Hence we would recommend to use the water purifier at the apartment level.

Flushing Water: Flushing water shall be sourced from the sewage treatment plant (STP). The treated effluent for flushing shall be obtained after tertiary treatment at STP. The tertiary treatment shall comprise of multi-grade filters, activated carbon filters and UV Treatment Units. Standby hypo dosing unit shall also be provided in case of breakdown of UV units. The treated effluent shall be color-less, odorless and shall be in acceptable chemical / bacteriological parameters as per local pollution control board laws.

Hot Water: Geyser shall be used as a source of Hot water for villas and apartments apart from solar water generation if any

Recycled Water from STP: Water recovered from tertiary sewage treatment plant shall be used for Flushing and landscape water requirements.

2.4 Water Storage

It is proposed to have 1.5 Day Storage at Ground level at club house. Refer annexure P-01 for the details

2.5 Water Distribution System

The domestic and flushing water supply distribution system shall be through <u>Hydropuematic</u> Feed to ensure minimum pressure of 15- 20 psi to the most hydraulically remote fixture during minimum pressure and maximum flow conditions. The maximum pressure permitted to fixtures will be 80 psi and maximum set pressure to fixture shall be is 45 psi.

Main Underground water storage tank and pump room housing, water treatment plant, Filter feed pumps shall be proposed below ground..

Full way gate valves of approved make shall be provided as close to the underground tank as practicable on every outlet pipe from the storage tank, except the overflow pipe. Overflow and vent pipes shall terminate with mosquito proof grating.

The overflow pipe shall be so placed as to allow the discharge of water being readily seen. The overflow pipe shall be of size as indicated. A stop valve shall also be provided in the inlet water connection to the tank. The outlet pipes shall be fixed approximately 50mm above the bottom of the tank towards which the floor of the tank is sloping. A separate clean outlet at tank bottom slab level to be provided to enable the tank to be nearly emptied for cleaning.

The pipe sizing shall be based on fixture unit calculation as per ASPE standard. Velocity for risers will be up to 2.0m/sec for up to 65mm dia pipe, for 80mm & above pipe dia& horizontal piping it shall be 2.4m/sec.

Water meters shall be provided in identified areas for domestic and flushing water consumption recording for efficient monitoring and assessment. Head losses through water meter shall be accounted for in water distributions calculations.

Color coding for flushing, domestic and irrigation water supply piping shall be ensured for clear identification of the piping.

The landscape water supply system comprising of pumping, piping, water supply nozzles and control equipment shall be designed and built by the appointed irrigation water supply vendor. Water for irrigation of lawns shall be sourced from recycled treated water from STP. In order avoid stagnation of water in the fire water tank overflow provision has been made and overflow pipe shall be bring down to the stilt floor parking level and shall be used for domestic applications.

Appurtenant

Following appurtenant shall be included in the design of water supply system for efficient functioning:

- 3.1 **Domestic Air Vents:** Automatic air vent shall be provided on cold water risers to eliminate possibility of air locking and to ensure efficient water flow / pressure availability at the user outlets.
- Ball Valve: Full bore gun-metal ball valve shall be provided for isolation of cold water supply for 3.2 the designated area. Further chrome-plated angle valve shall be provided for cold water isolation to wash basin faucets and for WC cistern water supply.
- 3.3 Pressure Gauge: Pressure Gauge shall be provided on cold water supply pipes for efficient monitoring of the system.
- 3.4 Pressure Relief Valves: If required PRVs shall be provided in the stacks of domestic and flushing water supply to ensure design pressure. Each pressure relief valve shall be of the fully enclosed type and fitted with hand easing gear. Each pressure relief valve in a pressure reducing station shall have a flow capacity equal to that of the pressure reducing valve. Pressure relief valves in locations other than reducing stations shall have flow capacities equal to that of the associated equipment.

Sewage, Sullage, Storm Water & Waste Drainage IV

The following parameters/ site conditions shall be kept in mind when designing the sewage, sullage and storm water drainage system:

- Natural slope of the area; •
- Layout of different facility in the complex; .
- Sub-soil water table;
- Soil condition;
- Provision of Sewage lifting station;
- Provision of venting arrangement for manholes;

- Construction of manholes & laying of pipes considering ground condition;
- Termination of vent cowl at terrace level;
- toilets

The soil and waste shall be carried down in separate independently vented pipes. Two pipe drainage systems shall be adopted as per ASPE standard. The sanitary, waste & vent system shall be water tight and gas tight designed to prevent escape of foul gas and odor from various fixtures. The sewage shall be discharged into proposed STP for recycling of waste water.

It is proposed to use SWR pipe for soil / waste drainage for internal drainage system. The soil & waste piping shall be in sunken slab/above false ceiling and the horizontal header shall be subsequently connected to the vertical stack located inside the associated pipe shaft which shall be coordinated carefully with other services and in consultation with Architect.

Provision for cleaning and rodding eyes (clean out) shall be made at strategic locations to allow the system maintenance

Drain channel shall be provided in the plant room areas within the floor fill above the raft. Drain channels shall be provided with adequate slope to affect self-cleaning velocity and shall terminate in sumps. For each sump, 2 nos. submersible pumps (1 working + 1 standby) shall be provided for disposal of collected run-off. Pumps shall be installed in identified sumps and shall be operated by Hi-Low level switches with automatic changeover between both pumps.

Separate and independent rain water drainage system shall be provided for collecting rain water from terrace, paved area, lawns and roads. Independent rain water down takes of appropriate size and number shall be provided in close coordination with Architect. The collected roof water shall be stored in UG Rainwater Harvesting Tank. The stored water shall be pre-treated and used for domestic applications.

A separate storm water collection sump to be provided at the exit of the storm water drain to collect the maximum storm water & the over flow of this sump will be let into the external storm water drain. The collected water shall be used for other applications

Provision of adequate slope for horizontal header in the under slung pipes especially for

Design Criteria

The system shall be designed as per following design criteria stipulated in the "Manual for Sewerage & Treatment" published by the Central Public Health and Environment Engineering Organization, Ministry of Urban Development, Govt. of India, IS-SP/35(S&T)-1987 and National and International practices on the subject.

а.	Flow of sewage	:	80% of water supply (peak flow)
b.	Peak flow	:	3 times average flow
С.	Min. diameter of pipe	:	150/200 mm dia
d.	Min. velocity in pipe	:	0.6 mps
e.	Max. velocity in pipe	:	3 m / second
f.	Flow conditions in pipes:		
	Pipes upto 400 mm dia	:	0.50 full running
	Pipes above 400 mm dia	:	0.67 full running
g.	Min. depth of pipe below ground level	:	
	For branches	:	0.6 m
	For other	:	1.5 M
h.	Formula for calculation and design of sewer lines	:	Manning's Formula

Sanitary Fixtures and Fittings V

The selection of sanitary fixtures and fittings shall be carried out in consultation with Architect. However, based on past experience, the following selection is proposed:

 All sanitary wares shall be white vitreous china. Water closets (European pattern) shall be wall hung. Water closet shall be provided with concealed dual flush type cistern.

- All wash basins shall be of white vitreous china under counter, oval wash basin, mixer connected by CP angle stop cocks below the counter.
- All sinks in kitchens shall be of stainless steel with single / double drain board and mixer fittings

With CP waste coupling and bottle trap.

Suggested to use Low flow water fixtures.

VI Sewage Treatment Plant

It is proposed to setup a treatment plant for treating the domestic waste, kitchen waste adopting Sequencing Batch reactor using diffused aeration. The other modes of treatment considered before arriving at activated sludge process are FAB (Fluidized Aerobic Bio Reactor), ASP (Activated Sludge Process) etc. The advantages and disadvantages of the each scheme, initial investment and maintenance cost etc. were compared and finally arrived at providing a STP using SBR - Sequencing Batch Reactor. The treated effluent shall be of a quality suitable for use as make-up water in cooling towers of air conditioning system, for flushing and irrigation purpose.

In order to conserve water, sewage treatment plant shall be designed to ensure that treated effluent (water) characteristics are well below the permissible limits, even under varying flow conditions which are typical for such systems. This implies that the selected process shall be able to withstand shock load situations.

The centralized STP system is proposed for two phases development

STP Capacities – Refer Annexure P-01

Following parameters shall be adopted as per PCB norms for the design of sewage treatment plant. Parameters for design of sewage treatment plant.

Parameters	Standards		
рН	6.0 - 9.0		
BOD	Less than10 Mg/L		
COD	Less than 60 Mg/L		
Turbidity, NTU	Less than 2		
E-coli	None		
Res.Cl2	About 1 Mg/L		

fitting and waste coupling with CP bottle trap fixed to the outlet. Inlet connections shall be





VII Material of Piping

Following material for piping are proposed to be used on the project:

- CPVC Pipes for domestic water and hot water supply, uPVC pipes for terrace and shaft piping • and underground installations for cold water supply.
- uPVC SWR class pipes for internal toilets.
- uPVC SWR class pipes for stack in the shafts .
- uPVC SWR class Pipes for rainwater pipes in shaft & header pipes in basements
- From 150 dia up to 315 dia HDPE pipes and from 450 dia to 600dia Hume pipes for external storm water drainage system.
- HDPE/ ECO drain pipes for sewer lines
- For invert levels up to 1m is proposed to go with FRP inspection chambers / manholes for sewerage/storm water system maintenance applications.

For invert levels more than 1m, is proposed to go with Masonry inspection chambers /manholes \bullet for sewerage/storm water system maintenance applications.

VIII Solid Waste Management:

INTRODUCTION

- Solid waste is the waste arising from human activities that are normally solid and that are discarded as useless or unwanted.
- The different sources of solid waste and different types of solid wastes are indicated below:

GENERAL SOURCE OF SOLID WASTE

Source	Types of solid wastes.
Flats	Food wastes, dry waste lik
Open areas	Agro waste, rubbish etc.,
Treatment Plant Site	Treatment plant wastes ar [After filter press process]

The main elements comprising solid waste management system is as follows:

Inorganic Wastes Organic Wastes	
- Glass	- Food waste
- Plastic	- Rotten Vegetable & Fruits
- Textiles	- Garden Trims
- Rubber	-Etc
- Leather	
- Etc	

ke paper, plastic etc., nd residual sludge.

NET WASTE

 Kitchen waste – Vegetable & fruit peels, food items, dried flowers etc. Use plastic bag & Biomedical waste - Sanitary napkins, tie it securely. diapers, soiled cloth, syringes etc.



DRY WASTE		
PAPER		
 All kinds of books Envelopes, cards, notices, pamphlets, fillers Shredded paper, bits of paper 		
 Carton boxes, pizza boxes 	Emptied, opened out and folded flat	
 Milk, juice tetra packs 	Rinsed and dried	

PL	ASTIC		
	Milk pouches/covers	Rinsed and dried	
	Any wet plastic covers/bags	Rinsed and dried	
	Plastic wrappers, gift wrappers		TESO S
	Plastic food containers	Washed and dried	
•	Mineral, juice and PET bottles	Rinsed and dried	
	Shampoo bottles	Rinsed and dried	RECYCLE
	Broken toys (non-electronic)		PLASTIC BAGS
•	Any other broken plastic		

М	ETAL	
	Metal cans/tins	
	Foils	
	Old vessels	Acc ¹
	Any other metal items	

GLASS		
 Glass bottles 	Rinsed and dried	
 Ketchup bottles 	Washed and dried	
 Bangles 		
 Mirrors, glasses 		

- Batteries
- CDs, computers, peripherals, monitors, printers
- Mobiles
- Any electronic or electrical parts/toys, PCBs
- Tube lights, Bulbs

DAY TO DAY SOLID WASTE MANAGEMENT

- · Day-to-day management of the municipal solid wastes is complex and costly in terms of manpower and methodology adopted.
- Direct activities that must be considered and coordinated on a daily basis include waste • generation rates, on-site storage, collection, transfer, transport, processing and disposal.

PRIMARY SORTING AT SOURCE

- Organic waste such as kitchen waste, which is biodegradable, should not be mixed with inorganic waste.
- The individual household should have two containers for inorganic and organic waste.
- Special household waste such as battery, bulbs, fluorescent tubes, should not be mixed with • both and disposed off separately.

ONSITE HANDLING

- On site handling refers to the activities associated with the handling of solid wastes until they are placed in the containers used for their storage before collection.
- Depending on the type of collection service, handling may also be required to move loaded • containers to the collection point and to return the empty containers to the point where they are stored between collections.



STORAGE OF SOLID WASTE:

Service Storage Area:

- Arrangements shall be made to store the wastes in service storage areas in a segregated manner.
- A water point is provided in the storage area for cleaning purpose and a floor drain is provided to drain the same.
- The leach ate / wash water will be sent to nearest STP for treatment.
- Segregated Garbage organic and inorganic waste at Flats shall be collected in three types of bins.
- Bin-1: This will be for collecting organic solid waste.Bin-2: This will be for Inorganic-1 type waste like paper, board, cartons, thermocol packing, etc., moderately combustible once.,
- Bin-3: This will be for Inorganic-2 type waste like plastic, glass & metal etc., which has less combustible property.



- These bins shall be stored in Garbage room.
- The other non-municipal solid waste like e-waste, battery shall be disposed according to the applicable Environmental Rules.
- Organic waste are pulverized by Waste converter
- Pulverized organic wasted can be used as composts for garden/ Landscaping/can be sold to farmers.
- Inorganic wastes like paper & board are segregated & sent for recycling/ Incineration.
- Other inorganic wastes like paper, metal & glass are segregated & shall be sold. QUANTITY OF SOLID WASTE GENERATED

Solid Waste Generation – Refer Annexure P-02

WASTE DISPOSAL SCHEME – DOMESTIC WASTE

1. ORGANIC COMPOSTING



IX STORM WATER MANAGEMENT

Rainwater drainage system will be provided for collecting rainwater Paved area, lawn & roads. Independent rainwater down takes of appropriate Perforated pipe drainage system will be provided for open-to-sky courtyard/lawn.

Surface runoff will be conveyed through the Hume pipe and catch basin at regular intervals on main roads (main storm water network).

Surface water from the villa will be conveyed through Bio swales and overflow connected to main storm water network.

Surface run off will be diverted to Water retention ponds for harvesting and recharging to improve the underground water table. Extent of recharging would be purely depends on the soil characteristics.





ed soil or

loose aggregate



Vegetated Swale

X Hot Water Generation & Distribution

Hot water system comprising of or Pre heated water from solar source (Solar panels), to cater for simultaneous hot water requirement of all Apartments. Independent Centralized Hot water system is planned for Building 1 & Building -3 types as preheated water short fall temperature shall be boosted through localized geysers.

A Unit comprise of generating 1600 Liters Hot water per day from solar source is planned on
Building-1 Terrace level with 16 numbers of solar panels.
A Unit comprise of generating 2000 Liters Hot water per day from solar source is planned on
Building-1 Terrace level with 20 numbers of solar panels.
Hot water shall be supply through Ring main at the terrace and branch lines to individual geysers at toilets as preheating water supply

ELECTRICAL SERVICE

CONTENTS

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Х	Power factor correction
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XIII	Lightning protection
XIV	LV System

PROJECT BRIEF I

- The current phase development requires a demand of 688 KVA- refer annexure 1 for detail
- Construction would happen phase wise
- Multiple blocks would have Transformer located centrally
- The standby power would be provided with partial back up to grid power
- Each Block to have exclusive Electrical room
- The power transmission to each Transformer Yard would be through 11kV cabling
- Provision for Communication path for all the blocks

DESIGN REFERENCE & GUIDELINES

The following standards and codes shall be followed/ referred during detailed design of the services:

- Indian electricity rules
- National Building Code
- National electric code
- Energy Conservation Building Codes
- Bureau of Indian Standards
- JERC rules & regulations
- Local CEIG norms
- Energy conservation building code

STATUTORY REQUIREMENTS

- Single-phase 2 wire 230V supply for C.L not exceeding 3kW •
- Three-phase 4 wire 415 volts for C.L above 3kW
- The power supply for connected loads / contract demands above 70 KVA but less than 1000KVA is released at a voltage of 11kV & above 1000KVA the same is released at 33KV voltage
- Point of supply Supply shall be given at a single point, in premises, at the outgoing terminal of the • Licensee's cut-outs fixed after: (a) Meters in case of Low Tension consumers. (b) Control switchgear that may be installed in Licensee's or consumer's premises as agreed mutually in case of High Tension consumers.
- All electricity supplies shall have power factor of 0.9 & above in case of LT supply
- Power Transformers of proper ratings with high efficiency & with less losses as per ECBC guidelines to be considered
- Balancing of Load.— The consumer taking three-phase supply shall balance his load between the phases as per IE Rules
- Metering room / Electrical room shall be in Ground floor •
- The DG's sets shall comply with the noise limit of 75dBA at 1M

TARIFF TYPE

LT POWER SUPPLY				
SL. NO.	TARIFF CODE	TARIFF TYPE	USAGE	CRITERIA
1	LT DS-1	Domestic	BPL housing	< 100 watts & 30KWH
2	LT DS-2	Domestic	Housing & Colonies	<150KWH
3	LT NDS-1	Non-domestic	Commercial, retail, shops etc.,	< 75KW
4	LT NDS-2	Non-domestic	Old age stay, orphange etc.,	< 75KW
5	LT NDS-3	Non-domestic	Neon sign boards	< 75KW
6	LT IAS-3.1	Irrigation & agriculture	Irrigation & agriculture	< 25 HP
7	LT IAS-3.2	Irrigation & agriculture	Irrigation & agriculture	< 100HP
8	LT IAS-3.3	Irrigation & agriculture	Poultries, flower ponding etc.,	< 100HP
9	LT IS-4.1	Industry	Indutrial use	< 25 HP
10	LT IS-4.2	Industry	Industrial use	< 100HP
11	LT PWW	Water supply boards	Government controlled STPs, plant room etc.,	< 100HP
12	LT PL	Publiclighting	Street lighting	< 75KW
13	LT BS-1	Domestic	Domestic bulk metering	30KW to 75KW
14	LT BS-2	Non-domestic	Non domestic bulk metering	30KW to 75KW
			<u> </u>	

TARIFF PATTERN – would vary time to time

DOMESTIC

1. <u>LTD</u>

2.

1 st 60Units	– 100Ps./Unit
61-250units-	- 150Ps/unit
251-500units	- 220Ps/unit
> 500units	- 250Ps/unit
LTD (MIXED)	
1 st 400Units	– 230Ps./Unit
400units	- 300Ps/unit

DESIGN BASIS IV

1.	Metering	-	LT metering for
2.	Total EB Power requirement	-	688kVA
3.	Total DG Power requirement	-	304kVA
4.	Power allocation on EB	-	1BHK : 3kW
			2BHK : 4kW
			3BHK : 5kW
			Villas – 8kW
5.	Power allocation on DG	-	partial backup Annexure-2
6.	Metering to each apartment monitored by JNERC	-Indepe	ndent metering
7.	One earth leakage circuit break	er (ELCB	, 30mA) for each
8.	Modular Switches		
9.	Telephone & TV points in Maste	er bed ro	om & living for
10.	Data points in Master bed room	I	
11.	AC provision in all the bed room be done by the end users	ns & livin	g in LRD & villa
12.	Auto source Change over betwe	een EB a	nd DG supply th
13.	Timer & sequential controls for	commo	n area lighting
14.	Power saving methods to meet	MOEF re	equirement
15.	Early streamer lightning protect	tion for t	he LRD building
16.	Special Services		

- Power status indication in each flat: To know the source of power in each apartment.
- Boom barrier For entry & exit gate
- Car charging points is proposed for the LRD at 10% of total carking slots

r Apartment blocks & Villas

for all units, villas and 100% for utility load -Refer

ng to each apartment, villa & utility loads

ch apartment

r LRD and living & all the bedrooms in villa

with sleeves for copper pipes but drainage would

hrough ACCL

g and villas

• CCTV – In each tower main lobby, external periphery & club house as per client's requirement

V **SCOPE MATRIX**

HT WORKS

- Incoming HT cable
- RMU & HT panel
- Transformers ٠
- LT Kiosk
- Earthing

LT WORKS

- LT panels
- LT cabling
- DG set and associated works
- Common area Lighting
- Electrical works related to Utility loads ٠
- Sub main cabling to each Apartment & villas
- Internal electrification for each Apartment & villas
- Earthing

EQUIPMENT SIZING VI

REFER ANNEXURE-1 FOR DETAILED BREAK UP OF LOAD MATRIX & TRANSFORMER SIZING

REFER ANNEXURE-2 FOR DETAILED BREAK UP OF LOAD MATRIX & DG SIZING

- RMU & HT panel at the incomer with fault level rating of 25KA •
- Transformers are located outdoor
- Transformers are of 11kV/0.433V oil type
- Transformers shall be copper wound and connections shall be delta on high voltage side and star on low voltage side, with neutral terminal brought out for solid earthing corresponding to the vector symbol DYN-11. Off-load tap change on HV side shall be with tapings for variation +5.0% to -7.5% in steps of 2.5%..
- Transformers shall be designed with latest technology, which shall have more efficiency with low losses. These losses shall be as per ECBC-2007
- A. <u>DG</u>
- DG's are located nearer to the Transformer yard
- Residential silencer shall be provided for each DG set. •
- Independent flue pipe from each DG set shall be taken though a standalone flue shaft structure. The height of the Flue gas shall be as per pollution control board norm.
- Acoustic insulated housing shall be provided for all DGs as per CPCB norms in order to minimize disturbance to occupants.
- Engine cooling will be achieved through Radiators mounted along with each engine •
- LRD buildings to have its own DG set , similarly Villa development to have exclusive DG

VII **FACILITY MATRIX**

Following facilities (not limited to) shall be provided for each of the unit.

REFER ANNEXURE-3 FOR DETAILED FACILITY MATRIX OF ALL TYPES



POWER DISTRIBUTION VIII

- Total power shall be tapped from the Transformer station within the project site
- Substation shall receive power from nearest tapping point of GOA power supply point
- 11Kv HT power shall be received from the tapping point through underground HT cables as ring main
- Multiple numbers of 500kVA transformers (Refer annexure-1) are proposed to locate within the site premises
- HV & LT switchgear protection and tripping system shall have 24 volts DC power supplies though dedicated sealed maintenance free battery pack with battery charger.
- For LRD buildings LT Power from Transformer shall be tapped to the Metering panel using 1100volts suitable size LT cable located in the stilt floor of each LRD building

- For the Villas The power supply from the Transformer would be distributed to the outdoor feeder pillars and further distributed to each of the villa unit
- EB Energy meters will be located in the Metering panel, the location of metering panel would be at the stilt floor for the LRDs and within the villa plot for all the villa units
- Power to the individual apartment or Villas are tapped from Metering panels through sub mains cables / wires running in shaft or in the floor/roof of villa unit
- LT Power from DG sets shall be brought to the DG change over panel located in the stilt floor electrical room of each LRD buildings. Similarly, DG power for the villas would be distributed through the outdoor feeder pillars and then to each of the villa
- The provision for the DG power consumption meter would be made for all the LRD units and villas
- The Changeover from EB to DG for LRD units would be done using ACCL (automatic source changeover with current) located in DG change over panel for LRDs and the same is located in metering panel for the villas
- The Changeover from EB to DG for utility loads are done using breakers interlocking or through ATS (Auto transfer switch) located in DG change over panel placed in electrical room of LRDs
- Functions Benefits of ACCL:
 - While monitoring the Mains supply, ACCL allows full load current
 - limiter
 - over load still exists. The unit can be reset at the ACCL level
 - be drawn.
- Distribution from the Metering panel to various LRD units & villas will be carried out through MSCC wires in PVC conduit till the apartment DB

- While monitoring the generator supply, ACCL allows only essential load and functions as load

Whenever the load current exceeds the pre-set limit, power is automatically switched off instantaneously and reset automatically after pre set time and trip again if the over load still exists, this cycle is repeated for few cycles as required and it will go into sleep mode if the

On resumption of the mains supply ACCL automatically changes over to EB, and full load can

- A dedicated room and associated riser shaft for power and ELV Services is planned for power cable & ELV services
- All riser shafts/openings at each floor shall be sealed and using fire sealant as a fire protection measure shall seal all floor wall penetration.
- Metering Panels, Utility panels shall incorporate moulded case circuit breakers/MCBs and shall be located on area basis. Final distribution boards shall incorporate miniature circuit breakers of 10 KA minimum interrupting capacity (MCB) & residual current circuit breaker of 30mA (RCCB) and shall be fed from these MDB's & SDB's by means of either PVC insulated aluminum armored cables or PVC insulated copper wires in appropriately sized MS/PVC conduits. 15-20% spare capacity shall be provided in all distribution boards/panels.

IX **EMERGENCY POWER -**

DIESEL GENERATORS 1.

- DG standby power is provided for each LRD units a, villas and & utility loads
- The sizing of the DG sets are arrived to suit phasing development Refer Annexure -2 for the detail •
- The DG for LRDs and Villas are planned separately ٠

POWER FACTOR IMPROVEMENT Х

- Power factor compensating multiple capacitor units would be provided for the Utility loads or ٠ maintenance of average power factor 0.95 to unity to have effective savings in energy cost
- Capacitor banks shall be provided for all inductive loads

XI LIGHTING

- Generally, all normal lighting of internal common areas shall be carried out using light fittings with linear T5 / LED lamps in Stilt, compact fluorescent lamps in balconies of flats, lift lobbies & staircases.
- The light fixtures be provided for all the common areas, such as building entrance vestibules, staircases, elevator lobbies, parking, all equipment plant rooms, electrical rooms, stilt corridors, security room communication, etc.,.
- The types of light fittings and their locations to be established with a view to meet the architectural concept and also to achieve as a minimum the illuminance levels recommended by Standards.

- The enclosures and ambient temperature tolerances of all light fittings shall be suitable for the • environment in which they are installed.
- Illumination levels shall generally be, as a minimum, those values shown below:

SI.No	Area description	Lux levels
	COMMON AREA	
1	Reception Lobby	300
2	Lift Lobby	200
3	Staircase Lobby	200
4	Passage & corridors	200
5	Covered parking areas - Driveway	30
6	Covered parking areas - Parking slot	15
7	Open Parking slots	5
8	Open to Sky driveways	15
9	Open to Sky Pathways	10
10	MEP service rooms	200
11	Rest rooms	200
	APARTMENTS	
1	Living	100-150
2	Bedroom	100-150
3	Toilet	100-150
4	Study area	200-300
5	Dress	200-300
6	Kitchen	200-300
7	Utility	100-150

EMERGENCY LIGHTING

- Emergency lighting shall be with hybrid type Inverter •
- All mid-landing lights in staircase will be on emergency lighting
- Stilt floor entry / exit shall have emergency lights
- All floor lobbies shall have 1 light on emergency

EXTERNAL LIGHTING

- External lighting shall be done as per the design given by the landscape architects.
- Quality Criteria considered luminance, Uniformity & Glare Index
- LED Solar light fixtures would be a preference
- Fixtures would meet the Green Building concept/LEED
- Exclusive meters for Public road
- Energy efficient fixtures would be considered



SAFETY REQUIREMENT XII

- Each apartment is provided with Earth leakage miniature circuit breaker (ELCB) as incomer and suitable rating MCB outgoings for lighting and power circuits which will protect the human body against over load (O/L), short circuits (S/C) and earth leakage (E/L)
- Sub main cables running in cable trenches / Hume pipes are also protected from O/L and S/C through MCB provided in the Metering panel
- The cable running from transformer to Metering panel are also protected from O/L and S/C through • Moulded Case Circuit Breaker (MCCB) provided in the Compact substation
- Earthing system shall be designed in accordance with BIS 3043 •
- Dedicated earthing pits shall be provided for neutral earthing of equipment like Transformers & • D G sets
- Interconnected Earthing stations shall be provided for body earthing of equipment like HT Panel, transformers, D G sets, LT panel etc.
- Distribution earthing shall be carried all along the MV distribution system, and effectively bonding the equipment.
- Earthing for light and power points shall be carried out with insulated copper earth wire running throughout the length of the circuit and shall be terminated at equipment, fixtures, etc.,

- system: Transformers Metering panels DG sets body DG sets neutral EPABX Security system Elevators Lightning arrester
- All the pits and main earthing bars are to be connected to each other to make a common earthing electrode grid. The resistance earth path is proposed to maintain within 1 Ω .
- Rubber floor mats are provided in electrical room
- Hand gloves inside electrical room
- Earth bus to be provided near all equipment's where ever is earthing is done
- FRP trays for earthing are provided •
- In all switchgear panels, feeders to be clearly labelled with name / type designation Labelling
- Doors mounted with live equipment in any panel to be earthed with flexible braided conductors

LIGHTNING PROTECTION- FOR LRDs & Villa's XIII

- Lightning Protection is planned based on IS 2309 using Conventional type Air Finals and connected with GI pipe or with early streamer type protection
- Earth Resistance value would be planned to maintain less than 10 Ohm
- All horizontal air terminations shall be interconnected such that no part of the roof is more than 5 m away from the nearest horizontal conductor (For type 2 Protection)
- Roof & Down Conductor is planned with 25 x 3mm Aluminum strip on DMC insulator supports at every 1.5 mtr interval.
- Number of down conductors & Earth stations are one for every 10M of periphery. Optionally, we can look at using structural column as a down conductor

- Every down conductor is proposed to be connected to a separate earth station and looped to ech other
- There would be a test link at 1.2M from Ground level for every down conductor

XIV LV SYSTEMS – to suit Zuari requirement

1. Security System

- The integrated security system uses near optimum blend of human factor and modern technology designed to provide maximum, yet cost effective, security cover to the users and assets within the Building Complex.
- All systems will be discreet enough so as not to upset the ambience of the Complex and yet be effective enough to achieve the basic goal of protection and reliability.

2. Closed Circuit Television (CCTV) Systems

- Close Circuit Television System is a system comprising of Pan Tilt Zoom and Fixed Cameras that coupled with Digital Video Recorder.
- All the events viewed on the camera can be viewed and simultaneously recorded.

Indoor CCTV System

- Security cameras will have a minimum resolution of 460 TV lines and be adjustable by remote control. The cameras will provide colour images.
- Mainly will be used fixed cameras with fix zoom lenses.
- Cameras will be provided inside each tower main lobby
- The central unit will be located in the security room.

Outdoor CCTV Systems

- Outdoor PTZ and fix cameras are used to monitor the activity outside the Building (limited to building's periphery and entry/exits), at entries (to monitor access doors),
- The cameras will have a minimum resolution of 460 TV lines and be adjustable by remote control.
- Depending on their position and use, the cameras will be directly and have zoom capabilities; cameras will be suitable for external usage (IP54 protection)

- The central unit will be located in the security room. The power will be supplied from one of the UPS networks with generator backup. Digital Video Recording System
- Digital Video Recorders receive all the output of the cameras and convert them into digital form. The Digital video manager software will enable viewing of any camera on a PC
- Operator workstations, digital video recorders, control equipment of the CCTV system will be installed in the security control room. CCTV data storage will be installed in PABX room and connected with the digital video recorders by optic fiber and copper-core cables.

3. Telephone System

- The buildings will be designed with a telephone system
- The central equipment for telephone in the building will be located in a PABX room, which is on stilt floor level. And in the security room
- The multi pair cabling going into the building will be provided by an service provider.

4. Cable Television Network

- Coaxial & telephone cable from all apartments to shaft shall be provided
- Dish shall be mounted on the terrace of each tower by service provider with vertical cabling & splitter box
- Communication cable from main entrance to the communication room shall be considered
- 5. Optionally, Fiber optic cable design for apartments for TV, Telephone & Data
 - The system works on **Triple play**, which caters to Voice calling, data, & IPTV through a single fibre optic cable. Also enables for Energy management, CCTV surveillance, Recording, Building Control and monitoring
 - Gated community Video & Voice calling (IP Enabled) which consists of Lobby phone at the main lobby of each building, Security Desk phone (at each Security Desk), Door Call bell (at each apartment door), Desk phone inside each apartment, Tab with communication app inside each apartment & Desk phones at Admin and other critical areas
 - Boom Barrier IP Access Control
 - Common Area CCTV System
 - Central Control and Recording of CCTV streams
 - Distributed monitoring per building
 - **Community Portal** Complex news and Broadcast messaging, Individual messaging, Emails, Provisional Services

Sample Triple play system

- All Telecom providers for Voice as well as Data will terminate their service at the entry of the building for gated communities
- Single dish/Termination point per TV (DTH and cable TV) service provider
- Single Fiber optic cable for all the services to each home
- Choice of service provider for each customer separately for Voice, Video and Data

FPS SYSTEM

I. REFERENCE STANDARDS

NBC ; National Building Code of India Part IV for Fire Protection System Bureau of Indian Standards

II. CLASSIFICATION

The building has been classified, as Residential buildings, Group – A, Sub -division A3, Building consisting of Stilt and 5 Upper floors of

SYSTEMS PROPOSED

SI. No.	Description	Area / Building	Remarks
1	Down comer System	All Blocks	Inside the building in the dedicated shaft
2	Automatic Sprinkler System		Only at Stilt parking
3	Fire alarm system	On all floors all Blocks	Manual fire alarm system
4	Two – way Public address system	On all floors all Blocks	On all staircases
5	Fire Extinguishers	Compete premises	

III. FIRE WATER STORAGE TANK

As required by local fire department 25 cum. OHT capacity per riser per block has been considered, with booster pump @ terrace floor per riser to deliver water at remote point with minimum pressure of 3.5bar.

IV. FIRE INTERNAL HYDRANT SYSTEM

Internal hydrants shall be fitted on the down comers for every 1000Sqmtr. All downcomer shall be of minimum 100 mm dia in size and shall be till ground floor. Each downcomer for each block located in dedicated shaft on all floors with single headed hydrant valves.



v. SPRINKLER SYSTEM

Sprinkler system is proposed to designed & installed at ceiling level for parking area. System consisting with Sprinkler mains pipes connected to downcomer, piping network with pipe supports, isolation valves, sprinklers, flow switches etc. Sprinklers are standard response pendant type, 68 deg. C temperature rating & designed to cover 9 to 12 sq. m for each sprinkler.



Fire Alarm system VI.

Fire alarm system is consisting with Fire alarm control panel, Manual call points and Hooters. Panel shall be located in the Fire control room room, Manual call points and Hooters are installed on the every landing on each staircase of each blocks. All manual call points and Hooters are connected to Fire alarm panel.



Public Address system VII.

A public address system comprises speakers located on landings of each staircases on all floors connected to a floor selector-switching console. The floor selector-switching console is interconnected to an amplifier of suitable wattage and a microphone. The console amplifier and microphone are installed close to the fire alarm control panel.



Hand held Fire Extinguishers

Fire extinguishers are proposed for parking areas, utility rooms like Electrical rooms, D,G, Rooms, Transformers, Pump rooms, STP, Lift machine rooms, Security rooms etc.

All Fire extinguishers shall be portable and hand held, an operating instruction should be pasted on the extinguisher body. Portable Fire extinguishers should be BIS (as per IS 15 683) approved and valid ISI certificates to be furnished at the time of delivery to site.





For wood, paper, textile and solid material fires	For liquid and electrical fires	For
D O NOT USE on liquid,	DO NOT USE on	l
electrical or metal fires	metal fires	elec

The contents of an extinguisher is indicated by a zone of colour on the red body of the extinguisher