

PROJECT REPORT FOR THE PROPOSED
RESIDENTIAL APARTMENT

At

AT Sy.N.47/1 & 47/2, Katha No.793/47/1/47/2,
SINGAPURA VILLAGE, YELAHANKA HOBLI,
BANGALORE NORTH TALUK, BANGALORE.
WARD NO.11.

1	NAME & DESIGNATION CORRESPONDANCE ADDRESS	Proposed Residential Building at AT Sy.N.47/1 & 47/2, Katha No.793/47/1/47/2, SINGAPURA VILLAGE, YELAHANKA HOBLI, BANGALORE NORTH TALUK, BANGALORE. WARD NO.11.
2	PROPOSED PROJECT	Residential Apartment
3	LOCATION	Proposed Residential Building at AT Sy.N.47/1 & 47/2, Katha No.793/47/1/47/2, SINGAPURA VILLAGE, YELAHANKA HOBLI, BANGALORE NORTH TALUK, BANGALORE. WARD NO.11
4	NUMBER OF FLATS NUMBER OF FLOORS	120 Nos Basement +G+4Upper floors
5	TOTAL PLOT AREA	5400.10 Sq.M
6	TOTAL BUILT UP AREA	16624.93 Sq.M.
7	TOTAL PLINTH AREA	2392.69 Sq.M
8	HEIGHT OF THE BUILDING	14.99 M
9.	PROPOSED WATER SUPPLY	Piped water supply Sourced from BWSSB = 90000 Ltrs
10.A	NUMBER OF PEOPLE	670.0 Persons
10.B	WATER CONSUMPTION IN KLD	90.0 KLD
11.	PROPOSED SANITATION SEWAGE QUANTITY IN KLD	Full fledged treatment plant 81.0KLD
11.A	S T P CAPACITY	

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12	SOLID WASTE MANAGEMENT	168.00 Kg/Day
12.A	ORGANIC WASTE	100.0Kg/day proposed to use as Manure by using organic converter
12.B	IN ORANIC WASTE	40.0 Kg/day proposed to hand over to municipal authorities.
13	COST OF THE PROJECT	35.0 Crores

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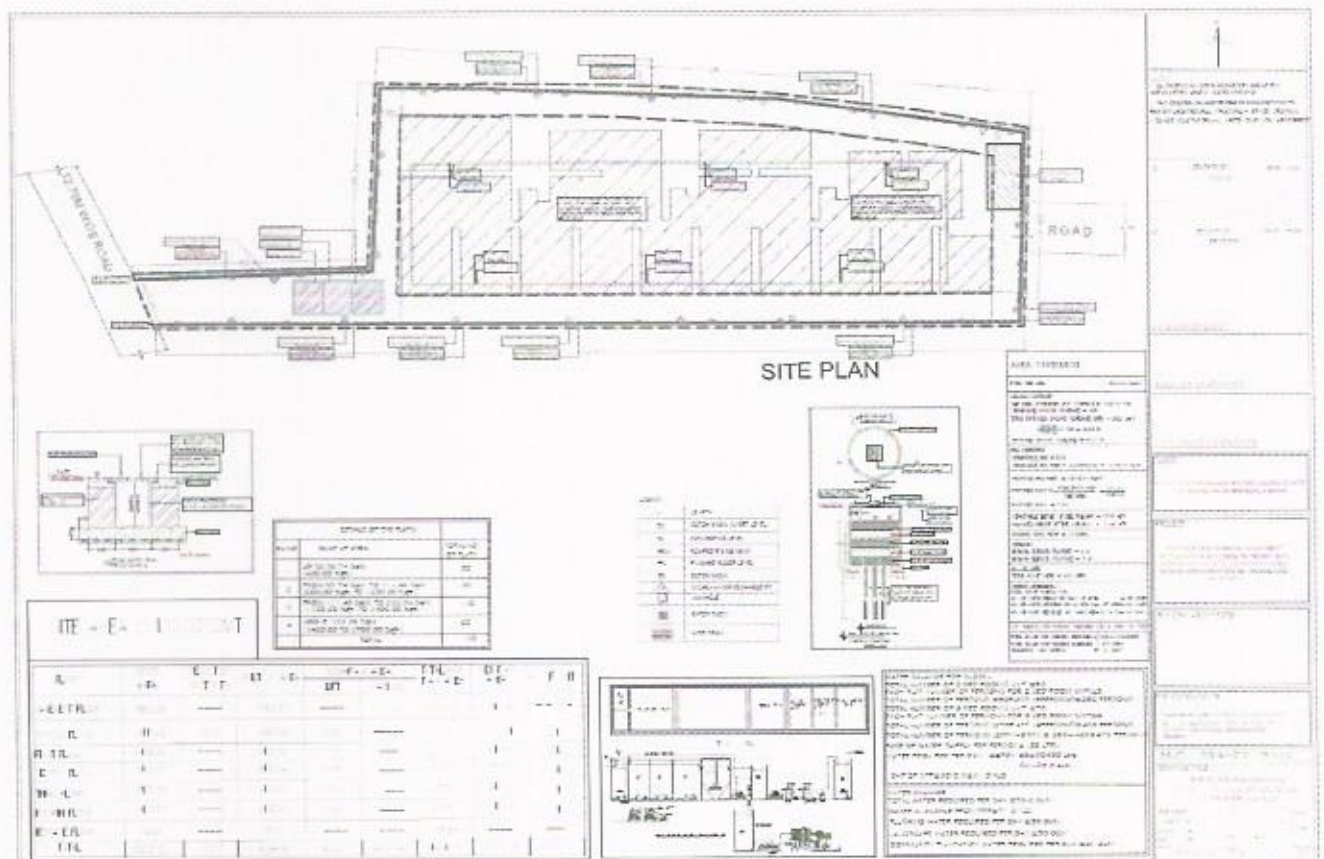
PROJECT REPORT

**PROPOSED RESIDENTIAL APARTMENT
AT Sy.N.47/1 & 47/2, Katha No.793/47/1/47/2,
SINGAPURA VILLAGE, YELAHANKA HOBLI,
BANGALORE NORTH TALUK, BANGALORE.
WARD NO.11**

CLIENT

**M/s.SRUTHIKA BUILDERS AND DEVELOPERS
Rep.By its Managing Partner**

SITE PLAN:



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K. K. K.

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- Total Rain Water Harvesting pits =15
- Road width (approach) = 12.0 MTRS
- Height of Building : = B+G+4Upper floors
- Capacity DG = 250 KVA.
- Approx cost of the project
- Total built up area – 178884.24SQ.FT (approx.)
- 1500/SQ.FT as construction cost (approx.)
- The total budget will be 25.00 Crore (approx.)
- Total Land cost 10.00 Crore.

Total cost of the project in Rupees-35.00 Crore./-(Approx

Water Consumption.

The Residential apartment being Residential water Demand is for Domestic Purpose, Public Use. It includes the quantity of water required in the houses for drinking, bathing, cooking washing etc. The quantity of water required for Domestic purposes depends on the habits, social status, climatic conditions and customs of

the people. In India on an average the domestic consumption of water under normal conditions is about 135lts/capita/day. As per IS 1172-1971, the details of the domestic consumption are as follows:

- Drinking : 5 liters.
- Cooking : 5 liters.
- Bathing : 50 liters.
- Washing of clothes : 20 liters.
- Utensils washing : 10 liters.
- Flushing of Toilets : 45 liters.

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Total : 135lpcd.

SEWAGE TREATMENT PLANT TREATMENT SCHEME

It is proposed to install STP of capacity 81,000 litres/day, Following is the scheme for treating 81,000Liters/day capacity sewage. The treated water can be utilized for Toilet Flushing & gardening. Various treatment units which have been envisaged in this sewage treatment plant are explained below.

General characteristics:

PH : 6.5-8.5

BOD5 : 250-350 mg/ltr.

COD : 500-600mg/ltr

SS : 100-200mg/ltr

The anticipated final water quality:

pH : 6 – 8.5

BOD5 : < 10 mg/lts

COD : < 100 mg/lts

SS : < 10 mg /lt.

Turbidity : < 2 NTU

E.Coli : None

Design Detail of Sewage Treatment Plant with

Sequential Batch Reactor Principle

The sequential batch reactor (SBR) process is a cyclic activated sludge treatment process. Multiple reactors are provided to treat the wastewater in batches. Sequencing batch reactors will be operated to oxidize carbonaceous BOD, nitrify the ammonia and denitrify to reduce total nitrogen to a level that meets the permit limits. All treatment processes including equalization, aeration, nitrification, and Sedimentation and decanting occur in the SBR's eliminating the need for separate clarification and return activated sludge systems. The typical SBR treatment sequence for nitrification – denitrification systems is as follows:

1. The reactor is allowed to fill with raw wastewater. The filling phase is often divided into stages that include aeration to reduce BOD and to nitrify ammonia and then mixing without aeration to promote denitrification (removal of nitrogen).
2. A reaction phase is generally provided to promote additional biological treatment.
3. A settling or quiescent phase follows to allow biological solids to settle.
4. A decanting phase is provided to draw off the clarified effluent from the

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upper portion of the reactor

5. Often a small idle phase is provided to allow time for miscellaneous operations that may need to occur to keep the reactors in sequence. Wasting of the biological solids that are produced by converting BOD to bacteria needs to occur periodically to maintain the design mixed liquor concentration and sludge age. Wasting can occur at any time in the process sequence. Frequently, wasting is performed following the decant phase when sludge concentration is highest or during react phase when the sludge concentration is consistent. The SBR's will be equipped with diffused aeration and decanting facilities. The discharge from SBR systems is higher than the inflow because the same volume of water that entered the SBR is discharged over a shorter time period. The treated water from SBR is pumped through the Pressure sand filter and Activated carbon filter for removal of suspended solids, final polishing and removal of any traces of color. For HVAC purpose part of the treated water is passed through Softener for achieving the desired hardness reduction. The effluent is then disinfected with Chlorine by intermittent dosing system. The treated sewage can be used for chillers

and flushing purposes. Excess sludge from SBR tank is pumped out periodically to the Sludge holding tank and then fed in to the Filter press for dewatering and drying during decanting phase.

Data & Assumption:-

Design Flow = 81 KLD

Influent BOD = 400mg/L

Total Suspended Solids = 300mg/L

F/M Ratio = 0.18/day

MLSS = 4000mg/L

VSS/TSS = 0.8

Maximum Volume of BOD Loading = 3.2 Kg/m³.d

Minimum Aeration Time = 4 Hr

Minimum Mean Cell Residence Time (MCRT) = 3 days

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Total No of Flats Considered	120	
Total No of 2B H K	50	
Population Per Flat For 2 BHK	5 Persons	
Qty of water required / persons per day	135	Lts
Hence total quantity of water required	135x50x5	33,750 Lts
Total No of 3B H K	70	
Population Per Flat For 3 BHK	6 Persons	
Qty of water required / persons per day	135	Lts
Hence total quantity of water required	135x70x6	56,700, Lts
	TOTAL	90,450 Lts
Hence total quantity of water required 1day		90.00 CUM
SAY TOTAL REQUIREMENT	SAY	90.00 Ltrs

CAPACITY OF STP: 90% of the volume of water supply is considered as sewage flow

Volume of sewage/day 90 x 0.90 =81.00 KLD

Capacity of STP= 81.0KLD

WATER BALANCE	
TOTAL WATER REQUIRED PER DAY	= 90.0 Cum
WATER AVAILABLE FROM STP	= 81.00 KLD
FLUSHING WATER REQUIRED PER DAY	= 30.00CUM
LANDSCAPE WATER REQUIRED PER DAY	= 30.00 CUM
COMMUNITY PLANTATION WATER REQUIRED PER DAY	=21.00 Cum

DESIGN CALCULATIONS

As part of environmental management plan to mitigate water pollution during operation phase of the project, it has been planned for implementation and monitoring of a tertiary level treatment of sewage and disposal to landscape for watering of garden plants, trees.

1.Quantity of Water:

Quantity of water will be calculated based on the population and per capita supply of water as per standard norms which is specified as above

2.Quality of Sewage:

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The quality of raw sewage generated from domestic activities and the envisaged treated sewage quality from the tertiary sewage treatment plant will be meeting the norms of the Karnataka State Pollution Control Board (KSPCB) for urban reuse standards for the following important parameters are:

Parameters	Raw Sewage	Treated Sewage (Desired quality)
Total suspended solids	450 mg/l.	Less than 20 mg/l.
B.O.D for 5-days at 20 deg.C	350 mg/l.	Less than 10 mg/l.
pH		6.5 to 8.0

3. Treatment process:

To obtain desired quality of water, the following treatment process is adopted:

Sequential batch reactor

Tertiary treatment unit with Coagulation cum flocculation, Chlorination, Two-stage Pressure filtration with sand & activated carbon bed and finally passed through Ultra-Filtration membranes.

Wastewater is organic in nature, treated economically and effectively through biological process involving microbes (bacteria, protozoa, rotifers, algae etc.) generated from microbial populations that occur and grow naturally in the wastewater itself. To proliferate the micro-organisms for oxidation of organic load in the sewage, forced aeration process adopted to provide oxygen required for biological oxidation. Sequential Batch reactor process demands the following requirements to be fulfilled for the successful treatment of wastewater containing organic pollution (BOD).

The biological process units consist of Aeration tank for reaction Clarification for removing solids/sludge generated during biological process and decanting. Micro-organisms in the Aeration tank should be kept alive and allowed to proliferate. This will automatically be ensured, when the active biological mass is continuously supplied with oxygen and nutrients. Oxygen supply is ensured when the wastewater gets induced air at the bottom of the tank through fine bubble membrane diffusers. The wastewater's deficient in dissolved oxygen (DO) get enriched through air from blower. It is a continuous process for replacing the DO used up by the micro-organisms.

The suspended matter in the Aeration Tank is called Mixed Liquor Suspended Solids (MLSS) has to be maintained at an optimum concentration of 0.05 to 0.15 kg Bod/kg MLSS.

The clarified water added with coagulant aid (flocculent) and chlorine solution for removal of turbid ness of water and killing of harmful bacteria. Further, the water is pumped to the two-stage filtration on sand & activated carbon bed for removal of suspended solids and colloids. The filtered water again passed through 0.1 to 3 micron grade ultra-filtration membranes for further removal of fine organic, bacteria, virus, algae etc. Standard pressure gauges will be installed on Pressure sand filter and on Activated carbon filter.

The schematic treatment processes are shown in block diagram. The treated effluent will be meeting the norms of urban water reuse standards as stipulated by the Karnataka State Pollution Control Board.

The excess sludge from the system will be passed through filter press for dewatering and sludge paste will be stored on sand bed for drying. Dried sludge cakes shall be used in gardening as manure.

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4.Design of Treatment Plant Units: Capacity 81 KLD

1. Bar Screen Chamber: 1 no.

The bar screens provided will stop all coarse suspensions such as rags, paper, threads, cloth pieces etc. and has to be raked clean by using the hand rake. The raking will be collected on the platform. After sometime they have to be removed and disposed off by landfill, burning.

Provide minimum size of bar screen chamber: 1.0 x 1.0 x 1.20 m liquid depth, MS bar shall be 10x10mm sq. rod placed at 20 mm c/c spacing bar screen.

2. Equalization Tank: 1 no.

The screened wastewater is collected in a collection sump for maintains uniform quality and to dampen the fluctuation of in-flow. The tank is provided with coarse bubble diffused air for mixing to avoid settlement of solids.

Quantity of sewage	81 kld or 4.2 cum per hour
Provide detention time	6 Hours
Volume of sump	25.8 cum
Provide side water depth (swd)of tank	4.0 m (swd)
Area of tank	6.45 sq. meter
Provide size of the tank	5.0m x 1.3 x 4.0 m (swd) depth with available free board
Method of construction	As Water retaining structure constructed in RCC

3. Raw sewage pumps: 2 nos.

To pump raw sewage from equalization tank to aeration tank for treatment, provide sewage solid handling pumps of minimum capacity of 3.0 HP each.

The pump will be solid handling, self-priming, and non-clog open impeller type and directly coupled to TEFC motor and 100% stand-bye unit.

4. Sequential batch reactor (S B R) tank : 1 no.

S B R process demands the following requirements to be fulfilled for the successful treatment of wastewater containing organic pollution (BOD).

Microorganisms in the S B R tank should be kept alive and allowed to proliferate. This will automatically be ensured, when the active biological mass is continuously supplied with oxygen and nutrients. Oxygen supply is ensured when the wastewater gets induced air at the bottom of the tank through fine bubble membrane diffusers. The wastewater's deficient in dissolved oxygen (DO) get enriched through air from Blower. It is a continuous process for replacing the DO used up the micro-organisms.

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The suspended matter in the Aeration Tank is called Mixed Liquor Suspended Solids (MLSS). Mixed Liquor Suspended Solids (MLSS) has to be maintained at an optimum concentration of 0.05 to 0.15 kg Bod/kg MLSS.

The tank for aeration will be fill and draw type, waste water added to the reactor is treated to remove undesirable components and subsequently discharged .

Aeration , Clarification confines in an single reactor tank , if the inlet from the sewerage system can be connected at 1.5 m from the ground level equalization tank can be eliminated , as the invert will be more the 1.5 m equalization tank is recommended.

Sludge drawn from the reactor unit will be pumped to sludge holding tank (size of 2m x 2m x 4.0m liquid depth) where in excess sludge will be pumped to mechanical filter press for sludge volume reduction.

Aeration Tank:

Design flow	81 KLD
BOD for 5-days	350 mg/ltr.
Food to micro-organism ratio	0.10 kg BOD/kg MLSS/day
MLSS concentration	3000 mg/ltr.
Volume of the tank required	$90(350 - 10) / 0.12 \times 3000 = 81.2 \text{ cum}$
Let side water depth of tank	4.0 m
Area of tank	20.3 sq. meter
Provide size of Aeration Tank	5.0x4.0 x4.0 m (0.5 m as free board)
Method of construction	RCC designed as water retaining structure as per IS

Roots Air Blowers:

Provide roots type positive displacement of air at 0.5 kg/sq. cm with capacity of Air blower **100 Cum** per hour. Quantity: 2 nos. (one working & one stand-bye)

5. Filter feed pumps: 2 nos.

Filter feed pumps of each capacity 5 HP each to pump partially treated effluent water from inter-mediate collection sump to the pressure sand filter followed by activated carbon filter.

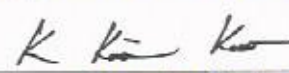
The pumps will be of mono bloc type with surface mounted and provision of one working and one stand-bye.

6. Pressure filters: 1 nos.

The partially treated effluent water put into the pressure filters (sand & activated carbon) to remove suspended solids, unsettled colloidal flocs etc. The filter consists of various grades of filtering media and operating control valves.

Design flow rate	10.75 cum/hour
Consider loading rate on each filter bed	3.0 cum/smt/hour
Filtration area required	3.58 sq. mt
Size of pressure filters	1200 mm diameter each, 1 nos.

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7. Chlorinator: 1 no.

The treated sewage contains disease-causing pathogens and should be disinfected by injecting chlorine solution to the filler outlet through electronic type constant solution dosing system. The dosing system comprising of solution storage tank and electronic dosing pump with assembly.

Residual chlorine of 2 ppm will be maintained at the outlet of the treated water

8. Mechanical Filter Press: 1 lot

Excess Sludge from the clarifier unit will be pumped to the filter press through screw pumps for sludge reduction. The removed sludge from the filter press will be putting on to sand bed for drying/storage. This sludge shall be used as manure in the gardening.

Provide recessed type filter press of plates PP material with 10 micron filter cloth. The size of plate will be 470x470mm with sludge cake thickness of 40mm. provide minimum ten chambers with mechanical hydraulic jack for closing. The working pressure of the filter press will be 7 kg/cm².

9. Piping & valves: 1 lot

All the inter-unit pipe size will be minimum size of 40mm/50mm dia. Of PVC with 6 KSC pressure and same size of ball valves type and MS air lines and PVC flexible of suitable size for air distribution to diffusers.

10. Electrical: 1 lot

The electrical includes control panel comprising of switches, interplant cabling for all power operated machinery's.

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SUMMARY OF TREATMENT PLANT UNITS:

Sl. No.	Treatment units	Size/capacity	Qty.
	Civil items:		
1.	Bar screen chambers	1.0 x 1.0 x 1.20 m depth	1 no.
2.	Equalization tank	5.0 x 1.3 m x 4.5 m Liquid Depth	1 no.
3.	S B R tank	5.0 x 4.0 x 4.5 m Total Depth	1 no.
4.	Sludge holding atnk	2.0 m sq. x 4.5 m Depth	1 no
	Mechanical items:	Equipment/ Piping/ Valves/ Electrical	
1	Raw sewage pumps	3 HP each	2 nos.
2	Diffusers	1.0 m long each	10 nos.
3	Air Blowers	100 cum/hr. at 0.5 ksc	2 nos.
4	Filter Feed pumps	5 HP each	2 nos.
5	Pressure sand filter	1.2 m dia	1 no.
6	Activated carbon filter	1.2 m dia	1 no.
7	Chlorine dosing unit	100 liters & dosing pump	1 lot.
8	Inter plant piping & valves	GI/PVC & ball valve type valves	1 lot
9	Electrical	Control panel, cable, etc.	1 lot
10	Filter Press	Plate size: 470x470x10 chambers with screw pumps, qty. 1 nos.	1 lot

Solid waste management for residential units

Total population = 670

Solid waste generation @ 250 gm per person per day

Solid waste generated = $670 \times 0.25 = 167.50$ kgs say 168.0 kgs

Organic waste 60 % of 168 = 100.80kgs SAY 100.00 kgs

Organic waste will be composted and used for land scape as manure

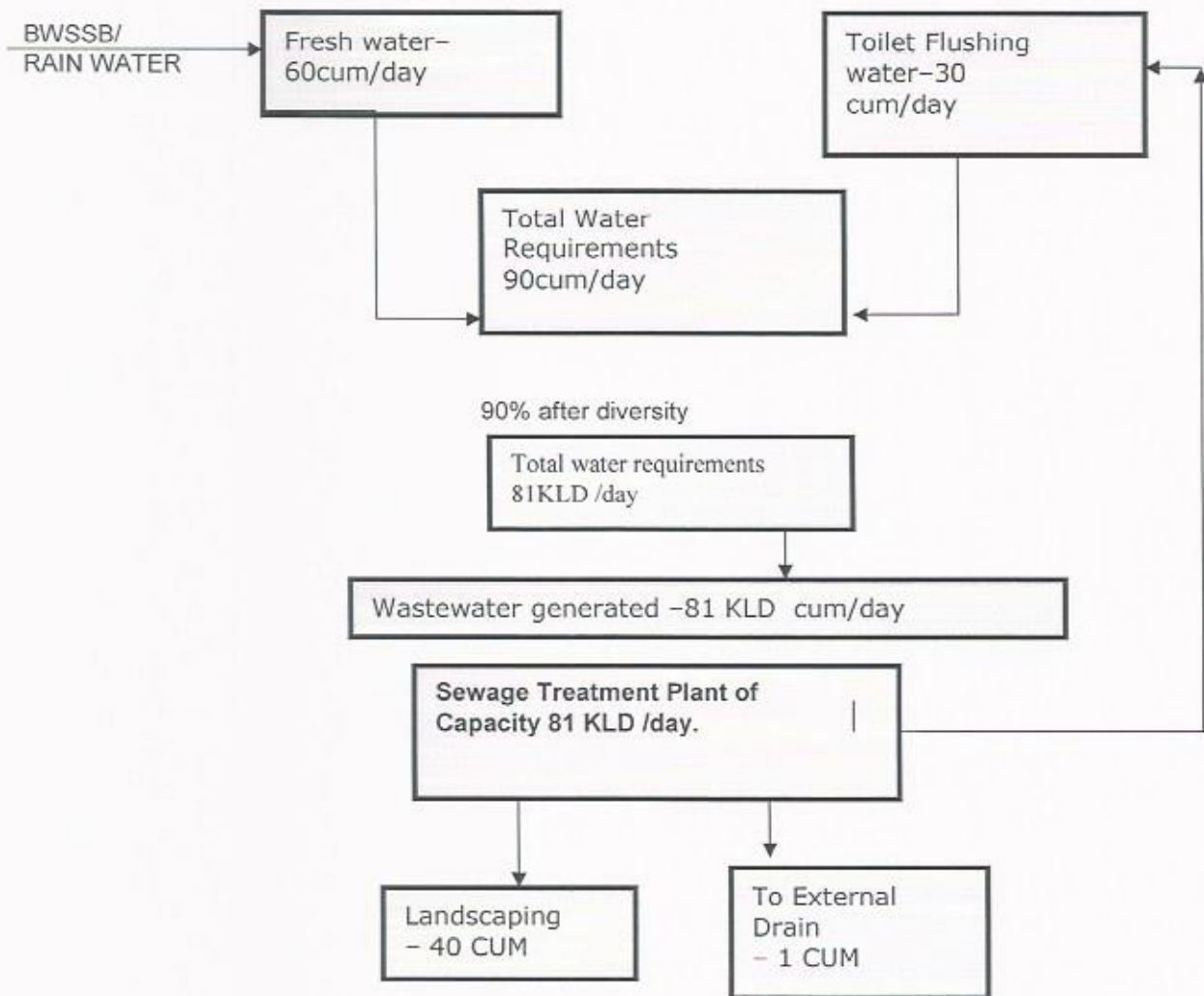
In organic waste 40 % of 100 = 40.00 kgs

This will be collected in designated bins and forwarded to recycling yards

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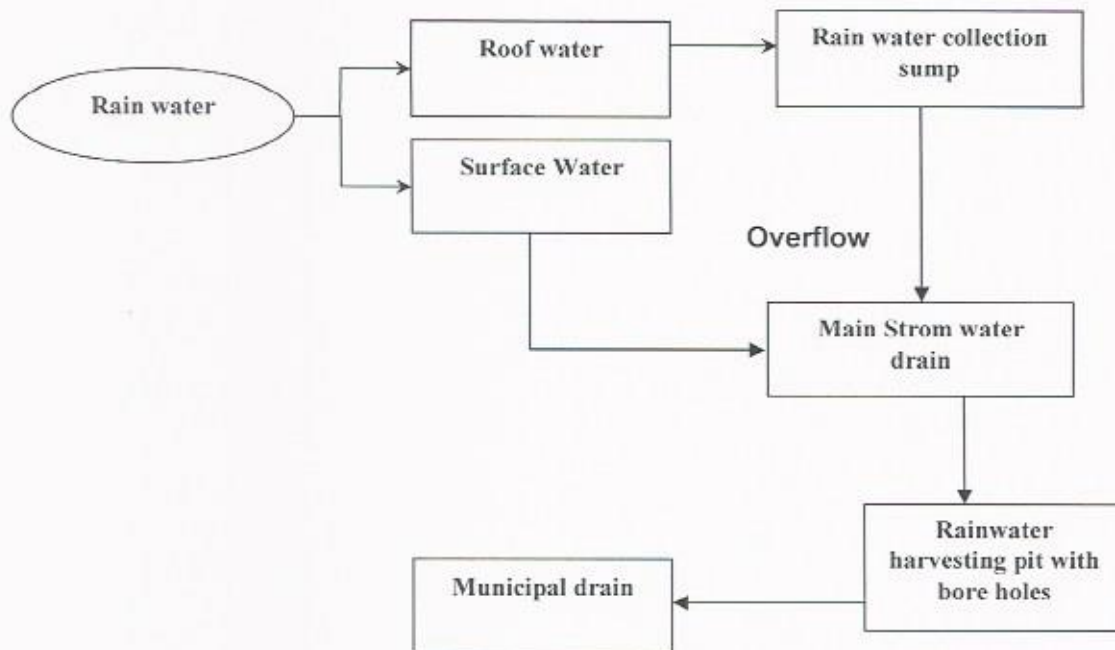
WATER BALANCE CHART



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Rain water collection tank and disposal system:



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