

Proposed expansion of S.L.C. Medical College & S.P.N.M.S. Hospital at Village – Parmanandpur, Block – Khagaria, District – Khagaria, Bihar.

1.0 INTRODUCTION

Madhuri Seva Nyas (Registered Public Charitable Trust) has proposed the expansion of **S.L.C. Medical College & S.P.N.M.S. Hospital** at Village – Parmanandpur, Block – Khagaria, District – Khagaria, Bihar.

As per the Environmental Clearance (EC) granted on 31/10/2025, the total built-up area of the project is 68,900.87 sq.m and the plot area is 54,875.37 sq.m.

As per MoEF&CC O.M. dated 08.06.2022, certified compliance report is not required for an expansion project if project proponent applies within a period of six months from the grant of previous EC. Only self – certified six monthly compliance report is sufficient.

The project has been planned to cater to the increasing demand for healthcare and medical education facilities in the region, with a total capacity of **1050 beds**. The campus includes a **Medical College, Nursing College, Paramedical & Pharmacy College, and associated academic and support facilities**, aimed at providing comprehensive healthcare and educational infrastructure.

The total population of the project has been estimated at **11,830 persons**, which includes inpatient load, outpatient visitors, students from various colleges, faculty, hospital staff, administrative personnel, and supporting staff. The population has been categorized into residential and floating components for effective infrastructure and utility planning.

As per the revised layout plan, the total site (land) area is **62119.345 sq.m**, compared to the earlier approved plot area of **54,875.37 sq.m**, indicating an increase in planning area to accommodate the proposed expansion.

Further, as per the revised site layout plan, additional infrastructure facilities have been proposed, resulting in an increase in the overall built-up area beyond the EC-approved configuration. The revised layout includes expansion of hospital blocks, academic buildings, hostels (boys & girls), staff quarters, administrative and examination blocks, and associated infrastructure, leading to an enhanced total built-up area of approximately **93,222.81 sq.m**.

The expansion is proposed within the project framework to strengthen healthcare delivery systems, enhance medical education capacity, and provide improved infrastructure along with sustainable planning features such as landscaping, parking, and utility services.

1.1 APPLICABLE LEGAL FRAMEWORK

As per the provisions of the **EIA Notification, 2006 (as amended)**, projects listed under the Schedule require prior Environmental Clearance (EC) from the competent authority before commencement of construction activities.

The present proposal pertains to the **expansion of S.L.C. Medical College & S.P.N.M.S. Hospital**, which falls under **Item 8(a): Building and Construction Projects**.

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The project has already obtained Environmental Clearance for a total built-up area of 68,900.87 sq.m within a plot area of 54,875.37 sq.m. However, after revision in the project planning, the total built-up area has been increased to approximately 93,222.81 sq.m, resulting in an additional built-up area of about 24,321.94 sq.m.

As per the EIA Notification, 2006 (as amended), any **increase in built-up area beyond the EC-approved limits** requires **prior amendment in Environmental Clearance** from the competent authority.

Accordingly, the present proposal for expansion attracts the provisions of the EIA Notification, 2006, and requires **prior Environmental Clearance amendment from the State Level Environment Impact Assessment Authority (SEIAA), Bihar** before implementation of the revised development plan.

The project shall be implemented in compliance with applicable environmental laws and regulations, including:

- Environment (Protection) Act, 1986
- EIA Notification, 2006 (as amended)
- Solid Waste Management Rules, 2016
- Construction and Demolition Waste Management Rules, 2016
- Plastic Waste Management Rules, 2016
- Hazardous and Other Wastes Management Rules, 2016
- E-Waste Management Rules, 2016
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and Control of Pollution) Act, 1974
- Applicable Local By-Laws and statutory provisions
- Forest Act 1927 & 1980

1.2 CONNECTIVITY AND SURROUNDINGS OF PROJECT SITE

The proposed project site is located at Mauza – Parmanandpur, Khata No. - 74, 43, 43, 43, 64, 74, 1, 31, 31, 47, 96, 96, 98, 47; Khasra No.- 191, 217, 217/216, 217, 191, 195, 185, 186; 190, 157, 159, 159, 168, 157, Thana No.- 271, Block – Khagaria, District – Khagaria, Bihar. The geographical coordinates of the project site lie approximately between latitude 25°30'08" N to 25°30'17" N and longitude 86°29'31" E to 86°29'46" E. The detailed coordinates of the project boundary and individual towers are presented in **Table 1 and Figure 1**.

The project site is well connected through the regional road network and is located near National Highway NH-31, which provides connectivity to Khagaria town, district headquarters, and other parts of Bihar as well as the rest of the country. The nearest railway station is Khagaria Railway Station, situated at an approximate distance of about 3 km from the project site on the Barauni–Katihar section of East Central Railway. The nearest airport is Jay Prakash Narayan International Airport, Patna, located at an approximate distance of about 150 km from the project site.

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The surrounding land use of the project site primarily consists of NH-31, railway line, and Khagaria town in the northern direction, vacant land and Budhi Gandak River in the southern and eastern directions, and vacant land along with Khagaria town in the western direction. The project site is situated in a developing area with availability of basic infrastructure and good connectivity, making it suitable for the proposed medical college and hospital development.

The details of surrounding features are presented in **Table 2**.

Table 1: Geographical Coordinates of Project Site

Point No.	Latitude	Longitude
1	25°30'17.54"N	86°29'32.67"E
2	25°30'10.36"N	86°29'32.84"E
3	25°30'17.69"N	86°29'41.35"E
4	25°30'15.62"N	86°29'41.32"E
5	25°30'15.33"N	86°29'43.45"E
6	25°30'10.70"N	86°29'42.65"E
7	25°30'10.89"N	86°29'38.63"E
8	25°30'09.97"N	86°29'38.57"E
9	25°30'15.41"N	86°29'44.01"E
10	25°30'15.19"N	86°29'46.55"E
11	25°30'11.95"N	86°29'46.09"E
12	25°30'12.26"N	86°29'43.52"E



Figure 1: Location of the Project

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Table 2: Surroundings of Project Site

S. No.	Feature	Name / Description	Distance	Direction
1	Nearest River	Budhi Gandak River	400 m	South (S)
2	Nearest Highway	NH-31	250 m	North (N)
3	Nearest City / Town	Khagaria	1.0 km	West (W)
4	Nearest Hospital	Sub-Divisional / Government Hospital	3.0 km	East (E)
5	Nearest School	Government Middle School	2.0 km	North-West (NW)
6	Ecologically Sensitive Area	Not Present with in 10 km	—	—

1.3 LAND REQUIREMENT AND AREA SUMMARY & PROJECT COST

The total plot area of the project was **54,875.37 sq.m** as per the earlier approved Environmental Clearance (EC). As per the revised site layout plan, the total plot area has been increased to **62119.345 sq.m**. The project is located at Mauza – Parmanandpur, Block – Khagaria, District – Khagaria, Bihar.

As per the earlier approved EC, the total built-up area of the project was **68,900.87 sq.m**

Subsequently, due to revision in the project planning and site layout, the built-up area has been modified. As per the revised layout plan, the total built-up area is **93,222.81 sq.m**, resulting in an increase of approximately **24,321.94 sq.m** in the built-up area.

The revised project proposal includes the development of additional facilities such as:

- Hospital Blocks (A, B & C)
- Academic Buildings
- Hostels (Boys & Girls)
- Staff Quarters and Residential Facilities
- Administrative and Examination Blocks
- Internal roads, parking areas, and utility infrastructure

The detailed area statement of the project before and after revision is provided in the respective tables.

The total project cost was initially estimated at approximately 85 **Crores**. However, the revised project cost after expansion is **150 Crores**.

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Table 3: Proposed / Revised Building Area Statement

EXISTING BUILDING AREA STATEMENT					
S.No.	Particulars	Ground Floor B/Area (Sq.ft.)	Floor	Total Built-up Area (Sq.ft.)	Total Built-up Area (Sq.m.)
01	Hospital (A)	16920	G+4	84600.0	7859.60
02	Academic Block	15240.50	G+5	91443.0	8495.33
03	Boys Hostel	8606.24	G+4	43031.20	3997.73
04	Girls Hostel	8450.0	G+4	42250.0	3925.15
	TOTAL B/A			261324.20	24277.81
PROPOSED BUILDING B/AREA					
S.no	Particulars	Ground Floor B/Area (Sq.ft.)	Floor	Total Built-up Area (Sq.ft.)	Total Built-up Area (Sq.m.)
05	Hospital (A)	16920.0	5 th floor	16920.00	1571.92
06	Hospital (B)	12300.0	G+5	73800.0	6856.24
07	Hospital (C)	4050.0	G+5	24300.0	2257.54
08	Admin Block	16920.0	G+5	101520.0	9431.51
09	Examination Hall	16920.0	G+5	101520.0	9431.51
10	Teachers Residence	10518.78	G+5	63112.68	5863.36
11	Boys Hostel (A)	8450.0	5 th floor	8450.0	785.03
12	Boys Hostel (B)	8450.0	G+5	50700.0	4710.18
13	Boys Hostel (C)	8450.0	G+5	50700.0	4710.18
14	Girls Hostel (A)	8450.0	5 th floor	8450.0	785.03
15	Girls Hostel (B)	8450.0	G+5	50700.0	4710.18
16	Women Staff Hostel	8450.0	G+5	50700.0	4710.18
17	Staff Quarter (6 No.)	3599.0	G+5	129564.0	12036.89
18	Auditorium	11678.00		11678.00	1084.92
	TOTAL B/A				68944.67
GRAND TOTAL BUILT-UP AREA (EXISTING & PROPOSED):- 93,222.81 sqm.					

Table: 3.1 Project Site Details

S. No.	Particulars	Area (sq.ft)	Area (sq.m)
1	Site (Land) Area	668,660 sq.ft	62119.345
2	F.A.R.	—	1.51
3	Parking Area	35,029.18	3,254.31
4	Landscape Area	158,228.23	14,699.88
5	Play Area	75,962.30	7,057.30
6	Pond Area	8,140.00	756.23
7	Maximum Height of Building	—	40 m
8	Maximum Stories	—	G+5
9	Total No. of Building Structures	—	18 Nos.

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Table 3.2: Summary of Existing and Revised Plot Area & Built-up Area

Particular	Existing (sqm)	Proposed (sqm)	Total (sqm)
Plot Area	54,875.37	7243.975	62119.345
Built-up Area	68,900.87	24,321.94	93,222.81

Table 3.3: Proposed Project Detailed statement

S. NO.	DESCRIPTION	Detail		
A.	Plot Area	62119.345 Sq.m.		
B.	Total Build-up Area	93,222.81 Sq.m		
C.	Total parking area	3,254.31 Sq.m		
D.	Building Height	40 meter		
E.	Number of Beds	1050		
F.	Number of OPD	1200 per day		
G.	No. of Student seats per year		UG Seats	PG Seats
		S.L.C. Medical College & S.P.N.M.S Hospital	250	250
		S.L.C. Nursing College	500	200
		S.L.C. Paramedical & Pharmacy College	580	80
H.	STP	2000		
I.	ETP	60		
J.	Total Municipal waste	5057.5 kg/day		
K.	Total Biomedical Waste	1050 kg/day		

1.4 ESTIMATED POPULATION

The total population of the hospital will be approximately 11830, which includes outdoor patients, indoor patients, attendants, OPD, Doctors, Resident Doctors, Nurses, technicians, and staff. The population break-up is given below in Table 4.

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Table 4: Estimated Population

S. No.	Category	Population
A. Hospital		
1	OPD Patients (per day)	1200
2	IPD Patients (Beds)	1050
3	Attendants	1050
4	Hospital Staff / Mess	50
	Subtotal (Hospital)	3350
B. S.L.C Medical College & S.P.N.M.S Hospital		
5	UG Students (250 × 5)	1250
6	PG Students (250 × 3)	750
7	Faculty	300
8	Hospital Staff	750
	Subtotal	3050
C. Nursing College		
9	UG Students (500 × 4)	2000
10	PG Students (200 × 3)	600
11	Faculty & Staff	200
	Subtotal	2800
D. Paramedical & Pharmacy College		
11	UG Students (580 × 4)	2320
12	PG Students (80 × 2)	160
13	Faculty	50
	Subtotal	2530
E. University		
14	Faculty & Staff	100
	Subtotal	100
	GRAND TOTAL POPULATION	11,830

1.5 WATER REQUIREMENT

Water requirement during the construction phase is expected to be about **30–50 KLD**, which will be sourced through government water supply or private water tankers.

The total water requirement for the proposed **Medical/Nursing College & Hospital project** will be approximately **1968 KLD**. Out of this, the fresh water requirement will be approximately **1267 KLD**, and the balance **543.24 KLD** will be met through treated water from the STP.

Water demand for **landscaping, fire fighting, HVAC, DG cooling, and other non-potable uses** will be fulfilled through treated wastewater. The fresh water will be sourced through bore wells at the project site.

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Detailed water requirement calculations are presented in **Table 5 and Table 6**, and the water balance diagram is provided in **Figure 3 and Figure 4**.

1.6 SEWAGE GENERATION

Approximately 1557 KLD domestic effluent will be generated from the proposed Medical College & Hospital campus premises. All these effluents will be sent to a 2000 KLD capacity STP inside the premises for treatment.

Table 5: Calculations for Total Daily Water Demand

Category	Capacity	Standard (LPCD)	Water Requirement (KLD)	Fresh Water Requirement (KLD)	Recycled Water Requirement (KLD)
Inpatient	1050	450	472.50	330.75	141.75
Other Residence (Staff & Student+Attendant)	9480	135	1279.80	895.86	383.94
Floating Staff	100	45	40.50	28.35	12.15
Outpatients & Visitors	1200	15	18.00	12.60	5.40
Domestic Water Requirement			1810	1267	543
Landscaping	14,699.88 sq.m	5 L/sq.m	73.50	0	73.50
Fire Fighting	—	—	5.00	0	5.00
HVAC	—	—	20.00	0	20.00
DG Cooling	2 × 1600 kVA	1.82 KVA/hr	12.00	0	12.00
OT Laundry	1050 beds	45 L/bed	47.25	0	47.25
TOTAL WATER REQUIREMENT			1967.75 =1968 KLD	1267 KLD	700.99=701 KLD

Table 6: Wastewater Calculations - ETP

Category	Total Quantity (KLD)
Effluent generation (OT Laundry)	47.25
Capacity of ETP (1 No. of 60 KLD)	60
Recovered water from ETP (90% of Waste Water)	43

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Table 7: Wastewater Calculations - STP

Category	Total Quantity (KLD)
Fresh Water Requirement	1267 KLD
Flushing Water Requirement	543 KLD
Total Domestic Water Requirement	1810 KLD
Sewage Generation (80% of domestic + 100% flushing)	1557 KLD
Capacity of STP	2000 KLD
Recovered Water from STP (≈90% of wastewater)	1401 KLD
Flushing	543 KLD
Landscaping (5 L/sq.m)	73.50 KLD
Fire Fighting	5.00 KLD
HVAC	20.00 KLD
DG Cooling	12.00 KLD
Laundry	47.25 KLD
Sewer / Excess	904 KLD
Total Recycled Water Generated (STP)	1202 KLD

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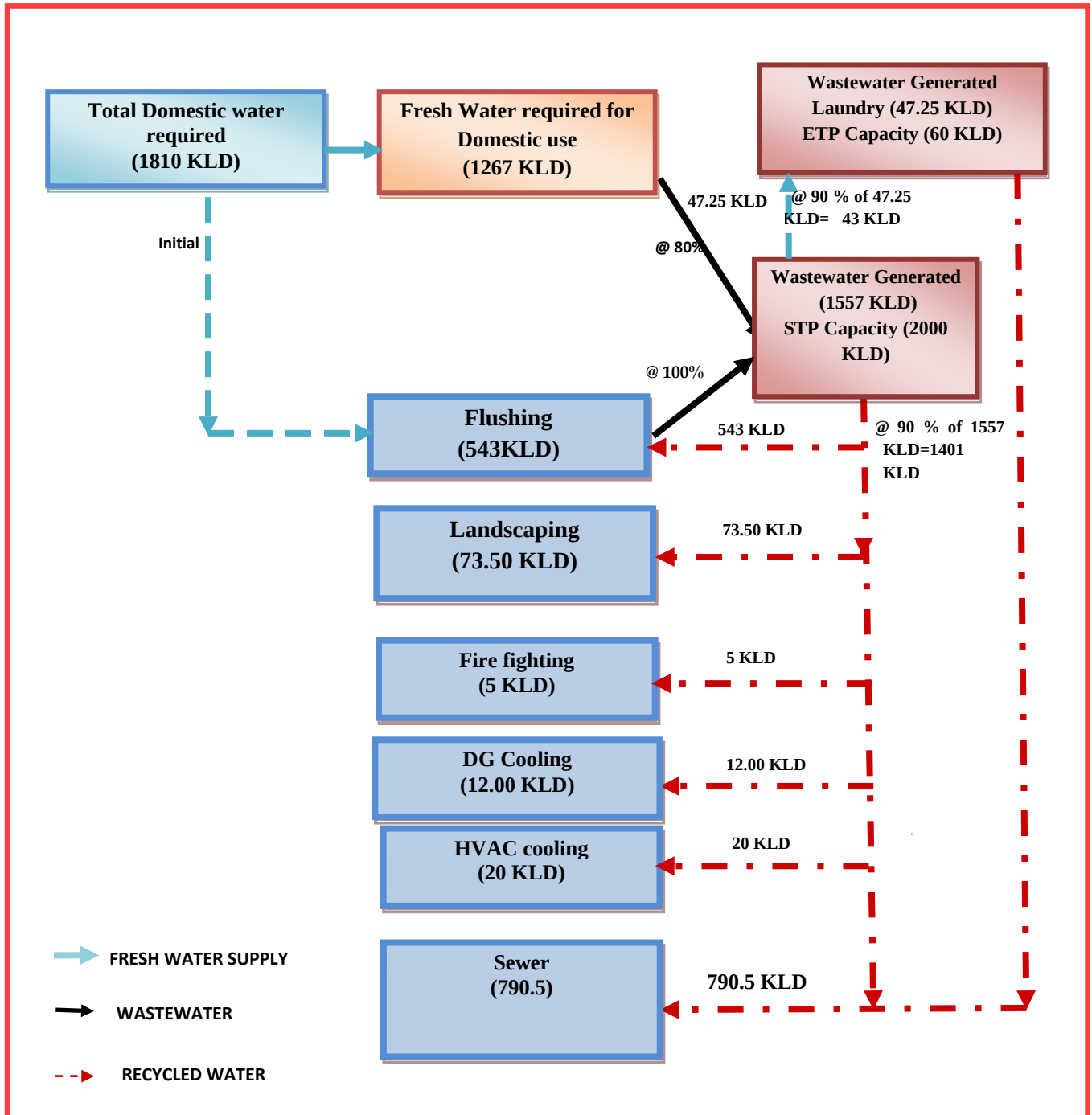


Figure3: Water Balance Diagram-Dry Season

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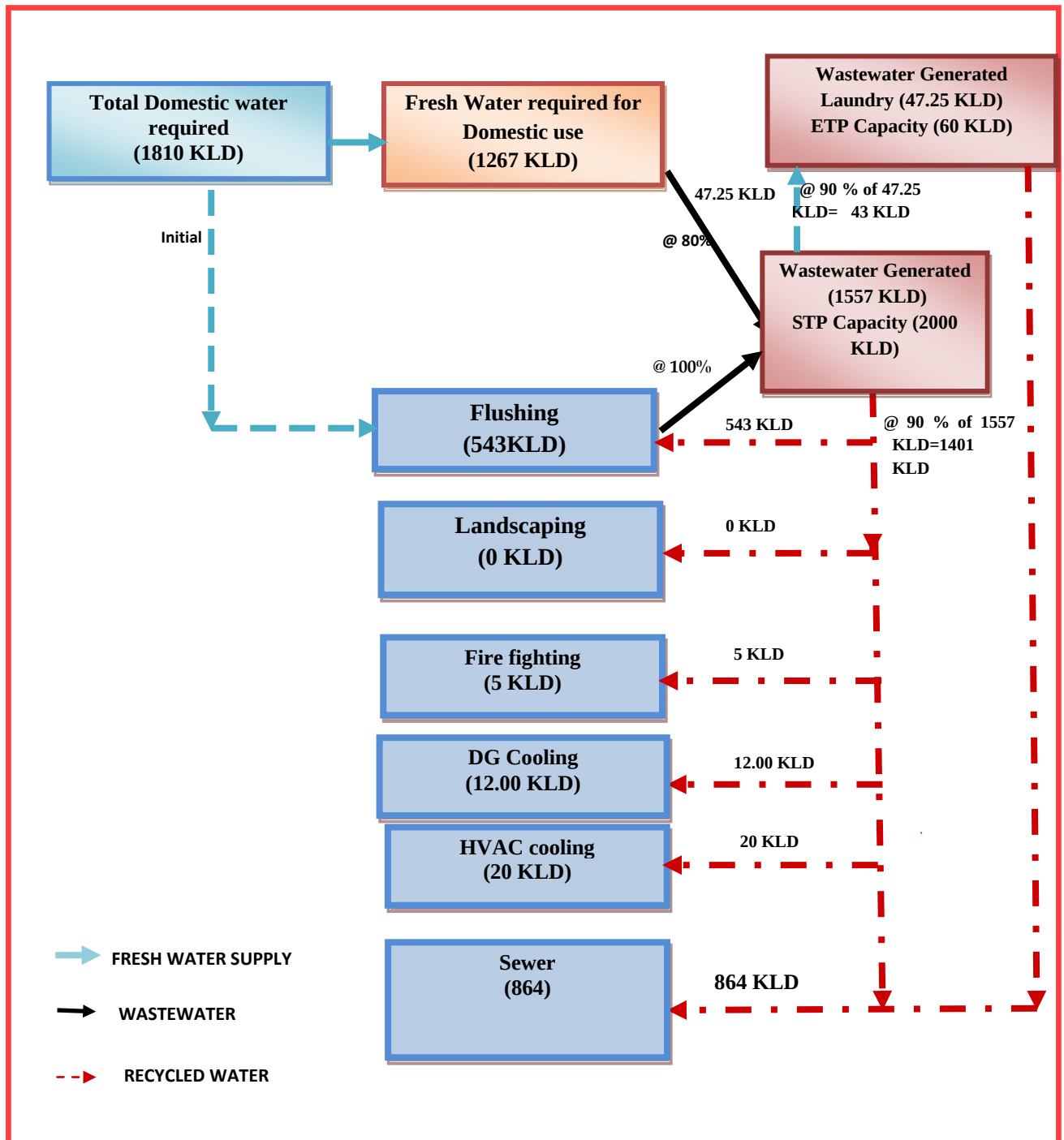


Figure 4: Water Balance Diagram-Monsoon Season

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1.7 SEWAGE MANAGEMENT

STP of 2000 KLD with MBBR technology will be provided at the site. Detail of the treatment technology and sewerage system is given below:

Sewerage System

An external sewage network shall collect the sewage from all units, and flow by gravity to the proposed sewage treatment plant.

Following are the benefits of providing the Sewage Treatment Plant in the present circumstances:

- Reduced net daily water requirements, source for Horticultural purposes by utilization of the treated waste water.
- Reduced dependence on the public utilities for water supply and sewerage systems.
- Sludge generated from the Sewage Treatment Plant shall be rich in organic content and an excellent fertilizer for horticultural purposes.

a. Wastewater Details

(a)	Daily load	:	1557KLD
(b)	Duration of flow to STP	:	24 hours
(c)	Temperature	:	Maximum 32°C
(d)	pH	:	6.5 to 8.5
(e)	Colour	:	Mild
(f)	T.S.S. (mg/l)	:	200-450 mg/l
(g)	BOD (mg/l)	:	300-400 mg/l
(h)	COD (mg/l)	:	600-800 mg/l
(i)	Oil & Grease	:	30-50 mg/l

b. Final discharge characteristics

(a)	pH	:	6.0 to 8.5
(b)	Oil & Grease	:	<5 mg/l
(c)	B.O.D.	:	<20 mg/l
(d)	C.O.D.	:	<100 mg/l
(e)	Total Suspended Solids	:	<10 mg/l

c. Treatment Technology

The technology is based on attached growth aerobic treatment followed by clarification by a tube settler. Lime will be dosed in for suppression of foaming tendencies. The clarified water will be filtered in a pressure sand filter after dosing of coagulant (alum) for removal of unsettled suspended impurities. This water will be passed through an activated carbon filter for removal of organics. The filtered water from ACF is then chlorinated & stored in the flushing tank.

The attached growth Moving bed bio reactor (MBBR) process combines the biological processes of attached & suspended growth. It combines submerged fixed film with extended aeration for treatment of the waste water.

The waste water after screening is collected in an equalization tank. The equalization tank is required for preventing surges in flow & facilitating equalization of characteristics over the entire quantity of effluent in a given time. A provision for pre-aeration is made in the equalization tank in order to ensure mixing & to prevent the sewage from going septic.

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The equalized sewage is then pumped into the MBBR reactor for biological processing. The water enters the bottom of the reactor & flows up through the fixed film media which grossly enhances the hydraulic retention time & provides a large surface area for growth of biological micro – organisms. The MBBR reactor is aerated by fine pore sub – surface diffusers which provide the oxygen for organic removal. The synthetic media floats on the water & the air agitation ensures good water to micro-organism contact.

The MBBR treatment is an attached growth type biological treatment process where in, the majority of biological activity takes place on the surface of the PVC media. Continuous aeration ensures aerobic activity on the surface of the media. Micro – organisms attach themselves on the media & grow into dense films of a viscous jelly like nature. Waste water passes over this film with dissolved organics passing into the bio-film due to concentration gradients within the film. Suspended particles & colloid may get retained on this sticky surface where they are decomposed into soluble products. Oxygen from the aeration process in the waste water provides oxygen for the aerobic reactions at the bio-film surface. Waste products from the metabolic processes diffuse outward & get carried away by the waste water or air currents through the voids of the media.

The aerated effluent passes into a tube deck settler for clarification. The theory of gravity tube settler system is that the carrier fluid maintains laminar flow in the settling media at specified maximum viscosity. These two parameters of a carrier fluid, flowing through a hydraulic configuration, will determine the velocity gradients of the flow, the height of boundary layer at the inclined surface and the residence time within the media.

The carrier fluid must be viscous Newtonian, exhibiting a Reynolds number of less than 1000 and preferably, a number under 400. The laminar flow, through the inclined tubes, will produce velocity gradients sufficiently large to form an adequate boundary layer, where the velocity of fluid approaches zero. Boundary layers are necessary in functioning tube settlers, to allow suspended solids to separate from the viscous carrier fluid. Under gravitational forces, they will settle to the hydraulic surface of the tube and subsequently from the clarifier media.

Since the tubes are inclined at 60 degrees, solids settled on the tubes are continually discharged down. This downward rolling action increases particle contact and hence further agglomeration, which increases the sludge settle ability. Studies show that these agglomerated sludge particles can have a settling rate in excess of ten times the settling rate of the individual floc particles in the influent. These heavy agglomerated masses quickly slide down the 60-degree inclined tube and settle at the bottom of the tank.

At the bottom of the Tube deck, where the sludge leaves the Tube surface, the larger agglomerated captures smaller particles in the upcoming stream. This solid contact phenomenon greatly enhances the capture efficiency.

Stages of Treatment: The treatment process consists of the following stages:

- Equalization
- Bio- Degradation
- Clarification & Settling

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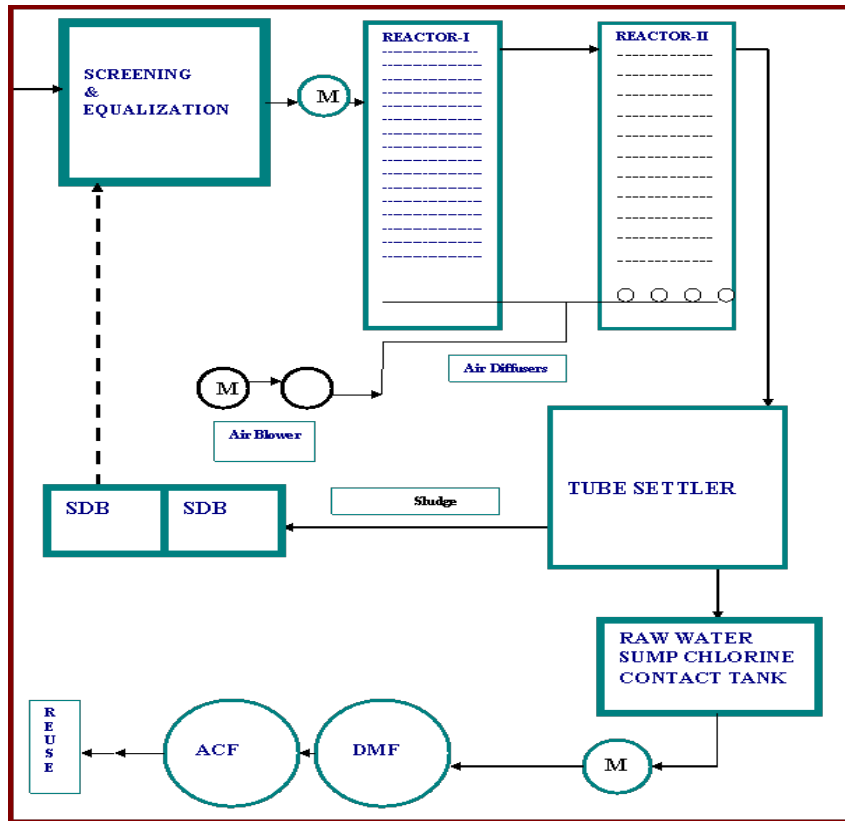


Figure 5: Schematic Diagram of STP

1.8 STORM WATER MANAGEMENT

Annual Rainwater harvesting potential of the proposed project will be approx. 57049.99 m³. All of this water is expected to percolate down to the groundwater table thus acting as a recharge system. The natural purification process (filtration and adsorption phenomena while percolation through soil) is expected to further enhance the water quality by the time the water reaches the groundwater table.

Each building have garland drain along with plinth protection. Discharge of Rain Water from terrace will be in garland drains through rain water pipes. The garland drain will be connected to storm water drain.

Run-off available from the site annually after project development is calculated and is presented in the **Table 7**. Calculations for rainwater harvesting pits are given below in **Table 8**.

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Table 7: Available Run-off from Site

S. No.	Catchment	Area (sq m)	Run-off Coefficient	Average Annual Rainfall (m)	Runoff Annually (m ²)	Peak Hourly Rainfall (m ³)	Runoff (m ³ /hr)
1.	Roof top	17855.00	0.9	0.97	15587.41	0.01	155.87
2.	Green	14699.88	0.1	0.97	1425.88	0.01	14.25
3.	Paved Areas	58964.22	0.7	0.97	40036.70	0.01	400.36
Total Run-off					57049.99		570.48

Table 8: Calculation for RWH Pits

Total Run-off (m ³ /hr)	570.48
Length and breadth and depth of the RWH pit m ³	4*3*4
Nos. of Pits Required	11.87 or 12

1.9 VEHICLE PARKING FACILITIES

Adequate parking facility will be provided within project premises for 200 nos. of ECS and Ambulances in 3254 Sqm. open area.

1.10 POWER REQUIREMENT

The estimated power and Backup power for the proposed Project is about 2500 KW of Built-up Area for the project, considering the specified power distribution and load factors. Although the power supply to the project would be from state electricity board. but in case of any power failure, the power back-up system is also being proposed. This power Back up would be provided by 3 DG sets of 2400 Kw capacity. The height of all sources of emissions will be provided as per the prevailing specifications of the MoEF, Govt. of India. Waste oil, if any, will be stored as per the specifications and sold to authorize agencies only as per requirement of Hazardous and Other Wastes (Management and Transboundary Movement) Rules '2016.

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1.11 SOLID WASTE GENERATION AND MANAGEMENT

Construction Phase

Solid waste will be generated both during construction as well as during operation phase. Solid waste generated during construction phase will mainly comprise of excavated earth, concrete debris, steel scrap, tiles, wood and packaging materials such as cement bags etc. Construction waste will be segregated into re-usable, recyclable and non-recyclable fractions. Re-usable material will be utilized within the project site for filling and leveling, recyclable material will be sold to authorized recyclers, and non-recyclable waste will be disposed of at designated sites as per local authority norms.

During the operation phase, municipal solid waste will be generated from residents, staff and visitors. The waste will be segregated at source into biodegradable and non-biodegradable components. Biodegradable waste will be treated through composting/organic waste management system within the site, while recyclable waste will be handed over to authorized recyclers. The solid waste management plan to be adopted for the project is given in **Table 9**.

Table 9: Solid waste management during construction phase

S. No.	Solid waste	Solid waste management
1.	Waste materials like MS Rods, concrete, broken tiles, wood pieces, cement bags etc.	Construction waste will be segregated into recyclable/reusable and discarded material. Recyclable material will be sold to authorize dealers. Re-usable material will be stored under covered conditions at site and reject will be disposed off at the designated locations by local body. Waste will be transported in covered vehicles only.
2.	Excavated Soil	Top soil will be stripped off and stored in covered condition. Excavated soil will be reused at site for levelling, filling and landscaping works
3.	Domestic Waste	Domestic waste generated by labour at the site will be disposed off through local agencies in the area on daily basis.

Operation phase

The collection, transportation, and disposal of solid waste generated during the operational phase of the proposed Medical College & Hospital project shall be carried out in accordance with the **Solid Waste Management Rules, 2016**.

During the operational phase, approximately **5058 kg/day (~5.06 TPD)** of municipal solid waste will be generated from the proposed Medical College & Hospital campus, comprising kitchen waste, biodegradable waste, and other domestic waste generated from patients, staff, students, and visitors.

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All generated solid waste shall be collected, segregated, and disposed of through the **local Panchayat / authorized waste collection agency**. Recyclable materials such as paper, plastic, glass, metal scrap, and other reusable items will be segregated at source and handed over to authorized recyclers/vendors.

The waste shall be segregated into biodegradable and non-biodegradable fractions at source, and proper storage facilities will be provided within the premises as per SWM Rules, 2016. A **three-bin system** will be adopted, comprising:

- **Green bins** for biodegradable waste (kitchen and garden waste)
- **Blue bins** for recyclable waste (paper, plastic, glass, etc.)
- **Black/Grey bins** for non-recyclable waste

Adequate numbers of color-coded bins will be provided at appropriate locations, and waste will be collected daily.

For treatment of biodegradable waste, **bio-composting facilities** shall be developed within the project site. The compost generated will be utilized for landscaping and greenbelt development.

Sludge generated from the Sewage Treatment Plant (STP) will be dried, packed in HDPE bags, and used as manure for horticulture purposes within the premises.

Hazardous waste such as **used oil from DG sets and machinery** will be stored in HDPE containers in a designated covered area and disposed of through **CPCB/BSPCB authorized recyclers** in accordance with the **Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016**.

Bio-medical waste generated from the hospital (approximately **1050 kg/day**) will be managed as per **Bio-Medical Waste Management Rules, 2016** and handed over to authorized Common Bio-Medical Waste Treatment Facilities (CBWTF).

BIO-MEDICAL WASTE MANAGEMENT;

Approximately **1.05 T/day (@ 1 kg/bed/day for 1050 beds)** of bio-medical waste will be generated from the proposed Medical College & Hospital campus, which will be handled in accordance with the provisions of the **Bio-Medical Waste Management Rules, 2016**.

The generated bio-medical waste will be collected, segregated, stored, transported, and disposed of through an authorized **Common Bio-Medical Waste Treatment Facility (CBWTF)**.

The detailed estimation of solid waste generation during the operational phase is presented in **Table 10**. The proposed solid waste management plan for handling, segregation, storage, and disposal of waste is described in the table below.

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Table 10: Calculation of Solid Waste Generation

S. No.	Description	Occupancy / Area	kg/capita/day	Total Solid Waste Generation (kg/day)
1	Outdoor Patients	1200	0.15	180
2	Indoor Patients (IPD)	1050	0.50	525
3	Attendants with IPD Patients	1050	0.25	262.5
4	Residential Population (Students + Residential Staff)	7580	0.50	3790
5	Non-Residential Staff	900	0.25	225
6	Hospital Staff / Mess	50	0.50	25
7	Landscape Waste	14,699.88 sq.m	—	50 (approx.)
	Total Municipal Solid Waste	—	—	5057.5 kg/day
8	Bio-Medical Waste	1050 beds	1 kg/bed/day	1050 kg/day

(Source: For Waste Collection, Chapter 3, Table 3.6, Page no. 49, of Central Public Health & Environment Engineering Organization, Ministry of Urban Development, (Government of India, May 2000))

Table 10: Calculation of Solid Waste Generation-Total

S.No	Description	Total Solid Waste Generation (kg/day)
1	Total Municipal Waste	5057.5
2	STP Sludge	150
3	ETP Sludge	6
Total Solid Waste		5213.5 or 5214
Bio-Medical waste		1050

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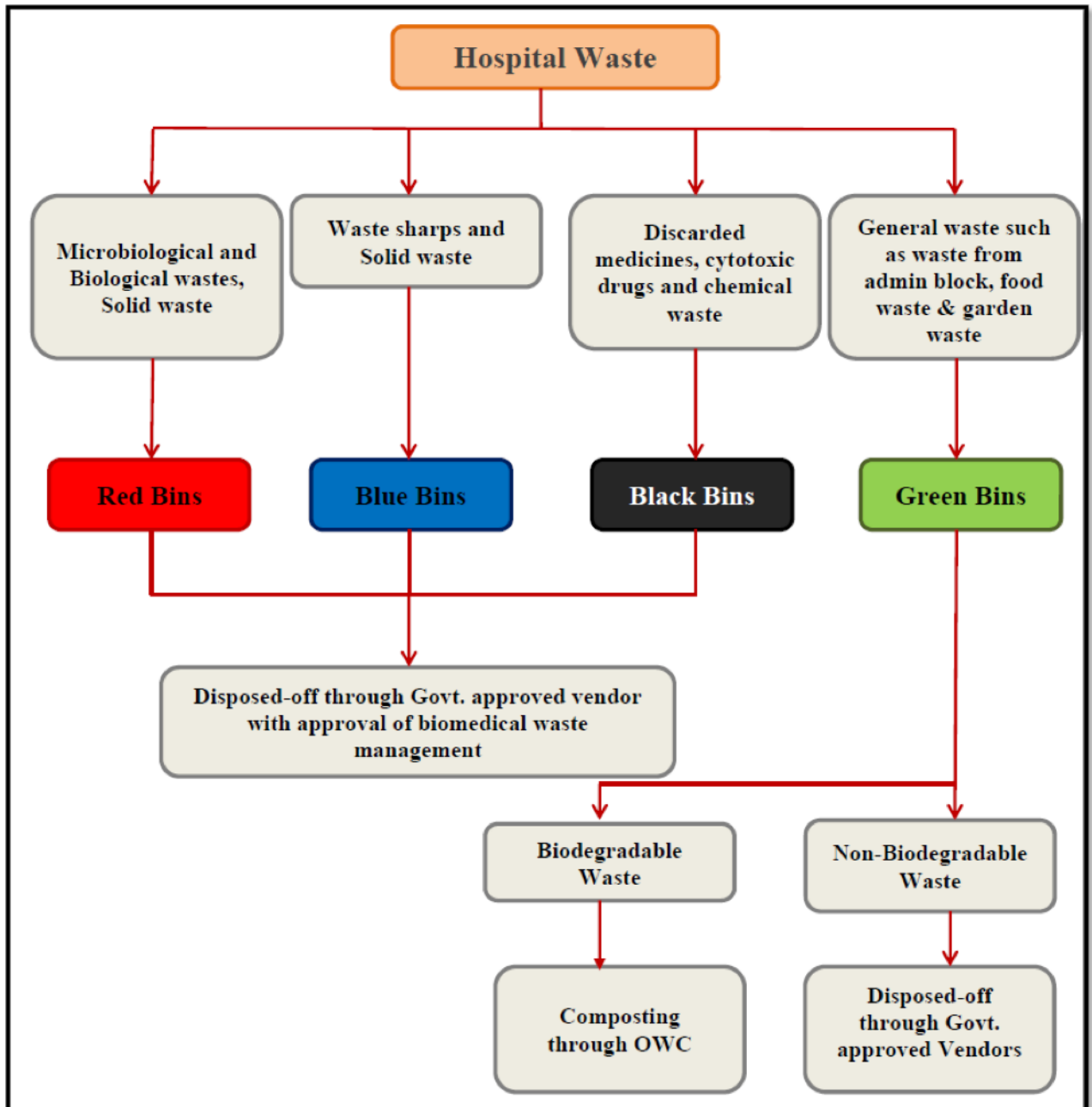


Figure-7: Solid Waste Management Scheme (Operation Phase)

Collection and Segregation of Waste

- ❖ For Hospital waste collection, adequate numbers of colored bins (Red, Yellow, Black, Blue and dark blue bins) are proposed to be provided at the strategic locations of the Hospital area.
- ❖ Red bins: These are for disposing of IV tubings, plastic bottles, syringes without needles, drainage tubes, catheters, and locally autoclaved microbiological waste.

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- ❖ Yellow bins: For the disposal of anatomical parts, amputated body parts, and placenta, as well as items contaminated with blood and body fluids, including cotton, dressings, soiled plaster casts, lines, bedding, and other material contaminated with blood.
- ❖ Black bins: For the discard of paper, wrappers, tissue and other general items.
- ❖ Blue bins: These are for disposing of glass bottles, ampoules, broken glass, vials, and other glass items.
- ❖ Dark Blue bins: For the disposal of sharps. Does not contain disinfectant. Includes needles, stylet, lancets and blades.
- ❖ Treatment of waste
 - Bio-Degradable waste:
 1. Bio-degradable Waste will be disposed of through the Govt. approved vendor for decomposition.
 2. STP sludge is proposed to be used for horticultural purposes as manure.
 3. ETP sludge is proposed to be sold out through Govt. vendors.
 4. Horticultural waste is proposed to be composted and used for gardening purposes.
 - Recyclable waste:
 1. Grass Recycling—The cropped grass will be spread on the green area. After decomposition, it will act as manure.
 2. Recyclable waste like paper, plastic, metals, etc., will be sold off to local recyclers.
 - ❖ Recyclable and non-recyclable waste will be disposed of through a local, approved agency as per the Municipal Solid Waste (Management and Handling) Rules, 2016. Biomedical waste will be disposed of through a government-approved vendor.

1.13 Radioactive Waste Management Plan

Disposal of Solid Radioactive Waste — An AERB-certified, trained, and authorised person may dispose of solid radioactive waste by burial into pits prepared in an exclusive burial ground, provided:

- (a) The burial ground is located in an isolated site owned by the said person.
- (b) The site is duly fenced off to prevent unauthorized entry.
- (c) The site is duly approved by the competent authority for burial of radioactive waste, the approval being governed by factors such as the nature of environment including topographical and geological characteristics of the burial site, usage of ground and surface waters in the general area around the site, with a view to minimize the assessed anticipated risk of accidental dispersal of the waste to potentially affected locations or back to the environment;
- (d) The depth of the burial pit is so chosen that the wastes have a top layer of compact earth of a minimum 120 cm thickness when the pit head is closed;
- (e) Successive burial pits are separated by a distance of at least 180 cm.
- (f) Not more than 12 burials are made in any one year.
- (g) The burial area is treated as a restricted area and subjected to periodic environmental surveillance by the Radiological Safety Officer to ensure that the appropriate disposal limits and operational limits are not exceeded.
- (h) A logbook is maintained.
- (i) Incineration of Radioactive Waste — An AERB-certified, trained, and authorized person may undertake incineration of radioactive wastes, including incineration of radioactive animal carcasses, provided
 1. The design of the incinerator is suitable for the intended operations, providing for the retention of solid and liquid combustion/scrubbing by-products and the controlled discharge of liquid and gaseous effluents.
 2. The incineration operations will not result in airborne radioactive contamination in excess of the operational limits prescribed under the Radiation Protection Rules, 1971, for unrestricted areas.

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3. The solid and liquid radioactive wastes arising from incineration operations will be duly collected and disposed of in accordance with these rules.
4. Adequate environmental surveillance, including air monitoring where necessary, will be provided to ensure that the operational limits are not exceeded.
5. The incineration operations are undertaken under the direct supervision of the radiological safety officer.

1.12 GREEN AREA

An area of 14,699.88 Sq. M. has been allocated within the proposed Medical College & Hospital Campus project (medical/nursing college & hospital etc) for green belt & landscaping development.

After construction of the proposed buildings, trees will be grown to the maximum extent all around the premises boundary.

As per the requirement of EIA Notification 2006 amendments vide Gazette Notification No. S.O. 3999(E) dt: 09.12.2016 , one tree / 80 sq. M. should be planted in case of building & construction projects, approx. 700 nos. of trees will be planted within and all around the proposed medical college and hospital building premises.

While carrying out plantation within premises or outside the following considerations will be given for choice of types of trees

- Species of trees and plants suitable for the local agro-climatic and soil conditions will be selected.
- Natural hedge rows will be preferred over fencing wherever possible.
- Trees with large canopies will be chosen which will serve as natural air filters, noise attenuators and umbrellas.
- Automatic irrigation systems will be installed. Irrigation will preferably be carried out at night so that less water is lost in evaporation and most of the water naturally percolates to groundwater through the soil.
- Location of trees and shrubs will be chosen such that they provide a natural shield to the buildings from natural ailments like excessive sunlight and rain.
- Organic manure made from garden waste (dry leaves etc.) & STP sludge will be used so that dependence on chemical fertilizer can be reduced.

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Table 11: List of plants to be proposed for planting

S. No.	Botanical Name	Common Name
1	<i>Butea monosperma</i>	Flame of the Forest / Palash
2	<i>Ficus benjamina</i>	Weeping Fig
3	<i>Ficus benghalensis</i>	Banyan
4	<i>Madhuca indica</i>	Mahua (<i>Not Jatropha – corrected</i>)
5	<i>Pongamia glabra</i>	Karanj
6	<i>Terminalia arjuna</i>	Arjun
7	<i>Albizia lebbbeck</i>	Siris
8	<i>Bombax ceiba</i>	Silk Cotton Tree / Semal
9	<i>Tectona grandis</i>	Teak / Sagwan
10	<i>Liriodendron tulipifera</i>	Tulip Tree (<i>not typical Poplar – corrected</i>)
11	<i>Azadirachta indica</i>	Neem
12	<i>Mangifera indica</i>	Mango
13	<i>Juniperus chinensis</i>	Chinese Juniper
14	<i>Kigelia pinnata</i>	Balam Kheera
15	<i>Polyalthia longifolia</i>	Ashoka
16	<i>Delonix regia</i>	Gulmohar
17	<i>Dalbergia sissoo</i>	Sheesham
18	<i>Emblica officinalis</i>	Amla

Following ornamental species will be planted within the premises of proposed Building Project;

• Crotons
• Coleus
• Colocasia
• English Laurel
• Song of India
• Roses
• Jasmine
• Chrysanthemum
• Gerbera
• Marigold
• Geranium
• Dahlia
• Daffodils
• Tulips
• Bird's Nest Fern
• Bougainvillea
• Arabian Jasmine
• Orchid Tree
• Bottle Brush
• Jungle Flame / West Indian Jasmine

1.13 CONSTRUCTION MATERIAL

Detail of different type of construction material to be used at project site with their U values is given in **Table 11**.

Table 12: List of Construction materials

S.No	Description
1.	Cement
2.	Sand
3.	Metal 20 mm
4.	Stock Bricks
5.	MS/RTS Rods
6.	Ceramic Tiles
7.	Country wood scantlings up to 4m length
8.	UPVC Windows
9.	Solid Core Flush Doors
10.	PVC Door Shutters

Table 13: U values Construction materials

Type of Construction	U values (in W/m ² °C)
Walls	
<i>Brick:</i>	
Plastered both sides	3.24
Solid unplastered	2.67
Plastered both sides	2.24
<i>Concrete, ordinary, Dense:</i>	
-152 mm	3.58
-203 mm	3.18
<i>Concrete block:</i>	
CLC Fly ash block	1.19
<i>Hollow Concrete block, 220 mm, single skin, outside rendered, inside plastered</i>	
CLC Fly ash block	1.70
Roofs Flat:	
Reinforced concrete slab, 100mm, screed 63-12 mm, 3 layers bituminous felt	3.35
Floors:	
Concrete on ground or hardcore fill	1.13
+ Grano, Terrazze or tile finish	1.13
+ Wood block finish	0.85
Exposure South Sheltered:	
Single glazing	3.97
Double glazing 6 mm space	2.67

1.14 LIST OF MACHINERY USED DURING CONSTRUCTION

List of machinery which will be used for construction is given below:

- Dumper
- Concrete mixer with hopper
- Excavator
- Concrete Batching Plant
- Cranes
- Road roller
- Bulldozer
- Tower Cranes
- Hoist
- Labor Lifts
- Concrete pressure pumps
- Mobile transit mixer