

CONCEPTUAL PLAN

1. INTRODUCTION

Kumar Infra Hotel Pvt. Ltd. has Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli, Beerchand Patel Path, Patna on the total land area measuring **5930.65 Sqm.** The total built up area is **37335 Sqm.** The land use of Proposed Hotel is Government land as this is Existing Hotel “Patliputra Ashok” located at Beerchand Patel Path, Patna. Hotel operations were gradually shut down due to poor condition and low viability and handed over to Bihar Govt (BSTDC control) on 2018. The Government decided not to continue operations in existing structure and Proposal initiated to redevelop into a modern Hotel-cum-Commercial Project. During covid period it was used for quarantine. An Agreement has been made between Bihar State Tourism Development Corporation Ltd. and Kumar Infra Hotel Private Limited for development of Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli, Beerchand Patel Path, Patna by Kumar Infra Hotel Pvt. Ltd.

The site plan is attached as **Annexure III.**

The Project built up area is greater than 20,000 sqm and less than 1,50,000 sqm. therefore, designated under Category “B” and falls under Item 8 (a) (Building & Construction Project) of the Environmental Impact Assessment (EIA) Notification of September 14, 2006 and its subsequent amendments.

2. SITE SURROUNDING & CONNECTIVITY

The proposed project is well connected to different villages and towns. It is surrounded by Kidwaipuri, Sri Krishna Nagar & Kadamkuan habitation & the project is also close proximity to the Patna town within 5 km of the area of proposed project. Site surroundings and connectivity details of the proposed project are given in **Table-1.**

Table-1: Site Surroundings and Connectivity Details

S. No.	Connectivity & Site Surroundings		
	Description		Distance and Direction
1.	Nearest Railway Station	Sachiwalay Halt Patna Railway Station Rajendra Nagar Terminal	Approx. 1.84 Km towards SW Approx. 0.95 Km towards SE Approx. 3.38 Km towards ESE
2.	Nearest Airport	Jai Prakash Narayan International	Approx. 3.55 Km towards WSW

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		Airport	
3.	Nearest Village	Kidwaipuri Sri Krishna Nagar Kadamkuan	Approx. 0.70 Km towards NW Approx. 0.78 Km towards North Approx. 1.80 Km towards East
4.	Nearest Highway/Roads	Beer Chand Patel Path NH 922 Boring Road	Adjacent to the Project Site Approx. 0.10 Km towards North Approx. 0.64 Km towards West
5.	Nearest School & College	Patna Women's College Mount Carmel School St. Joseph's High School	Approx. 0.22 Km towards NW Approx. 0.48 Km towards West Approx. 1.20 Km towards NNE
6.	Nearest Hospital	New Gardiner Road Hospital Rainbow Emergency Hospital Tara Hospital and Medical	Approx. 0.14 Km towards ENE Approx. 1.38 Km towards NNW Approx. 1.30 Km towards NE
7.	Places of worship	Iskcon Temple Mahavir Mandir Patna Shri Panchroopi Hanuman Temple	Approx. 0.40 Km towards SE Approx. 0.90 Km towards SE Approx. 2.45 Km towards WSW
8.	Water Bodies	Ganga River	Approx. 2.75 Km towards North
9.	Zoological garden	Sanjay Gandhi Biological Park	Approx. 2.75 Km towards WSW
10.	Nearest Town	Patna City	The project is in Patna
11.	Defense Installation	Danapur Cantonment	Approx. 9.20 Km towards WNW
12.	Wetland	Mangal Talab	Approx. 9.64 Km towards East
13.	Routers or facilities used by the public for access to recreation or other tourist, pilgrim areas	Indira Gandhi Planetarium Patna Museum Bihar Museum Buddha Smriti Park Eco Park (Rajdhani Vatika) Golghar	Approx. 0.20 Km towards ENE Approx. 0.40 Km towards NE Approx. 0.62 Km towards West Approx. 0.64 Km towards ESE Approx. 1.45 Km towards WSW Approx. 1.41 Km towards NE

Source: Google Earth & Site visit

The Site Location map is shown in **Figure-1**. A Google Map showing the site corner coordinates of the proposed project is shown in **Figure-2**. Topographical map (*Survey of India Top sheet no.- G45N2_72G2*) of 10 km radius is shown in **Figure 3**.

Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli, Beerchand Patel Path, Patna by Kumar Infra Hotel Pvt. Ltd.

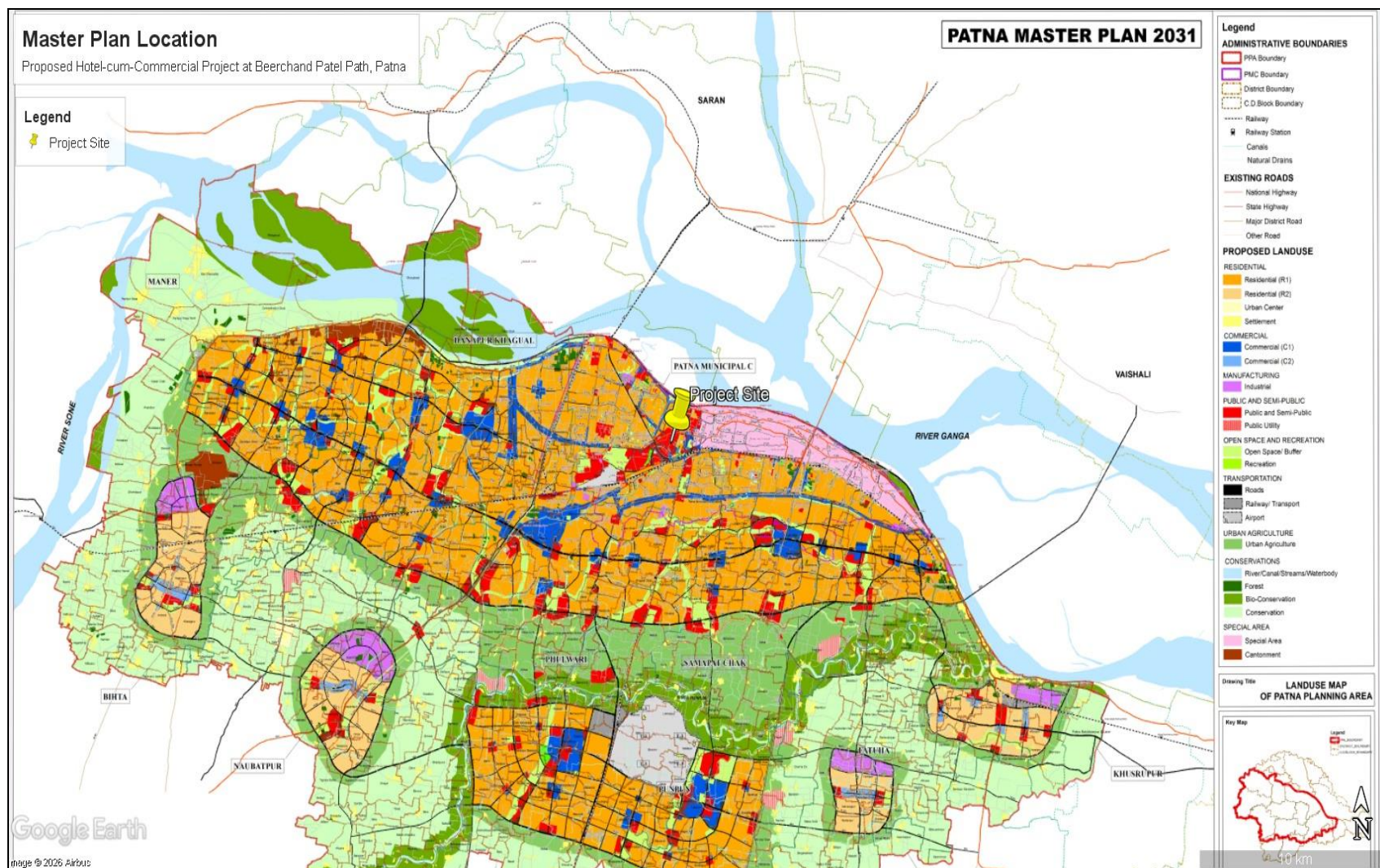
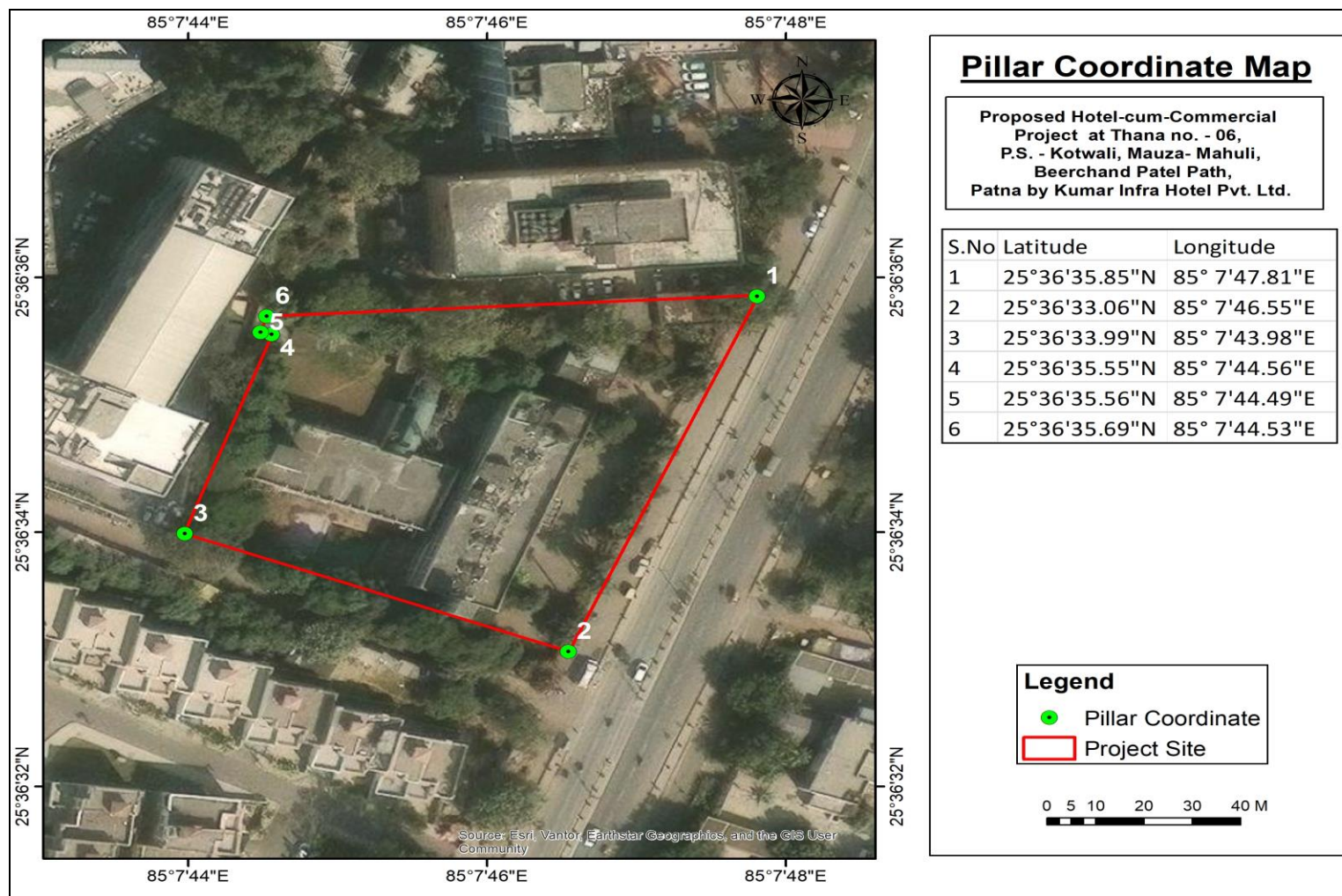


Figure-1: Site Location Map

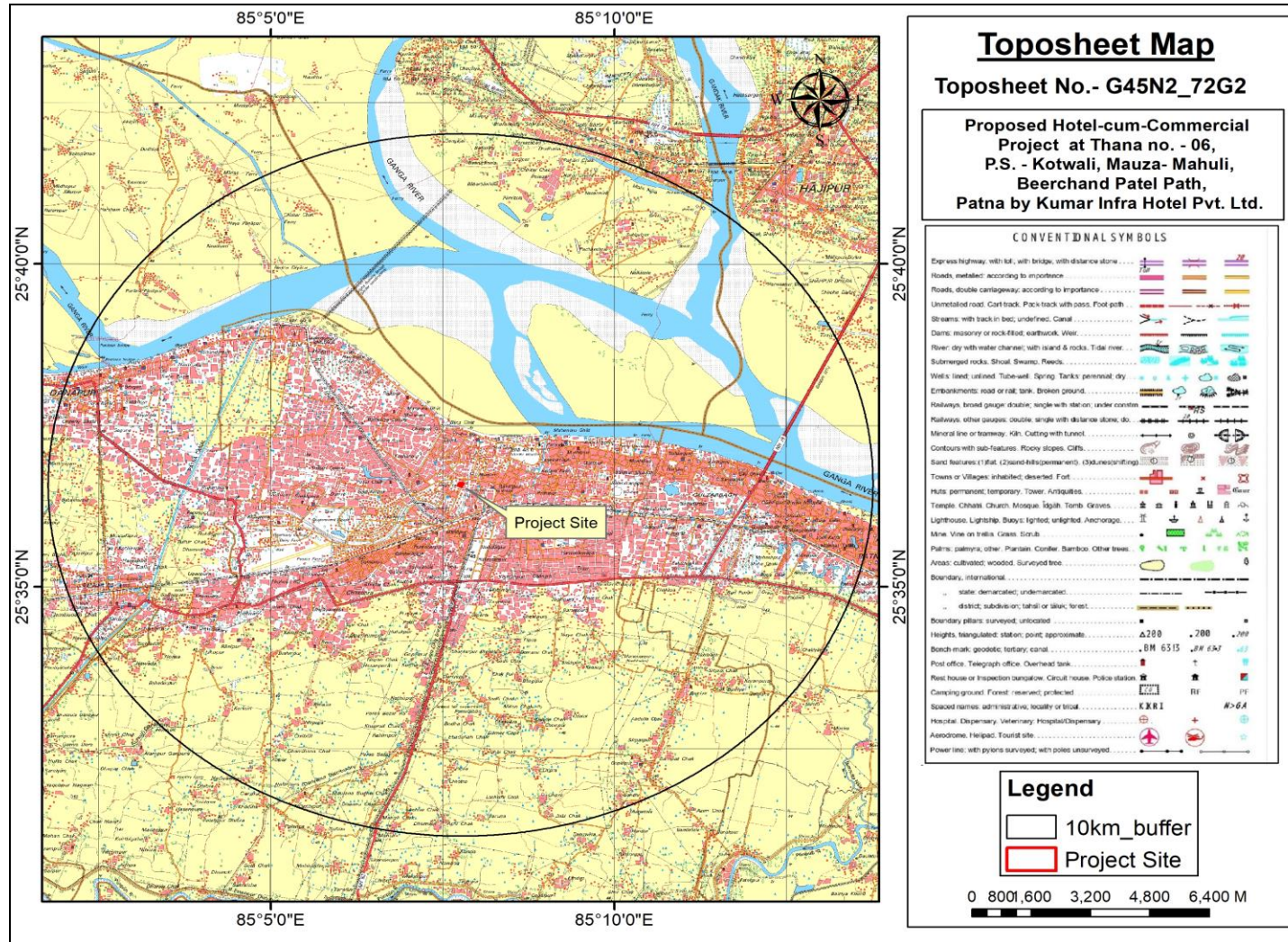
**Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli,
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Source: Google Map

Figure-2: Pillar Coordinate Map

**Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli,
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Source: Survey of India

Figure 3: Topographical Map of 10 km radius

3. PROJECT LOCATION AND DESCRIPTION

The Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli, Beerchand Patel Path, Patna. The coordinates of the project boundary are mentioned below in the **Table-2**.

Table-2: Coordinates of the Project Boundary

S. No.	Latitude	Longitude
1	25°36'35.85"N	85° 7'47.81"E
2	25°36'33.06"N	85° 7'46.55"E
3	25°36'33.99"N	85° 7'43.98"E
4	25°36'35.55"N	85° 7'44.56"E
5	25°36'35.56"N	85° 7'44.49"E
6	25°36'35.69"N	85° 7'44.53"E

The detailed area statement is given below in **Table-3**.

Table-3: Detailed Area Statement

S. No.	Details	Area	
1	Total Plot area	5930.65	Sqm.
2	Permissible FAR	4	
3	FAR Area achieved @4	23720.06	Sqm.
4	Parking Area required	7389.12	Sqm.
5	Total Parking Provided at Basement	8481.88	Sqm.
6	Service floor area	3141.66	Sqm.
7	Service area in Basement 1 & 2	1544.4	Sqm.
8	Service at Terrace	447	Sqm.
9	Total Built-up Area	37335	Sqm.
10	Greenbelt area Provided @17.15%	1017	Sqm.
11	Total Ground Coverage	2750.02	Sqm.
12	Road Area & open area	2163.63	Sqm.

4. DETAIL OF BUILDING BLOCK

The Project envisages construction of one blocks. Details of Building Blocks are given in **Table 4.**

Table 4: Details of Building Blocks

S. No.	Floor	Area (Sqm.)
1	Basement 1 (FAR)	99.28
2	Basement 2 (FAR)	99.28
3	Lower Ground	2711.99
4	Ground Floor	2750.02
5	1st Floor	2662.3
6	2nd Floor	2693
9	3rd Floor	2314.35
10	4th Floor	1455.35
11	5th Floor	1455.35
12	6th Floor	1455.35
13	7th Floor	1455.35
14	8th Floor	1455.35
15	9th Floor	1455.35
16	10th Floor	1657.74
	Total FAR Proposed	23720.06
	Service floor area	3588.66

	Service area in Basement 1 & 2	1544.4
	Basement 1 Parking	4240.94
	Basement 2 Parking	4240.94
	Total Built-up area	37335

5. POPULATION DETAIL

Total population of the proposed project will be 1461 which include the population of dwelling units, visitors & Commercial. Breakup of the population is given in **Table-5**.

Table-5: Calculation of Population

Description	No. of units	Population
Hotel		
Hotel rooms	150	300
Staff		225
Commercial		
Commercial Shop	28 nos.	140
Visitors		700
Ball Rooms		700
Conference room & Meeting room		100
Speciality Restaurant		150 seats
Spa		5
Gym		8
Total		2328

6. PARKING DETAIL

The details of parking required and provided are mentioned in following **Table 6**.

Table 6: Parking Details

Parking Details	Area (Sqm.)
Parking requirement	
Area of Lower Ground Floor (Commercial)	2711.99
Area of Lower Ground Floor (Commercial)	2750.02
Total commercial area	5462.01

Parking required @35% of commercial area	1911.703
Total FAR Commercial & Hotel	23720.06
Area of Hotel	18258.05
Total Parking requirement @30%	5477.415
Total Parking area required	7389.118
Total Parking area provided	8481.88
Total no. of Car Parking provided	272
No. of cars in Basement 1	131
No. of cars in Basement 2	141

7. LANDSCAPE DEVELOPMENT

Increasing vegetation in the form of greenbelt is one of the preferred methods to mitigate air pollution. Plants serve as a sink for pollutants, reduce the flow of dust and reduce noise pollution. The site for the proposed buildings is vacant so, no tree cutting is required. Calculation of green area for proposed project is given in **Table-7**.

Table-7: Calculation of Green Area

Total Plot Area	5930.65 Sqm
Landscape area provided @ 17.15 %	1017 Sqm.
Total No. of Trees will be Planted @ 1 tree per 80 Sqm. of Plot Area	74 Nos.

8.0 WATER REQUIREMENT, SUPPLY AND DISTRIBUTION

Water Requirement for the proposed project is discussed below.

8.1 Water requirement during Construction phase

Approx. 21 KLD water will be required for domestic as well as for construction purpose. Source of fresh water will be packaged drinking water. Source of construction water is treated water & tanker water supply.

No use of ground water or surface water will be used during the construction activity

S. No.	Type Population	Details	Flushing Use		Domestic Use		Total water requirement	Total wastewater
			LPCD	Total Water Req. in Ltr.	LPCD	Total Water Req. in Ltr.		
1.	Construction Labour	400	20	8000	25	10000	18000	16000
2.	Staff	10	20	200	25	250	450	400
3	Water Sprinkling						2000	
4	Curing & Landscaping						5000	
	Total	410		8200		10250	25450	16400
	Mobile STP Capacity= 20 KLD							

7.2 Water requirement during operation phase

Water requirement during the operational phase will be met through ground water. The total water requirement for the proposed project has been estimated **~149 KLD**. This includes domestic water requirement, flushing and landscaping. The total fresh water requirement is **~103 KLD** which includes domestic water requirement. The water requirement for flushing and landscaping will be met through treated water from STP. Details of break-up of water requirement are given in **Table-8**.

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Table-8: Details of Water Requirement

S. No.	Description	No. of units / Area in Sqm	Unit Population	Population	Unit water consumption (lpcd)	Total water required (kld)	Fresh water required (kld)	Flushing (kld)	Total Wastewater (kld) (80% of domestic +100% Total flushing)
1	Hotel rooms	150	10 & 5	300	320 (260+60)	96.00	78.00	18	80.4
2	Staff	...	...	225	45 (25+20)	10.13	5.63	4.5	9
3	Commercial Shop Staff	28 Shops	5 staff @1 shop	140	45 (25+20)	6.30	3.50	2.8	5.6
4	Commercial Shop Visitors	...	...	700	15 (5+10)	10.50	3.5	7.00	9.8
5	Ball Rooms		...	700	15 (5+10)	10.50	3.5	7.00	9.8
6	Conference room & Meeting room	...	...	100	15 (5+10)	1.50	0.5	1.00	1.4
7	Restaurant		...	150	70 (55+15)	10.5	8.3	2.25	8.85
8	Spa & Gym		...	13	15 (5+10)	0.20	0.065	0.13	0.182
	Subtotal I					146	103	43	125
	Reuse of treated water								
1	Horticulture	1017	3 liter/sqm of Landscape area	...		3			0
		Subtotal II				3			0
		Grand Total I+II				149			

8.3 Wastewater Generation

The total estimated quantity of wastewater to be generated from proposed project is **~125 KLD**.

Calculation of wastewater generation is shown below in **Table-9**.

Table-9: Calculation of Wastewater Generation

Details	Water (KLD)
Water requirement for domestic purpose	103
Wastewater to be generated from domestic use (@ 80% of domestic water requirement)	82
Water requirement for Flushing Purpose	43
Wastewater to be generated from Flushing (@ 100% of flushing requirement)	43
Total wastewater generated	125
STP capacity 20% higher than total waste water	~150

Water balance diagram for given in **Figure-4**.

**Proposed Hotel-cum-Commercial Project at Thana no. - 06, P.S. - Kotwali, Mauza - Mahuli,
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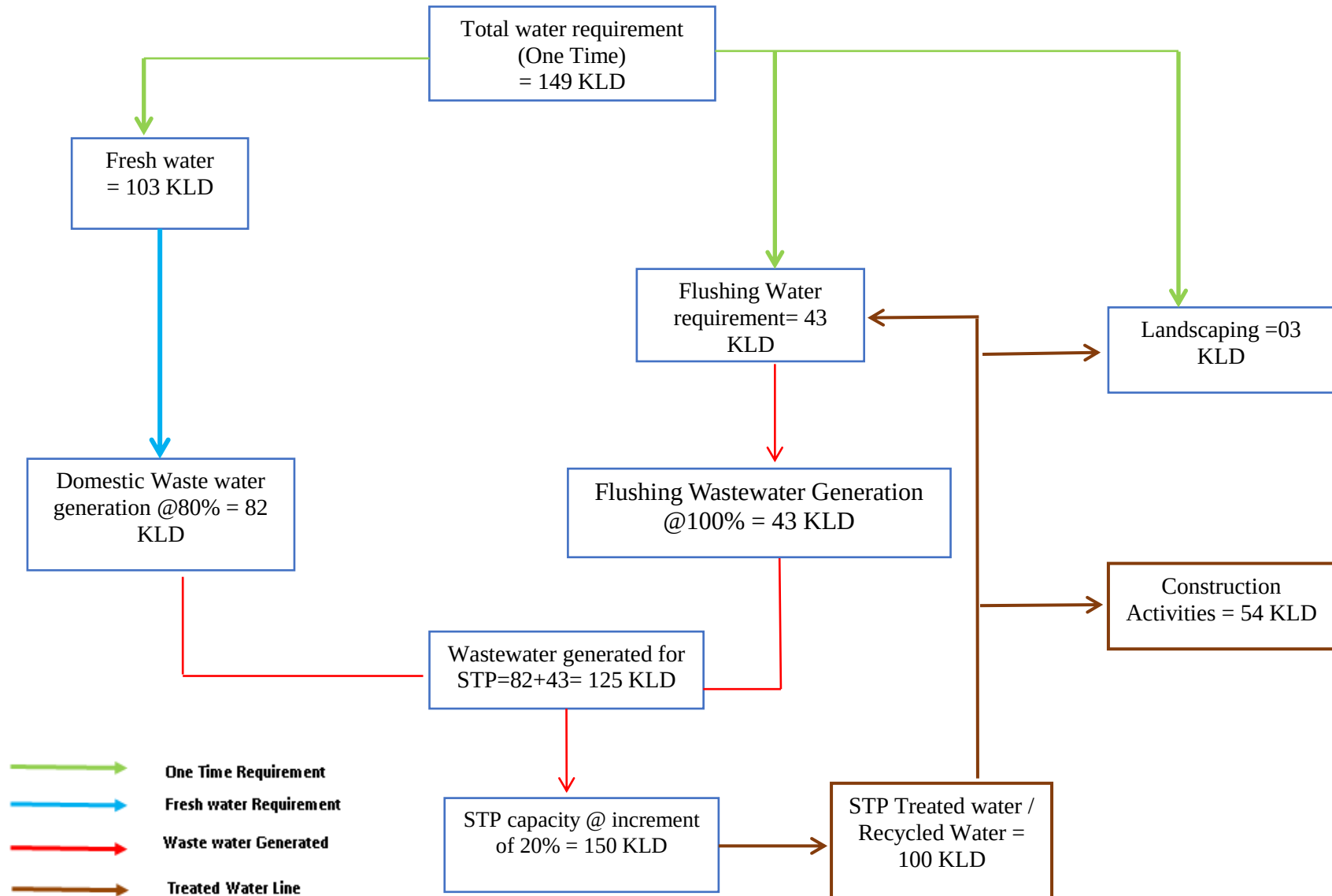


Figure-4: Water Balance Chart

Reuse of Treated Water:

Waste water generated is 125 KLD, which will be treated in the onsite STP of capacity 20% more than the waste water generated i.e. 150 KLD. The treated water available is 100 KLD (@ of 80%) and it will be recycled and re-used for flushing and landscaping purpose.

During the non-monsoon season, treated water will be used in Flushing & landscaping management and during the monsoon season, as there will be no requirement of water for landscaping, and the excess treated water depending up on requirement either will be used in nearby construction site or discharged into the sewer line.

Pre-treatment:

To reduce the chances of membrane damage, wastewater should undergo a high level of debris removal using screens prior to the MBR. Primary treatment is often provided in larger installations. In addition, all MBR systems require 1- to 3-mm-cutoff fine screens immediately before the membranes, depending on the MBR manufacturer. These screens require frequent cleaning.

Membrane Configuration:

MBR manufacturers employ membranes in two basic configurations: hollow fiber bundles and plate membranes. A number of **bundles** are connected by manifolds into units that can be readily changed for maintenance or replacement.

The other configuration, employ **membranes** in a flatplate configuration, again with manifolds to allow a number of membranes to be connected in readily changed units.

System Operation:

All MBR systems require some degree of pumping to force the water flowing through the membrane. While other membrane systems use a pressurized system to push the water through the membranes, the major systems used in MBRs draw a vacuum through the membranes so that the water outside is at ambient pressure. The advantage of the vacuum is that it is gentler to the membranes; the advantage of the pressure is that throughput can be controlled. All systems also include techniques for continually cleaning the system to maintain membrane life and keep the system operational for as long as possible. All the principal membrane systems used in MBRs use

an air scour technique to reduce buildup of material on the membranes. This is done by blowing air around the membranes out of the manifolds.

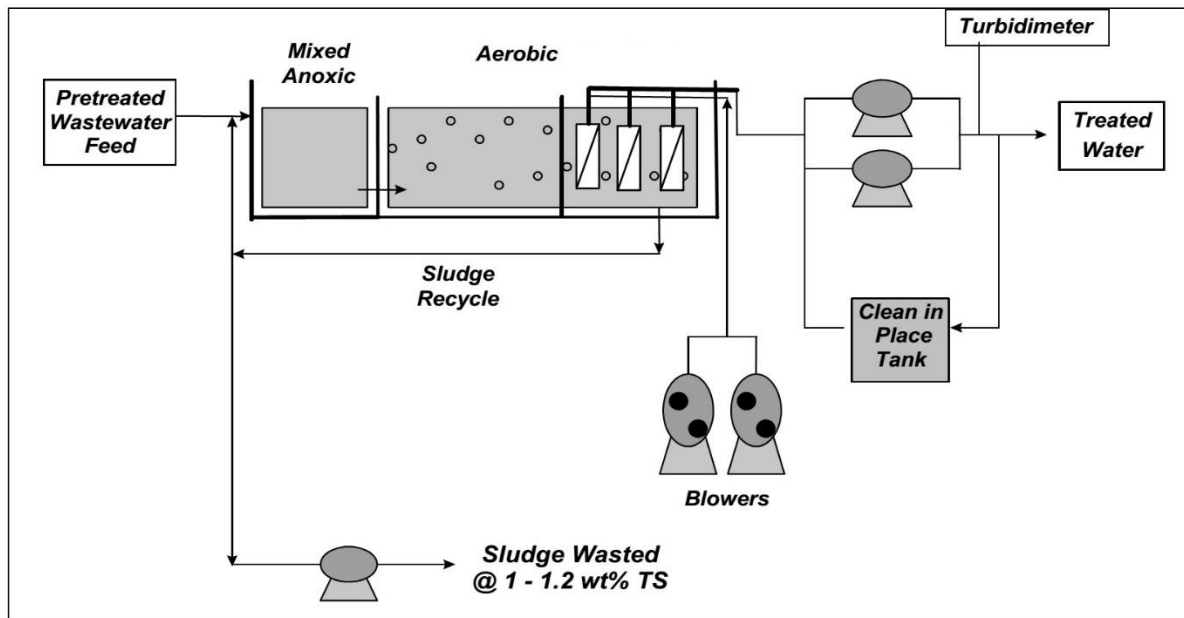


Figure 5: Schematic Diagram of MBR STP

8. STORM WATER MANAGEMENT

The storm water disposal system for the premises shall be self-sufficient to avoid any collection/ stagnation and flooding of water. Maximum harvesting will be done within the site. Therefore, it has been decided to provide sufficient rain water harvesting at selected locations, which are liable to catch the maximum run-off from the area. Following are some measures for Storm water disposal:

- 1) Since the existing topography is congenial to surface disposal, a network of storm water pipe drains is planned adjacent to roads. All building roof water will be brought down through rain water pipes.
- 2) Proposed storm water system consists of pipe drain, catch basins and seepage pits at regular intervals for rain water harvesting and ground water recharging.
- 3) The annual rainfall intensity of 45 mm/hr shall be considered for designing the storm water drainage system.

The entire site is provided with extensive planned drainage system to low lying areas. The arrangement provides appropriate protection to the site against flooding.

10. RAIN WATER HARVESTING

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater will be stored for direct use or for recharging the groundwater. Rain Water Harvesting is the technique through which rain water is captured from the roof and paved surfaces and stored in sub-surface ground water reservoir by adopting artificial recharge techniques.

Advantages:

- ✓ To meet the ever increasing demand for water.
- ✓ To avoid flooding of roads.
- ✓ To augment the ground water storage and control the decline of water table levels.
- ✓ To reduce ground water pollution.
- ✓ To improve the quality of ground water.
- ✓ To reduce the soil erosion.
- ✓ To supplement domestic water requirement during summer, drought etc.
- ✓ Improves the quality of ground water through dilution when recharged to ground water.

As stated above, due to high ground water table, it is not feasible to provide the rain water recharge pits for aquifer recharging but there will be provision of the water sump for the collection of roof top rain water and it will be further used for miscellaneous purposes. The rainwater runoff from the roofs shall be transported through underground pipes to water sumps structures & surface rainwater shall naturally percolate in the underground aquifer through natural filtration.

Table-10: Rainwater Harvesting Calculation

Input Data			Unit	Reference
Catchment Area		Value		
1	Rooftop Area of Building/shed	2750.02	Sqm.	
2	Green Belt Area	1017	Sqm.	
3	Road & Paved Area	2,163.63	Sqm.	
	Total	5930.65		
Run off Coefficient, c				
	Rooftop Area of Building/shed	0.85		RWH in India, MoEF&CC, e-book 2016
	Green Belt Area	0.15		
	Paved Area	0.75		
	Open Area	0.15		

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				CGWB Patna
Rainfall				
	Average Annual Rainfall	1076	mm/year	
	Hourly Peak Rainfall Intensity, I	45	mm/hour	$Q = A * c * I$
	Peak Time taken	15	minutes	
Total Volume of Water to be Captured on Annual Basis				
	Rooftop Area of Building/shed	2515.17	cu-m/year	
	Green Belt Area	164.14	cu-m/year	
	Paved Area	1746.05	cu-m/year	
Runoff Calculation for the Peak Rainfall, Q				
	Rooftop Area of Building/shed	26.30	cu-mtr/hour	RWH in India, MoEF&CC, e-book 2016
	Green Belt Area	1.72	cu-mtr/hour	RWH in India, MoEF&CC, e-book 2016
	Paved Area	18.26	cu-mtr/hour	RWH in India, MoEF&CC, e-book 2016
	Total	46.27	cu-mtr/hour	
Annual Recharge Potential				
	Recharge Potential	4425.36	cu-m/year	IMD
	Rainy Season	June-Sep		
Design of Recharge Structure for Peak Flow				
Calculation for One Pit				
	Diameter of Pit	2.5	mtr	
	Depth of the Pit	1.5	mtr	
	Volume of the Pit	7.36	cu-mtr	
Number of Pits Required to store the peak discharge				
		6.3		
	Rain water harvesting Pits provided	6		

Number of RWH Pits Proposed = ~6

11. POWER REQUIREMENT

The total electrical load demand has been estimated to be ~2500 KVA. The source of power will be supplied by State Electricity Board.

In case of power failure, 3 DG sets of (650KVA, 1250KVA, 1010KVA) will be provided as power back-up. The DG sets are located in the basement and will be air cooled.

The DG sets will be provided with acoustic enclosure. Adequate stack heights of D.G. Sets will be provided as per the stipulated guidelines of Central Pollution Control Board (CPCB) to

facilitate natural dispersion of exhaust gases as the calculation for the stack height is given below considering height of the building.

Calculation of DG Stack Height:

$$H = h + 0.2 \sqrt{\text{(capacity of DG in KVA)}}$$

Where:

H = Total height of stack in meter.

h = Height of the building in meters where the generator set is installed.

KVA = Total generator capacity in the set of KVA.

For DG set of 1250 KVA

$$H = h + 0.2 \sqrt{1250}$$

$$H = h + 0.2 \times 35.35$$

$$H = h + 7.07$$

We suggest 7 meter above the max. Height of the building

12. SOLID WASTE GENERATION AND MANAGEMENT

The project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated from the project will be collected properly and will be managed as per Solid Waste Management Rules, 2016. Following solid waste generation rate has been considered as given in **Table-11**.

Table 11: Solid waste Generation details

S. No.	Category of Solid Waste	Waste Generation Rate	Formula	Total Population	Waste Generated (Kg/day)	Bio-degradable (Kg/day)	Non-biodegradable (Kg/day)
1	Hotel Rooms	0.3 to 0.6 kg/cap/day	Total Population* 0.45	300	135	81	54
2	Restaurant	0.3 to 0.6 kg/cap/day	Total Population* 0.45	150	67.5	40.5	27
3	Staff	0.05 to 0.2 kg/cap/day	Total Population* 0.125	378	37.8	22.68	15.12

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4	Visitors (Shops, Ball rooms, Conference room & meeting room, Spa and Gym)	0.1 to 0.2 kg/cap/day	Total Population* 0.15	1500	225	135	90
	Total			2328	465	279	186

Reference: NBC 2016

Source: Manual on Municipal Solid Waste Management, published by Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India.

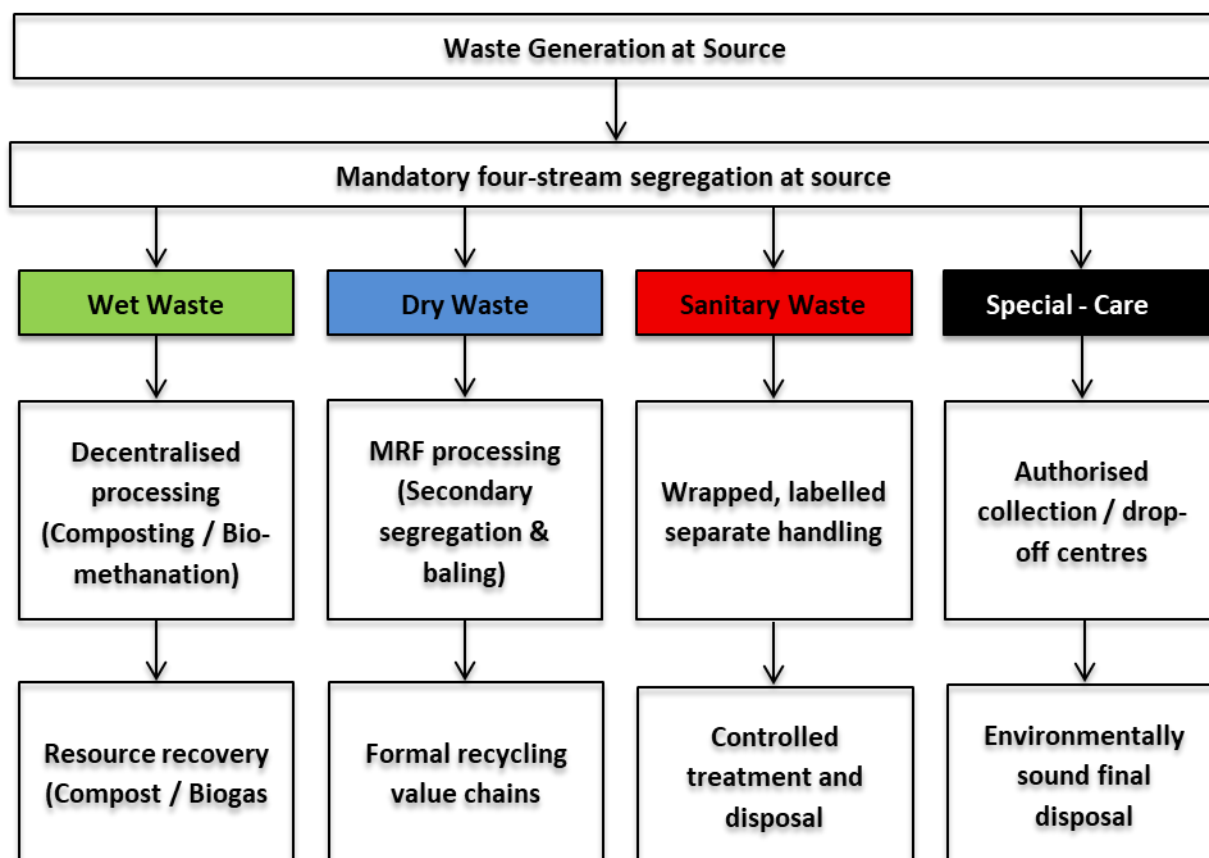


Figure-6: Solid Waste Management during Operation Phase

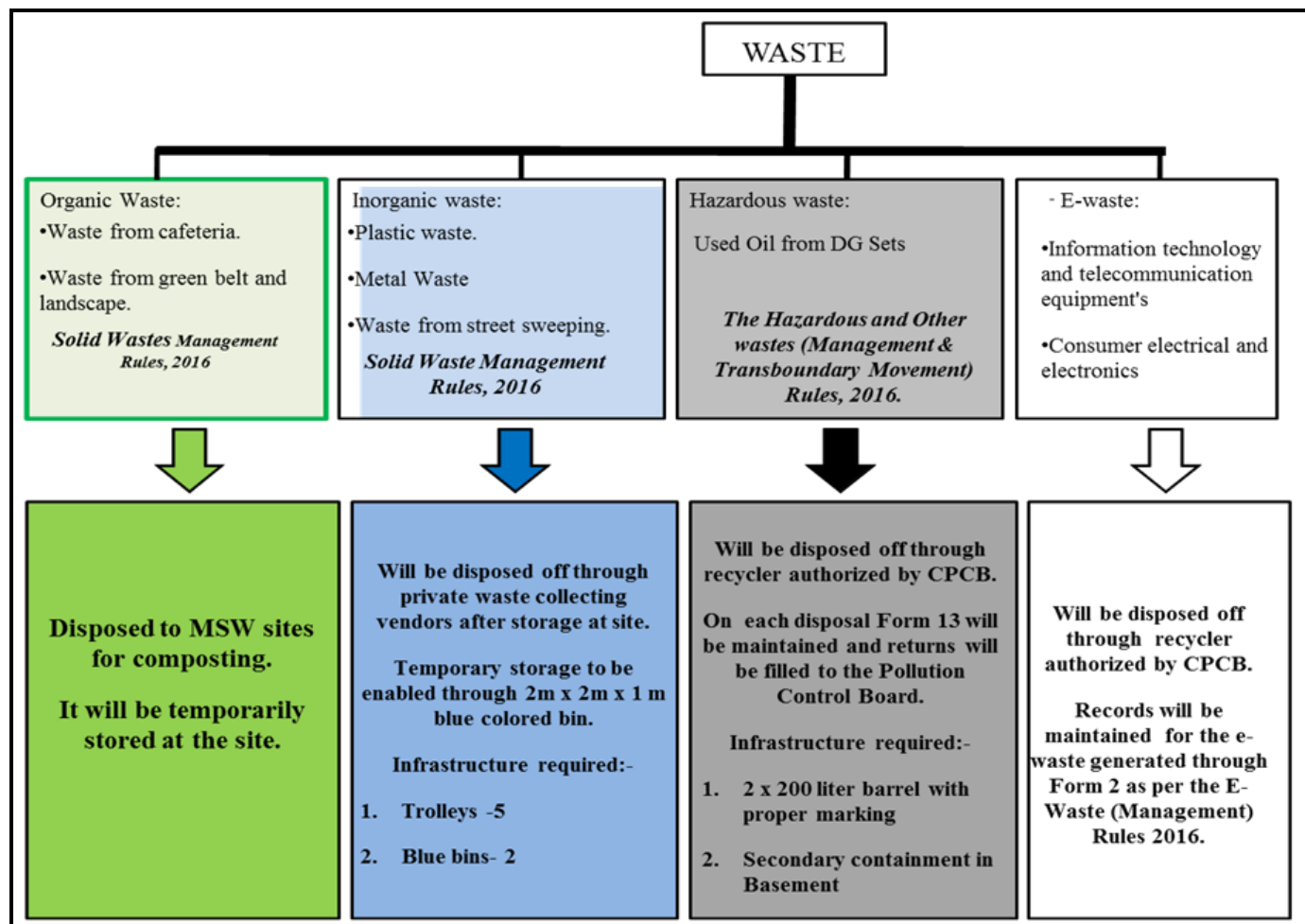


Figure-7: Hazardous Waste Management Plan

13. FIRE FIGHTING SYSTEM

The Fire Fighting will be designed as per the recommendations of the National Building Code of India: Part 4 Fire and Life safety: 1997. The building has been classified under Group-C: Institutional Building, Sub Division (C-1) in the National Building Code 2016.

The fire-fighting system has been designed considering the following codes, manual and guidelines;

- National Building Code of India (NBC);
- As per requirement of fire officer/local fire approving authorities; and
- As per Indian Standard Code for Fire Protection (IS Codes)

14. DETAIL OF CONSTRUCTION MATERIAL

List of building materials will be used at site:

- Coarse sand- 841892.314 CFT
- Stone aggregate (10 MM)- 192749.02 CFT
- Stone aggregate (20 MM)- 449,747.73 CFT
- Cement (50 Kg/BAG)- 177240.487 BAGs
- Bricks- 3766360.353 Nos
- Steel- 1661.62 Tons
- Plywood- 57603.158 SFT

Finishing materials like tiles, sanitary fixtures, etc. shall be stored in closed rooms.

16. Occupational Health and Safety (during construction)

The Management of the project has committed for the health and safety of workers as under;

- The management declares its intention and commitment with all relevant statutory requirements in regard to environment, health and safety of workers.
- The management has assigned the responsibility at different levels as:

Project Manager : For all the workers/employees.

Supervisor : For casual and daily/unskilled workers.

The management will ensure the occupational health and safety, at the site during construction, by adopting following practices;

- a) Every responsible effort will be made to provide and maintain safe and healthy working conditions, environment, and system of work for all employees.
- b) It will also endeavor of the project proponent to ensure that surrounding environment is not adversely affected by the work activity.
- c) The working environment would be healthy and co-operative.
- d) The prevention of accidents or accident hazards leading to personal injury or damage of equipment/property is recognized as essential as an integral part of efficient operations.
- e) Every employee will follow safety rules/regulations, operating procedures/safe work method design to protect people and equipment from risk of injury of damage to property.

- f)** The project will endeavor to adequately train all employees suitably equip them to perform their duties in a safe and effective way.
- g)** Every employee will discharge his personal responsibility, and shall co-operate and actively participate in maintaining and improving safety standards.
- h)** A primary health care centre will be provided within the campus. Besides, there is a multi-specialty private hospital (on panel of the institute) just opposite to the institute entrance.
- i)** A doctor will be appointed for health checkup of workers at regular intervals and related records shall be maintained. A doctor and a hospital will be empanelled for attending off site health problems of the workers.
- j)** First Aid kits will be kept ready and available to the workers, in case of emergencies, company will provide fastest possible medical aid. Staff will be adequately trained for this.
- k)** Adequate supply of clean drinking water, neat and clean toilets and washing facilities will be provided at the site.
- l)** Proper ventilation, wherever required, shall be provided in the work areas.
- m)** Proper safety and protections, steps and guards shall be provided at all required places.
- n)** Suitable safety instructions will be displayed in writing (including that in vernacular language) for all critical areas and working conditions.
- o)** A vehicle/ambulance will be specifically positioned at the site for emergency evacuation of workers in case of any health problem/accident.