

PROPOSED RESIDENTIAL PROJECT “VEENA VATIKA” AT DARBHANGA NEAR DELHI MORE AT MAUZA-SONHAN,VASUDEOPUR, KHATA NO- 117,716/1564 TAUZI NO - 1596,1656 KHESHRA NO - 776(OLD),1178(OLD)/1539 (NEW), THANA NO - 449, DIST-DARBHANGA.

1.0 INTRODUCTION

M/s KKT CONSTRUCTIONS PRIVATE LIMITED has developed a Proposed Residential Project at Darbhanga Near Delhi More At Mauza-Sonhan,Vasudeopur, Khata No- 117,716/1564, Tauzi No - 1596,1656, Khasra No - 776(Old), 1178(Old)/1539 (New), Thana No - 449, Dist-Darbhangha, State-Bihar. Municipal Corporation has permitted the construction of proposed Residential project at the project site.

The Project proposal involves development of 6 no. s of Residential buildings- Block A, Block B(Type 01), Block B(Type 02),Block C, Block D and Block E with the allied facilities like waste management system, storm water management system, water supply system, sewerage system, Fire Fighting Management, adequate parking facility and green area. Total plot area of the project is **16148.7 sq.m**. Built-up area of project after development will be approx. **53693.45 sq m**.

1.1 APPLICABLE LEGAL FRAMEWORK

Project involves development of 6 no. of Residential buildings Block with allied facilities like Shops, waste management system, storm water management system, water supply system, sewerage system, Fire Fighting Management, adequate parking facility and green area. Built-up area of project is **53693.45 sq m**. As per EIA Notification, 2006 the projects listed in schedule I of the notification attracts applicability of EIA Notification, 2006 and are required to obtain prior environmental clearance. Building and construction projects having built-up area more than 20,000 sq m and less than 1,50,000 sq m falls under the category B2 and activity 8 (a). Thus, it is required to obtain prior environmental clearance for proposed project from SEIAA, Bihar. The acts and rules applicable to the project includes following:

- Environment protection Act, 1986
- EIA Notification, 2006 as amended
- MSW Rules, 2016
- Construction & Demolition Waste Management Rules, 2016
- Plastic waste Management Rules, 2016
- Hazardous & Other waste Management Rules, 2016
- E-Waste Rules, 2016
- Air Act, 1981
- Water Act, 1974
- Local By Laws
- Forest Act 1927 & 19

1.2 CONNECTIVITY ANDSURROUNDINGS OF PROJECT SITE

Project lies in Sonhan, Vasudeopur. Location map of the project site is given in **Figure 1**. Geographical coordinates of the center of project site are 26°11'17.84"N and 85°53'45.45"E. Site

Conceptual Plan | 2

PROPOSED RESIDENTIAL PROJECT “VEENA VATIKA” AT DARBHANGA NEAR DELHI MORE AT MAUZA-SONHAN,VASUDEOPUR, KHATA NO- 117,716/1564 TAUZI NO - 1596,1656 KHESHRA NO - 776(OLD),1178(OLD)/1539 (NEW), THANA NO - 449, DIST-DARBHANGA.

is flat land with average elevation of approx. 51 m AMSL. Project site is well connected with road adjacent. This road connects site to NH-27 at distance of 0.12 km S direction and NH-105 at distance of 0.5km E direction. Shisho Railway Station is 1.98 km away in NW direction. Kavi Kokil Vidhyapati Airport is at about 1.75 km in NE direction.

Table 1: Geographical Coordinates of Project Site

S. No.	Point in Image	Latitude	Longitude
1.	A	26°11'21.30"N	85°53'47.20"E
2.	B	26°11'21.30"N	85°53'48.10"E
3.	C	26°11'19.00"N	85°53'48.30"E
4.	D	26°11'17.30"N	85°53'48.40"E
5.	E	26°11'16.70"N	85°53'44.80"E
6.	F	26°11'19.60"N	85°53'44.00"E
7.	G	26°11'17.10"N	85°53'44.10"E
8.	H	26°11'20.50"N	85°53'47.00"E
9.	I	26°11'20.65"N	85°53'44.02"E

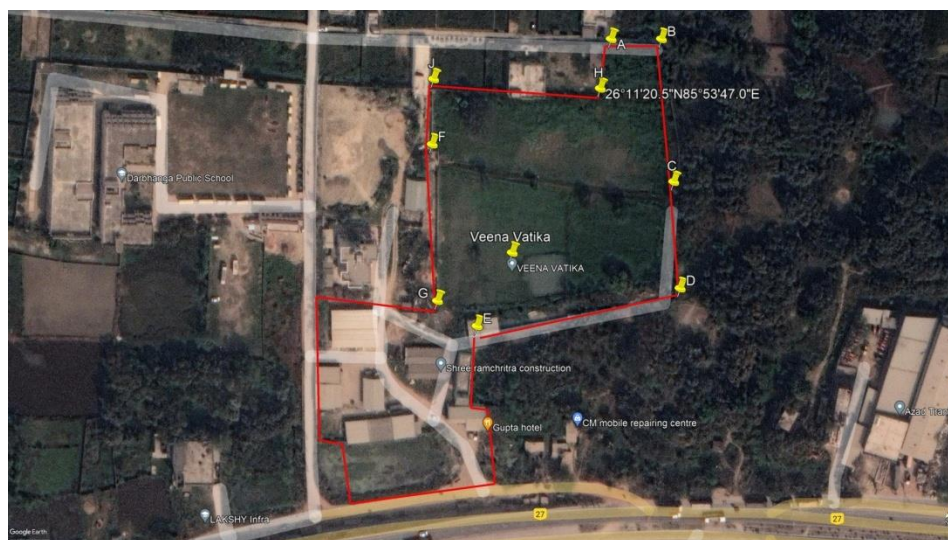


Figure 1: Location Map

Table 1: Surroundings and Connectivity of the Project Site

Near-by Residential Areas	- Basdeopur (1.7 Km E) - Bella Dullah (1.6 km SW)
Nearest City/Town	- Pursili (1 Km) SE - Kandra (9.57 Km WSW)
District Headquarters	Darbhangha
Nearest Schools & Colleges	- Darbhangha Public School (approx. 200m, W) - Darbhangha Central School (approx. 400m W) - Ramballabh Jalan College (approx. 1.2km S) - Lalit Narayan Mithila University (approx. 3km S)

Nearest Hospitals	• Mediworld Multispeciality Hospital,(approx. 500 m, E) • KIMS Hospital (approx. 1.02 km, W)
Nearest Water Bodies	• Chhoti Bagmati River (0.47 Km W) • Vidya River (approx 7km NW) • Manth Pond(300 m S) • Harahi Lake (approx. 3km W) • Dighhi Lake (approx. 4km W)
Nearest Highway & Road	• NH-27 (0.12 km, N) • NH-105 (0.56 km, W) • Road adjacent to project site
Nearest Railway Station	• Shisho Railway Station (1.98 Km NW) • Darbhanga Junction Railway Station (3.9 km SE)
Nearest Airport	• Darbhanga Airport (0.8 km NE)

1.3 PROJECT COST

Total cost of the project is 99.33 Cr.

1.4 LAND REQUIREMENT AND AREA SUMMARY

The total plot area of the project site is **16148.7 sq.m.** Project involves development of 6 no.s of Residential plotted buildings with the allied facilities like waste management system, storm water management system, water supply system, sewerage system, Fire Fighting Management, adequate parking facility and green area. Built-up area of project after development will be approx. **53,693.45 sq.m.** Area summary is given in **Table 2.** Site Plan is attached as **Annexure III.**

Table 2: Area Summary

S. NO.	DESCRIPTION	AREA (SQ M)
A.	Plot Area	16148.7
B.	Proposed Ground Coverage (@46.59%) of plot area)	7523.67
C.	FAR area(@2.71)	43736.88
D.	Non-FAR area	9956.57
E.	Built-up Area (C+D)	53,693.45
F.	Green Area on ground (@25.64 %of plot area)	4140.83
G.	Open Parking area (@1.54% of plot area)	250
H.	Proposed Stilt parking	10,758.50
I.	Road Area/ Paved Area and open Areas (@26 % of plot area)	4234.2
J.	Height	23.6 m
K.	No. of Dwelling Units	528

Table: Block Wise Details

Blocks	No. of Floors	Dwelling Units
Block A (3 BHK)	B+G+6	48
Block B(Type 1) (3 BHK)	B+G+6	72
Block B(Type 2) (3 BHK)	G+6	72
Block C (3 BHK)	G+6	144
Block D (2 BHK)	G+6	144
Block E (2 BHK)	G+6	48

1.5 ESTIMATED POPULATION

Population estimated at the site is 2542 which includes residential and floating population.

Table 3: Estimated Population

S. No.	Category	No of DU/Area	Standard	Population
1.	Residents	528	5.5 person/unit	2976
4.	Staff	--	@5%	149
5.	Visitors	--	@10%	298
	Total Residential Population			3423

1.6 WATER REQUIREMENT

Water requirement during construction phase is approx. 20-30 KLD. Source of water during construction phase will be from Private tanker. Source of water during operation phase will be from Municipal supply supplemented with Ground water if required. Total water requirement during operation phase is 466 KLD out of which Domestic water requirement is 413 KLD. Fresh water requirement is 286 KLD. Water calculation detail is given in **Table 4 & 5**. Water balance diagram are given in **Figure 2 & 3**.

1.7 SEWAGE GENERATION

Sewage generation from the site is expected to be 356 KLD which will be treated in STP of capacity 400 KLD proposed to be constructed at the site. Treated water from the STP will be used for flushing, Fire Fighting, DG cooling, Road Washing and horticulture purpose. STP will be provided with MBBR Technology.

Table 4: Calculations for Total Daily Water Demand

Category	Population/ Area (sq m)/Capacit y	Standard (LPCD)	Water Requireme nt (KLD)	Fresh Water Requirement (KLD)	Recycled Water requirement (KLD)
Domestic					
Residents	2976	135	402	281	121
Staff	149	45	7	2	5
Visitors	298	15	4	3	1
Total Domestic Water Demand			413	286	127
Landscape	4140.83	6ltr/sq.m	25	-	25
Fire Fighting	-	-	1	-	1
DG cooling	3706 KVA	0.9l/KVA/hr	27	-	27
Total			466	286	180

(D.G. sets operation period is 8 hrs.)

Table 5: Wastewater Calculations

Category	Total Quantity (KLD)
Domestic water Req. (Fresh)	286
Flushing water Req.	127
Sewage generation (@80% of the fresh + 100% flushing water requirement)	356
Capacity of STP	400
Recovered water from STP (90% of Waste water)	320
1. Flushing	127
2. Landscaping	25
3. Fire Fighting	1
4. DG Cooling	27
5. Road washing/Sewer	140

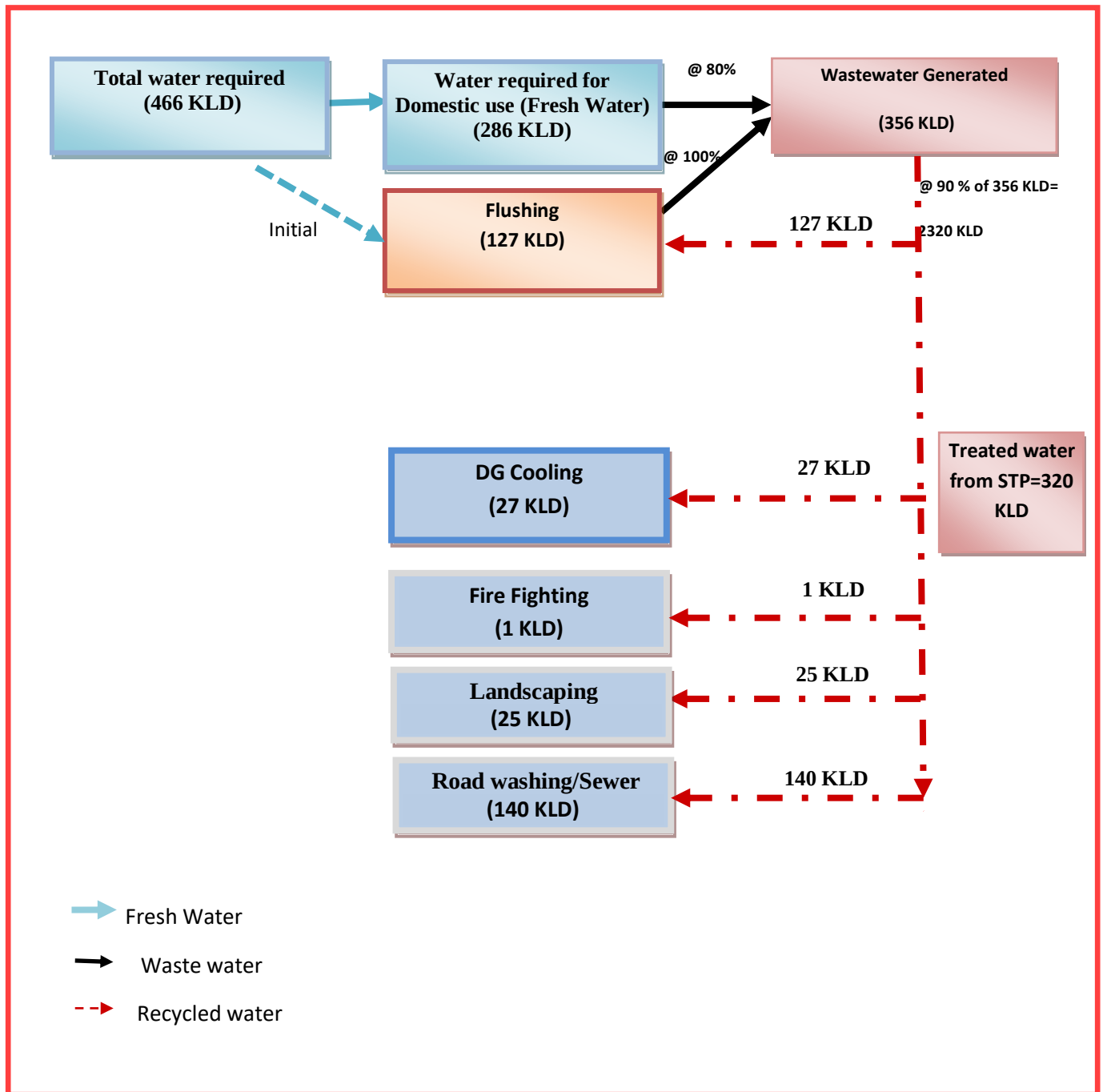


Figure 2: Water balance diagram During Non-Monsoon

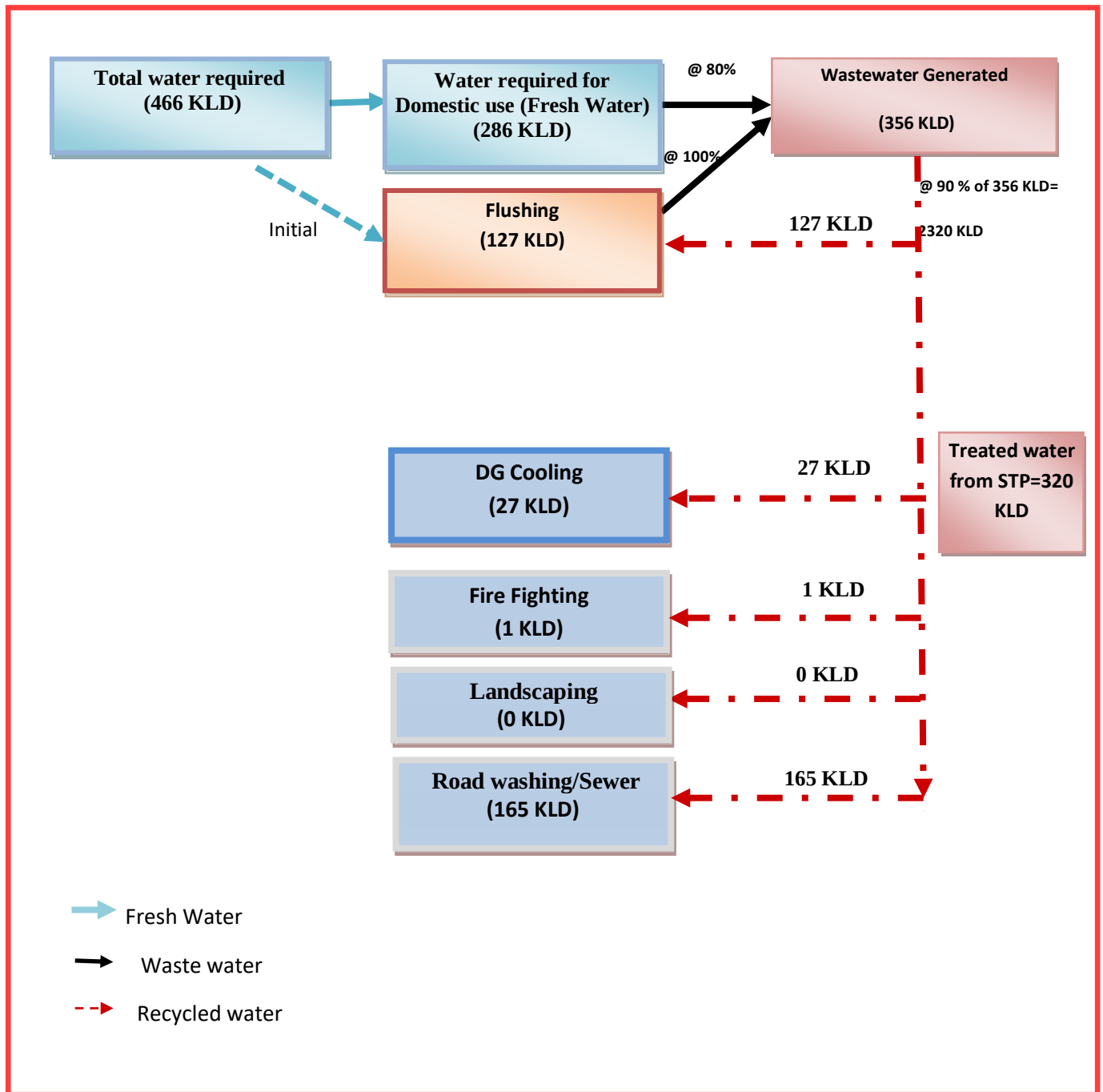


Figure 3: Water balance diagram During Monsoon

1.8 SEWAGE MANAGEMENT

STP of 400 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	:	356 KLD
(b)	Duration of flow to STP	:	24 hours
(c)	Temperature	:	Maximum 32°C
(d)	PH	:	6.5 to 8.5
(e)	Color	:	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	:	7.0 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.

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
- Filtration

The plant sanitary sewage from ablution blocks etc will be segregated from industrial waste and routed to the sewage treatment plant (STP) through sewer network. The existing and proposed colony will also be provided with STP. The STP shall be following components:

Sl. No.	Components	Quantity
1.	Bar Screen Chamber	1 No
2.	Oil & Grease Trap	1 No
3.	Equalization Tank	1 No
4.	Aeration Tank-1	1 No
5.	Primary Settling Tank	1 No
6.	Aeration Tank-2	1 No
7.	Tube Settling Tank	1 No
8.	Chlorine Contact Tank	1 No
9.	Sludge Holding Tank	1 No
10.	Treated Water Tank	1 No

There will also be mechanical and biological parts as follows:

- 1- Sewage Transfer Pump: Submersible Type Pump (2 Nos.)
- 2- Air Blower- 3 Nos. (400 Cum/hr each)
- 3- Diffuser: Coarse & Fine Bubble (1 lot each)
- 4- MBBR Media: 1 lot
- 5- PVC tube pack: Cool deck (1 lot)
- 6- Filter Feed Pump: 2 Nos.
- 7- Filters: MGF & ACF
- 8- Filter Press Feed Pump: 2 Nos.
- 9- Filter Press: 1 No

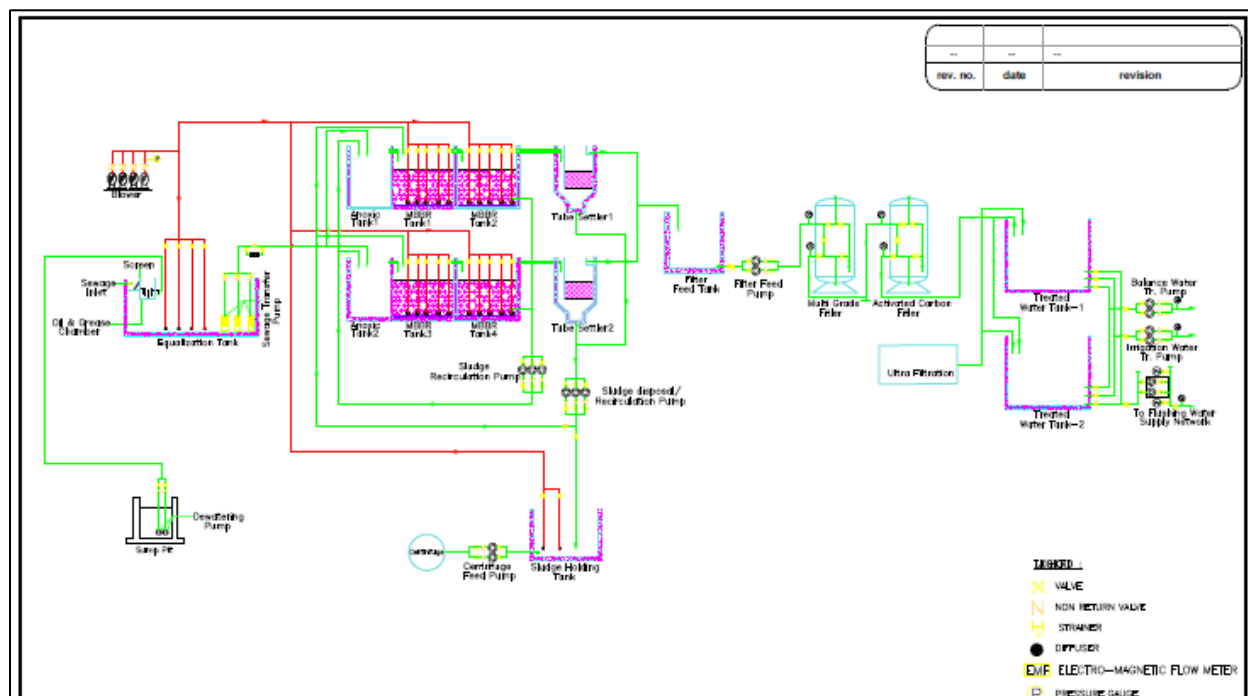


Figure 5: Schematic Diagram of STP (MBBR)

1.9 STORM WATER MANAGEMENT

Storm water drainage system is provided at the site for channelizing storm water and prevents local flooding. Covered storm water drains are provided at the site. Run-off from the site is collected and recharged into ground through 12 nos. of RWH pits. Recharge of the rainfall run-off to ground not only prevents the local flooding during rain but also helps in augmenting the ground water level of the aquifers. Ground water level in project area is approx. 3.17 to 30.59 m bgl during pre-monsoon season and 2.2 to 12.2 m bgl during post-monsoon season. Diameter of the recharge bore will be approx 100-150 mm. Run-off generations from site without development is approx. 498 cum/hr. This run-off increases due to generation of paved surfaces. 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**.

Table 7: Available Run-off from Site

S. No.	Catchment	Area (sq m)	Run-off Coefficient	Average Annual Rainfall (m)	Available Annual Run-off (cum)
1.	Roof top	7523.67	0.9	1.14	7720
2.	Green	4140.83	0.1	1.14	472

3.	Paved Areas	1614.87	0.7	1.14	1289
Total Run-off					9481

Table 8: Calculation for RWH Pits

S. No.	Catchment	Area (sq m)	Run-off Coefficient	Peak Hourly Rainfall (m)	Available Annual Run-off (cum)
1.	Roof top	7523.67	0.9	0.06	406
2.	Green	4140.83	0.1	0.06	24
3.	Paved Areas	1614.87	0.7	0.06	68
Total Run-off					498
Retention Time					15 min
Available Run-off in 15 min					124
Volume of RWH System (10 x 3 x 3)					42
Nos. of Pits Provided					2

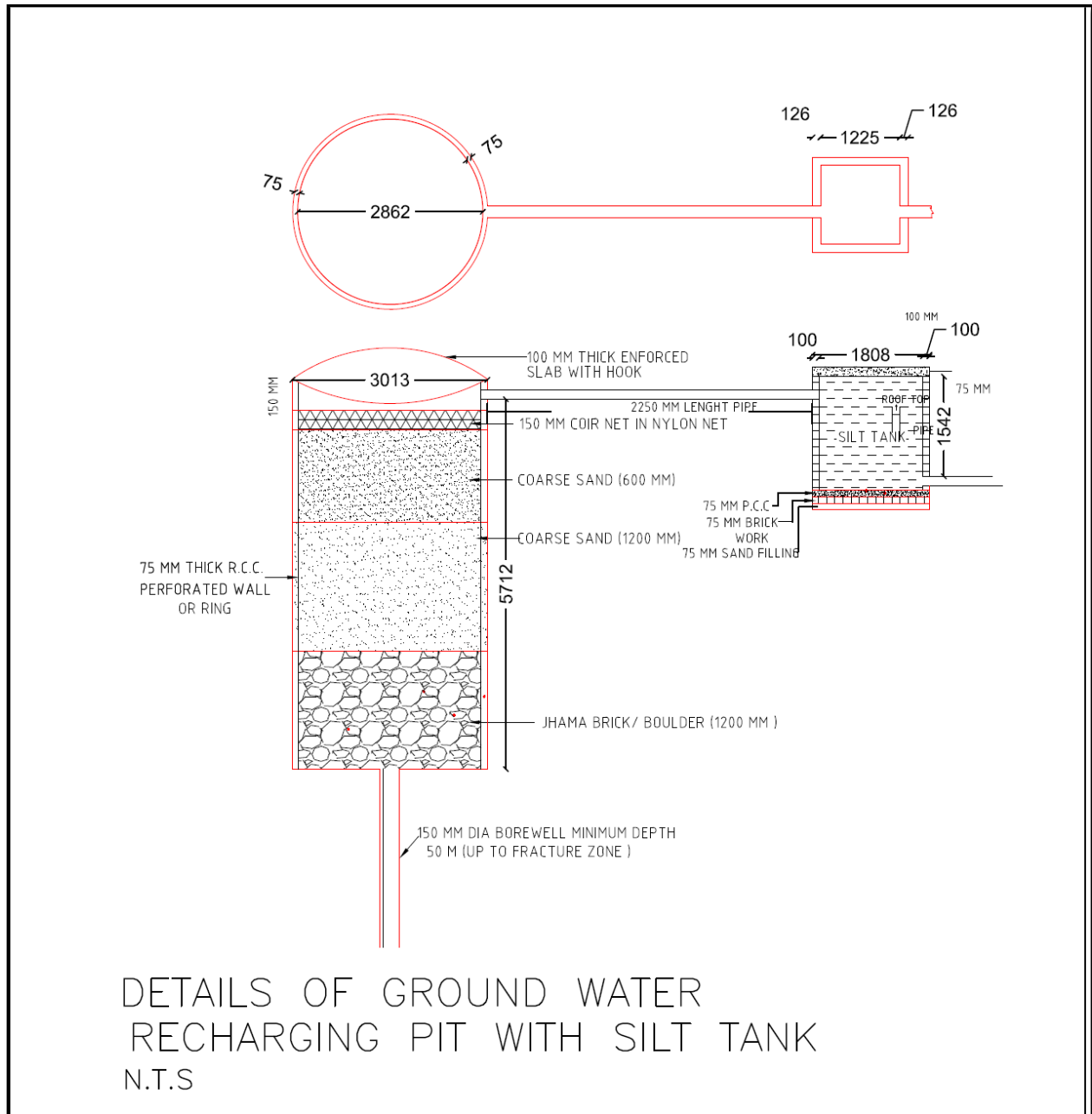


Figure 5: Schematic Diagram of RWH Pit

1.10 VEHICLE PARKING FACILITIES

Adequate parking of 612 ECU (Four Wheeler Car Parking for Resident and Visitors- 555, Fire Fighting Vehicle – 01, Ambulance – 01, Two Wheeler Parking- 55 nos.). will be provided to accommodate the expected vehicles during operation phase of the project in line with the requirement of Local Building by Laws. Parking required and proposed parking is given in **Table 8**.

Table 8: Parking Required and Provided

Particulars	Area (sqm)
Open Parking	250
Stilt Parking	10758.50
Basement Parking (Block A & B)	2535.5
Total	13544

1.11 POWER REQUIREMENT

Maximum power demand for the project during construction and operation phase is estimated to be 50 kVA and 5930.88 kVA respectively. Source of power will be Bihar State Electricity board. 2 no. of DG set of Total 3706 kVA each will be provided as power back-up during power failure.

1.12 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 be majorly excavated materials, cement bags, bricks, concrete, MS rods, tiles, wood etc. Construction waste will be segregated into re-usable, recyclable and reject fraction. Re-usable waste will be stored at site, recyclable material will be sold to authorized vendor and rejected material will be disposed off at the designated areas of local authority. Solid waste management plan followed 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, bricks, 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 authority. Waste will be transported in covered vehicles only.
2.	Excavated Soil	Top soil will be stripped off and stored in covered condition. Top soil will be used for landscaping within the project site. Remaining excavated soil will be used within the site for filling and leveling and construction of roads. Excess muck will be disposed off through authorized vendors.
3.	Domestic Waste	Domestic waste generated by labor at the site will be disposed off through local agencies in the area on daily basis.

Operation phase

During operation phase, waste comprise of municipal waste. It is estimated that approx. 1571 kg per day (0.5 kg per capita per day for the residents, 0.15 kg per capita per day for the visitor).

0.25 kg per capita per day for the staff members, whereas 0.2 kg/acre/day is considered for landscape waste) to be generated from project site. Approx. 36 kg/day will be generated by STP sludge. Estimations for solid waste generation during operation phase are given in **Table 10**. Waste management plan is given below.

Table 10: Calculation of Solid Waste Generation

S. No	Description	Occupancy/Area	kg/capita/day	Total Solid Waste Generation (kg/day)	Recyclable (kg/day)	Non-Recyclable (kg/day)
1.	Residents	2976	0.5	1488	1190	298
2.	Staff	149	0.25	37	30	7
3.	Visitors	298	0.15	45	36	9
4.	Landscape waste	1.02 Acres	0.2 kg/acres	1	0.8	0.2
	Total Domestic waste			1571	1257	314
5.	STP sludge	356 KLD	--	36	29	7
Total Waste Generated				1607	1286	321

(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))

❖ **Collection and Segregation of waste**

- Door to door collection system will be provided for collection of domestic waste
- Local vendors will be hired for waste collection, management and disposal
- Separate colored bins for dry recyclables and rejected waste will be provided to residents as well as in common and open areas

❖ **Disposal**

- Rejected fraction of the waste will be collected and disposed by local agencies on daily basis at the locations designated by Municipal Corporation. Recyclable waste and E-waste will be sold to authorized vendors
- Used oil from DG sets will be sold to authorized vendors.

1.13 GREEN AREA

Total green area provided at the site is Green Area 4140.83sq.m (@25.64% of plot area). Number of trees as per MoEF&CC norms (1 tree per 80 Sq.m of plot area).

Out of which Green belt area is 2422.31 sq.m (15% of the total plot area) and landscape area is 1718.22 sq.m (10.64 % of the total plot area) and Evergreen native species and ornamental tree

species will be planted at the site. Table 12 indicates various suggested species to be used in greenbelt development).

Table 12: List of Plant to be proposed to planted

S. No	Botanical Name
1.	<i>Neem (Azadirachta indica)</i>
2.	<i>Kachnar (Bauhinia variegata)</i>
3.	<i>Ashok (Polyalthia longifolia)</i>
4.	<i>Gulmohar (Delonix regia)</i>
5.	<i>Amaltas (Cassia fistula)</i>

1.14 CONSTRUCTION MATERIAL

Detail of different type of construction material used in the site is given in **Table 13** with their U values is given in **Table 13(a)**. List of machinery which will be used for construction is given below.

Table 13: Construction materials List

<i>Construction Material</i>	<i>Quantity</i>	<i>unit</i>
Sand	27998	Cft
Fine aggregate	148637	Cft
Coarse aggregate	5826	Cft
Cement (PPC)	2385794	Kg
Steel	2609267	Kg
Fly Ash	0	Kg
Bricks	3240384	nos.
RMC	17946	Cum

Table 13(a): 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, scered 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

1.15 LIST OF MACHINERY USED DURING CONSTRUCTION

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