INTRODUCTION

Farukhnagar Logistics Parks LLP is planning expansion of Warehouse for storage of Non-agro Produce situated in Village Farukhnagar, Distt. Gurugram and Village Khalikpur, Distt. Jhajjar, Haryana. The project is to be developed in land having an area of 107.168 acres (or 4,33,685.50 sq.m.). The project has been granted Change in land use from Chief Town Planner, Director General, Local Bodies, Haryana vide Memo No. DULB/CTP/CLU-261 GGM/2018/3537 dated 20.06.2018 copy is enclosed as **Annexure-1**. Project has also obtained Environmental Clearance from SEIAA, Haryana for construction of 7 sheds for the plot area of 4,33,685.50 sq.m. (107.168 Acres) and built-up area of 1,42,709.29 sq.m. vide letter No. SEIAA/HR/2018/1109 dated 20/08/2018; copy of Earlier Environmental Clearance is enclosed with the application. Now, application is being filed for expansion of earlier Environmental Clearance for total 13 no. of sheds within the same plot area of 107.168 acres and built-up area of 2,62,932.15 sq.m. The products to be stored within the warehouse project will be linked with the following details as mentioned below:

1. Retail/FMCG/Consumer Durables
2. Logistics & telecom
3. Automobile & Industrial Automation
4. Health care/media
5. E-commerce

The warehouse requires a comprehensive infrastructure for the convenience ease of service and safety of storage materials and of the staff. Adequate power supply, efficient lighting, reliable power back up, continuous water supply at adequate pressure, an efficient soil and waste disposal system and fire protection system are a part of complete services infrastructure.

Further, revenue raasta is passing within the project site in such a way that project is divided into 2 parts. 1st part comprises of Block Nos. A, B, C, D, E, F, G, H, I & J and 2nd part comprises of Block Nos. K, L & M. Thus, services such as plumbing services i.e. water supply, sewage & treated water supply, storm water line etc. as well as STP will be separate for both the parts. Comparison of the details between EC Accorded, Proposed & Total (After Expansion) details is mentioned below in **Table 1.**

Table 1: Comparison of EC Accorded, Proposed & Total (After Expansion) details

SI. No.	Description	EC Accorded	Proposed	Total (After Expansion)
1.	**Total Scheme Area**	4,33,685.50sq.m. (or107.168 acres)		
2.	**Built Up Area**	1,42,709.29 sq.m.	1,18,171.86 sq.m.	2,62,932.15 sq.m.
3.	**Estimated Population**	2,166 Persons	1,224 Persons	3,390 Persons
4.	**Total Domestic Water Requirement**	120 KLD	68 KLD	188 KLD
5.	**Fresh water Demand**	60 KLD	34 KLD	94 KLD
6.	**STP capacity**	2 STPs of 100 & 50 KLD capacity respectively	STP of 150 KLD instead of 100 KLD	2 STPs of 150 & 50 KLD capacity respectively
7.	**Solid waste generation**	1,020 kg/day	572 kg/day	1,592 kg/day
8.	**Rain water recharging Pits / tanks**	107 pits	1 pit and 2 rainwater harvesting tanks	108 pits and 2 rainwater harvesting tanks
9.	**Power Load**	7,500 KW		
10.	**DG sets**	2 DGs of 1000 kVA and 1 DG of 500 kVA		
11.	**Project Cost**	Rs. 594 Crores		

SITE LOCATION AND SURROUNDINGS

The project site is located at Village Farrukhnagar, Distt. Gurugram and Village Khalikpur, Distt. Jhajjar, Haryana. The project is well connected to State Highway i.e. SH-15A. The nearest railway station is Farukhnagar Railway Station & Gurgaon Railway Station at a distance of approx. 2.8 km towards SE & 23 km towards NE respectively from the project site. The nearest airport is IGI, Delhi Airport at a distance of approx. 26 km towards NE from the project site. Google Earth Image showing site & surroundings is enclosed as **Annexure-6.**

PROJECT COST

The total estimated cost of the project is Rs. 594 Crores which includes the cost of the land as well as development cost.

AREA DETAILS

The total plot area of the project is 4,33,685.50sq.m. (or 107.168 acres). Comparison of Area details from EC accorded and Total (After Expansion) is shown below in **Table 2(a).** While, Block wise details are given in **Table 2(b).**

Table 2(a): Comparison of Area Details from EC accorded and Total (After Expansion)

SI. No.	Description	EC Accorded	Proposed	Total (After Expansion)
		Area (in sq.m.)	**Area (in sq.m.)**	**Area (in sq.m.)**
1.	**Total Plot Area (Scheme Area)**	4,33,685.50 sq.m. (or107.168 acres)		
2.	Permissible Ground Coverage (@ 60%)	2,60,211.30		
3.	Proposed Ground Coverage	1,45,334.05 (@ 33.51%)	1,09,267.15	2,54,601.20 (@ 58.71%)
4.	Permissible FAR (@ 0.75)	3,25,264.125		
5.	Proposed FAR	1,40,658.21 (@ 0.324)	1,12,202.14	2,52,860.35 (@ 0.5831)
6.	Non-FAR	2,051	8,020.8	10,071.8
7.	Open Parking Area	65,132.46	-79.46	65,053.00
8.	**Built-up Area**	**1,42,709.29**	**1,18,171.86**	**2,62,932.15**
9.	Proposed Green Area	88,053.33 (@ 20.30%)	-1,313.33	86,740 (@ 20.00%)

Table 2(b): Block wise details (After Expansion)

SI. No.	Block wise details	Area of Ground Floor (in sq.m.)	Area of Mezzanine Floor (in sq.m.)	Area of Canopy (in sq.m.)
1	Block A	21046.50	530.41	735.30
2	Block B	21046.50	530.41	735.30
3	Block C	16629.30	437.24	529.20
4	Block D	16629.30	437.24	529.20
5	Block E	18241.14	448.27	567.00
6	Block F	16629.30	437.24	529.20
7	Block G	14156.10	357.09	529.20
8	Block H	16629.30	437.24	544.95
9	Block I	26474.87	667.48	612.00
10	Block J	26474.87	667.48	803.25
11	Block K	20234.70	510.35	696.60
12	Block L	22684.50	572.85	718.20
13	Block M	9704.03	246.66	491.40
14	Security Block	360		
15	Facility Management Office	345		
16	Water Tank And Pump Room	875		
17	Substation	375		
18	STP	96		
	Total	**2,48,631.41 sq.m.**	**6,279.96 sq.m.**	**8020.8 sq.m.**

POPULATION DENSITY

The total estimated population of the project after expansion will be 3,390 persons. Comparison of Population details from EC accorded, Proposed and Total (After Expansion) is given below in **Table 3(a).** The detailed population breakup for both the parts after expansion is given below in the **Table 3(b) & 3(c).**

Table 3(a): Comparison of Detailed Population Calculations from EC accorded, Proposed and Total (After Expansion)

SI. No.	Details	EC Accorded	Proposed	Total (After Expansion)
1.	Staff	1,969	1,113	3,082
2.	Visitors	197	111	308
Total Population		**2,166**	**1,224**	**3,390**

Table 3(b): Population Calculations Part- I Total (After Expansion)

SI. No.	Details	Norms	Population
1.	Staff	@ 1 person per 80 sq.m.	2,424
2.	Visitors	@ 10%	242
	Total Population of Part-I		**2,666**

Table 3(c): Population Calculations Part- II Total (After Expansion)

SI. No.	Details	Norms	Population
1.	Staff	@ 1 person per 80 sq.m.	658
2.	Visitors	@ 10%	66
	Total Population of Part-II		**724**

WATER REQUIREMENT

The water will be supplied through Public Health supply. The total fresh water requirement after expansion will be 94 KLD and 169 KLD of sewage will be generated from the project which will be treated in proposed 2 STPs of 150 & 50 KLD capacity each. Comparison of water demand along with wastewater generated from accorded EC, Expansion and Total (After Expansion) is given below in **Table 4(a).** The detailed water demand and flushing water demand calculations for Total (After Expansion) for both the parts are given below in **Table 4(b), 4(c), 4(d) & 4(e).**

The water balance diagrams Part I & Part II for Total (After Expansion) for 3 different seasons are

shown below in **Figure 1, 2, 3, 4, 5 and 6** respectively.

Table 4(a): Comparison of Water Demand & Wastewater Generation Details of EC Accorded, Proposed and Total (After Expansion)

SI. No.	Description	EC Accorded	Proposed	Total (After Expansion)
1.	**Total Domestic Water Demand**	120 KLD	68 KLD	188 KLD
2.	**Fresh water requirement**	60 KLD	34 KLD	94 KLD
3.	**Wastewater generated**	108 KLD	61 KLD	169 KLD
4.	**STP capacity**	2 STPs of 100 & 50 KLD capacity respectively	STP of 150 KLD instead of 100 KLD	2 STPs of 150 & 50 KLD capacity respectively

PART-I

Table-4(b): Calculations for Daily Water Demand (Part-I) Total (After Expansion)

SI. No.	Details	Norms	Water demand (in KLD)
1.	Staff (2424)	30 lpcd & 2 shifts	145.44
2.	Visitors (242)	10 lpcd	2.42
	Domestic Water Requirement		**147.86 KLD Say 148 KLD**
3.	Landscaping water req. (71,727.67 sq.m)	3 lt./m^2/day 1.5 lt./m^2/day 1 lt./m^2/day	215 108 72

Table-4(c): Calculation of Wastewater Generation (Part-I) Total (After Expansion)

Description	Quantity (in KLD)
Domestic water req. • Fresh water req. (15 lpcd for staff & 5 lpcd for visitors) • Flushing water req. (15 lpcd for staff & 5 lpcd for visitors)	148 KLD 74 KLD 74 KLD
Total Wastewater generated (@ 80% of fresh + 100% flushing)	59 + 74 = 133 KLD
STP proposed	150 KLD capacity

WATER BALANCE DIAGRAM (Part-I)

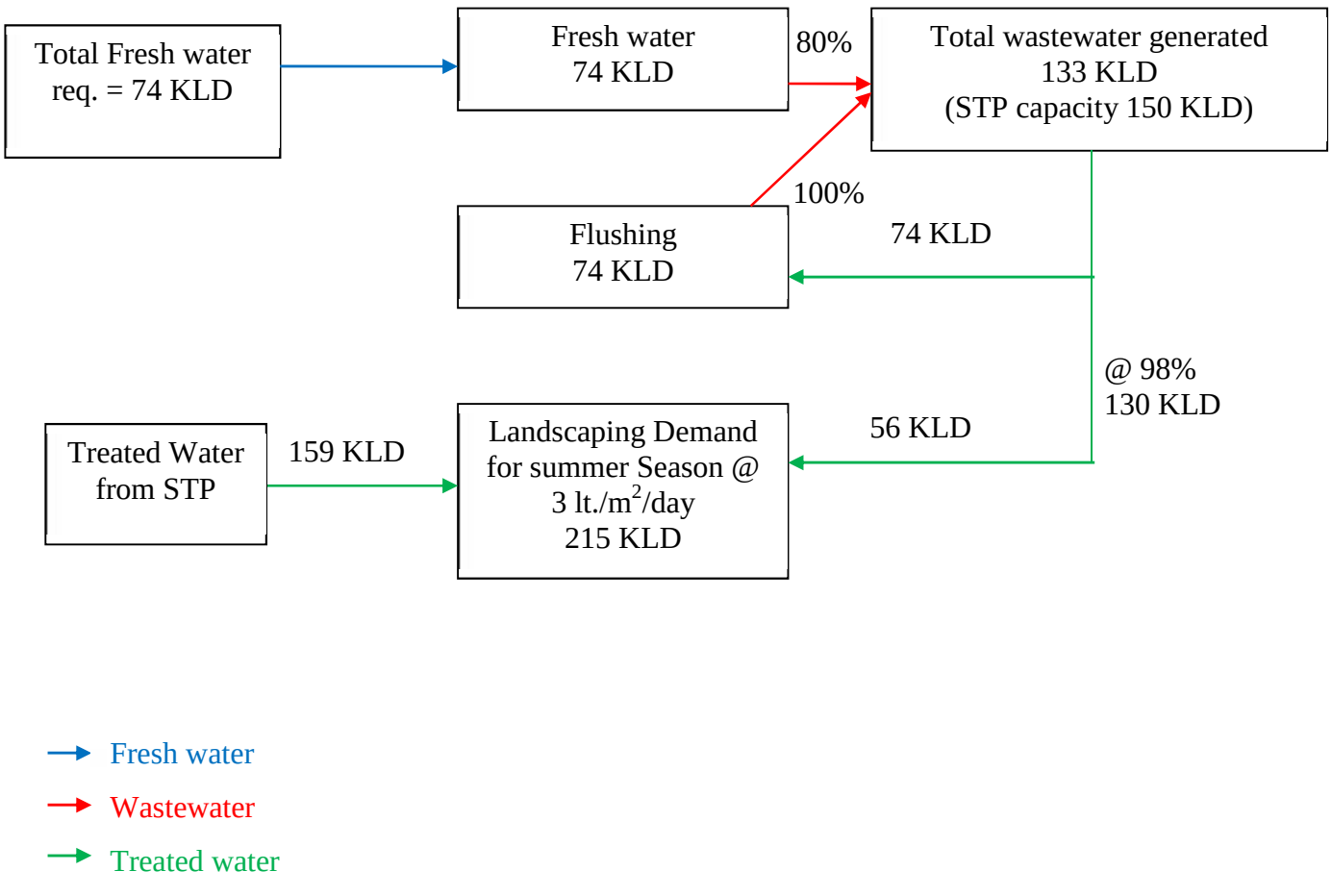


Figure-1: Water Balance Diagram (Part-I) For Summer Season

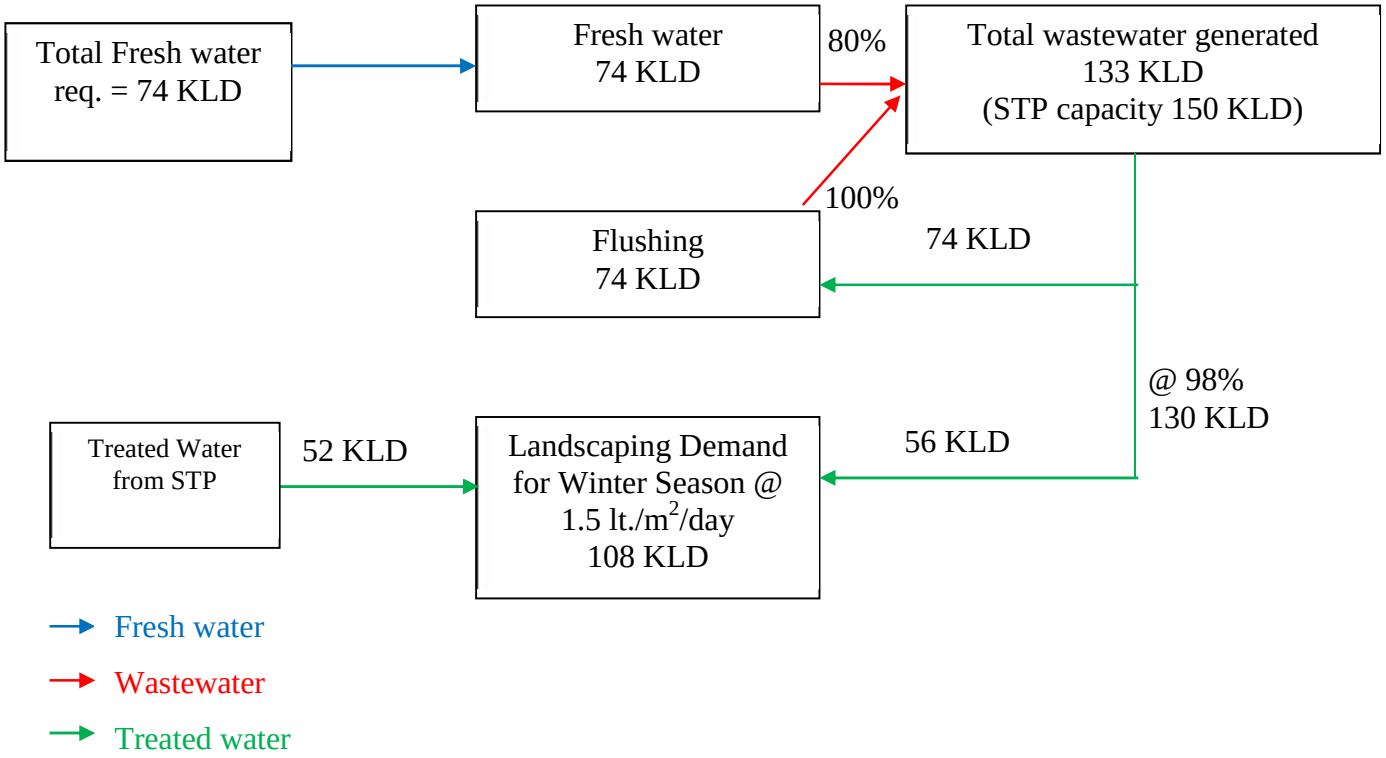


Figure-2: Water Balance Diagram (Part-I) For Winter Season

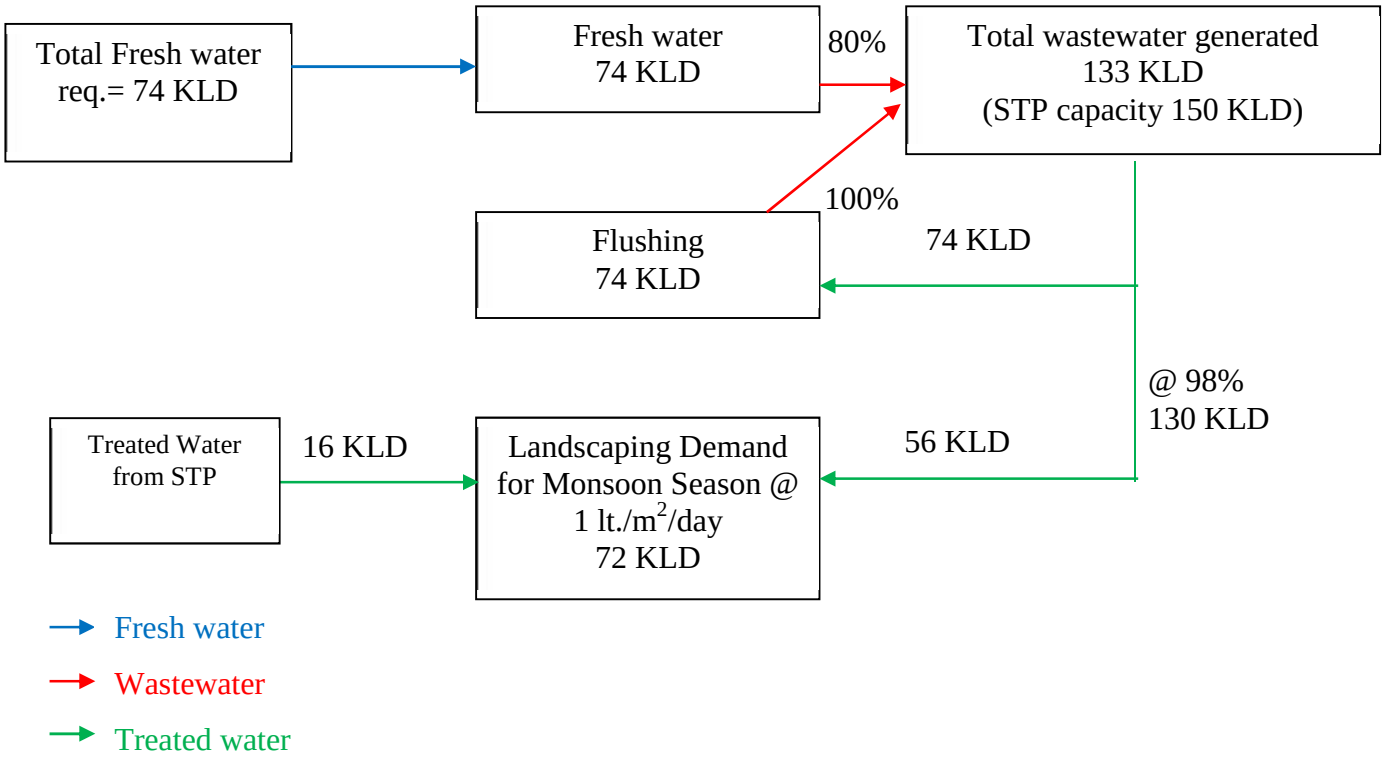


Figure-3: Water Balance Diagram (Part-I) For Monsoon Season

PART-II

Table-4(d): Calculations for Daily Water Demand (Part-II)

SI. No.	Details	Norms	Water demand (in KLD)
1.	Staff (658)	30 lpcd & 2 shifts	39
2.	Visitors (66)	10 lpcd	1
	Domestic Water Requirement		**40 KLD**
3.	Landscaping water req. (15,012.33 sq.m)	3 lt./m^2/day 1.5 lt./m^2/day 1 lt./m^2/day	45 23 15

Table-4(e): Calculation of Wastewater Generation (Part-II) Total (After Expansion)

Description	**Quantity (in KLD)**
Domestic water req. • Fresh water req. (15 lpcd for staff & 5 lpcd for visitors) • Flushing water req. (15 lpcd for staff & 5 lpcd for visitors)	40 KLD 20 KLD 20 KLD
Total Wastewater generated (@ 80% of fresh + 100% flushing)	16 + 20 = 36 KLD
STP proposed	50 KLD capacity

WATER BALANCE DIAGRAM (Part-II)

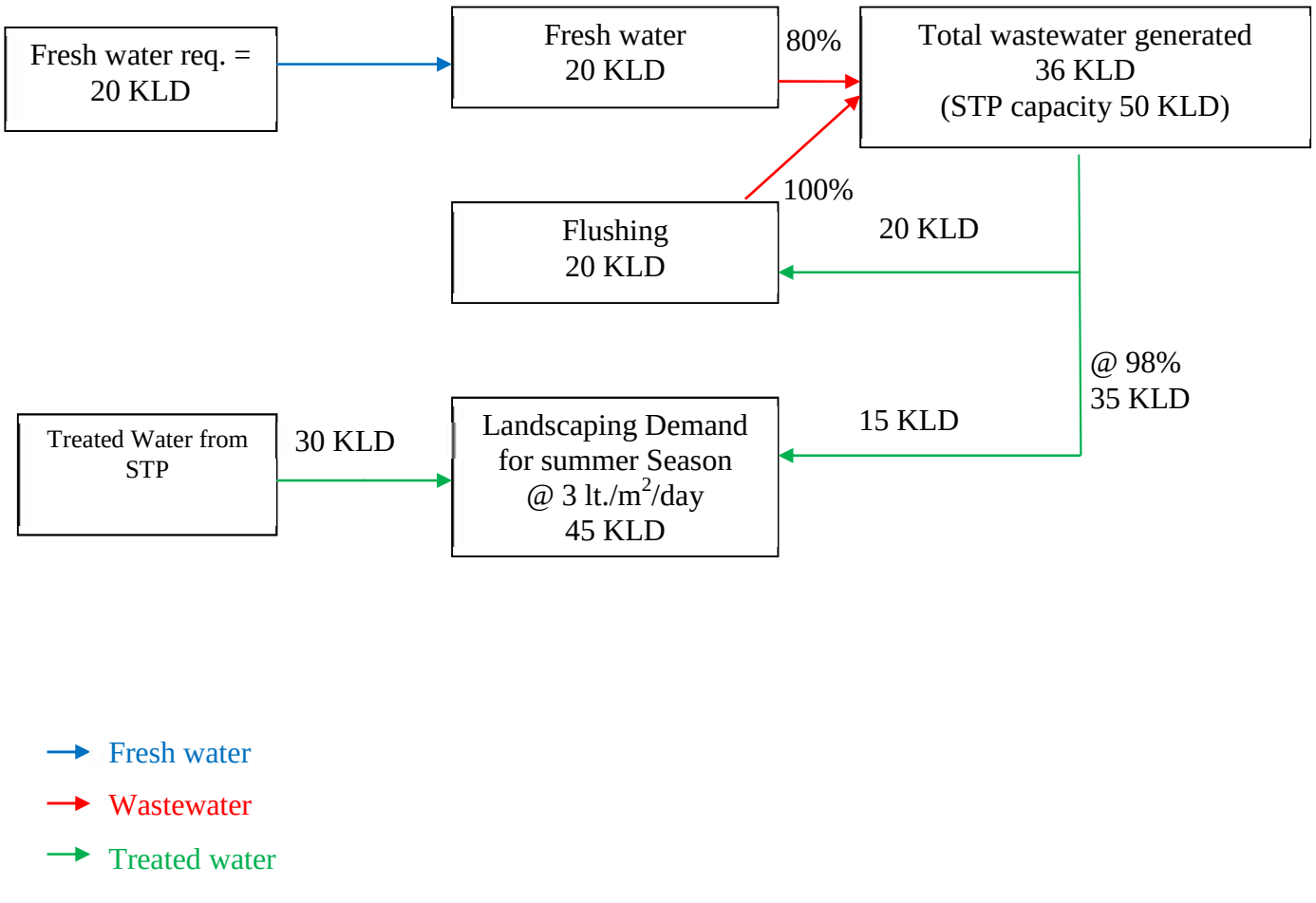


Figure-4: Water Balance Diagram (Part-II) For Summer Season

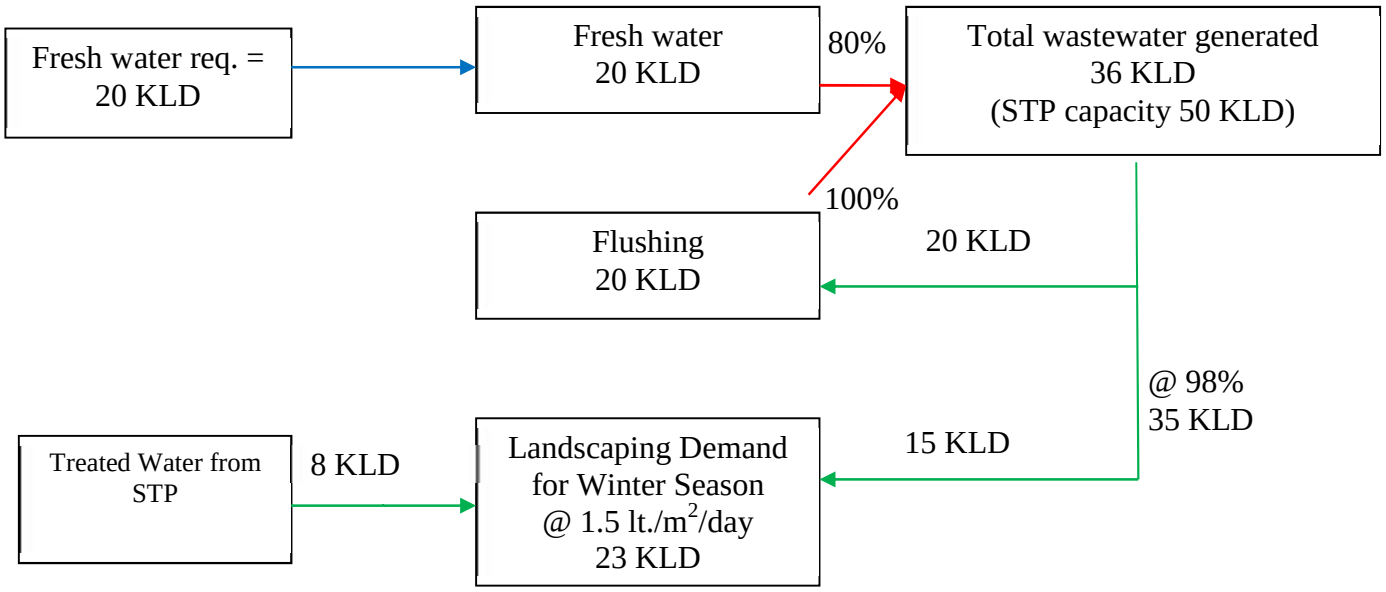


Figure-5: Water Balance Diagram (Part-II) For Winter Season

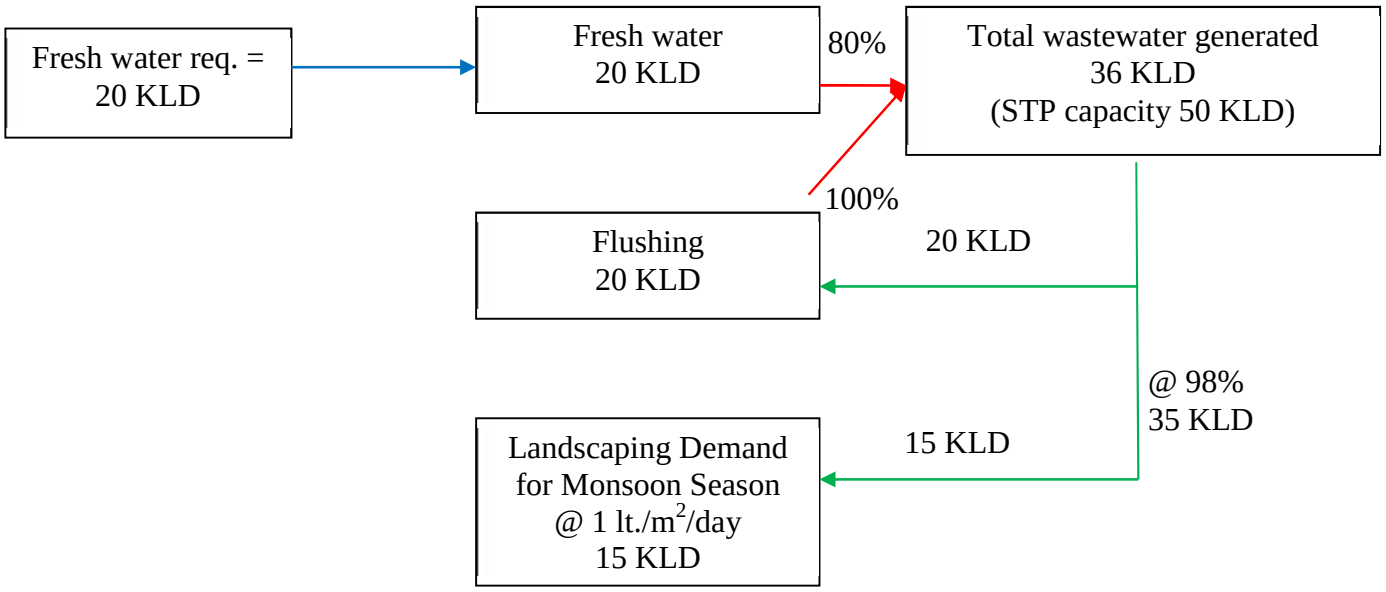


Figure-6: Water Balance Diagram (Part-II) For Monsoon Season

SEWAGE TREATMENT TECHNOLOGY

Moving Bed Bioreactor Technology

Sewerage System

An external sewage network shall collect the sewage from all units, and flow by gravity to the 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 wastewater.
- 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)	Duration of flow to STP	:	24 hours
(b)	Temperature	:	Maximum $32^{o}C$
(c)	pH	:	7 to 7.5
(d)	Colour	:	Mild
(e)	T.S.S. (mg/l)	:	250 mg/l
(f)	BOD_5 (mg/l)	:	275 mg/l
(g)	COD (mg/l)	:	600 mg/l

b. Final discharge characteristics

(a)	pH	:	7 to 8
(b)	Oil & Grease	:	<10 mg/l
(c)	B.O.D.	:	< 5 mg/l
(d)	C.O.D.	:	< 80 mg/l
(e)	Total Suspended Solids	:	< 50 mg/l

c. Treatment Technology

The sewage will be first passed through a Bar Screen Chamber where any extraneous matter would get trapped. The influent would overflow by gravity to the Oil & Grease Chamber which is provided for safety so that the oil may not inhibit the biological growth in the MBBR reactors.

The sewage would then collected in an Equalization Tank where the variations in flow and characteristics are dampened, which otherwise can lead to operational problems and moreover it allows a constant flow rate downstream. Here, the sewage is kept in mixed condition by means of coarse air bubble diffusion.

The Bio Reactor is based on the Fluidized Random Aerobic Reactor which combines the advantage of

an Activated Sludge Plant with the Random distribution systems such as Biofilter with capacities that could be as low as $1/10^{th}$ of ASP and fractional power consumption, such a reactor is ideal for the efficient removal of BOD and organics from the wastewater.

The tanks are packed with RIGID PP-UV-sterilized Gas Fluted Media with liquid random distribution wherein air diffusers are placed to uniformly release air across the tanks.

Working Principle:

Bacteria grow rapidly in the Bio-Pac unit under properly engineered conditions. They consume organic chemical for their growth and remove them from the wastewater. The bacteria converts chemical into biological cells, which under proper growth conditions, form slims. The bacteria adhere to available surfaces and accumulate into what we call random biological film or fixed film. The high surface area-to-volume ratio of the units allows for accumulation of substantial concentration of bacteria in the relatively small reactor units. Further, the accumulated bacteria which provides high rates of removal or organic chemicals are fixed in the system and do not need to be recycled back to the basin.
In the Bio Reactor system the water is constantly flowing through rigid PVC matrix to which the biological film attached. As the water flows past the biological film, bacteria in the film absorb organic chemicals as well as oxygen, nitrogen, phosphorus, and other trace nutrients required for their growth.
As the bacteria grow on the matrix and as more chemicals are added to the unit, the stationary biological film will continue to build in thickness. As the film becomes thicker the depth of penetration by diffusion of the absorbed material such as oxygen or other nutrients is not sufficient to reach the entire distance through the slime of the plastic media. At some point, the film will become sufficiently thick and portion of the film closest to the plastic media will not receive any food or nutrient, particularly oxygen. The inner layer of the film becomes anaerobic and the organisms lose their ability to adhere to the media surface. The shear forces of the water and / or air bubbles flowing through the matrix will ultimately become great enough to tear this portion of the biological film loose from the media. This process is called sloughing. The solids which slough from the media will flow out of the system with the sewages and are to be removed from the water through clarification in a settling module. The exposed portion of media surface will repeat the process of slime accumulation and sloughing.

In actual operation of the Bio Reactor units, biological film will be in a state of dynamic, continuous growth and sloughing. At any given time, portion of the media are always at some point between forming a new film sloughing.

Sewage Quality:

The Sewage discharged from the Bio reactor system will contain sloughed biological solids, but would be relatively free of soluble organic chemicals. The quantity of biological solids in the sewage will depend substantially on the quantity of suspended solids and the concentration of soluble BOD entering

system. It is therefore necessary to provide means of separating the biological mass from the sewage. Package unit contains tube settlers for sedimentation and 60 Gross fluted Rigid PVC fill media for the FAB units to treat the wastewater for discharge into the receiving waters and/or the sanitary sewers as per the local regulations. The media thickness changes with the design parameters/depth of the unit and can vary from 0.25 to 0.40 mm thickness.

1. Tube Settler: Here we are providing the Tube Settler along with the PVC media which will enhance the contact period and thereby the improved performance. The Tube settler will have a determined lope in the bottom to collect the suspended solids from the waste water. The sludge will be suited to the Sludge Drying Beds.

2. Pressure Sand Filter: Here the treated water coming from the TSS will be treated for the suspended impurity removal.

3**. Activated Carbon Filter:** Here the water coming from the ACF will be treated for colour removal, suspended impurity removal and the treated water shall be sent to the sewer.

4. Filter Press:A filter comprises a set of vertical, juxtaposed recessed plates, presses against each other by hydraulic jacks at one end of the set. The pressure applied to the joint face of each filtering plate must withstand the chamber internal pressure developed by the sludge pumping system. This vertical plate layout forms watertight filtration chambers allowing easy mechanization for the discharge of cakes. Filter clothes finely or tightly meshed are applied to the two grooved surfaces in this plat.

Primary Treatment: This is the first step of inlet waste mainly consist of removal of coarse particles, oil and grace and mixing co-agents in the water for removal of suspended solids through sedimentations. After this treatment scheme, the BOD, TSS, COD, and O&G level comes down to 20% of initial levels.

Secondary Treatment:
This is second step of waste water treatment. It mainly consist aerobic process of the Primary treated water, bacterial growth, EM dosing addition of oxygen and chemical which help in bacterial growth and lastly settlement of the biological waste as sludge. Normally it is found that the reduction level in TSS, BOD, O & G and COD after an efficient secondary treatment will be as under-

Tertiary Treatment:
This is the final stage of treatment where the Sewage after secondary treatment is disinfected under the treatment which involves Hypo Dosing. Sewage is then passed through (PSF) dual media filter and (ACF) activated carbon filter where sand, anthracite and activated carbon will be used as filtration media. From ACF the water is pumped through the UF feed water pump into Ultra-filtration system for removal of turbidity and to reduce the SDI level to enhance the recovery rate through the RO Membranes provided at the downstream in RO System.

Due to very fine suspended solids present in the raw water, UF feed system gets clogged over a period of time and needs cleaning / backwashing periodically. When the Trans Membrane Pressure (TMP) across the UF membrane modules gets increased to a predetermined set point, backwashing through the backwash pumps will take place manually. Cleaning of the membrane in the UF system will be required periodically with the chemicals i.e., Sodium Hypo Chloride and Hydrochloric Acid, having high and low pH to remove the biological growth retained over the UF membrane.

Ultra Filtration systems are pressure-driven membrane operations that use porous membranes for the removal of dissolved and colloidal material. These systems differ from Reverse Osmosis Systems by relatively low driving pressures, usually under 1034 KN/m^2. Ultra Filtration is normally used to separate colloidal material and large molecules with molecular weights in excess of 5000 from salts and low molecular weight materials, with pores of 0.001 to 0.1 micron. Turbidity is sharply reduced by 99 %. UF is an excellent means to remove metal hydroxides, reducing the heavy metal content to 1ppm or less. UF permeate will be stored in the UF permeate tank.

Once the above limits achieved thereafter the final outlet water will also confirms the Bio Assay test of 90% of fish survive.

RAIN WATER RECHARGING

The storm water disposal system for the premises shall be self-sufficient to avoid any collection/stagnation and flooding of water. The amount of storm water run-off depends upon many factors such as intensity and duration of precipitation, characteristics of the tributary area and the time required for such flow to reach the drains. The drains shall be located near the carriage way along either side of the roads. Taking the advantage of road camber, the rainfall run off from roads shall flow towards the drains. Storm water from various areas/shall be connected to adjacent drain by a pipe through catch basins. Therefore, it has been calculated to provide **108 rainwater recharging pits and additional 2 rainwater harvesting tanks** at selected locations, which will catch the maximum run-off from the area.

1) Since the existing topography is congenial to surface disposal, a network of storm water pipe drains is planned adjacent to roads. The 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 recharging and ground water recharging.
3) Peak Hourly rainfall of 45 mm/hr shall be considered for designing the storm water drainage system. Rain water recharging has been catered to and designed as per the guidelines of CGWA.

The bottom of the recharge structure will be kept 5 m above the ground water level. At the bottom of the recharge well, a filter media is provided to avoid choking of the recharge bore. Design specifications of the rain water recharging plan are as follows:

- Catchments/roofs would be accessible for regular cleaning.
- The roof will have smooth, hard and dense surface which is less likely to be damaged allowing release of material into the water. Roof painting has been avoided since most paints contain toxic substances and may peel off.
- All gutter ends will be fitted with a wire mesh screen and a first flush device would be installed. Most of the debris carried by the water from the rooftop like leaves, plastic bags and paper pieces will get arrested by the mesh at the terrace outlet and to prevent contamination by ensuring that the runoff from the first 10-20 minutes of rainfall is flushed off.
- No sewage or wastewater would be admitted into the system.
- No wastewater from areas likely to have oil, grease, or other pollutants has been connected to the system.

Table 5(a): Comparison of Rain water Recharging Pits from EC Accorded, Proposed and Total (After Expansion)

	EC Accorded	Proposed	Total (After Expansion)
Rain water Recharging Pits	107 Pits	1 pit and 2 rainwater harvesting tanks	108 rain water recharging pits and 2 rainwater harvesting tanks

Based on the site plan of the project area, the computation of annual runoff of entire project premises has been worked out and the details are tabulated below in **Table 5(b)**.

Table 5(b): Annual run off from entire Project

S.No.	Description	Area (in sq.m.)	Run- off coefficient	Rainfall (mm)	Quantity of water (m^3)
1	**Roof Top Area**	2,54,601.2	0.9	0.562	128,777
2	**Green Area**	86,740	0.2	0.562	9,750
3	**Paved Area**	92,344.30	0.7	0.562	36,328
Total		**4,33,685.5**			**1,74,855**

From the above computation, it is evident that a total quantum nearly of 1,74,855 m^3 of rainwater can be generated annually. In order to design the recharge structure, hourly runoff of 45mm/hr has been taken into account and the details are given below in **Table 5(c).**

Table 5(c): Rain Water quantity calculations (After Expansion)

S.No.	Description	Area (in sq.m.)	Run- off coefficient	Intensity of Rainfall (m^3/hr)	Quantity of Rainwater (m^3)
1.	**Roof Top Area of the building**	2,54,601.2	0.9	0.045	10311
2.	**Green Area**	86,740	0.20	0.045	781
3.	**Paved Area**	92,344.30	0.7	0.045	2909
	Total	**4,33,685.5**			**14001**

It has been worked out that total runoff generated within project premises per hour with 45 mm/hr intensity of rainfall shall be 14,001 m^3/hr.

The calculations are as under:

Taking 20 minutes retention time, total volume of storm water = 14,001/3= 4,667 m^3

Taking effective diameter & depth of a recharge pit as 3.5 m & 4.5 m respectively;

Volume of recharge pit = 3.14 × 3.5 × 3.5 × 4.5/ 4 = 43.27 m^3

Volume of De-silting chamber = 15 m^3

Total volume of single Recharge structure = 43.27 m^3 ~43 m^3

No. of recharge pits required = 4667/ 43 = 108.53 pits

As 1 pit per acre is to be proposed; thus, total 108 no. of Rain Water Recharging pits have been proposed for artificial rain water recharge as well as 2 rainwater harvesting tanks has been proposed within the project premises.

VEHICLE PARKING FACILITIES

Adequate provision will be made for vehicle parking within the project site. There shall also be adequate parking provisions for visitors so as not to disturb the traffic and allow smooth movement at the site.

Table 6: Comparison of Vehicle Parking from EC Accorded, Proposed and Total (After Expansion)

	EC Accorded	Proposed	Total (After Expansion)
Vehicle Parking Area	65,132.46 sq.m.	-79.46 sq.m.	65,053 sq.m.

PARKING REQD.:

Parking Reqd. @15% of site area = (4,33,685.50*15) / 100 = 65,052.825 sq.m.

PARKING PROPOSED:

Open Parking Area = 65,053 sq.m.

Thus, adequate parking area has been kept for parking space as compared to parking norms.

POWER REQUIREMENT

The power supply shall be supplied by Dakshin Haryana BijliVitranNigam(DHBVN). The connected load for the project after expansion will be approx. 7500 KW.

Details of D.G Sets: There will be provision of 3 DG sets having total capacity of 2500 KVA (2 DGs of 1000 kVA and 1 DG of 500 KVA). The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion.

SOLID WASTE GENERATION

Solid waste would be generated both during the construction as well as during the operation phase. The solid waste being generated from the construction phase comprise of excavated materials, used bags, bricks, concrete, MS rods, tiles, wood etc. The following steps are proposed to be followed for the management of solid waste:

- Construction yards are proposed for storage of construction materials.
- The excavated material such as topsoil and stones is stacked for reuse during later stages of construction.
- Excavated top soil is stored in temporary constructed soil bank and will be reused for landscaping of the Project.
- Remaining soil is being utilized for refilling / road work / rising of site level at locations/ selling to outside agency for construction of roads etc.

During the operation phase, waste will be generated from the project. The solid waste generated from

the project shall be mainly domestic waste and estimated to be 1,592 kg/day after expansion.

Table 7(a): Comparison of Solid waste Generation from EC Accorded, Proposed and Total (After Expansion)

Solid waste Generation	**EC Accorded**	**Proposed**	**Total (After Expansion)**
	1020 kg/day	572 kg/day	1592 kg/day

Table-7(b): Solid waste details of Project (Total after Expansion)

SI. No.	**Details**	**Criteria**	**Solid waste generated (in kg/day)**
1.	Staff (3082 * 2)	0.25 kg/capita/day	1541
2.	Visitors (308)	0.15 kg/capita/day	46.2
3.	Landscaping waste (21.5 acres)	0.2 kg/acre/day	4.3
	Total Solid Waste Generated		**1,591.5 say 1592 kg/day**

(*Source: For Waste Collection, Chapter 3, section 3.3.6.2, Page no. 49, Central Public Health a& Environment Engineering Organization, Ministry of Urban Development, (Government of India, May 2000)*)

Following arrangements will be made at the site in accordance to Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules 2016.

1 Collection and Segregation of waste

1. Collection system will be provided for collection of domestic waste in colored bins.
2. Separate colored bins will be provided for dry, wet and inert waste.
3. Litter bin will also be provided in open areas like parks, etc.

2 Treatment of waste

Bio-Degradable wastes

1. Bio-degradable waste will be composted by the use of mechanical composter and the compost will be used as manure.
2. STP sludge is proposed to be used for Landscaping as manure.
3. Horticultural Waste is proposed to be composted and will be used for gardening purposes.

Recyclable wastes

1. Grass Recycling – The cropped grass will be spread on the green area. It will act as manure after decomposition.
2. Recyclable wastes like paper, plastic etc. will be sold off to recyclers.

3. Hazardous wastes such as used oil will be sold off to authorized recyclers. Buy back arrangement will be made for batteries.

3 Disposal

The Municipal Solid Waste Management will be conducted as per the guidelines of Municipal Solid Wastes (Management and Handling) Rules, 2000 and amended Rules, 2016. The inert non-recyclable wastes will be disposed through government approved agency for land filling.

GREEN AREA

Total green area measures 86,740 sq.m i.e. 20% of plot area which will be area under tree plantation within the project and along the roads. Evergreen tall and ornamental trees and ornamental shrubs have been proposed to be planted inside the premises.

Table-8(a): Green Area Calculation

S. No.	Description	Area (sq.m.)
1.	Total Green Area Required (@ 20% of the plot area)	86,737.50 m^2
2.	Total Green area proposed (@ 20% of the plot area)	86,740.00 m^2

Table 8(b): List of Plantation

S. NO.	TREES	
	Botanical Name	**Common Name**
1.	*Polyalthialongifolia*	Ashoka
2.	*Anthocephalluschinensis*	Kadam
3.	*Grevillearobusta*	Silk Oak
4.	*Cassia fistula*	Golden Shower tree
5.	*Delonixregia*	Royal poinciana
6.	*Bauhinia variegata*	Kachnar
7.	*Alstoniascholaris*	Scholar tree

8.	*Ficus spp.*	Figs tree
9.	*Azadirachtaindica*	Neem
10.	*Meliaazadirachta*	Neem
11.	*Tabernaemontanadivaricata*	Chandani
12.	*Cestrum nocturnum*	Raat Ki Rani
13.	*Hibiscus rosa-sinensis*	China Rose

DETAIL OF CONSTRUCTION MATERIALS

List of building materials being used at site:

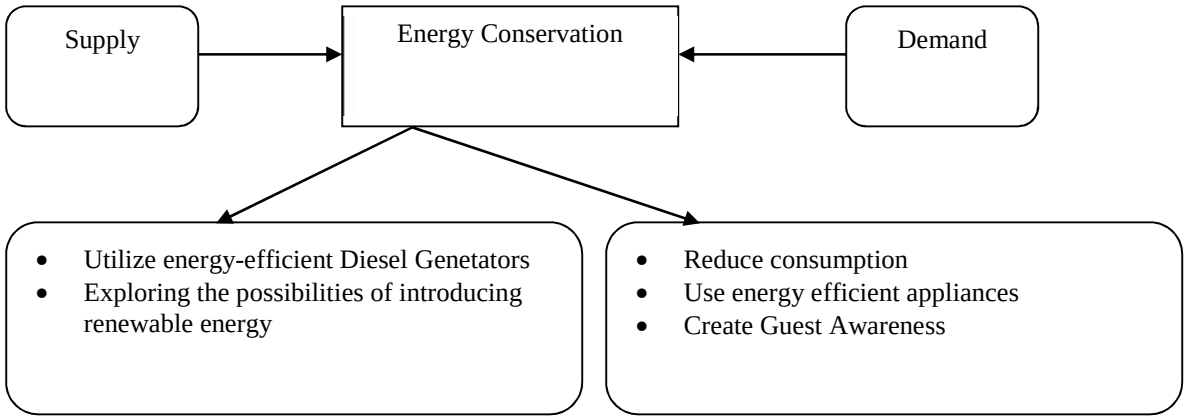
1. Coarse sand
2. Fine sand
3. Stone aggregate
4. Stone for masonry work
5. Cement
6. Reinforcement steel
7. Pipe scaffolding (cup lock system)
8. Bricks
9. CLC fly ash blocks
10. Crazy (white marble) in grey cement
11. P.V.C. conduit
12. MDS, MCBs
13. PVC overhead water tanks
14. 2 1/2" thick red color paver tiles
15. PPR (ISI marked)
16. PVC waste water lines
17. S.W. sewer line up to main sewer
18. PVC rain water down take
19. Stainless steel sink in pantry
20. Joinery hardware- ISI marked

LIST OF MACHINERY USED DURING CONSTRUCTION

(i) Dumper
(ii) Concrete mixer with hopper
(iii) Excavator
(iv) Concrete Batching Plant
(v) Cranes
(vi) Road roller
(vii) Bulldozer
(viii) RMC Plant
(ix) Tower Cranes
(x) Hoist
(xi) Labor Lifts
(xii) Pile Boring Machines
(xiii) Concrete pressure pumps
(xiv) Mobile transit mixer

ENERGY CONSERVATION

Energy conservation program will be implemented through measures taken both on energy demand and supply.



Energy conservation will be one of the main focuses during the complex planning and operation stages. The conservation efforts would consist of the following:

- **Architectural design**
  - Maximum utilization of solar light will be done.
  - Maximize the use of natural lighting through design.
  - The orientation of the building will be done in such a way that maximum daylight is available.

- The green areas will be spaced, so that a significant reduction in the temperature can take place.

❖ **Energy Saving Practices**

- Energy efficient lamps will be provided within the complex.
- Constant monitoring of energy consumption and defining targets for energy conservation.
- Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.

❖ **Behavioral Change on Consumption**

- Promoting person awareness on energy conservation
- Training staff on methods of energy conservation and to be vigilant to such opportunities.