

## **FORM IA**

### **CHECK LIST OF ENVIRONMENTAL IMPACTS**

(Project proponents are required to provide full information and wherever necessary attach explanatory notes with the Form and submit along with proposed environmental management plan & monitoring program)

#### **SECTION 1- LAND ENVIRONMENT**

**1.1 Will the existing land use get significantly altered from the project that is consistent with the surroundings? (Proposed land use must conform to the approved Master Plan/Development Plan of the area. Change of land use, if any and the statutory approval from the competent authority are submitted). Attach Maps of (i) site location, (ii) surrounding features of the proposed site (within 500 meters) and (iii) the site (indicating levels & contours) to appropriate scales. If not available attach only conceptual plans.**

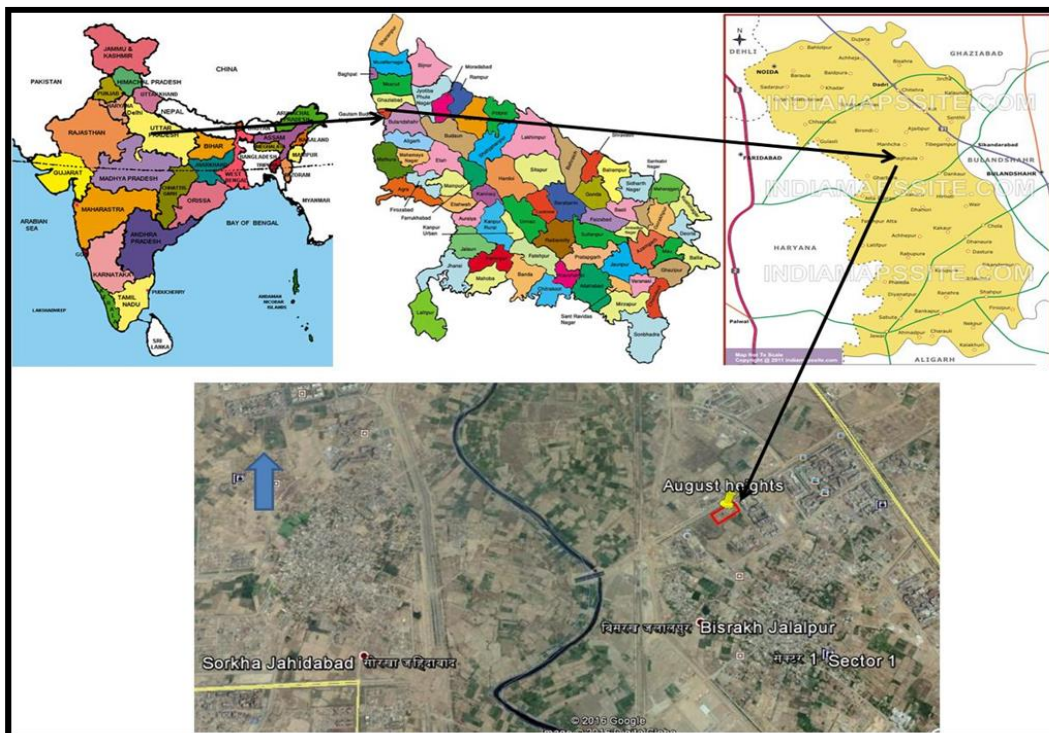
➤ **No**

M/s Comely Buildtech India Pvt. Ltd. has proposed to develop group housing project “August Heights” at Plot No. GH-11 B, Sec-01, Greater Noida, Gautam Budh Nagar, U.P. Site is earmarked for residential development as per Greater Noida Development Plan, 2021 and is attached as **Annexure I**. Thus does not involve change in land use. Location map of project is given in **Figure 1**. Geographical co-ordinates of the centre of project site are 28°34'35.68"N & 77°25'55.14"E. Site is located in urban area and is surrounded by residential areas. Surroundings of the project site are given in **Table 1** below. Google image showing surroundings of project site is given below in **Figure 2**.

Land belongs to the M/s Comely Buildtech India Pvt. Ltd. and land documents are attached as **Annexure II**. The project comprises of 4 residential towers A-D and small commercial area, along with other facilities like park, green belt, roads, water supply system, wastewater management system, storm water harvesting system and waste management system. Project is spread over an area of 14769 sq ms built-up area of 63559.45 sq m.

**Table 1: Surroundings of Project Site**

Description	Name, Distance & Direction
Near-by Residential Area	<ul style="list-style-type: none"> <li>• Bistrakh Jalalpur Village (500 m, S)</li> <li>• Patwari Village (1.8 km, E)</li> <li>• Aimnabad Village (1.9 km, S)</li> <li>• Sector 1, Greater Noida (500 m, S)</li> <li>• Sorkha Jahidabad Village (2.2 km, W)</li> </ul>
Nearest City	<ul style="list-style-type: none"> <li>• Ghaziabad (7.0 km, NNE)</li> <li>• Indirapuram (9 km, NNW)</li> </ul>
Nearest School/College	<ul style="list-style-type: none"> <li>• Sarvottam International School (2.0 km, NW)</li> <li>• The Manhattan School (4.5 km, WSW)</li> <li>• Pathways School (7.3 km, SW)</li> <li>• The Millenium School (7.0 km, W)</li> </ul>
Nearest Hospital	<ul style="list-style-type: none"> <li>• Neo Hospital (6.0 km, W)</li> <li>• Surbhi Hospital (7.0 Km, W)</li> <li>• Manas Hospital (7,0 km, WNW)</li> <li>• Yathrath Wellness Hospital (6.7 km, SW)</li> <li>• Fortis Hospital (8.0 km, NW)</li> </ul>
Nearest Water body	<ul style="list-style-type: none"> <li>• River Hindon (1.1 km, W)</li> <li>• River Yamuna (12.0 km, W)</li> </ul>
Eco-sensitive Zone	<ul style="list-style-type: none"> <li>• Kalindi Bird Sanctuary (12 km, W)</li> </ul>



**Figure 1: Location Map of Site**



**Figure 2: Map Showing Surroundings of Project Site**

**1.2 List out all the major project requirements in terms of the land area, built up area, water consumption, power requirement, connectivity, community facilities, parking needs etc.**

➤ **LAND REQUIREMENT**

Total plot area of project site is 14769 sq m. Area Break-up details of the project are given below in **Table 2**. Detailed built-up area calculation is given in **Table 3** below. Site layout plan of the project is attached as **Annexure III**.

**Table 2: Area Break Up Detail**

S. No.	Description	Area (sq m)
1	Plot Area	14769
2	Permissible GC (@35% of plot area)	5169.15
3	Proposed GC (@23.53% of plot area)	3691.49
4	Permissible FAR(@2.75% of plot area)	40614.75
5	Proposed FAR (@2.741% of plot area)	40608.36

**Proposed Group Housing Project “August Heights”**  
**At Plot No. GH 11 B, Sec-01, Greater Noida**  
**Gautam Budh Nagar, U.P.**

**FORM 1A**

6	FAR-Residential	40191.27
7	FAR-Commercial	405.09
8	FAR Meter Room	12
9	Permissible Facility Area (@15% of permissible FAR)	6092.212
10	Proposed Facility Area (@12.2% of permissible FAR)	5589.74
11	Open Area	11077.51
12	Green Area (@50.2% of open area)	4851.415
13	Basement Area	11502.97
14	Non Tower Stilt Area	4121.29
15	Tower Stilt	1737.09
16	Built-up area	63559.45
17	No of dwelling units	329 nos.

**\*FAR = Floor Area Ratio**

**Table 3: Detailed Built-Up Area Calculation**

<b>Towers/Facility</b>	<b>Units</b>	<b>Ground Coverage</b>	<b>FAR</b>	<b>15% Facility Area &amp; Non-FAR</b>	<b>Stilt</b>	<b>Built-up Area</b>
Tower A	87.00	805.26	14790.54	1780.62	573.8	17144.96
Tower B	17.00	406.26	4953.76	907.19	0	5860.95
Tower C	136.00	1,438.65	15969.88	1215.55	1163.29	18348.72
Tower D	89.00	501.82	4477.09	682.34	0	5159.43
Community Hall	--	0.00	0	608.95	0	608.95
Commercial Area	--	0.00	405.09	0	0	405.09
Meter Room	--	12.00	12	0	0	12
Guard Room	--	24.00	0	24	0	24
LT Panel Room	--	0.00	0	81.81	0	81.81
Ramp Area	--	503.50	0	0	0	0
UG Tank	--	0.00	0	186.65	0	186.65
STP	--	0.00	0	102.63	0	102.63
Podium	--	0.00	0	4121.29	0	4121.29
Basement	--	0.00	0	11502.97	0	11502.97
<b>Total</b>	<b>329.00</b>	<b>3691.49</b>	<b>40608.36</b>	<b>21214.00</b>	<b>1737.09</b>	<b>63559.45</b>

➤ **POPULATION**

Total population at the project site is estimated to be 2435. This includes staff, visitors and residents. Population estimations are given in **Table 4** below.

**Table 4: Population Estimation for the Project**

Category	No. of Dus	Person/DU	Population
<b>Residential</b>			
Residents	329.00	5	1645
Staff	5% of total population		83
Visitors	10% of total population		165
<b>Total Residential Population</b>			<b>1893</b>
<b>Commercial</b>			
<b>Total Population Commercial Area</b>	<b>406.01</b>	<b>3 sq m/person</b>	<b>136</b>
Staff	10% of commercial population		14
Visitors	90% of commercial population		122
<b>Community Hall</b>			
<b>Total Population Community Hall</b>	<b>609.35</b>	<b>1.5 sq m/person</b>	<b>406</b>
Staff	20% of commercial population		82
Visitors	80% of commercial population		324
<b>Total Population</b>			<b>2435</b>

➤ **WATER REQUIREMENT**

During construction phase water supply will be taken from CSTP at Greater Noida for construction purpose and from private water tanker suppliers for construction workers. During operation phase, source of water will be Municipal Supply. Total water requirement estimated for the project is approx. 172 KLD. Domestic water requirement for the project is 157 KLD. Fresh water requirement for the project is approx. 110 KLD.

➤ **POWER REQUIREMENT**

Power Requirement for the project is estimated to be 1190 kVA. Transformer of capacity 1600 kVA will be installed at site. Source of power will be Noida Power Company Ltd. (NPCL).

➤ **POWER BACK UP**

Two nos. of DG sets 600 kVA each (2 X 600 = 1200 kVA) will be installed at the site for power back-up. Out of this 1 DG set of 600 kVA will be kept as stand by, thus total power back up will be 600 kVA or app. 50% of power required.

➤ **CONNECTIVITY**

Project site abuts 24 m wide road in North direction and 60 m wide road in East direction. Kishan chowk road is app. 1 km from site in East direction and Noida Greater Noida link road is at 3 km from site in North direction. Noida Greater Noida Expressway is at 9 km from site in West direction. Ghaziabad railway station is at 8.6 km from site in North direction. Wave city centre metro station is at 7 km from site in West direction. Indira Gandhi International Airport is at distance of 30 km in W direction from project site. Google Map showing the project site and its connectivity within 5 km radius is given in **Figure 3** below.



**Figure 3: Google Map Showing Project Site Connectivity**

➤ **PARKING FACILITIES**

Car parking space of 508 ECS will be provided within project site to accommodate expected vehicles against the requirement of 508 ECS as per Greater Noida Building Bye Laws. Besides this, internal road of adequate width within the project will facilitate smooth traffic movement.

**1.3 What are the likely impacts of the proposed activity on the existing facilities adjacent to the proposed site? (Such as open spaces, community facilities, details of the existing land use and disturbance to the local ecology).**

Construction work will take place within the project site thus will not impact the surroundings of the project site. Project is a well planned activity. 50% of open area (4851.4 sq m) is kept under greens. Peripheral green belt, avenue plantation, organized greens will be developed which will improve aesthetics of the area. The project will have an overall positive impact on the nearby area and will not cause any disturbance to the local ecology. Planned activity will have no adverse impact on surroundings. Project site abuts 24 m wide Road & is well connected with roads thus there will not be significant pressure on the roads due to material transportation & vehicular movement.

**1.4 Will there be any significant land disturbance resulting in erosion, subsidence & instability? (Detail of soil type slope analysis, vulnerability to subsidence, seismicity etc may be given).**

Project site is a flat land and is surrounded by developed area. No significant threat of erosion, subsidence or instability is anticipated. Soil quality study has also been carried out for the project site and soil quality analysis report for the project is attached as **Annexure VI**.

The site falls under the zone IV as per the seismic zone map of India and indicating high damage risk zone and maximum expected intensity of earthquake in the area is MSK VI. Measures will be taken to maintain structural stability as per NBC, 2005.

**1.5 Will the proposal involve alteration of natural drainage system? (Give details on a contour map showing the natural drainage near the project site).**

Proposed group housing project will be undertaken within project site. The project site does not intersect any natural drainage route. No perennial or non-perennial drainage system is found to exist within the project site or being obstructed by the project. River Hindon is located at the distance of app. 1.1 km in West direction. Project activity will not significantly impact River Hindon as proper storm water management system is planned for the site so as no storm water

run-off from site will enter the River Hindon. Thus, no impact on the natural drainage system is anticipated.

**1.6 What are the quantities of earthwork involved in the construction activity-cutting, filling, reclamation etc. (Give details of the quantities of earthwork involved, transport of fill materials from outside the site etc?)**

The earthwork for project will include soil excavation and cutting of the earth for construction of basement. Project will generate 40260 cum of earth. Top soil from site will be first separated (15 cm layer) and will be stored for later usage for landscaping purpose. Remaining sand will be used for filling for construction of road & podium. Excess soil, if any will be disposed off at designated site of GNIDA.

**1.7 Give details regarding water supply, waste handling etc. during the construction period.**

Water requirement during construction of project is estimated to be 25-30 KLD and will be taken from CSTP at Greater Noida. Fresh water for construction workers need will be purchased from private water tankers. Waste water generated during the construction phase will be ~5 KLD and waste water will be disposed off through septic tanks & soak pits.

Waste handling during the construction phase is done by the site contractor whose responsibility lies with collection and storage of construction and demolition waste generated on the site. Construction debris will be stored in covered yards and will be segregated into re-usable & discarded waste. Re-usable waste will be used within the project site to the extent possible. Discarded waste will be sent to the designated site for construction waste disposal by GNIDA. Solid waste management plan during construction phase is given in **Table 5** below.

**Table 5: Solid Waste Management during Construction Phase**

<b>S. No.</b>	<b>Solid waste</b>	<b>Solid waste Management</b>
1.	Waste materials like MS Rods, bricks, concrete, broken tiles, wood pieces, cement bags etc.	Material would be segregated. Recyclable material will be sold to authorize dealers. Rest will be used within project site for filling & leveling purpose. Remaining will be sent for disposal through government authorized vendors. Cement bags will be used for covering of loose materials.
2.	Excavated Soil	Top soil will be stored in covered areas and will be

		later used for landscaping purpose. Remaining soil will be used for back filling & leveling of site. Unused soil will be disposed off to designated sites. Total 40260 cum of soil will be excavated from the site.
3.	Domestic waste	Will be handed over to local authority, responsible for waste management in the area.

**1.8 Will the low lying areas & wetlands get altered? (Provide details of how low lying and wetlands are getting modified from the proposed activity).**

No. The site area is a flat land and the surroundings are characterized by an urbanized stretch. No low lying areas or wetlands are found in the region.

**1.9 Whether construction debris & waste during construction cause health hazard? (Give quantities of various types of wastes generated during construction including the construction labor and the means of disposal).**

Waste expected to be generated & its management plan during construction phase is given in **Table 5** above. No health hazards are expected to be caused by construction debris & waste as it will be managed properly. Additionally health & safety of construction worker will be taken care of by taking following measures:

- Providing personal protective equipment like ear plugs, face masks, helmets, safety jackets & gloves
- Appointment of safety officers at site
- Regular inspection & maintenance of the construction machinery
- Construction activities will be restricted to day time
- Provision of adequate lightning during night time
- Cautionary notices to be displayed at required places
- Regular clearing off site to remove the debris
- Availability of medical officer & first-aid facility at construction site
- Tie-up with near-by hospital to attend emergency case, if any

**SECTION 2- WATER ENVIRONMENT**

**2.1 Give the total quantity of water requirement for the project with the breakup of requirements for various uses. How will the water requirement be met? State the sources & quantities and furnish a water balance statement.**

During construction phase water supply will be taken from CSTP at Greater Noida for construction purpose and from private water tanker suppliers for construction workers. During operation phase, source of water will be Municipal Supply. Total water requirement estimated for the project is approx. 172 KLD. Domestic water requirement for the project is 157 KLD. Fresh water requirement for the project is approx. 110 KLD. Daily water requirement calculation for the project is given below in **Table 6 & 7.**

**Table 6 : Calculations for Daily Water Demand**

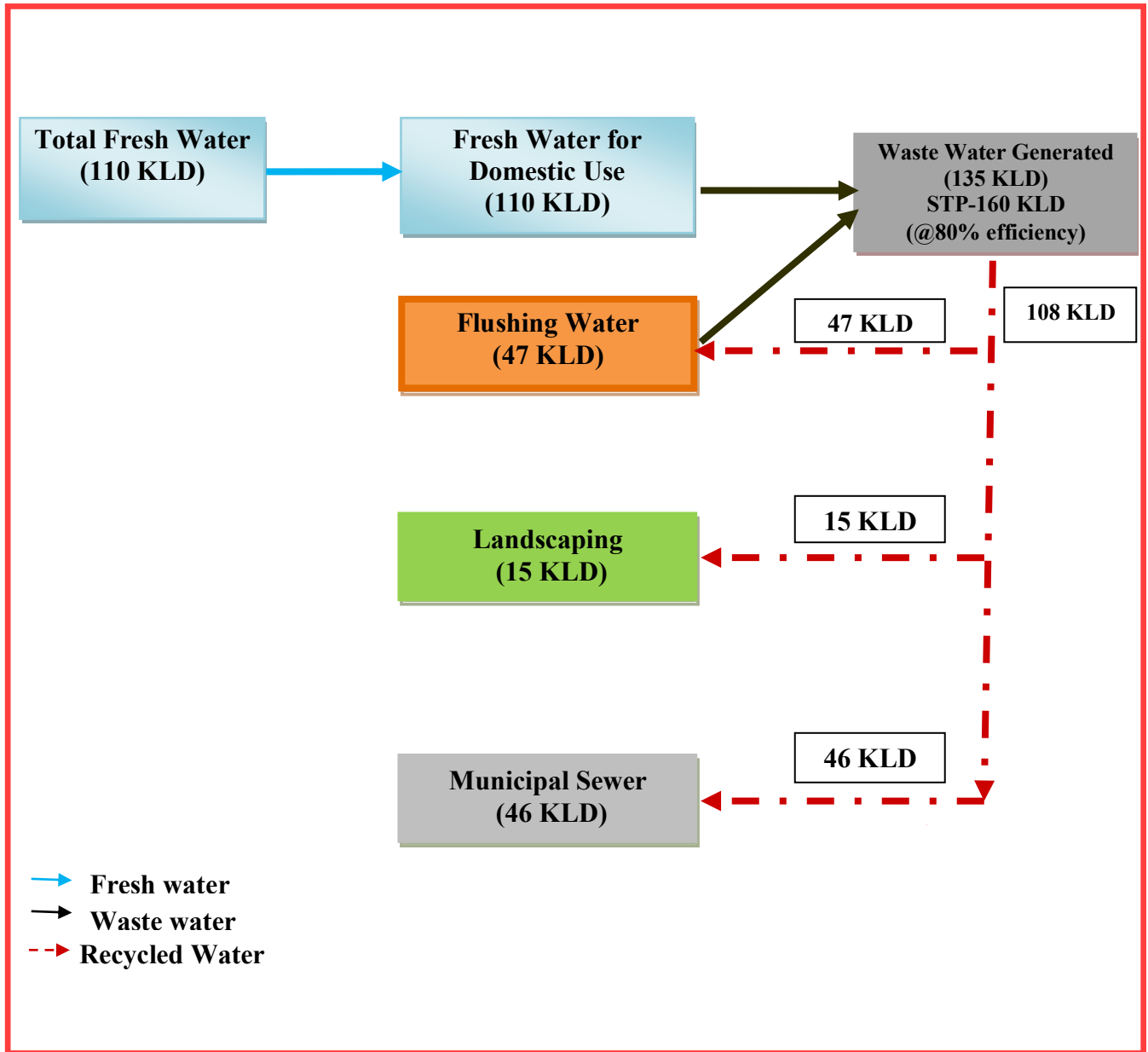
Category	Total Population/Area (sq )	Standards (LPCD)	Water Requirement (KLD)	Fresh Water Requirement (KLD)	Recycled Water Requirement (KLD)
<b>Domestic Water Requirement</b>					
Residents	1645	86	142	99	43
Staff	179	30	6	4	2
Visitors	611	15	9	7	2
<b>Total Domestic Water Requirement</b>			<b>157</b>	<b>110</b>	<b>47</b>
Horticulture	4851.4 sq m	3 l/sq m	15	0	15
<b>Total Water Requirement</b>			<b>172</b>	<b>110</b>	<b>62</b>

**Table 7: Wastewater Calculations**

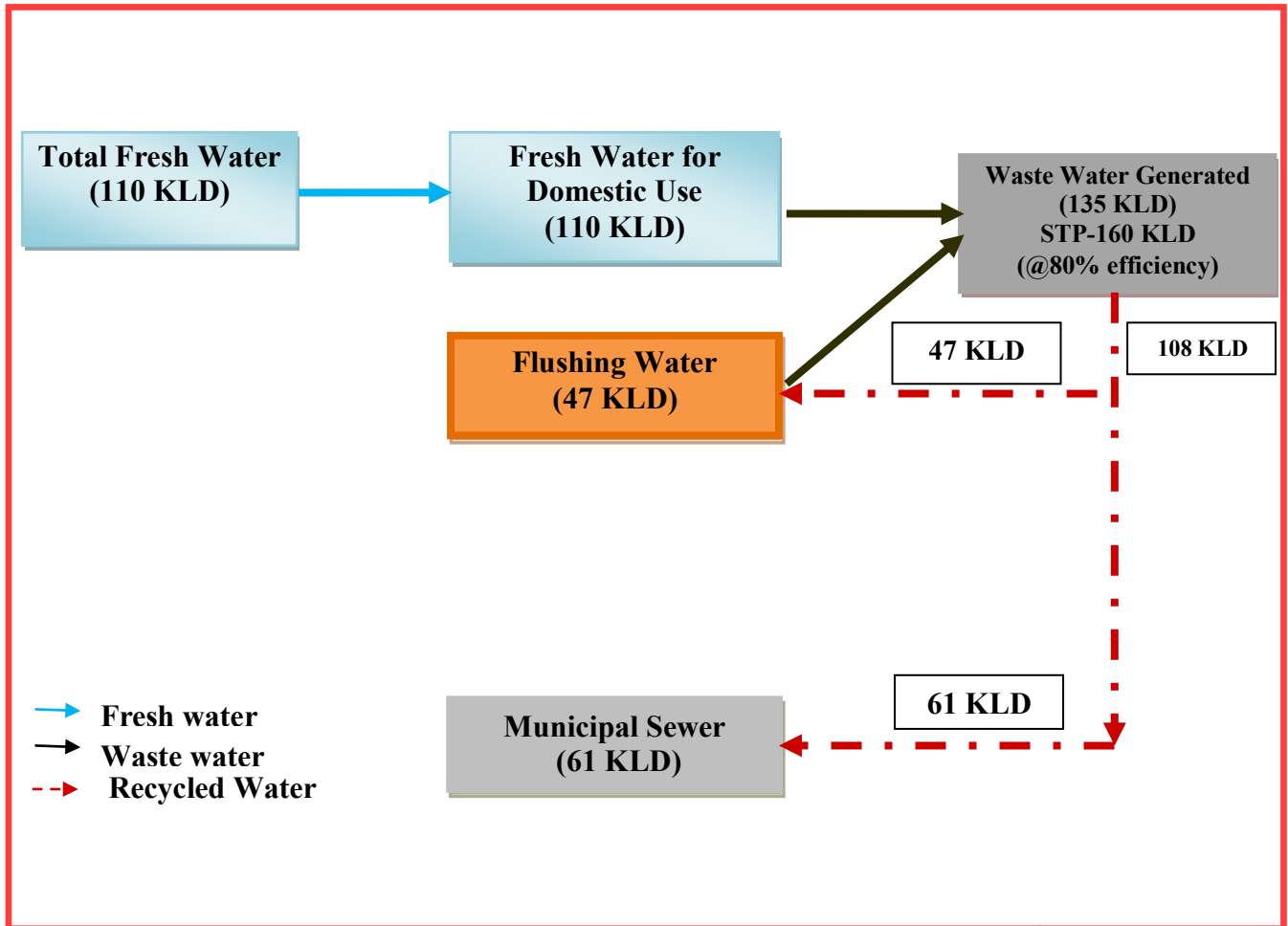
Category	Quantity (KLD)
<b>Total Water Requirement</b>	172
<b>Domestic Water Requirement</b>	157
<b>Fresh Water Requirement (@70% of dom. Water req.)</b>	110
<b>Flushing Water Requirement (@30% of dom. Water req.)</b>	47
<b>Sewage Generated (80% fresh water for domestic use +100% flushing water)</b>	135
<b>STP Capacity</b>	160
<b>Treated Water (@80%)</b>	108
<b>Flushing</b>	47
<b>Landscaping</b>	15
<b>Municipal Sewer</b>	46

**Wastewater Generation & Treatment**

It is expected that the project will generate approx 135 KLD of sewage. Sewage will be treated in STP of 160 KLD proposed to be constructed within project site. Treated water from STP will be re-used within project site through dual plumbing system for flushing and landscaping purpose. 108 KLD of water will be recovered from STP and out of this 62 KLD will be reused within the project site and remaining 46 KLD will be discharged into sewer. Dual plumbing system will be provided so as to re-use the water. Water balance diagram for dry & monsoon season are given below in **Figure 4 (a) & (b)**



**Figure 4 (a): Water Balance Diagram During Dry Season**



**Figure 4 (b): Water Balance Diagram during Monsoon Season**

**2.2 What is the quality of water required, in case, the supply is not from a municipal source? (Provide physical, chemical, Biological characteristics with class of water quality).**

Total water requirement estimated for the project is approx. 172 KLD. Domestic water requirement for the project is 157 KLD. Fresh water requirement for the project is approx. 110 KLD and will be sourced from Municipal supply. However ground water quality analysis study is carried out and the ground water quality analysis report is attached as **Annexure VII**.

**2.3 How much of water requirement can be met from the recycling of treated sullage? (Give the details of quantities, sources and usage)**

It is expected that the project will generate approx 135 KLD of sewage. Sewage will be treated in STP of 160 KLD proposed to be constructed within project site. Treated water from STP will be

re-used within project site through dual plumbing system for flushing and landscaping purpose. 108 KLD of water will be recovered from STP and out of this 62 KLD will be reused within the project site and remaining 46 KLD will be discharged into sewer. Dual plumbing system will be provided so as to re-use the water.

**2.4 Will there be diversion of water from other users? (Please assess the impacts of the project on other existing uses and quantities of consumption).**

No. There will not be any diversion of water from other users. Water source during operation phase will be Municipal supply.

**2.5 What is the incremental pollution load from sullage generated from the proposed activity? (Give details of the quantities and composition of sullage generated from the proposed activity)**

Approximately 135 KLD of sewage will be generated from project site. Sewage will be treated in the STP proposed inside the project premises of capacity 160 KLD. Treated water from STP will be re-used within project site through dual plumbing system for flushing and landscaping purpose. 108 KLD of water will be recovered from STP and out of this 62 KLD will be reused within the project site and remaining 46 KLD will be discharged into sewer.

**2.6 Give details of the water requirements met from water harvesting? Furnish details of the facilities created.**

Storm water harvesting system will be provided within the project site as per CPCB guideline on Rainwater Harvesting & Artificial Ground water Recharge. Storm water from roof-top will be collected via storm water drainage network and will lead into recharge pits proposed to be provided within the site. Storm water drainage will be designed in line of existing drainage pattern and considering the natural flow direction of water. First flushing system will be provided to prevent water from first rain to enter the ground as it is believed to contain several impurities. Rain water harvesting system is designed considering maximum peak hourly rainfall (50 mm/hr). Thus pits are designed to accommodate the maximum possible rainfall taking in consideration peak hourly rain-fall for that area. Retention time for water in pit is considered to be 15 minutes. De-silting chamber is provided with each RWH pit. Oil trap is provided to

remove oil & grease, if any in the storm water. Periodic cleaning & maintenance of RWH system will be done. Calculation for storm water system designing is given in **Table 8**. Schematic diagram of Rain Water Harvesting pit as per CGWB is attached as **Annexure IV**.

**Table 8: Calculations for storm water load**

<b>S. No.</b>	<b>Catchment</b>	<b>Area of Catchment (sq m)</b>	<b>Run-off Coff.</b>	<b>Peak Hourly Rainfall (m/hr)</b>	<b>Run-off collected (cu m)</b>
<b>1</b>	<b>Roof-Top</b>	3691.49	0.9	0.05	166.2
<b>Retention Time in Pits</b>					15 mins
<b>Total Run-off in 15 mins</b>					41.5
<b>Size of RWH Pit (diameter- 3m , depth 3 m)</b>					21.95
<b>No. of Pits Required</b>					1.9 Pits
<b>No of Pits Provided</b>					2 Pits

Total 2 Nos. of Rain Water Harvesting pits are being proposed for artificial rain water recharge within the project premises. 1 No. RWH tank of 50 cum is proposed to be developed to harvest the storm water from other areas.

**2.7 What would be the impact of the land use changes occurring due to the project on the runoff characteristics (quantitative as well as qualitative) of the area in the post construction phase on a long term basis? Would it aggravate the problems of flooding or water logging in any way?**

The project includes paved areas and thus the runoff from the plot is expected to increase due to reduced infiltration. However, the increased runoff will not cause flooding or water logging as a well designed storm water drainage is proposed to be provided at site. The roof top runoff will be collected into rainwater harvesting pits for groundwater recharging. Remaining surface run-off will be discharged into municipal drains.

**2.8 What are the impacts of the proposal on the ground water? (will there be tapping of ground water; give the details of ground water table, recharging capacity and approvals obtained from competent authority, if any)**

Water will be taken from municipal supply. Water will be taken after obtaining permission from competent authority.

**2.9 What precautions/ measures have been proposed to check the surface run-off, as well as uncontrolled flow of water into any water body?**

The following management measures are suggested to protect the water quality are:

- Avoid excavation during monsoon season.
- Care would be taken to avoid soil erosion.
- Toilets will be constructed on the site during construction phase and the sewage will be channelized to the septic tank in order to prevent sewage from entering the water bodies.
- Any area with loose debris/soil within the site shall be fully planted by local plant species.
- To prevent surface and ground water contamination by oil/grease, leak proof containers would be used for storage and transportation of oil/grease. The floors of oil/grease handling area would be kept effectively impervious.
- Collection and settling in the storm water, prohibition of equipment wash downs, and prevention of soil loss and toxic release from the construction site will be adhered to minimize water pollution.

**2.10 How is the storm water from within the site managed? (State the provisions made to avoid flooding of the area, details of the drainage facilities provided along with a site layout indication contour levels).**

Roof top storm water produced on site will be harvested for ground water recharge. Surface run-off however will be discharged into municipal drains. A proper management of roof top run-off is must to ensure that it is free of contamination. A detailed Storm Water Management Plan is developed which will consider the sources of storm water. The plan incorporates following best management practices

- Regular inspection and cleaning of storm drains.
- Installation of clarifiers or Oil/Water separators/traps system of adequate capacity around parking areas and garages as per requirement.
- Avoid application of pesticides and herbicides before wet season.

- Conducting routine inspections to ensure cleanliness.
- Preparation of spill response plans, particularly for fuel and oil storage areas.
- Provision of silt traps in storm water drains.
- Good housekeeping in the above areas.

**2.11 Will the deployment of construction laborers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation).**

Toilets will be provided on site and the waste water will be disposed off in septic tanks/soak pits. Daily cleaning of the site will be carried out. Dustbins will be provided at project site for collection of waste generated. Collected solid waste will be handed over to local authority responsible for waste management in that area. Drinking water & bathing facility will be provided at site for construction workers. These practices will help in maintaining sanitary conditions at the project site during construction phase.

**2.12 What on-site facilities are provided for the collection, treatment & safe disposal of sewage? (Give details of the quantities of sullage generation, treatment capacities with technology & facilities for recycling and disposal).**

It is expected that the project will generate approx 135 KLD of sewage. Sewage will be treated in STP of 160 KLD proposed to be constructed within project site. Treated water from STP will be re-used within project site through dual plumbing system for flushing and landscaping purpose. 108 KLD of water will be recovered from STP and out of this 62 KLD will be reused within the project site and remaining 46 KLD will be discharged into sewer. Dual plumbing system will be provided so as to re-use the water.

**2.13 Give details of dual plumbing system if treated waste used for flushing of toilets or any other use.**

Dual plumbing system that utilizes separate piping systems for freshwater and recycled water will be adopted for the project. Sewage will be treated in the STP (160 KLD) provided within the project site. Treated water will be used for flushing, DG cooling and landscaping purpose.

### **3. VEGETATION**

#### **3.1 Is there any threat of the project to the biodiversity? (Give a description of the local ecosystem with its unique features, if any).**

No ecologically sensitive area falls within the project site and 10 km of project site. Hence, no threat is anticipated to ecological environment. Green area measuring 4851.4 m<sup>2</sup> (50.0% of open area) is planned to developed at project site. This will improve the ecology of the area as native plant species will be planted.

#### **3.2 Will the construction involve extensive clearing or modification of vegetation? (Provide a detailed account of the trees & vegetation affected by the project)**

The project site does not support any significant vegetation thus clearance of vegetation is not involved. It is proposed to develop a peripheral greenbelt, avenue plantation and organized greens comprising of native plant species to enhance the aesthetic value of the region and also provide an excellent habitat for various faunal groups. Evergreen tall and ornamental trees and shrub have been proposed to be planted inside the premises.

Trees and shrubs proposed to be planted at project site are given below in **Table 9** below

**Table 9: List of Trees**

<b>S. No.</b>	<b>Botanical Name</b>	<b>Common Name</b>
<b>Trees</b>		
1	<i>Cassia fistula</i>	Golden Shower Tree
2	<i>Bauhinia blakeana</i>	Hong Kong Orchid
3	<i>Saraca indica</i>	Ashoka
4	<i>Delonix regia</i>	Gulmohar
5	<i>Ficus Benjamina</i>	Weeping fig
6	<i>Pterospermum acerifolium</i>	Kanak Champa
7	<i>Plumeria obtusa/Rubra</i>	Frangipani
<b>Shrubs</b>		
1	<i>Cycus revolute</i>	Japanese sago palm
2	<i>Jatropha integerrima</i>	Peregrina
3	<i>Rhapis palms</i>	Broad leaf lady palm
4	<i>Duranta goldeana</i>	Golden dewdrop
5	<i>Tecoma gaudichaudi</i>	Yellow bells

6	<i>Pittosporum tobira</i>	Japanese Mock Orange
<b>Grass/herbs</b>		
1	<i>Alternanthera ficoidea</i>	Red fine leaf
2	<i>Ophiopogon japonicas</i>	Monkey grass
3	<i>Zephyranthes rosea</i>	Pink rain lily
4	<i>Asparagus plumosa</i>	Asparagus
<b>Creepers</b>		
1	<i>Clerodendron splendens</i>	Glory tree
2	<i>Bignonia venusta</i>	Flame vine
3	<i>Bougainvillea bonsai</i>	Bougainvillea

*(Source: Guidelines for developing Green Belts by CPCB, 2000)*

**3.3 What are the measures proposed to be taken to minimize the likely impacts on important site – features (Give details of proposal for tree plantation, landscaping creation of water bodies etc along with a layout plan to an appropriate scale?)**

Total area measuring 4851.4 m<sup>2</sup> i.e. 50 % of the open area will be developed as green area. Evergreen, native species will preferably be planted at the project site. Native species are adapted to natural conditions and also requires less aftercare and maintenance. Trees with large & round canopy will be planted. Plantation will act as noise buffer and will provide surface for dust settlement. Green belt development plan for the area is given below

***Green Belt development Plan***

All the developments are associated with the pollution of one or more environmental component. Plants are the natural sink of that pollution. Plants help in abatement of the pollution and restore the degraded environment. Green belt lowers down the air pollution by providing a surface to settle down or by absorbing the pollutants, attenuate noise level and uses the waste water. Phyto-remediation is one of the most successful available technologies of restoring the degraded environment. For this project area of 4851.4 m<sup>2</sup> i.e. 50 % of the open area is proposed to be put under green cover. Green cover will comprise of:

- A peripheral green belt
- Planters along the roads
- Lawns/parks

***Selection of Plant Species for Green Belt Development***

Selection of plant species for the development depends on various factors such as climate, elevation and soil. The plants would exhibit the following desirable characteristics in order to be selected for plantation

1. Species should be fast growing and providing optimum penetrability with minimal maintenance. Perennial, evergreen & fast growing trees
2. Species should be wind-firm and deep rooted
3. Indigenous and locally available species will be planted
4. Trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces. Round, thick & spreading canopy is preferred for peripheral green belt and oblong canopy for road side plantation
5. Ability to withstand conditions like inundation and drought
6. Soil improving plants (Nitrogen fixing rapidly decomposable leaf litter)
7. Bird and insect attracting tree species
8. Tolerant to climatic conditions of the area and with less water requirement & after care will preferable be planted. Species tolerance to air pollutants like SO<sub>2</sub> and NO<sub>2</sub> should be preferred
9. Plantation trees with ornamental foliage & shrubs with fragrant flowers will enhance scenic beauty of the area. Attractive appearance with good flowering and fruit bearing
10. Plantation should be such that it maintains ecological & hydrological balance of the region.

Trees and shrubs proposed to be planted at project site are given above in **Table 9**.

#### ***After Care and Monitoring***

Plants grown will be monitored for first three years. Nutrients will be supplemented and the juveniles provided protection. Following measures will be taken:

- Adequate nutrient supply will be maintained by providing manure timely
- Absence of water stress
- Construction of the protection wall all around to protect from animals and outsiders from damage

Regular inspection of the site will be kept. Record keeping of number of saplings planted and surviving will be kept. Regular pruning of road side trees will be done as per requirement.

Weeding will be carried out along with regular manuring & watering. Treated water from STP will be used for watering plant which is rich in nutrients. Landscape Plan for the project site is attached as **Annexure III**.

#### **4. FAUNA**

**4.1 Is there likely to be any displacement of fauna both terrestrial and aquatic or creation of barriers for their movement? Provide the details.**

No. The surrounding land use around the site is urban and does not provide a habitat for wild species. A thick green belt will be developed along the project site and along the roads. Organized greens will also be developed within project site. Proposed green area will provide habitat to local flora & fauna. 50% of open area will be maintained as green.

**4.2 Any direct or indirect impacts on the avifauna of the area? Provide details.**

Project will not have any direct or indirect impacts on the avifauna of the area. However proposed tree belt will provide habitat to avifauna in the area

**4.3 Prescribe measures such as corridors, fish ladders etc. to mitigate adverse impacts on fauna.**

Not applicable

#### **5. AIR ENVIRONMENT**

**5.1 Will the project increase atmospheric concentration of gases & result in heat islands? (Give details of background air quality levels with predicted values based on dispersion models taking into account the increased traffic generation as a result of the proposed construction).**

Project development will not cause any significant increase in atmospheric pollutants & formation of heat island. It is a residential project & sources of pollution during operation phase will be vehicular movement & DG set operation. Green belt will be provided around the project site to the extent possible, which acts as settling surface for dust and thus will significantly reduce dust levels from air. DG sets will be provided with stack as per CPCB norms. These

stacks will aid release of gases at a height such that it will not have significant impact on Ground Level Concentration of various gases. Construction is a temporary and short term phase, thus impact on air quality during construction phase is also temporary. Measures will be taken to reduce air pollutant generation during construction phase also.

All the construction and related activities are proposed to be undertaken within the site. Surroundings of project site are built-up and paved areas. Thus no impact on heat reflection will be there due to project development. Green belt & lawns are proposed to be provided which will absorb the reflected heat from the buildings and thus neutralize the effect.

Ambient air quality monitoring at the project site has been undertaken and lab analysis report is attached as **Annexure VIII**.

**5.2 What are the impacts on generation of dust, smoke, odorous fumes or other hazardous gases? Give details in relation to all the meteorological parameters.**

There will not be generation of any smoke, odorous fumes & hazardous gases, either during construction or operation phase. Dust generation is anticipated to occur while loading & unloading of construction material, debris & construction activities and vehicular movement during construction phase. During operation phase dust generation will result from vehicular movement. Dust generation is controlled by taking following measures.

- Covering the scaffolding
- Clearance of grass or weeds only from activity area
- Water sprinkling on unpaved surfaces/open areas
- Washing wheels of vehicles
- Storage of construction material, excavated soil & debris in covered sheds
- Regular cleaning of site
- Development of green belt during operation phase
- No open land will be left without vegetation cover & roads will be paved.

Taking above measures, dust generation can be minimized thus negligible impact is anticipated. D.G. sets are proposed to be provided at project site and will be functional during power failure. Emission of SO<sub>2</sub> & NO<sub>x</sub> will be there from DG sets but stack of appropriate height will be provided to discharge the exhaust gases so that there will be minimal impact on GLC.

**5.3 Will the proposal create shortage of parking space for vehicles? Furnish details of the present level of transport infrastructure and measures proposed for improvement including the traffic management at the entry and exit to the project site.**

Adequate parking is provided to accommodate the expected vehicles during operation phase of the project. Parking is provided in accordance to Greater Noida Building Bye Laws. Parking required and provided is given in **Table 10 & 11** below.

**Table 10: Parking Required**

S. No.	Parking Requirement	FAR (sq m)	Parking Required (ECS)
<b>As Per MoEF</b>			
1.	1 ECS/100 sq m of FAR	40608.36	407
<b>As per Greater Noida Building Bye Laws</b>			
1.	1 ECS/80 sq m of FAR	40608.36	508

**Table 11: Parking Provided**

S. No.	Parking	Total Area	Parking Area (sq m)	Area per ECS (sq m)	Parking Provided (ECS)
1.	Stilt	1737.09	1737.09	30	57
2.	Podium	4121.29	4121.29	30	137
3.	Basement	11502.97	9041.48	30	301
4.	Open	536.25	536.25	20	13
<b>Total Parking Provided</b>					<b>508</b>

Car parking space of 508 ECS will be provided within project site to accommodate expected vehicles against the requirement of 508 ECS as per Greater Noida Building Bye Laws. Car Parking Plans for stilt and basements are attached as **Annexure V a & b**.

**5.4 Provide details of the movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc, with areas under each category.**

Internal roads of adequate width, footpaths/pedestrian pathways have been well planned for the project.

**5.5 Will there be significant increase in traffic noise & vibrations? Give details of the sources and the measures proposed for mitigation of the above.**

Construction activities & increase traffic movement at project site will contribute to noise level in the area but no significant rise in noise level & vibrations is anticipated. Following measures are proposed to minimize the noise generation & its impact on the environment.

- Construction activity will be restricted to day hours
- Usage of machinery and equipment complying to the noise standards
- Regular servicing and maintenance of vehicles
- Prohibiting honking at project site
- Provision of speed breakers at project site to restrict the speed of vehicles
- Provision of pedestrian path to encourage walking
- Development of green belt around project site wherever possible which will act as noise buffer.

**5.6 What will be the impact of D.G. sets and other equipment on noise levels and vibration in ambient air quality around the project site? Provide details.**

D.G. sets will be operational during power failure during both construction & operation phase. Operation of D.G. sets leads to generation of noise & emission of gases like SO<sub>2</sub> & NO<sub>x</sub>. If not managed this may lead to noise & air pollution. DG sets to be used are enclosed in acoustic enclosures and are provided with stack of height as per CPCB norms so that exhaust gases can be discharged at appropriate height minimizing impact on GLC of various gases in air. Also low sulphur diesel is used as fuel to minimize the SO<sub>2</sub> generation. Green belt will be developed during operation phase which helps in reducing the noise and dust levels at project site. Noise level monitoring is carried out at the site and the noise level analysis report is attached as **Annexure IX.**

**6. AESTHETICS**

**6.1 Will the proposed construction in any way result in the obstruction of a view, scenic amenity or landscapes? Are these considerations taken into account by the proponents?**

All project activities will be confined to the project site. The project site lies in an urbanized settlement and is well planned. Thus, no obstruction of view or scenic beauty or landscape is anticipated. Furthermore, the construction will be planned in such a way that the organized open spaces and landscaped areas will render the plot aesthetically appealing.

**6.2 Will there be any adverse impacts from new constructions on the existing structures? What are the considerations taken into account?**

No impacts anticipated.

**6.3. Whether there are any local considerations of urban form & urban design influencing the design criteria? They may be explicitly spelt out.**

The project will strictly follow the Greater Noida Building Bye Laws and NBC, 2005 norms. All norms on Ground Coverage, FAR, Height, Setbacks, Fire Safety Requirements, Structural Design and other parameters will be strictly adhered to.

**6.4 Are there any anthropological or archaeological sites or artifacts nearby? State if any other significant features in the vicinity of the site have been considered?**

No anthropological or archaeological sites or artifacts are found within 5 km area of project site.

**7. SOCIO-ECONOMIC ASPECTS**

**7.1 Will the proposal result in any changes to the demographic structure of local population? Provide the details.**

No such changes anticipated.

**Construction phase:** Since local labourers will be engaged during construction phase, alteration to the existing demographic profile of the area is not anticipated.

**Operation phase:** The project will mainly lead to spatial redistribution of local population and hence no considerable influx of population is envisaged owing to the project.

**7.2 Give details of the existing social infrastructure around the project.**

The area around the project is surrounded by developed area. Areas occupied by sensitive man-made land uses like hospitals, schools, community facilities etc. and details are given in **Table 12** below.

**Table 12: Site Surroundings**

<b>Description</b>	<b>Name, Distance &amp; Direction</b>
Near-by Residential Area	<ul style="list-style-type: none"> <li>• Bistrakh Jalalpur Village (500 m, S)</li> <li>• Patwari Village (1.8 km, E)</li> <li>• Aimnabad Village (1.9 km, S)</li> <li>• Sector 1, Greater Noida (500 m, S)</li> <li>• Sorkha Jahidabad Village (2.2 km, W)</li> </ul>
Nearest City	<ul style="list-style-type: none"> <li>• Ghaziabad (7.0 km, NNE)</li> <li>• Indirapuram (9 km, NNW)</li> </ul>
Nearest School/College	<ul style="list-style-type: none"> <li>• Sarvottam International School (2.0 km, NW)</li> <li>• The Manhattan School (4.5 km, WSW)</li> <li>• Pathways School (7.3 km, SW)</li> <li>• The Millenium School (7.0 km, W)</li> </ul>
Nearest Hospital	<ul style="list-style-type: none"> <li>• Neo Hospital (6.0 km, W)</li> <li>• Surbhi Hospital (7.0 Km, W)</li> <li>• Manas Hospital (7,0 km, WNW)</li> <li>• Yathrath Wellness Hospital (6.7 km, SW)</li> <li>• Fortis Hospital (8.0 km, NW)</li> </ul>
Nearest Water body	<ul style="list-style-type: none"> <li>• River Hindon (1.1 km, W)</li> <li>• River Yamuna (12.0 km, W)</li> </ul>
Eco-sensitive Zone	<ul style="list-style-type: none"> <li>• Kalindi Bird Sanctuary (12 km, W)</li> </ul>

**7.3 Will the project cause adverse effects on local communities, disturbance to sacred sites or other cultural values? What are the safeguards proposed?**

No adverse impacts are anticipated due to project development on local community or sacred sites as project is surrounded by developed area and all construction and related activities are confined within project site only. No place of cultural and archaeological importance is present within 1 km of the project site. Measures will be taken to control air, water, soil & noise pollution to minimize negative impact of project development on the environment & society. Environment management plan has been drafted detailing safeguards proposed for environmental management and is given in Section 10 of this report. Project will be beneficial for the society as development of project will lead to improvement in living standard of society by generation of modern living facility in affordable price.

## **8. BUILDING MATERIALS**

**8.1 May involve the use of building materials with high embodied energy. Are the construction materials produced with energy efficient processes? (Give details of energy conservation measures in the selection of building materials and their energy efficiency)**

For the purpose of paved path, sun dried pavers will be used instead of baked pavers as they are manufactured through energy efficient processes. Fly ash bricks & fly ash cements are used for construction purpose.

**8.2 Transport and handling of materials during construction may results in pollution, noise and public nuisance. What measures are taken to minimize the impacts?**

Mitigation Measures for Air Pollution during Construction Stage:

- Construction materials are suitably covered with tarpaulin cover etc during transportation.
- Water sprinkling is done on haul roads where dust generation is anticipated.
- Raw material storage and handling yard are enclosed from all sides.
- To minimize the occupational health hazard, proper personal protective gears i.e. mask are provided to the workers working in the dust prone areas.

Mitigation Measures for Noise Pollution during Construction Stage:

- Administrative as well as engineering control of noise is implemented.
- Isolation of noise generation sources and temporal differentiation of noise generating activities are ensured minimum noise at receiver’s end.
- To prevent any occupational hazard, earmuff / earplug are given to the workers working around construction plant & machinery emitting high noise levels.
- Use of such plant or machinery is allowed during night time. Careful planning of machinery operation and scheduling of operations shall be done to minimise such impact.

**8.3 Are recycled materials used in roads and structures? State the extent of savings achieved?**

Yes, for road construction fly-ash is utilized. Fly ash bricks are used in common areas for construction purpose in project site.

**8.4 Give detail of the methods of collection, segregation & disposal of the garbage generated during the operation phases of the project.**

During operation phase, waste will comprise of municipal waste, small quantity of used oil from DG sets and e-waste from individual household. It is estimated that approx. 974 kg of municipal solid waste will be generated per day from project site (@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 and 0.2 kg/acres/day is considered for landscape wastes). Estimations for solid waste generation during operation phase are given in **Table 13**.

**Table 13: Calculation of Solid Waste Generation**

Category	Total Population/Area (sq )	Standard (Kg/day)	Waste Generated (kg/day)	Compostable Waste (kg/day)	Recyclable (kg/day)	Inert Waste (kg/day)
Residents	1645	0.5	823	494	247	82
Staff	179	0.25	45	27	14	4
Visitors	611	0.15	92	55	28	9
Landscape Waste	1.2 acres	0.2 kg/acres	0.3	0.3	0	0
STP Sludge	--	--	13	13	0	0
<b>Total Waste generated</b>			<b>974</b>	<b>590</b>	<b>289</b>	<b>95</b>

*(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**

1. A door to door collection system will be provided for collection of domestic waste from project site
2. Local vendors will be hired for waste collection and management
3. Separate colored bins for dry recyclables, wet compostable and inert waste will be provided
4. Litter bin will also be provided in open areas like parks etc.

❖ **Treatment of waste**

• **Bio-Degradable wastes**

- a. Bio-degradable waste will be treated in Organic Waste Converter to convert it into manure which can later be used for landscaping
- b. STP sludge is proposed to be used for horticultural purposes as manure.

• **Recyclable wastes**

Recyclable wastes like paper, plastic, metals etc. will be sold off to authorized recyclables.

❖ **Disposal**

Inert fraction of waste will be sent through authorized vendor for disposal.

Apart from the municipal waste, E-waste comprising of rejected CFL, bulbs, laptops, TV sets, computers etc will be generated. This waste will be insignificant in initial stage. Room will be provided within project site for storing discarded electronics. These will be sold to authorized vendors on regular basis. Very less quantity of used oil will be generated from the DG sets and will be sold to authorized vendors.

**9. ENERGY CONSERVATION**

**9.1 Give details of the power requirements, source and supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?**

Power Requirement for the project is estimated to be 1190 kVA. Transformer of capacity 1600 kVA will be installed at site. Source of power will be Noida Power Company Ltd. (NPCL).

**Details of D.G Sets**

Two nos. of DG sets 600 kVA each (2 X 600 = 1200 kVA) will be installed at the site for power back-up. Out of this 1 DG set of 600 kVA will be kept as stand by, thus total power back up will be 600 kVA or app. 50% of power required. Following effective measures have been

incorporated to minimize the energy consumption at project site. App. 22.7% of energy will be saved by taking the given energy conservation measures.

- Orientation of building is such that it allows natural lightning and ventilation
- Overhangs on the windows will be provided to control the direct sun heat
- Usage of AAC blocks in building construction
- Painting wall with heat reflecting paint
- Vertical plantation will be carried out
- Usage of fly ash bricks, hollow bricks and fly ash mix cement for construction purpose.  
Usage of excavated soil and construction debris within the project site as filling material
- Usage of locally available construction material
- Provision of solar water heater
- Lightning in common area will be LED based. Solar lights will be provided whenever possible
- Common lights will be shut down to 50% after 10:00 pm when traffic movement is drastically reduced
- All internal lighting shall be BEE star rated. All internal lightning will be CFL or T5 lamps based
- Direction signage, based on LED shall be powered by solar.

**Table 15: Energy Saving Calculations**

Description	Energy Saving (kW)
Energy Saved by using Solar based LED Lighting in 10 % of common areas, landscape areas , signage's, entry gates and boundary walls etc	6
Energy Saved by using LED based Lighting in the remaining common areas, basement landscape areas, signage's, entry gates and boundary walls etc.	4
Energy Saved by using LED based Lighting in all the other areas	260
Energy Saved	270
Total Energy Consumed	1190
Percentage of Energy Saved (%)	22.7%

**9.2 What type and capacity of power backup do you plan to provide?**

Two nos. of DG sets 600 kVA each (2 X 600 = 1200 kVA) will be installed at the site for power back-up. Out of this 1 DG set of 600 kVA will be kept as stand by, thus total power back up will be 600 kVA or app. 50% of power required.

**9.3 What are the characteristics of the glass you plan to use? Provide specifications of its characteristics related to both short wave and long wave radiation?**

Glass is not proposed to be used as wall material. However some glass will be used for window glazing. 6 mm clear glass will be used for window panes and have U value 5.7 W/sq m K, L.T value : 88% & S.F : 0.82.

**9.4 What passive solar architectural features are being used in the building? Illustrate the applications made in the project.**

Orientation of the buildings is as per the sun path analysis. Architectural features like façade, and overhangs for windows will be provided to prevent direct sunlight & heat to enter into the building. Roofs of buildings will be painted with heat reflecting paint. Building is designed in a way that sunlight is used for insolation during day time by providing adequate fenestration.

**9.5 Does the layout of street & building maximize the potential for solar energy devices? Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.**

Solar energy will be harnessed to meet various energy requirements of the project such as:

- LED based Solar street lights.
- Solar powered LED signange boards
- Solar water heaters

**9.6 Is the shading effectively used to reduce cooling/heating lands? What principles have been used to maximize the shading of walls on the East and the West and the Roof? How much energy saving has been effected?**

Building material like AAC blocks, venetian blinds etc will be provided for insulation in the building. This will minimize the cooling load. Energy savings will be achieved by using energy efficient lightning & building material.

**9.7 Do the structures use energy-efficient space conditioning, lightening and mechanical systems? Provide technical details. Provide details of the transformers and motor efficiencies, lightening intensity and air conditioning load assumption? Are you using CFC and HCFC free chillers? Provide specifications.**

**Yes.** Yes, to increase energy efficiency, CFL lamps and T-5 lamps are proposed to be used for internal lightning purpose. Solar street lights & CFL will be used to minimize energy consumption for open area. Building is not air-conditioned. Awareness for energy saving will be spread among occupants by campaigning and visual notices.

**9.8 What are the likely effects of the building activity in altering the micro-climates? Provide a self assessment on likely impacts of the proposed construction on creation of heat island & inversion effects?**

Heat emissions from the project may be from the following sources:

- Heat absorbed from the paved and concrete structures
- Heat increase due to increased vehicle use

However, the heat generated will not be significant and will be dissipated in the greens and open areas provided within the project area.

**9.9 What are the thermal characteristics of the building envelope? (a) Roof (b) external walls and (c) fenestration? Give details of the material used and the U value or the R values of the individual components.**

**Roofs:** Intensity of solar radiation is more on horizontal surfaces, i.e. roofs of the buildings. Adequate insulation will be provided using heat reflection tiles on the roof.

**Walls:** Walls will be plastered both sides, AAC blocks will be used as wall material. This will provide insulation to the structure. Glass will be used for window glazing. The R-Value for the major building components used is given below in **Table 16**.

**Table 16: R-Value of Construction Materials**

<b>S.No</b>	<b>Component</b>	<b>R value (Fm<sup>2</sup>s/Btus<sup>-1</sup>)</b>
1	230 mm AAC block	2.00
2	12/15 mm cement plaster	0.32
3	125 mm Concrete roof slab	1.04

**9.10 What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.**

**Disaster Management Plan**

- Disaster Management Plan will be developed to reduce the impact of disasters like earthquake, fire etc. and to encourage recovery.
- It would be a volunteer kind of set-up and professionals can also be hired in case of eventuality.
- Training will be given to residents, staff & visitors about disaster management and handling
- Emergency evacuation plan will be provided in common areas
- Safety guidelines will be provided in & outside elevators

**Management & Prevention of Fire hazard**

The entire fire safety installation shall be compliant with NBC, 2005 for the entire project site to ensure the highest safety standard and uniformity of system. Further, before property is opened to public, the fire protection shall be fully operated and tested. Fire-fighting system will be provided keeping in view guidelines of the following:

- National Building Code Sept 2005: Part IV for Fire Protection
- Greater Noida Development Building Regulation
- Consultation with local Chief Fire Officer.

All Building will be provided with fire protection arrangements such as hose reel, hose, wet riser, automatic sprinkler system in entire building, manual call points, underground water storage tank, overhead water tank, fire pumps, portable fire extinguishers, exit signs, P.A. System, Yard

Hydrants, Fireman’s lift grounding switch, precautionary notices in lifts & restricted areas in case of fire, display of fire evacuation plan and fire control room from fire safety point of view.

### **Management & Prevention of Earthquake hazard**

#### **During Construction Phase**

To ensure safety of the building from Seismic Load the Design of the building will be done in accordance to Section 1, Part 6 of NBC 2005. Buildings will be designed keeping in consideration that structures should possess strength to withstand minor earthquakes which occur frequently, without damage; resist moderate earthquake without significant structural damage; and aims to withstand major earthquakes without collapse.

- Earthquake resistant building materials will be used for construction of structures e.g. RCC.
- Walls will be made up of lighter material like AAC blocks to reduce the weight of the building

#### **During Operation Phase**

- Residents & staff will be given training to handle emergency situations
- Charts detailing Do’s & Don’t during earthquake will be displayed at prominent places
- First aid facility will be available at all the time
- Fire-extinguishers are provided to deal with fires induced due to earthquake

### **9.11 If you are using glass as wall materials, provide details and specifications including emissivity and thermal characteristics.**

Glass is not proposed to be used as wall material. However some glass will be used for window glazing. 6 mm clear glass will be used for window panes and have U value 5.7 W/sq m K, L.T value : 88% & S.F : 0.82.

### **9.12 What is the rate of air infiltration in to the building? Provide details of how you are mitigating the effects of infiltration.**

Infiltration in the building will be reduced by providing proper building envelope and air retarders.

**9.13 To what extent the non-conventional energy technologies are utilized in the overall energy consumption? Provide details of the renewable energy technologies used.**

Solar energy will be variedly used as:

- Solar street lights.
- Solar powered LED signange boards
- Solar heaters
- Green area is provided along with tree plantation which will result in natural air cooling and will reduce the load on conventional energy sources

**10. ENVIRONMENT MANAGEMENT PLAN**

The Environment Management Plan (EMP) would consist of all mitigation measures for each component of the environment due to the activities increased during the construction, operation and the entire life cycle to minimize adverse environmental impacts resulting from the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the sites including fire. The detailed EMP for the project is given below.

**10.1 Environmental Management Plan**

The Environment Management Plan (EMP) is a site specific plan developed to ensure that the project is implemented in an environmental sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental risks arising from the project and take appropriate actions to properly manage that risk. EMP also ensures that the project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle. The plan outlines existing and potential problems that may adversely impact the environment and recommends corrective measures where required. Also, the plan outlines roles and responsibility of the key personnel and contractors who will be in-charge of the responsibilities to manage the project site.

**10.1.1 The EMP is generally**

- Prepared in accordance with rules and requirements of the MoEF and CPCB/ SPCB
- To ensure that the component of facility are operated in accordance with the design
- A process that confirms proper operation through supervision and monitoring
- A system that addresses public complaints during construction and operation of the facilities and
- A plan that ensures remedial measures is implemented immediately.

The key benefits of the EMP are that it offers means of managing its environmental performance thereby allowing it to contribute to improved environmental quality. The other benefits include cost control and improved relations with the stakeholders.

**EMP includes four major elements:**

- Commitment & Policy: The management will strive to provide and implement the Environmental Management Plan that incorporates all issues related to air, water, land and noise.
- Planning: This includes identification of environmental impacts, legal requirements and setting environmental objectives.
- Implementation: This comprises of resources available to the developers, accountability of contractors, training of residents, operational staff associated with environmental control facilities and documentation of measures to be taken.
- Measurement & Evaluation: This includes monitoring, counteractive actions and record keeping.

It is suggested that as part of the EMP, a monitoring committee would be formed by M/s Comely Buildtech India Pvt. Ltd. comprising of the site in-charge/coordinator, environmental group representative and project implementation team representative. The committee’s role would be to ensure proper operation and management of the EMP including the regulatory compliance.

The components of the environmental management plan, potential impacts arising, out of the project and remediation measures are summarized below in **Table 17**.

**TABLE 17: SUMMARY OF POTENTIAL IMPACTS AND REMEDIAL MEASURES**

<b>S. No.</b>	<b>Environmental components</b>	<b>Potential Impacts</b>	<b>Potential Source of Impact</b>	<b>Controls Through EMP &amp; Design</b>	<b>Impact Evaluation</b>	<b>Remedial Measures</b>
1.	Ground Water Quality	Ground Water Contamination	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>Waste water generated from temporary labor tents.</li> </ul>	<ul style="list-style-type: none"> <li>Waste water will be managed to achieve zero discharge and to maintain hygienic condition at site</li> </ul>	No significant impact as majority of labors would be locally deployed	<ul style="list-style-type: none"> <li>Waste water arising from the project will be disposed conforming to CPCB by septic tanks/soak pits</li> </ul>
			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>Discharge from the project site</li> </ul>	<ul style="list-style-type: none"> <li>No untreated water will be discharged in sewer</li> </ul>	No negative impact on ground water quality envisaged.	<ul style="list-style-type: none"> <li>Waste water generated will be treated in STP Proposed inside the Project Premises and used for flushing and horticulture. Remaining will be discharged into sewer.</li> </ul>
2.	Ground Water Quantity	Ground Water Depletion	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>No impact as ground water will not be used</li> </ul>	<ul style="list-style-type: none"> <li>No water ponding will be allowed at site</li> </ul>	No impact	<ul style="list-style-type: none"> <li>Treated Water from CSTP at Greater Noida will be used for construction purpose. Water will be purchased from private water tanker suppliers for usage of workers. No ground water will be used.</li> </ul>
			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>Source of water will be municipal supply and ground water will not be used</li> </ul>	<ul style="list-style-type: none"> <li>Water management will be practiced to conserve water. Rain water harvesting will be carried out.</li> </ul>	No Impact	<ul style="list-style-type: none"> <li>Using water efficiently</li> <li>Re-cycle &amp; Re-use of water</li> <li>Use of Water Efficient fixtures like flow regulators &amp; dual flushing cisterns</li> </ul>

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						<ul style="list-style-type: none"> <li>• Provision of RWH pits to collect rain water for ground water recharge.</li> </ul>
3.	Surface Water Quality	Surface water contamination	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>• Surface runoff from site during construction activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Water &amp; Sewage management will be carried out at the site to control water pollution</li> </ul>	Measures to be taken to restrict the run-off from site.	<ul style="list-style-type: none"> <li>• Provision of Silt traps and diversion ditches at site to control surface run-off during site development</li> <li>• Curing to be carried out by spraying water to reduce run-off</li> </ul>
			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>• Discharge from Project Site</li> </ul>	<ul style="list-style-type: none"> <li>• No untreated water will be discharged outside project site</li> </ul>	No negative impact on surface water quality envisaged.	Treated water will be recycled and re-used for flushing and horticulture. Remaining will be discharged into sewer.
4.	Air Quality	Dust Emissions (PM)	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>• Construction activities</li> <li>• Vehicular movement</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable control measures will be adopted for reducing the PM level in the air as per air pollution control plan.</li> </ul>	Dust generation is temporary and dust settles faster due to application of dust suppression techniques. Impact restricted to small area.	<ul style="list-style-type: none"> <li>• Provision of Water sprinklers</li> <li>• Regular sweeping of construction site</li> <li>• Covering Construction material &amp; debris carrying vehicles</li> </ul>

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		SO <sub>2</sub> , NO <sub>2</sub> and CO	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>• Vehicular exhaust</li> <li>• Running D.G. set (back up)</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid on-site construction</li> </ul>	Impact will be for short duration	<ul style="list-style-type: none"> <li>• Regular monitoring of emissions and control measures will be taken to reduce the emission levels.</li> <li>• Use of low sulfur diesel</li> <li>• Regular maintenance and servicing of vehicles.</li> </ul>
		Emissions of PM, SO <sub>2</sub> , NO <sub>x</sub> and CO	<u>Operation Phase</u> <ul style="list-style-type: none"> <li>• Vehicular movement</li> <li>• Vehicular exhaust</li> <li>• Running D.G. set (back up)</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable control measures will be adopted for reducing emissions</li> </ul>	Not significant. Regular monitoring of air quality will be carried out to maintain air quality	<ul style="list-style-type: none"> <li>• Stack height of DG as per CPCB standards</li> <li>• Use of low sulfur diesel</li> <li>• Traffic management</li> <li>• Providing Footpath</li> <li>• Developing Green belt</li> <li>• All vehicles will carry PUC</li> </ul>
5.	Noise Environment		<u>Construction phase</u> <ul style="list-style-type: none"> <li>• Construction Activities</li> <li>• Operation of Machinery</li> <li>• Operation of DG sets</li> </ul>	<ul style="list-style-type: none"> <li>• Noise Management by adopting suitable measures.</li> </ul>	Impact will be temporary and will be restricted to small area.	<ul style="list-style-type: none"> <li>• Provision of Noise shields</li> <li>• DG sets provided with acoustic enclosures</li> <li>• Construction activities involving high level noise generation restricted to day time</li> <li>• Provision of ear muffs to workers</li> <li>• Traffic Management at site to prevent honking</li> <li>• Use of machinery of modern make, meeting the noise standards</li> </ul>

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			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>Noise from vehicular movement</li> <li>Noise from DG set operation</li> </ul>	<ul style="list-style-type: none"> <li>Noise Management by adopting suitable measures</li> </ul>	Not Significant.	<ul style="list-style-type: none"> <li>Development of green belt</li> <li>DG sets will be provided with acoustic enclosure</li> <li>DG sets will be provided with acoustic enclosure</li> <li>Proper traffic management &amp; circulation.</li> <li>Honking will be prohibited in the premises</li> <li>All vehicles will carry PUC certificate</li> </ul>
6.	Land Environment	Soil contamination	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>Disposal of construction debris</li> <li>Spillage of oil or paints</li> <li>Excavation of soil</li> </ul>	<ul style="list-style-type: none"> <li>By controlling soil erosion and maintaining soil quality by periodic soil quality monitoring</li> </ul>	No significant impact. Impact will be restricted to project site	<ul style="list-style-type: none"> <li>Construction debris used for leveling or to be sent to landfill for disposal</li> <li>Proper work management to avoid spillage</li> <li>Excavated soil is re-used for landscaping &amp; filling purpose in project site.</li> <li>Provision of Silt traps and dykes</li> </ul>
			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>Municipal solid waste</li> </ul>	<ul style="list-style-type: none"> <li>Solid waste management as per MSW Rules, 2000.</li> </ul>	Since solid waste is handled by the authorized agency, waste dumping will	<ul style="list-style-type: none"> <li>MSW Management as per MSW Rules, 2016 by the authorized agency.</li> <li>Treatment of compostable waste within project site</li> </ul>

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			<ul style="list-style-type: none"> <li>Used oil from D.G. set</li> </ul>		<p>not be practiced thus impact is not significant.</p> <p>Negligible impact.</p>	<ul style="list-style-type: none"> <li>Recyclable waste to be sold to authorized dealers</li> <li>Inert waste to be disposed-off by authorized agency</li> <li>Used oil generated to be disposed as per norms to authorized vendors</li> </ul>
7.	Biological Environment	Displacement of Flora and Fauna on site	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>Site Development during construction</li> </ul>	<ul style="list-style-type: none"> <li>Important species of trees, if any, will be identified and marked and will be merged with landscape plan</li> </ul>	No significant vegetation exists at project site so no tree felling involved.	<ul style="list-style-type: none"> <li>No clearing of trees</li> </ul>
			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>Site Development</li> </ul>	<ul style="list-style-type: none"> <li>Development of Green Belt</li> </ul>	Positive Impact	<ul style="list-style-type: none"> <li>Green belt to be developed along periphery</li> <li>Avenue plantation to be carried out</li> <li>Proper after care &amp; maintenance to be done</li> </ul>
8.	Socio-Economic Environment	Population displacement	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>Construction activities may lead to temporary relocation</li> </ul>	<ul style="list-style-type: none"> <li>Generation of employment for local people especially labor</li> </ul>	Positive Impact	<ul style="list-style-type: none"> <li>Generation of employment for skilled, unskilled and semiskilled people</li> <li>Development of an area due to improved infrastructure</li> <li>Employment preferably to be given to local people</li> </ul>
			<u>Operation Phase</u>	<ul style="list-style-type: none"> <li>Generation of</li> </ul>	Positive impact	

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			<ul style="list-style-type: none"> <li>• Site operation</li> </ul>	employment for semi-skilled & unskilled people and comfortable living facility		
9.	Traffic Pattern	Increase in traffic	<u>Construction Phase</u> <ul style="list-style-type: none"> <li>• Import of construction material at site</li> <li>• Export of construction debris from project site</li> </ul>	<ul style="list-style-type: none"> <li>• Proper Traffic Management &amp; circulation</li> </ul>	Impact will only be for short time (construction phase)	<ul style="list-style-type: none"> <li>• Provision of adequate parking space</li> <li>• Proper traffic circulation system at site</li> <li>• Proper signage system</li> <li>• Restrict hours of material transport</li> </ul>
			<u>Operation Phase</u> <ul style="list-style-type: none"> <li>• Vehicles of residents, staff &amp; visitors</li> </ul>	<ul style="list-style-type: none"> <li>• Proper Traffic Management &amp; circulation</li> </ul>	Not Significant as project site is well connected via network of roads	<ul style="list-style-type: none"> <li>• Provision of adequate parking space</li> <li>• Proper traffic circulation system at site</li> <li>• Informatory &amp; directive Sign boards will be provided</li> <li>• Provision of pedestrian path to encourage parking</li> </ul>

## **10.2 ENVIRONMENT MANAGEMENT PLAN**

An Environmental Management Plan (EMP) will be required to mitigate the predicted adverse environmental impacts during construction and operation phase of the project and these are discussed in later subsections.

### **10.2.1 EMP for Air Environment**

#### **Construction Phase**

To mitigate the impacts of PM during the construction phase of the project, the following measures are recommended for implementation:

- A dust control plan
- Procedural changes to construction activities

#### **Dust Control Plan**

The most cost-effective dust suppressant is water because water is easily available on construction site. Water can be applied using water trucks, handled sprayers and automatic sprinkler systems. Furthermore, incoming loads could be covered to avoid loss of material in transport, especially if material is transported off-site.

#### **Procedural Changes to Construction Activities**

**Idle time reduction:** Construction equipment is commonly left idle while the operators are on break or waiting for the completion of another task. Emission from idle equipment tends to be high, since catalytic converters cool down, thus reducing the efficiency of hydrocarbon and carbon monoxide oxidation. Idling control technologies comprise of power saving mode, which automatically off the engine at preset time and reduces emissions, without intervention from the operators.

**Improved Maintenance:** Significant emission reductions can be achieved through regular equipment maintenance. Contractors will be asked to provide maintenance records for their fleet as part of the contract bid, and at regular intervals throughout the life of the contract. Incentive

provisions will be established to encourage contractors to comply with regular maintenance requirements.

**Reduction of On-Site Construction Time:** Rapid on-site construction would reduce the duration of traffic interference and therefore, will reduce emissions from traffic delay.

### **Operation Phase**

To mitigate the impacts of pollutants from DG set and vehicular traffic during the operational phase of the Project, following measures are recommended for implementation:

- DG set emission control measures
- Vehicular emission controls and alternatives
- Greenbelt development

### **Diesel Generator Set Emission Control Measures**

Adequate stack height will be maintained to disperse the air pollutants generated from the operation of DG set to dilute the pollutants concentration within the immediate vicinity. Hence no additional emission control measures have been suggested.

### **Vehicle Emission Controls and Alternatives**

During construction, vehicles will be properly maintained to reduce emission.

Footpaths and Pedestrian ways: Adequate footpaths and pedestrian ways would be provided at the site to encourage non-polluting methods of transportation.

### **Greenbelt Development**

Increased vegetation in the form of greenbelt is one of the preferred methods to mitigate air and noise pollution. Plants serve as a sink for pollutants, act as a barrier to break the wind speed as well as allow the dust and other particulates to settle on the leaves. It also helps to reduce the noise level at large extent. **Table 9** above enlists various species of the greenbelt that can be used to act as a barrier.

### **10.2.2 EMP FOR NOISE ENVIRONMENT**

#### **Construction Phase**

To mitigate the impacts of noise from construction equipment during the construction phase on the site, the following measures are recommended for implementation.

Time of Operation: Noisy construction equipment not allowed using at night time.

Job Rotation and Hearing Protection: Workers employed in high noise areas are employed on shift basis. Hearing protection such as earplugs/muffs is being provided to those working very close to the noise generating machinery.

#### **Operation Phase**

To mitigate the impacts of noise from diesel generator set during operational phase, the following measures are recommended:

- Adoption of Noise emission control technologies
- Greenbelt development

#### **Noise Emission Control Technologies**

- DG set room will be provided with acoustic enclosure to have minimum 25 dB(A) insertion loss or for meeting the ambient noise standard whichever is on higher side as per E (P) Act, GSR 371 (E) and its amendments
- Green belt will be developed along periphery. This will act as noise buffer
- Honking will be banned within premises
- All vehicles will carry PUC

#### **Greenbelt Development**

The following species can be used, as in a greenbelt, to serve as noise breakers:

- *Polyalthia longifolia*
- *Delonix regia*
- *Cassia fistula*

### **10.2.3 EMP FOR WATER ENVIRONMENT**

#### **Construction Phase**

To prevent degradation and to maintain the quality of the water source, adequate control measures have been proposed. The following management measures are suggested to protect the water source being polluted during the construction phase:

- Avoid excavation during monsoon season
- Care would be taken to avoid soil erosion
- Common toilets constructed on site during construction phase and the waste water channelized to the septic tanks to prevent waste water to enter into the nearby water bodies
- Temporary grass plantation of open/loose soil
- Usage of leak proof containers for prevention of surface water and soil contamination
- To prevent surface and ground water contamination by oil and grease, leak-proof containers would be used for storage and transportation of oil and grease. The floors of oil and grease handling area would be kept effectively impervious. Any wash off from the oil and grease handling area or workshop shall be drained through imperious drains
- Collection and settling of storm water, prohibition of equipment wash downs and prevention of soil loss and toxic release from the construction site are necessary measure to be taken to minimize water pollution

#### **Operation Phase**

In the operation phase of the project, water conservation and development measures will be taken, including all possible potential for rain water harvesting. Following measures will be adopted:

- Water source development.
- Minimizing water consumption.
- Promoting reuse of water after treatment and development of closed loop systems for different water streams.

### **Water Source Development**

Water source development shall be practiced by installation of scientifically designed Rain Water Harvesting system. Rainwater harvesting promotes self-sufficiency and fosters an appreciation for water as a resource.

Most of the storm water produced on site will be harvested for ground water recharge. 2 Nos. of RWH pits will be provided to recharge collected storm water into the ground. Thus proper management of this resource is a must to ensure that it is free from contamination.

A detailed storm water management plan will be developed which will consider the possible impacts from above sources. The plan will incorporate best management practices which will include following:

- Regular inspection and cleaning of storm drains
- Clarifiers or oil/separators will be installed in all the parking areas. Oil / grease separators installed around parking areas and garages will be sized according to peak flow guidelines. Both clarifiers and oil/water separators will be periodically pumped in order to keep discharges within limits
- Covered waste storage areas
- Avoid application of pesticides and herbicides before wet season
- Conducting routine inspection to ensure cleanliness
- Provision of slit traps in storm water drains
- Good housekeeping in the above areas

### **Minimizing Water Consumption**

Consumption of fresh water will be minimized by combination of water saving devices and other domestic water conservation measures. Further, to ensure ongoing water conservation, an awareness program will be introduced for the residents, staff & visitors. The following section discusses the specific measures, which shall be implemented:

#### **Domestic Usage**

- Use of water efficient plumbing fixtures (ultra low flow toilets, low flow sinks, water efficient dishwashers and washing machines). Water efficient plumbing fixtures uses less water with no marked reduction in quality and service
- Leak detection and repair techniques.

- Sweep with a broom and pan where possible, rather than hose down for external areas.
- Meter water usage: Implies measurement and verification methods.
- Monitoring of water uses is a precursor for management.

#### **Horticulture**

- Plants with similar water requirements shall be grouped on common zones to match precipitation heads and emitters.
- Use of low-angle sprinklers for lawn areas.
- Select controllers with adjustable watering schedules and moisture sensors to account for seasonal variations and calibrate them during commissioning.
- Place 3 to 5 inches of mulch on planting beds to minimize evaporation.

#### **Promoting Reuse of Water after Treatment**

It is expected that the project will generate approx 135 KLD of sewage. Sewage will be treated in STP of 160 KLD proposed to be constructed within project site. Treated water from STP will be re-used within project site through dual plumbing system for flushing and landscaping purpose. 108 KLD of water will be recovered from STP and out of this 62 KLD will be reused within the project site and remaining 46 KLD will be discharged into sewer. Dual plumbing system will be provided so as to re-use the water.

### **10.2.4 EMP FOR LAND ENVIRONMENT**

#### **Construction Phase**

The waste generated from construction activity includes construction debris, biomass from land clearing activities, waste from the temporary make shift tents for the labors and hazardous waste. Following section discuss the management of each type of waste. Besides waste generation, management of the topsoil is an important area for which management measures are required.

#### **Construction Debris**

Construction debris is bulky and heavy and re-utilization and recycling is an important strategy for management of such waste. As concrete and masonry constitute the majority of waste generated and this waste can be recycled by conversion to aggregate which can be further used as construction raw material. Mixed debris with high gypsum, plaster, shall not be used as fill, as

they are highly susceptible to contamination, and will be send to designated solid waste landfill site.

Metal scrap from structural steel, piping, concrete reinforcement and sheet metal work shall be removed from the site by construction contractors. A significant portion of wood scrap will be reused on site. Recyclable wastes such as plastics, glass fiber insulation, roofing etc shall be sold to recyclers

#### **Hazardous waste**

Construction sites are sources of many toxic substances such as paints, solvents wood preservatives, pesticides, adhesives and sealants. Hazardous waste generated during construction phase shall be stored in sealed containers and disposed off as per The Hazardous Waste & Other Waste Rules, 2016

Some management practices to be developed are:

- Herbicides and pesticide will not be over applied (small-scale applications) and not applied prior to rain
- Paintbrushes and equipment for water and oil based paints shall be cleaned within a contained area and will not be allowed to contaminate soil, water courses or drainage system
- Provision of adequate hazardous waste storage facilities. Hazardous waste collection containers will be located as per safety norms and designated hazardous waste storage areas which will be located away from storm drains or natural watercourses
- Segregation of potentially hazardous waste from non-hazardous construction site debris
- Well labeled hazardous waste containers with the waste being stored and the date of generation
- Instruct employees and subcontractors in identification of hazardous and solid waste

#### **Waste from Temporary Makes Shift Tents for Labors**

Wastes generated from temporary make shift labor tents will mainly comprise of household domestic waste, which will be managed by the contractor at the site. Wastewater generated will be channelized to the septic tank/soak pits.

### **Top Soil Management**

To minimize disruption of soil and for conservation of top soil, the contractor shall keep the top soil cover separately and stockpile it. After the construction activity is over, top soil will be utilized for landscaping activity. Other measures, which would be followed to prevent soil erosion and contamination include:

- Maximize use of organic fertilizer for landscaping and green belt development
- To prevent soil contamination by oil/grease, leak proof containers would be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through impervious drains and treated appropriately before disposal
- Removal of as little vegetation as possible during the development and re-vegetation of bare areas after the project is completed.
- Working in a small area at a point of time (phase wise construction)
- Construction of erosion prevention troughs/berms.

### **Operational Phase**

The philosophy of solid waste management at the project site will be to encouraging the four R's of waste i.e. **Reduction, Reuse, Recycling and Recovery** (materials & energy). Regular public awareness meetings will be conducted to involve the residents, staff & visitors in the proper segregation and storage techniques. The Environmental Management Plan for the solid waste focuses on three major components during the life cycle of the waste management system i.e., collection and transportation, treatment and disposal of the waste.

#### ❖ **Collection and Segregation of waste**

1. A door to door collection system will be provided for collection of domestic waste from project site
2. Local vendors will be hired for waste collection and management
3. Separate colored bins for dry recyclables, wet compostable and inert waste will be provided
4. Litter bin will also be provided in open areas like parks etc.

#### ❖ **Treatment of waste**

- Bio-Degradable wastes

- c. Bio-degradable waste will be treated in Organic Waste Converter to convert it into manure which can later be used for landscaping
- d. STP sludge is proposed to be used for horticultural purposes as manure.

- Recyclable wastes

Recyclable wastes like paper, plastic, metals etc. will be sold off to authorized recyclables.

- ❖ **Disposal**

Inert fraction of waste will be sent through authorized vendor for disposal.

Apart from the municipal waste, E-waste comprising of rejected CFL, bulbs, laptops, TV sets, computers etc will be generated. This waste will be insignificant in initial stage. Room will be provided within project site for storing discarded electronics. These will be sold to authorized vendors on regular basis. Very less quantity of used oil will be generated from the DG sets and will be sold to authorized vendors.

### **10.2.5 EMP FOR ECOLOGICAL ENVIRONMENT**

Construction activity changes the natural environment. But residential project like this provides improved living facility at affordable price. The project requires the implementation of following choices exclusively or in combination.

#### **Construction Stage**

- Restriction of construction activities to defined project areas
- Restrictions on location of temporary labor tents and offices for project staff near the project area to avoid human induced secondary additional impacts on the flora and fauna species
- Cutting, uprooting, coppicing of trees or small trees if present in and around the project site for cooking, burning or heating purposes by the labors will be prohibited and suitable alternatives for this purpose will be made
- Along with the construction work, the peripheral green belt would be developed with suggested native plant species, as they will grow to a full-fledged covered at the time of completion.

Total green area measures 4851.4 m<sup>2</sup> i.e. 50 % of the open area which will be area under landscaping. Landscape plan is attached as **Annexure VIII**.

***Green Belt development Plan***

For this project area of 4851.4 m<sup>2</sup> i.e. 50 % of the open area is proposed to be put under green cover. Green cover will comprise of:

- A peripheral green belt
- Avenue plantation
- Lawns/parks & grass cretes
- Planters

***After Care and Monitoring***

Plants grown will be cared for first three years. Nutrients will be supplemented and the juveniles provided protection. Following measures will be taken:

- Adequate nutrient supply will be maintained by providing manure timely
- Absence of water stress
- Construction of the protection wall all around to protect from animals and outsiders from damage

Regular inspection of the site will be kept. Record keeping of number of saplings planted and surviving will be kept. Regular pruning of road side trees will be done as per requirement. Weeding will be carried out along with regular manuring & watering. Treated water from STP will be used for watering plant which is rich in nutrients.

**10.2.6 EMP for Socio-Economic Environment**

The social management plan has been designed to take proactive steps and adopt best practices, which are sensitive to the socio-cultural setting of the region. The Social Management Plan for planned project focuses on the following components:

- **Income Generation Opportunity during Construction & Operation Phase:** The project would provide employment opportunity during construction and operation phase. There would also be a wide economic impact in terms of generating opportunities for secondary occupation within and around the project site. The main principles considered for employment and income generation opportunities are out lined below:

- i) Employment strategy will provide for preferential employment of local people
- ii) Conditions of employment would address issues like minimum wages and medical care for the workers. Contractors would be required to abide to employment priority towards locals and abide by the labor laws regarding standards on employee terms and conditions.
- **Improved Living Facility:** Development of the project will provide a better living facility equipped with all modern day facilities at affordable price. Additional facilities available at the site are community building, lawns, swimming pool, kids play area, waste management facility, green belt

### **10.2.7 EMP FOR ENERGY CONSERVATION**

Energy conservation program will be implemented through measures taken both on energy demand and supply. Energy conservation is integral part of our project planning. Energy saving will help saving the energy as well as the cost for the power usage. The conservation efforts would consist of the following:

- **Architectural design**
  - 1) Maximum utilization of solar light will be done.
  - 2) Maximize the use of natural lighting through design.
  - 3) The orientation of the buildings will be done in such a way that maximum soft daylight is available.
  - 4) The green areas will be spaced, so that a significant reduction in the temperature can take place.
- **Energy Saving Practices**
  - 1) Energy efficient lamps will be provided within the project site
  - 2) Constant monitoring of energy consumption and defining targets for energy conservation.
  - 3) Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.
- **Behavioral Change on Consumption**
  - 1) Promoting resident awareness on energy conservation

- 2) Training staff & residents on methods of energy conservation and to be vigilant to such opportunities.

### **10.3 ENVIRONMENTAL MANAGEMENT SYSTEM AND MONITORING PLAN**

For effective implementation of proposed EMP, an Environmental Management system (EMS) would be established at the site. The EMS would include the following:

- Environment Management Budget
- Environmental Monitoring.
- Personnel Training.
- Regular Environmental audits and Correction measures.
- Documentation – standards operation procedures Environmental Management Plan and other records.

#### **10.3.1 Environmental Management Budget**

Implementation cost for environmental management plan during operation & construction phase of the project is given below in **Tables 18 & 19** below.

**Table 18: EMP budget for Construction Phase**

<b>S. No.</b>	<b>Activity</b>	<b>Capital Cost (Lacs)</b>	<b>Recurring Cost (Lacs)</b>
1.	Temporary Construction Raw material storage yard	1.0	0.1
2.	Temporary excavated soil storage yard	0.5	0.05
3.	Solid waste Management	2.0	2.0
4.	Health & safety of Workers	1.5	0.3
5.	Environmental Monitoring	1.04	1.04
	<b>Total</b>	<b>6.04</b>	<b>3.49</b>

**Table 19: EMP budget for Operational Phase**

<b>S. No.</b>	<b>Activity</b>	<b>Capacity/ Area/Nos./parameters</b>	<b>Capital Cost (Lacs)</b>	<b>Annual Recurring Cost (Lacs)</b>
1.	STP	160 KLD	32.0	2.0
2.	Landscaping & planting trees	4851.4 m <sup>2</sup>	20.00	3.0
3.	Solid waste Management	974	5.0	3.0
4.	RWH Pit Installation	2 Nos.	8.0	1.0

5.	Energy Saving	..... % using efficient lightning	20	2.5
6.	Environmental Monitoring*	Air, Water, Soil & Noise	1.6	3.2
	<b>Total</b>		<b>86.6</b>	<b>14.7</b>

\* Environment monitoring to be carried out twice in year so recurring cost per annum is double that of onetime cost of environmental monitoring.

### 10.3.2 Environmental Monitoring

The purpose of environmental monitoring is to evaluate the effectiveness of implementation of Environmental Management Plan (EMP) by periodic monitoring. The important environmental parameters within the impact area are selected so that any adverse affects are detected and time action can be taken. The project proponent will monitor ambient air Quality, Ground Water Quality and Quantity, and Soil Quality in accordance with an approved monitoring schedule.

**Table 20 Suggested Monitoring Program for Project**

S. No.	Type	Locations	Parameters	Period and Frequency
1.	Ambient Air Quality	Project Site	Criteria Pollutants: SO <sub>2</sub> , NO <sub>2</sub> , PM <sub>2.5</sub> & PM <sub>10</sub>	Half yearly (24 hr average samples) during construction phase and annual during operation phase.
2.	Groundwater (Portability testing)	Project site	Drinking water parameters as per IS 10500.	Half Yearly
3.	Ambient Noise	Project site	dB (A) levels	Half Yearly (Hourly day and night time $l_{eq}$ levels) during construction phase and every year during operation phase.
4.	Potable water quality	Drinking water supply	As per IS 10500 potable water standards	Half Yearly
5.	Soil quality	Project site	Organic matter, C.H., N, Alkalinity, Acidity, heavy metals and trace metal, Alkalinity, Acidity.	Half Yearly
6.	Waste Characterizati	Domestic/Municipal	Physical and Chemical	Daily

	on		composition	
7.	Treated water	Outlet of STP	BOD, MPN, coliform count, etc.	Monthly

### **10.3.3 Awareness and Training**

Training and human resource development is an important link to achieve sustainable operation of the facility and environment management. For successful functioning of the project, relevant EMP would be communicated to:

#### **Residents, staff & Contractors**

Residents, staff & contractors must be made aware of the importance of waste segregation and disposal, water and energy conservation. The awareness can be provided by periodic Integrated Society meetings. They would be informed of their duties.

### **10.3.4 Environmental Audits and Corrective Action Plans**

To assess whether the implemented EMP is adequate, periodic environmental audits will be conducted by the project proponent’s Environmental division. These audits will be followed by Correction Action Plan (CAP) to correct various issues identified during the audits.