Form -1A for Environmental Clearance of the Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

Submitted By

M/s Apex Heights Pvt. Ltd

CONSULTANT

Ascenso Enviro Pvt. Ltd.
A QCI Accredited Environmental Consulting Organization
APPENDIX II
(See paragraph 6)

FORM-1 A (only for construction projects listed under item 8(a) of the Schedule)

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)

1. **LAND ENVIRONMENT**

1.1 Will the existing land use get significantly altered from the project that is not 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 to be 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.

**Land use Pattern:** The proposed project site is marked under Ghaziabad Master Plan of 2021. Hence no land is change is envisaged. The land use is not expected to get altered due to construction of proposed project

**Site Location:** M/s Apex Heights Pvt. Ltd. has proposed Group Housing Project at Plot no. 04/BS – 02(GH-03), Siddharth Vihar, District -Ghaziabad, Uttar Pradesh.

Geographically, the proposed project site is located at:

- **Latitude** 28°38'57.80"N
- **Longitude** 77°24'13.85"E

The Ghaziabad Master Plan showing location and land use of the project site is given in **Figure-1**.

**Surrounding Features:** The surrounding area of the project site possesses residential land use pattern. Since, the surrounding area has been developed as per the U.P. Housing & Development Board. The development in the project site will be consistent with the surroundings.
A Google Map showing surrounding area of project within 500 m is shown in **Figure-2**.
Figure-1: Ghaziabad Master Plan showing location of project site
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

Figure-2: Google Map of 500m radius showing surroundings of the area
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.

M/s Apex Heights Pvt. Ltd. has proposed Group Housing Project at Plot no. 04/BS – 02(GH-03), Siddhartha Vihar, District -Ghaziabad, Uttar Pradesh.

**Land Area:** The Proposed project is being developed on the total plot area of 26000.00 m$^2$. The built up area is 1,80,845.83 m$^2$ which includes the FAR, incentive and 5% of permissible FAR and Non-FAR area.

But project will be provided 2,688 Sq mt areas as plots which include 1,000 Sq mt, Medical Center 888 Sq mt and Medical Centre handed over 800 Sq mt and handed over to authority for further development.

**Water Consumption:** Water requirement during the operational phase will be met through Municipal supply. The total water requirement for the existing phase is 687 KLD. This includes domestic water requirement, flushing, landscaping, DG Cooling, filter back wash and for firefighting tank. The total fresh water requirement for existing phase is 488 KLD which includes domestic water requirement and filter back wash. The water requirement for flushing, DG Cooling and landscaping will be met through treated water from onsite STP.

**Power Requirement:** The total electrical load demand has been estimated to be 3820 KVA. The source of power will be supplied by Paschimanchal Vidyut Vitran Nigam Limited (PVVNL). In case of power failure, 4 DG sets of total capacity of 3700 KVA (2*1250+2*600) will be provided as power back-up.

**Connectivity:** Nearest railway station is Ghaziabad Railway Station at an aerial distance of 2.24 km towards ENE direction.

Nearest Airport is Safdarjung Airport at an aerial distance of 20.64 km towards South-West. The site is well connected to roadways also.

- NH-91
- NH-24
- Hapur Road
- Adjacent road of 50 meter in West

**Community Facilities:** The project site is surrounded by many schools and hospitals such as:

- **Schools/ College:**
  Santosh Medical College 0.4 km towards East
  DPS Indirapuram is 2.12 km towards Southwest
Hospitals:
Shanti Gopal Hospital Ghaziabad is 2.40 km towards South west.
Jeevan Lok Hospital is 1.15 km in East.

Parking Requirements: The parking required as per Ghaziabad
by laws is for the proposed project is 1,658 ECS, the parking provided is 1,660 ECS, which includes parking for residential, commercial and including floating population.

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, disturbance to the local ecology).

The proposed development shall be carried out as per the Ghaziabad building by-laws hence no negative impact is envisaged due to proposed development. Further, the construction as well as operation stage of the project will generate direct and indirect employment opportunities for a large section of society. The employment will have positive impact thereby improving the quality of life.

- The main areas of concern which will pose a significant impact are Emissions from D.G. Sets, Noise from D.G. Sets and Sewerage discharge. Mitigation options that are proposed are mentioned below:
  i. Emission from the numbers of DG sets: Proper stack height will be provided as per CPCB/MoEF CC guidelines;
  ii. Noise from DG sets: Acoustic enclosure will be provided for D.G. sets.
  iii. A Sewage Treatment Plant (STP) of capacity 640 KLD is proposed and the treated water will be reused for DG Sets Cooling, landscaping, flushing purposes.

- Further, there shall not be any change in the land use pattern due to the proposed project. The area will be developed as per the Ghaziabad Master Plan 2021.

- The project site is a vacant land with scanty vegetation mainly herbs and shrubs and possesses no existing structure. Hence, no clearance of vegetation, no felling of trees and structure will be required. The green area has been planned to develop 50% of open area to provide beautiful and natural environment. The green area will be developed as shelter belt, along with avenue plantation on both sides of road lawns area including herbs and shrubs. The indigenous/local plants will be planted, which will increase the aesthetic value of the area. Hence, there will be no disturbance to the local ecology of the area.

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

The proposed activity will not affect any land disturbance resulting in erosion, subsidence and instability. The area is not susceptible to erosion.
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

Soil Type:
Geologically, Ghaziabad forms a part of the Indo-Gangetic alluvium. Soil is characterized mainly by silty sand and loamy soils.

Slope Analysis:
Originally established on the eastern side of River Hindan, present sprawling development of Ghaziabad can be observed on both sides of the River. Hindan River is an important tributary of Yamuna River of the Ganges River System. Flowing north-south, Hindan River passes through middle of the City and meets Yamuna about 13.45 km southwest of Ghaziabad. The topography of the City is almost plain and the general slope is from north to south.

The project area possesses fairly plain terrain with negligible drainage slope of the project site.

Seismicity:
- The whole country has been divided into 5 Seismic zones as per maximum intensity of ‘Modified Mercalli Scale’ (MMS). The project site lies in Seismic Zone IV, called as ‘High Damage Risk Zone’.
1.5 Will the proposal involve alteration of natural drainage systems? (Give details on a contour map showing the natural drainage near the proposed project site).

Originally established on the eastern side of River Hindan, present sprawling development of Ghaziabad can be observed on both sides of the River. Hindan River is an important tributary of Yamuna River of the Ganges River System. Flowing north-south, Hindan River passes through middle of the City and meets Yamuna about 13.45 km south west of Ghaziabad. The topography of the City is almost plain and the general slope is from north to south.
The drainage system has been designed accordingly. No natural drainage lies in the vicinity of the proposed project. Therefore topography of the site is not expected to change due to the project activities and hence, no impacts are expected on the natural drainage profile or run-off characteristics.

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?)

During Construction phase, excavation will be carried out to provide foundations and for establishing the pillar. Approximately 1,25,602.5 m$^3$ of soil will be excavated for the proposed project. This excavated soil will be properly stacked within the site under tarpaulin cover. The filling works will be done by the excavated material and no extra material will be used. All the topsoil excavated during construction activities shall be stored for use in horticulture/landscape development within the project site. The lower strata earth is either used for filling the plinths, road substructure and leveling low lying areas.

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

Water Supply:
Water required during the construction period will be supplied through treated water from CSTP/private water tanker or excess treated water from nearest operational STP. It is estimated that water demand during the construction phase may vary from 16-18 KLD. Water will be used in the construction activity for cement mixing, sprinkling, dust suppression and domestic purposes of the construction workers.

Waste Generation/Handling:

Sewage: Sewage generated from the labor camps will be disposed of through Soak pit or septic tank. For the construction activity treated water will be used.

Construction waste: No demolition waste will be generated as the site is a vacant plot. The solid waste generated during the construction phase like metal cutting. Debris, plastic material and wooden log etc. will be collected and stored in a separate covered area so as to prevent damage to property and personnel working at the project site. Further, most of the construction debris will be used for filling activities and the rest will be disposed of through authorized recyclers.
The excavated soil will be used on site for the development of green belt and leveling of the plot.

The waste generated during the construction activities shall be limited to project site only and during construction phase only. These will be reused for backfilling and road development after manual segregation. This waste shall be utilized for construction of roads.

Major types of construction wastes are expected from the proposed Project: -

- **Clean Fills:**
  Clean fill is uncontaminated soil, rock, sand, gravel, concrete, asphaltic concrete, cinder blocks brick, minimal amounts of wood and metal and inert (non-reactive) solids for fill, reclamation or other beneficial use. Minimal means the smallest amount possible.

- **Recovered Materials**
  Recovered Materials are those removed for reuse (lumber, doors, windows, ceramic tile and glass) and those removed to be recycled into new products. Potentially recyclable construction and demolition wastes will include scrap metals, asphalt shingles, sheet rock, lumber, glass and electrical wire.

- **Regulated construction and demolition waste**
  Regulated construction and demolition wastes are those not classified as clean fill and not being reused or recycled. Regulated non-hazardous construction and demolition wastes will be disposed of at a permitted landfill or transfer station.

Scrap metal painted with heavy metals will be sent to a salvage yard for recycling.

Conclusively, it can be stated that impacts may be confined to small area (mainly to project site) and for short duration. Construction waste will be reused; disposal of non-reusable waste will be done through authorized vendors/recyclables.

**Solid Waste during Construction Phase**

*Table-1* gives an estimate of the average composition of waste generated from the onsite construction activities whereas *Table-2* lists of the various hazardous wastes expected to be generated from the project during construction.
Table-1: Waste Composition - During Construction Phase

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Constituents</th>
<th>Percentage Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Soil, Sand and Gravel</td>
<td>34.99</td>
</tr>
<tr>
<td>2</td>
<td>Brick and Masonry</td>
<td>29.95</td>
</tr>
<tr>
<td>3</td>
<td>Concrete</td>
<td>24.98</td>
</tr>
<tr>
<td>4</td>
<td>Metal</td>
<td>4.97</td>
</tr>
<tr>
<td>5</td>
<td>Bitumen</td>
<td>2.04</td>
</tr>
<tr>
<td>6</td>
<td>Wood</td>
<td>2.04</td>
</tr>
<tr>
<td>7</td>
<td>Other</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: TIFAC Report “Utilization of Waste from Construction Industry,” 2001*

Table-2: Types of hazardous waste to be generated during construction

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Hazardous Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Construction phase</strong></td>
</tr>
<tr>
<td>1</td>
<td>Used Oil from DG Sets</td>
</tr>
<tr>
<td>2</td>
<td>Centering Oil, formwork oil</td>
</tr>
<tr>
<td>3</td>
<td>E-waste- Circuit boards, CRTs, Electronic parts, solder dross, weld waste</td>
</tr>
<tr>
<td>4</td>
<td>Paints, pigments, dyes and primers</td>
</tr>
<tr>
<td>5</td>
<td>Fuels and heating oils and other volatile/flammable liquids such as coolants, grease etc.</td>
</tr>
<tr>
<td>6</td>
<td>Tar and tar products</td>
</tr>
<tr>
<td>7</td>
<td>Lead containing products</td>
</tr>
<tr>
<td>8</td>
<td>Product packaging (cement bags, cartons, containers, plastic covers etc.)</td>
</tr>
<tr>
<td>9</td>
<td>Fluorescent lamps intact and crushed, halogen lamps, arc lamps, UV lamps, high pressure sodium lamps, neon lamps, incandescent lamps.</td>
</tr>
<tr>
<td>10</td>
<td>Mercury containing lamps and tubes, mercury vapor lamps, Mercury containing devices- mercury switches, relays, regulators, thermostats, manometers and debris containing mercury.</td>
</tr>
</tbody>
</table>
1.7 Will the low lying areas & wetlands get altered? (Provide details of how low lying and wetlands are getting modified from the proposed activity).

There are no low lying areas and wetlands in near vicinity of the project site. So, there will be no impact.
1.8 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).

- No significant health hazard is associated with the proposed construction.
- During construction period, source of fugitive dust generation will be material handling and vehicular movement. Impact due to fugitive dust emission is negligible as water sprinklers will be used to suppress fugitive dust emission as and when generate. However, the impacts will be confined to laborers/workers particularly with regard to occupational exposure. Proper Personal Protective Equipments will be provided to the workers working in the potential areas (e.g. masks, ear plugs etc.).
- Careful design, planning and good site management would minimize waste of materials such as concrete, mortars and cement grouts. Construction wastes will be segregated as much as possible at site itself to increase the feasibility of recycling concrete and masonry as filling material and steel pieces as salable scrap. Litter disposal and collection points will be established around the work sites. Empty packaging materials, drums, glass, tin, paper, plastic, pet bottles, wood, and other packaging materials, etc will be disposed through recyclers. The construction spoils will be temporarily stored at designated dumpsite located inside the site premises. Later on these wastes will be used for land filling / leveling work within the site premises.

2. WATER ENVIRONMENT

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

Water Requirement:

During Construction Phase:
During construction phase, water will be sourced primarily through tankers arranged by the contractor. It is estimated that water demand during the construction phase may vary from 16-18 KLD which will be used in domestic as well as construction purpose.

Details of 16-18 KLD water used During Construction:
Supervisory & Construction Labour= 150 persons @45 LPCD =6.75 KLD  
(Drinking = 2.25 KLD and Other=4.5 KLD)
Curing & Mixing of Mortar & Cement = Approx 6 KLD
Dust control = Approx 4.8 KLD
During Operation Phase:
Water requirement during the operational phase will be met through Municipal supply. The total water requirement for the existing phase is 687 KLD. This includes domestic water requirement, flushing, landscaping, DG Cooling, filter back wash and for firefighting tank. The total fresh water requirement for existing phase is 488 KLD which includes domestic water requirement and filter back wash. The water requirement for flushing, DG Cooling and landscaping will be met through treated water from onsite STP.
Table-3: Detail of water requirement for the proposed project

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>No. of units/Area in Sq mt</th>
<th>Unit Population</th>
<th>Population</th>
<th>Unit water consumption (litres)</th>
<th>Total water required (kld)</th>
<th>water requirement for domestic use (kld)</th>
<th>Flushin g/Recycled water (kld)</th>
<th>Total Wastewater (kld)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main Dwelling units</td>
<td>1,051.0</td>
<td>5.0</td>
<td>5,255.0</td>
<td>86.0</td>
<td>451.9</td>
<td>341.6</td>
<td>110.4</td>
<td>383.6</td>
</tr>
<tr>
<td>2</td>
<td>LIG/EWS/Incentive Units</td>
<td>376.0</td>
<td>5.0</td>
<td>1,880.0</td>
<td>86.0</td>
<td>161.7</td>
<td>122.2</td>
<td>39.5</td>
<td>137.2</td>
</tr>
<tr>
<td>2</td>
<td>Community Population</td>
<td>247.1</td>
<td>1 person per 1.5 Sqm</td>
<td>164.7</td>
<td>15.0</td>
<td>2.5</td>
<td>1.5</td>
<td>1.0</td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>Commercial Population</td>
<td>975.0</td>
<td>1 person per 10 Sqm</td>
<td>97.5</td>
<td>30.0</td>
<td>2.9</td>
<td>2.0</td>
<td>0.9</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>visitors</td>
<td>.....</td>
<td>5% of total Population</td>
<td>369.9</td>
<td>15.0</td>
<td>5.5</td>
<td>3.3</td>
<td>2.2</td>
<td>4.9</td>
</tr>
<tr>
<td>5</td>
<td>Staff</td>
<td>.....</td>
<td>1% of total population</td>
<td>74.0</td>
<td>45.0</td>
<td>3.3</td>
<td>2.2</td>
<td>1.1</td>
<td>2.9</td>
</tr>
<tr>
<td>6</td>
<td>Fiter Backwash</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
<td>15.0</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>7</td>
<td>DG Cooling</td>
<td>3700.0</td>
<td>.....</td>
<td>11it /KVA*8</td>
<td>29.6</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
</tr>
<tr>
<td>8</td>
<td>Horticulture</td>
<td>2600.0</td>
<td>.....</td>
<td>3.0</td>
<td>7.8</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
<td>.....</td>
</tr>
</tbody>
</table>
Water balance diagram for Non-Monsoon is given in **Figure-5** and for Monsoon is given in **Figure-6**.
Figure-5: Water Balance Diagram for Non-Monsoon Season
Figure-6: Water Balance Diagram for Monsoon Season
Total Sewage generated will be 533 KLD. After Treatment about 426 KLD will be available which will be used for Flushing, DG Sets cooling, Horticulture and all excess treated water will be discharge into sewer line after taking necessary permission from concerned authority.

2.2. What is the capacity (dependable flow or yield) of the proposed source of water?

Water requirement of construction phase will be met from CSTP/Private water supplier. While during operation phase water requirement will be met from Municipal Authority.

2.3. 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)

Water requirement of construction phase will be met from Private water tanker and excess treated water from nearby operation STP which will confirm treated water norms of STP. During post construction water demand will be met from Municipal water supply. Ground water abstraction will be done only after getting NOC from CGWA. During operation phase the supplied drinking water to each dwelling unit will be as per Bureau of Indian Standards (BIS) and IS: 10500-2012.

2.4. How much of the water requirement can be met from the recycling of treated wastewater? (Give the details of quantities, sources and usage)

The generated waste water is 533 KLD. The waste water generated will be treated in the Sewage Treatment Plan, and the capacity of Sewage Treatment Plant (STP) will be 20% higher than waste water generated i.e. 640 KLD. The proposed STP will be based on Fluidized Aerobic Bio-Reactor (FAB) and it will be recycled and re-used for flushing, DG Cooling and landscaping. During the non-monsoon season, treated water will be used in Flushing, DG Cooling & landscaping and during the monsoon season, as there will be less requirement of water for landscaping, and the excess treated water will be discharged into the Sewer line. The details of recycled water uses are provided in Table-4 below.

<table>
<thead>
<tr>
<th></th>
<th>Treated Water</th>
<th>Flushing</th>
<th>Landscaping</th>
<th>DG Sets Cooling</th>
<th>Discharge to Sewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Monsoon Season</td>
<td>426 KLD</td>
<td>155 KLD</td>
<td>8 KLD</td>
<td>30 KLD</td>
<td>233 KLD</td>
</tr>
<tr>
<td>Monsoon Season</td>
<td>426 KLD</td>
<td>155 KLD</td>
<td>4 KLD</td>
<td>30 KLD</td>
<td>237 KLD</td>
</tr>
</tbody>
</table>

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

There will not be such diversion of water from other users as the water demand during construction phase will be met from CSTP/Private water tanker or by excess treated water from nearby operation STP. In operational phase water demand will be met from Municipal water.
supply. Ground water abstraction will be done only after getting NOC from CGWA. Hence, no impact on others user observed.

2.6. What is the incremental pollution load from wastewater generated from the proposed activity? (Give details of the quantities and composition of wastewater generated from the proposed activity).

During the operational phase, 533 KLD waste water will be generated which will be treated in the sewage treatment Plant within the premises.

Proposed STP will be of FAB technology and comprises of Oil grease trap, Equalization tank, FAB tank, tube settler tank, sludge holding tank, ACF and MGF.

The waste water generation is given in Table-5. Table-6 shows expected characteristic of untreated and treated wastewater.

**Table-5: Details of Wastewater Generation**

<table>
<thead>
<tr>
<th>Details</th>
<th>Water (KLD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water requirement for domestic purpose</td>
<td>473</td>
</tr>
<tr>
<td><strong>Wastewater to be generated from domestic use (@ 80% of domestic water requirement)</strong></td>
<td>378</td>
</tr>
<tr>
<td>Water requirement for Flushing Purpose</td>
<td>155</td>
</tr>
<tr>
<td><strong>Wastewater to be generated from Flushing (@ 100% of flushing requirement)</strong></td>
<td>155</td>
</tr>
<tr>
<td><strong>Total Wastewater generated</strong></td>
<td>378+155</td>
</tr>
<tr>
<td></td>
<td>= 553 KLD</td>
</tr>
</tbody>
</table>

**Table-6: Characteristic of untreated and treated sewage**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Raw sewage</td>
</tr>
<tr>
<td>pH</td>
<td>6.0-9.0</td>
</tr>
<tr>
<td>BOD₃ 27°C</td>
<td>250-300Mg/L</td>
</tr>
</tbody>
</table>
The waste water generation will be about 533 KLD. After treatment in STP approx 640 KLD will be available for reuse, which will be used for Flushing, DG Sets cooling, Horticulture and all excess treated water will be discharge into sewer line/CSTP after taking necessary permission from concerned authority.

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

(i) Rainwater Collection Potential for Reuse or Recharging

Rainwater harvesting is the activity of direct collection of rainwater. Collected Rainwater will be stored for direct use or for recharging the groundwater. Rain Water Harvesting is the technique through which rain water is captured from the roof and paved surfaces and stored in sub-surface ground water reservoir by adopting artificial recharge techniques. The run off calculations for Rain Water Harvesting are shown in Table-7 and for pits in Table-8.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of Surface</th>
<th>Catchment Area (m²)</th>
<th>Runoff Coefficient</th>
<th>Intensity of Rainfall (mm/hr)</th>
<th>Intensity of Rainfall (m/hr)</th>
<th>Runoff (m³/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Total Roof/Terrace Area</td>
<td>5229.140</td>
<td>0.85</td>
<td>90</td>
<td>0.09</td>
<td>400.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total runoff water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>400.03</td>
</tr>
</tbody>
</table>

Table-7: Runoff Calculation of the Area

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Volume of desilting tank</th>
<th>Volume of recharge pit</th>
<th>Total Volume</th>
<th>Runoff in 15 minutes</th>
<th>No. of pits required</th>
<th>No. of pits proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>14 m³</td>
<td>3.5 m³</td>
<td>17.5 m³</td>
<td>88.05 m³</td>
<td>5.03</td>
<td>6 pits</td>
</tr>
</tbody>
</table>

Table-8: Numbers of Pits Calculation
As per the calculation provided above, the nos. of RWH Pits is required 5 pits and we are proposing 6 nos. of RWH pits.

2.8. What would be the impact of the land use changes occurring due to the proposed 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?

- There will not be such impact as the proposed project will be developed on a land base which is for mixed use purpose as per the Ghaziabad Master Plan 2021.

- As the project site is almost plain land and the topography of the site is not anticipated to change due to the project activities, hence, no impacts are expected on the drainage profile or runoff characteristics after construction phase.

- A network of storm water drain is proposed all along the direction along the main roads and cross roads of suitable area size. All storm water drains will be covered with RC slabs so as to prevent the entry of soil and dust. Storm water collected through storm water drains and discharged into existing Storm Water Drains. Storm water drains will be constructed on all the edges of roads.

- The proposed project will have a storm water management system aiming at “Maximum uses of Storm water.” The system will include collection of storm water and roof-top rainwater and recharging through designed RWH systems. Excess storm water will be discharged outside of the project site through a drainage system. The proposed project would not aggravate the problems of flooding or water logging in anyway.

2.9. 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)

Adequate management measures are suggested to protect the water quality during construction phase. Excavation during monsoon season will be avoided. Care would be taken to avoid soil erosion. Community toilets shall be constructed on the site during construction phase and the wastewaster will be recycled and reused to avoid entering in to the water bodies. Any area with loose debris within the site shall be planted. 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 of 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. As per Hydro geological map of India Groundwater potential of state Uttar Pradesh is between 25-40 liters/sec and as per Categorization of Blocks State Uttar Pradesh falls in safe Zone. **Figure-7** and **Figure-8** shows Hydrogeology map of India and categorization of Blocks. As per **Figure-9** the depth of water level 5-10 m bgl at the proposed project site. As per **Figure-10** the proposed project site is suitable for artificial recharge.
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

Figure-9: Depth to Water level Map of Uttar Pradesh (January-2014)

Source: CGWB 2014
2.10. What precautions/measures are taken to prevent the runoff from construction activities polluting land & aquifers? (Give details of quantities and the measures taken to avoid the adverse impacts)

During Construction phase suitable Garland drain as per the existing contours of the plot will be developed to avoid any chance of contamination due to runoff.

In operation phase most of the storm water produced on site will be harvested for ground water recharge. Thus proper management of this resource must be ensuring that it is free of contamination. A detailed Storm Water Management Plan will be developed which will consider the sources of storm water. The plan will incorporate best management practices which will include the following:

- Regular inspection and cleaning of storm drains.

Figure-10: Areas identified for Artificial Recharge in Uttar Pradesh
✓ Installation of clarifiers or Oil/Water separators system of adequate capacity around parking areas and garages as per requirement.
✓ Cover waste storage areas.
✓ 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.

Precautions /Measures Taken to Prevent the Run-Off from Construction Activities

- **Domestic Wastewater from Toilets:** Domestic wastewater generated from the toilets will be treated through soak pit or septic tank. The treated water will be used for construction purpose.

- **Site Development and Construction:** The wastewater generation during site development and construction mainly includes the storm water run-off from the construction areas, stockpiles of construction materials and wastes, etc. mainly containing high suspended solids (SS), in case these activities are undertaken during rainy season.

2.11. 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).

Most of the storm water will be managed through Rain water harvesting technology. The storm water management plan will include practices as stated in point 2.10.

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

During construction phase sewage generated will be treated through the soak pit or septic tank. Hence it will not lead to unsanitary conditions around the project site.

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

The waste water generated will be treated in the Sewage Treatment Plan. The capacity of Sewage Treatment Plant (STP) will be higher of waste water generated i.e. 640 KLD. The proposed STP is based on FAB technology.
Fluidized Aerobic Bio-Reactor (FAB)

It is proposed to use activated sludge process working on the principle of extended aeration based on a Fine Bubble Diffused Aeration System. Raw Sewage will flow through a bar screen chamber to an Equalization Tank. The bar screen shall be so designed that it can be cleaned manually from outside the Tank. Two submersible solid handling pumps shall be provided in the Equalization Tank to pump the collected Raw Sewage to the Aeration Tank. An automatic level controller shall be provided in the Equalization Tank to turn the pump off at the low water level in the Tank and to start the pump automatically when water level is high.

Air will be introduced in the Equalization Tank through submerged air diffusers, to prevent the sewage from becoming septic during long retention or low load conditions. The Raw Sewage that comes into the Aeration Tank shall be aerated by using Fine Bubble Diffusers mounted in a grid at the bottom of the tank. Facility will be made to pull up the diffusers for cleaning if necessary. Air will be supplied to the diffusers by twin lobe rotary air blowers located in the plant room. The aeration system shall be designed in a way so as to achieve complete mixing of the sludge organisms with raw sewage in order to achieve a MLSS of between 3000 – 4000 in the Aeration Tank. From the aeration tank this mixed liquor passes into a Clarifier. The liquid in the clarifier tank is maintained in quiescent condition allowing the solids to settle to the bottom of the Clarifier for collection.

The accumulated solids (Activated Sludge) shall be constantly pumped back into the aeration tank by sludge recycle pumps. This return sludge undergoes further digestion in the aeration tank and also provides the active organism needed to digest the incoming raw sewage.

The Clarifier shall be provided with an overflow weir to collect the treated effluent and a scum baffle shall keep any floating matter from passing out in the final treated water. Treated water from clarifier shall over flow into a Chlorine Contact Tank where hypo chlorite solution shall be added to disinfect the treated water.

Excess sludge from the bottom of the Clarifier shall be wasted into an adjoining aerobic digester cum thickener tank. In this tank sludge shall be aerated. The air shall be shut off periodically and supernatant water will be led back into the Equalization Tank. This way the sludge shall be thickened and its volume shall be reduced. The thickened sludge will be further solidified using a centrifuge or a filter press and the solid cakes will be used as manure in horticulture.

The treated and disinfected water from the Ozonation and UV treatment will be passed through a Multigrade Filter, an Activated Carbon Filter and a Softener and then stored in a Treated Sewage Water Tank.
2.14. Give details of dual plumbing system if treated waste is used for flushing of toilets or any other use.

Dual plumbing system that utilizes separate piping systems for freshwater and recycled wastewater will be adopted for the project. Treated water amounting 426 KLD generated from the on-site STP shall be utilized by the recycled water system and serve for non-contact uses such as flushing, horticulture, and DG cooling etc. while the excess treated water will be discharge into sewer line after taking necessary permission from concerned authority.
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)**

There is no such area within 10 km radius of the project site. Even the local flora and other species will not be affected due to the pre and post construction activities. Also, there are no eco-sensitive areas in the project vicinity.

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

As this is Group Housing project and project site is vacant land therefore there no tree cutting is required.

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?)**

The following steps were taken to minimize the likely impacts on the surrounding environment.

- As per the Forest Conservation Act, 1980. The compensatory afforestation plan will be prepared, if required for the recovery of greenery loss due to construction activities.
- The Green Belt is proposed for clean, healthy and beautiful green environment for the people to live in and work in.
- Within the proposed project site green belt to be developed by plantation of various species of plants, shrubs to create a clean, healthy and aesthetic environment that provides a visual retreat and relaxation to the occupants of the project. A combination of evergreen trees and ornamental flowering trees and shrubs is used in the project site.
- The plantation arrangement would be based on optimal use of available land and quantum of irrigation water and treated waste water.
- The capability of plants to act as a sink for air contaminants has been addressed by a number of reviews. Various studies indicate that the surface of vegetation provides a major filtration and reaction surface to the atmosphere for removing pollutants from the atmosphere. Therefore, the green belt is essential feature of any developmental project because it acts as a pollution cleaning region, improvement of the aesthetic value of the project and a noise buffer.
- The procedure for tree felling and forest land diversion (if evolved) to be minimize or issue to addressed as per the guidelines of the Forest (Conservation) Act, 1980.

**Table-9: Suggested Species to be used for Greenbelt Development**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Binomial Name</th>
<th>Family</th>
<th>Common Name</th>
<th>Hindi Name</th>
<th>Sensitive/Tolerant</th>
<th>Habit</th>
<th>Height</th>
<th>Growth Rate</th>
<th>Regeneration</th>
<th>Evergreen/Deciduous</th>
<th>Flowering Season</th>
<th>Crown Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Cassia fistula</em> linn</td>
<td>Caesalpinaeae</td>
<td>Golden Shower</td>
<td>Amlatas</td>
<td>T</td>
<td>Tree</td>
<td>12 m</td>
<td>Quick Growing</td>
<td>By seeds, Suckers</td>
<td>Deciduous</td>
<td>Mar - May</td>
<td>Round</td>
</tr>
<tr>
<td>2</td>
<td><em>Grevillea robusta</em> A. Cunn.</td>
<td>Proteaceae</td>
<td>Silvery or Silky oak</td>
<td>T</td>
<td>Tree</td>
<td>20 m</td>
<td>Quick Growing</td>
<td>By Seeds</td>
<td>Evergreen</td>
<td>Feb - April</td>
<td>Oblong</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><em>Jacaranda mimosaefolia</em> D.Don</td>
<td>Caesalpinaeae</td>
<td>Nil-gulmohur</td>
<td>Jacaranda</td>
<td>S</td>
<td>Tree</td>
<td>10 m</td>
<td>Quick Growing</td>
<td>By Seeds</td>
<td>Deciduous</td>
<td>March - April</td>
<td>Round</td>
</tr>
<tr>
<td>4</td>
<td><em>Polyalthia longifolia</em> (Sonn.) Th</td>
<td>Anonaceae</td>
<td>Ashok</td>
<td>Devdaaru</td>
<td>S</td>
<td>Tree</td>
<td>15 m</td>
<td>Quick Growing</td>
<td>Through seeds (fresh)</td>
<td>Evergreen</td>
<td>April - June</td>
<td>Conical or Rounded</td>
</tr>
<tr>
<td>5</td>
<td><em>Delonix regia</em> (Boj. ex Hook.) Raf.</td>
<td>Fabaceae</td>
<td>Flamboyant</td>
<td>Gulmohar</td>
<td>T</td>
<td>Tree</td>
<td>12 m</td>
<td>Quick Growing</td>
<td>By seeds</td>
<td>Deciduous</td>
<td>April - June</td>
<td>Round</td>
</tr>
<tr>
<td>6</td>
<td><em>Lagerstroemia speciosa</em> (L.) Pers.</td>
<td>Lythraceae</td>
<td>Giant Crape-myrtle</td>
<td>Jarul.</td>
<td>T</td>
<td>Shrub</td>
<td>3 m</td>
<td>Quick Growing</td>
<td>By Seeds</td>
<td>Deciduous</td>
<td>June</td>
<td>Round / Oblong</td>
</tr>
<tr>
<td>7</td>
<td><em>Caesalpinia pulcherrima</em> (L.) Sw.</td>
<td>Fabaceae</td>
<td>Peacock Flower</td>
<td>Radhachura</td>
<td>T</td>
<td>Shrub</td>
<td>3 m</td>
<td>Quick Growing</td>
<td>By seeds</td>
<td>Deciduous</td>
<td>June</td>
<td>Round</td>
</tr>
<tr>
<td>8</td>
<td><em>Euphorbia pulcherrima</em> Willd. ex Klotzsch</td>
<td>Euphorbiaeae</td>
<td>Poison tia</td>
<td>Christ mas Star</td>
<td>T</td>
<td>Shrub</td>
<td>4 m</td>
<td>Quick Growing</td>
<td>By seeds</td>
<td>Deciduous</td>
<td>June</td>
<td>Round</td>
</tr>
<tr>
<td>9</td>
<td><em>Bougainvillea spp</em> Comm. ex Juss.</td>
<td>Nyctaginaceae</td>
<td>Bougainvillea</td>
<td>Bougainvillea</td>
<td>T</td>
<td>Shrub</td>
<td>3 m</td>
<td>Quick Growing</td>
<td>By tubers</td>
<td>Deciduous</td>
<td>Round the year</td>
<td>Rounded</td>
</tr>
<tr>
<td>10</td>
<td><em>Azadirachta indica</em> A. juss.</td>
<td>Meliaceae</td>
<td>Indian Lilac</td>
<td>Nim</td>
<td>T</td>
<td>Tree</td>
<td>20 m</td>
<td>Quick Growth after 1st</td>
<td>By Seeds</td>
<td>Evergreen</td>
<td>Jan - March, Aug. - Sept.</td>
<td>Spreading</td>
</tr>
</tbody>
</table>
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.

The proposed site is within the Ghaziabad Urban area, an open land and devoid of forestation so in the existing conditions, this place is not the habitat for any wild fauna. There will not be any type of displacement or any other effect on the local fauna due to proposed project activities.

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

The following impacts can be observed after the completion of the project.

- After green belt development, the planted trees and shrubs will provide shelters and shed especially to the birds and other domesticated animals and human being.
- Within the proposed project site, proper landscaping has been planned to provide a clean, healthy, and beautiful green environment for the people to live and work in.
- The common native variety of trees and ornamental flowering species will be planted in the green space.
- The vibration raised during construction will affect the movement of birds during day time.
- The monitoring to be done for regular checkup of the pollution raised by construction activities. That should not above the prescribed limit as per CPCB norms.

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

These measures are not applicable for this project.

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 constructions)

Increased traffic generation due to proposed project is not going to cause significance increase in atmospheric concentration of gases and will not result island formation.

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.
**Construction Phase:**
During construction phase there will be increased generation of dust and smoke from the background levels.

There is no activity associated with generation of odorous fumes and any hazardous gases during construction phase.

The main sources of dust generation can be associated to land clearing, drilling, ground excavation, cut and fill operations (i.e., earth moving), and construction of a particular facility. A large portion of the dust emissions results from equipment traffic over temporary roads at the construction site.

The main source of smoke generation will be use of Diesel Generators during power failure.

The meteorological conditions such as higher turbulence in lower layers of atmosphere will increase the impact of dust emissions on workers at the site.

Inversion layer in winter season increases of likelihood of impact of D.G. set emissions to the workers at the site.

Rains wash off the atmospheric pollutants and thus will reduce the impact of dust and smoke.

**Measures taken during Transport and Handling of Materials during Construction**
The transport and handling of materials during construction has potential impacts on air quality in the vicinity. Thus the following mitigation measures are adopted to minimize the impacts.

**Air Emissions**
- **Dust Suppression:** The most cost-effective dust suppressant applied to mitigate airborne dust is water, because of its efficiency as well as ready availability on the construction site. Water can be applied using handheld sprays and automatic sprinkler systems depending on the location. Water spray at the site also effectively suppresses dust generated. Results have proven that for about 80% of such active area(s), the water spray suppresses airborne dust by about >90%.

<table>
<thead>
<tr>
<th>Sources/Process</th>
<th>Emission Potential</th>
<th>Scope of Control</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic excavators and loaders (e.g. Front loader, backhoe face shovel bulldozers) for the</td>
<td>High when dry or fine silty material are being handled, Use of water sprays to moisten material being handled. Soils may be subject to a soil moisture content planning condition</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Risk Reduction Measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation, lifting and movement of material such as Soil, overburden.</td>
<td>Minimize drop heights when unloading material. Protect from exposure to wind where possible.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor scrapers (Soil strippers) for cutting, lifting, transporting and placing, spreading or shaping of soils</td>
<td>Use of water sprays to moisten material being handled.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles for transport of material within the site.</td>
<td>Minimize onsite transportation distances.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic breakers for size reduction of large rocks</td>
<td>Water spraying of rock prior to fragmentation when high degree of control required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhausters and cooling fans on mobile plant processing quarried material.</td>
<td>Mobile plant exhausts and cooling fans will discharge above the horizontal to prevent dust mobilization.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conveyors for transporting material</td>
<td>Enclosure of transfer points (including roofing) of conveyors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stockpiles for storage of material</td>
<td>Seed surfaces of completed mounds of material</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
quarried materials and soil/overburden during extraction and site development phases. or fine silty materials are being stored /handled particularly during strong weather. overburden and top soil (restoration materials).

Limit mechanical disturbance. Shield from wind e.g. through the use of tree planting or screening. Use of water sprays to moisten surfaces during dry weather. Moderate

- **Emission Control for Construction Equipment/Vehicles:** Construction equipment and heavy transport vehicles shall meet emission standards like Bharat Stage -III requirements for vehicles. The operation and maintenance of all vehicles, equipments deployed on site by different contractors would be regulated and effectively monitored. The Pollution under Control (PUC) certification will be ensured for proper O&M of vehicles.

- **Improved Maintenance:** Recognizing that significant emission reductions can be achieved through regular equipment and vehicle maintenance, all site contractors will be asked to take necessary steps for proper maintenance of vehicle and equipments. A monetary incentive/disincentive provision encourages contractors to comply with regular maintenance requirements. The fuel used in the equipments, DG sets and vehicles will be of good quality with low “Sulphur” percentage by following the norms prevailing in project area.

- **Reduction of On-site Construction Time:** The heavy construction activities will be confined to the daytime to avoid higher impacts during the nighttime. During daytime, there is higher atmospheric dilution. Rapid on-site construction would reduce the duration of traffic interference and therefore, reduce emissions from traffic delay. Off-site fabrication of various moulded structural components, obtaining proper cut size of stone, pre-fabricated concrete slabs, etc. shall also enhance the quality of work environment at the construction site because other factors such as traffic congestion and emissions are then not relevant.

- **Barrier around the Site:** Besides the project site is enclosed by about 2.5 m high temporary barrier during the whole construction period so that the spread of dust to the neighborhood shall be restricted.

**Operation Phase:**
The land use of the site is designed to have open areas covered with either soft or hard landscape and paved areas (roads and pedestrian walkways). This will mitigate dust emissions in any meteorological conditions.
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

There will be intermittent smoke emissions from D.G. sets which will be used only during power failures.

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 & exit to the project site.

No, the proposed project will not create shortage of parking space for the vehicle. The total parking provided is 1,660 ECS which includes parking for residential and commercial area. Parking facilities provided as per the norms and standards of the Ghaziabad Building bye Laws.

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

Internal road of adequate width has been proposed for internal traffic management.

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.

**Sources of traffic noise & vibrations in construction phase:**
Construction vehicles (Majorly Trucks & JCBs, Road rollers etc.)

The trucks carrying materials such as concrete bags, construction debris etc. will be serviced regularly and there will be speed limit for all the vehicles moving within the project site. Proper maintenance of the internal roads will be carried out, encourage vehicle owners to not to blow horns. The movement of vehicles will be restricted to day time so as to reduce the disturbances in nearby areas of project site during night.

**Sources of traffic noise in operation phase:**
Light motor vehicles & 2-wheelers

There will be negligible effect of vibration from movement of light vehicles and 2 wheelers.

To mitigate the noise effects vehicle owners will be encouraged for regular checks of their vehicles. Maximum parking will be provided in the basement. Moreover the effect of noise will be further minimized by plantation on the sides of internal roads, on the open spaces inside and around the periphery of whole project site.

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

During operational phase of the project, there would be 4 numbers of DG Sets having total capacity 3700 KVA is used for proposed project. These are outdoor type DG having acoustic enclosure.
Impact of D.G. sets on noise & vibration and mitigation measures to be adopted in construction and operational phase:

D.G. sets if not enclosed in acoustic enclosures will contribute to significant increase in noise levels at the project site. However the D.G. sets used during construction and operation phase will be enclosed in an acoustic enclosure to reduce the noise. The DG sets foundation will be comprises of heavy weight inertia concrete block. The generator will be mounted on Cushy Foot mounting and the concrete block will be isolated from the adjoining floor. Thus no vibration impacts are expected from the DG sets.

The D.G. sets will be checked for noise every 6 months.

The noise level of 4 DG sets will be maximum 75dB (A) (at 1.0 m distance) & the insertion loss will be maintained at minimum 25 db as per the prescribed compliance standards of the MoEF& CC{Noise pollution (regulation & control) (Amendment) rule 2010}.

Impact of D.G. sets on ambient air quality and mitigation measures to be adopted:

The D.G. Set emission consist of following pollutants
1. Hydrocarbon+ NOx
2. Carbon Monoxide (CO)
3. Particulate Matter (PM)
4. Smoke

If unchecked the emissions from D.G sets will increase the concentration of above mentioned pollutants in the atmosphere. To mitigate the polluting effects of D.G. sets following mitigation measures will be taken,

A. Use of High Speed Diesel as a fuel to run D.G. sets
B. Provision of stack with height as prescribed by Central Pollution Control Board.
C. Emission test of D.G. stacks every 6 months to check the concentration of pollutants.

Calculation of DG Stack Height:

\[ H = h + 0.2 \sqrt{\text{capacity of DG in KVA.}} \]

Where:
H = Total height of stack in meter.
h = Height of the building in meters where the generator set is installed.
KVA = Total generator capacity in the set of KVA.

For DG set of 600 KVA
H = h + 0.2 √600
H = h + 0.2 x 24.4
H = h + 4.89 or say 5 meter

We suggest 6 meter above the max. Height of the building

For DG set of 1250 KVA

H = 14Q^0.3 where, Q = SO2 emission (g/sec)
Consider Fuel Consumption = 310 lit/hr
Sulphur content in fuel = 0.25%
Sulphur content in whole fuel = 77.5% = .775 lit/hr = 0.65875 kg/hr
SO2 Emission (Q) = 1.3175 kg/hr
So, H = 14Q^0.3
= 15.20 meters
Say 15 m

For Combined DG set capacity of 3700KVA (2*1250+2*600 KVA)

H = 14Q^0.3 where, Q = SO2 emission (g/sec)
Consider Fuel Consumption = 1000 lit/hr
Sulphur content in fuel = 0.25%
Sulphur content in whole fuel = 250% = 2.5 lit/hr = 2.125 kg/hr
SO2 Emission (Q) = 4.25 kg/hr
So, H = 14Q^0.3
= 21.60 meters
Say 22 m

We suggest 6 meter above the max. Height of the building.

6. AESTHETICS

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

There will not be any adverse impacts from new constructions on the existing structures as the proposed development shall be carried out as per the defined Ghaziabad building by-laws. All precautions would be taken to mitigate the impact due to water air and noise pollution during construction and operation phase.

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

There is no local consideration of urban form and urban design criteria. The proposed project will be constructed within the designated site as per the defined building bye laws of Ghaziabad.

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

Within the project influence area, there are no significant archeological sites or artifacts nearby. Since all the activities whether during the construction or operation stage, will be carried out in the project premises hence no impact on any type of archeological monuments are envisaged.

7. **SOCI-ECONOMIC ASPECTS**

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

Establishment of any project like group housing, plotted development leads to socio-economic changes. The major land use of present project is Group Housing, which will help for development of a society that will stand robustly against economic or natural calamities by providing residential stability. It fulfills the required demand for housing needs for the development of country. Influx of population leads to change in social & economic status of the community. During construction period local people will be engaged and hence there will be temporary increase of 200 workers, till construction complete. During operation period, there will be increase of 7,200 persons in the local population. The proposed project involves the construction of residential houses with number of amenities like Dual Plumbing, Provision of STP, Parking Facilities, Lawns, One entry/exits with guard rooms for security, DG sets for power back up, Firefighting water Tank etc. This will be in line with the proposed development plan of Ghaziabad.
7.2. Give details of the existing social infrastructure around the proposed project.

Table-11: Existing Social Infrastructure around the project site.

|   | Nearest School & College | Santosh Medical College and Dental College  
DAV Pratap Vihar  
Indirapuram Public School, Pratap Vihar  
DPS Indirapuram | 0.41 km, East  
1.22 km, East  
1.44 km, East  
2.12 km, Southwest |
|---|--------------------------|----------------------------------------------------------------------------------|
| 1. | Nearest Hospital         | Jeevan Lok Hospital  
Shanti Gopal Hospital | 1.15 km, East  
2.4 km, Southwest |
| 2. | Places of worship        | Mothi Masjid  
Norani Masjid | 1.89 km, North  
2.04 km, North |
| 3. |                          |                                                                   |

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, the proposed development will not have adverse effects on local communities. On the contrary, it is expected that there will be major positive impacts due to development of the proposed project. Positive impacts would include improvement in residential stability directly and economic condition of society indirectly. Respect to the local sacred sites and other cultural phenomena will be the integral part of the proposed project.

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).

The main construction materials being utilized in the construction of the proposed project include Stone Aggregate, Coarse sand/fine sand, Steel, Fly Ash, Sand Stone, Granite/Marble, Bricks, and Blocks, glass etc. The embodied energy content of the material is given in Table-12.
Table-12: Embodied Energy Content of the Material

<table>
<thead>
<tr>
<th>Primary Energy Requirement</th>
<th>Materials</th>
<th>Primary Energy Requirement (Gj/tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High Energy</td>
<td>Aluminum</td>
<td>200-250</td>
</tr>
<tr>
<td></td>
<td>Stainless steel</td>
<td>50-100</td>
</tr>
<tr>
<td></td>
<td>Plastic</td>
<td>100+</td>
</tr>
<tr>
<td></td>
<td>Copper</td>
<td>100+</td>
</tr>
<tr>
<td></td>
<td>Steel</td>
<td>30-60</td>
</tr>
<tr>
<td></td>
<td>Lead</td>
<td>25+</td>
</tr>
<tr>
<td>High Energy</td>
<td>Glass</td>
<td>12-25</td>
</tr>
<tr>
<td></td>
<td>Cement</td>
<td>5-8</td>
</tr>
<tr>
<td></td>
<td>Plasterboard</td>
<td>8-10</td>
</tr>
<tr>
<td></td>
<td>Lime</td>
<td>3-5</td>
</tr>
<tr>
<td>Medium Energy</td>
<td>Clay bricks and tiles</td>
<td>2-7</td>
</tr>
<tr>
<td></td>
<td>Gypsum Plaster Concrete</td>
<td>1-4</td>
</tr>
<tr>
<td></td>
<td>Sand, aggregate</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>

Source: Manual on norms and standards for environment clearance of large construction projects, MoEF

- These construction materials will be procured from the reputed suppliers/manufacturers and thus it is expected that they are produced with energy efficient processes. Most of the quality grade building material production facilities and industries now use energy efficient processes.
- All the items to be used in the proposed project will be as per the National Building Code specification. If the building materials with high-embodied energy are locally available, it will be used in construction.

8.2. Transport and handling of materials during construction may result in pollution, noise & public nuisance. What measures are taken to minimize the impacts?
The transport and handling of materials during construction phase has potential impacts on air and noise emissions in the vicinity. Thus, to control this, various mitigation measures will be adopted to minimize the impacts.

Air Emissions
Dust Suppression: The most cost-effective dust suppressant applied to mitigate airborne dust is water, because of its efficiency as well as ready availability on the construction site. Water can be applied using water trucks, handheld sprays and automatic sprinkler systems depending on the
location. Water spraying at the site also effectively suppresses dust generated. Results have proven that for about 80% of such active area(s), the water spray suppresses airborne dust by about >90%.

**Emission Control for Construction Equipment/Vehicles:** Construction equipment and heavy transport vehicles shall meet emission standards like Bharat Stage -III requirements for vehicles. The operation and maintenance of all vehicles, equipments deployed on site by different contractors will be regulated and effectively monitored. The Pollution under Control (PUC) certification will be ensured for proper O&M of vehicles.

**Improved Maintenance:** Recognizing that significant emission reductions can be achieved through regular equipment and vehicle maintenance, all site contractors are asked to take necessary steps for proper maintenance of vehicle and equipments. A monetary incentive/disincentive provision encourages contractors to comply with regular maintenance requirements. The fuel used in the equipments, DG sets and vehicles will be of good quality with low “Sulphur” percentage by following the norms prevailing in project area.

**Reduction of On-site Construction Time:** The heavy construction activities will be confined to the daytime to avoid higher impacts during the night time. During daytime, there is higher atmospheric dilution. Rapid on-site construction would reduce the duration of traffic interference and therefore, reduce emissions from traffic delay. Off-site fabrication of various moulded structural components, obtaining proper cut size of stone, pre-fabricated concrete slabs, etc. shall also enhance the quality of work environment at the construction site because other factors such as traffic congestion and emissions are then not relevant.

**Noise Emissions**

- The mitigation measures concerning technological control at source (of vehicles) shall meet the minimum compliance requirements for manufacturing stage. Besides these, other measures shall be of preventive nature as follows:
- **Restriction of Time of Construction:** The heavy construction and transport activities shall be restricted to daytime operation when the background noise levels are high so that impacts like sleep disturbance during the night time are avoided.
- **Provision of Noise Barrier:** No extra barrier will be provided because it is within the premises of the project site.
- **Proper Maintenance of Construction Equipment/Vehicles:** Proper operation and maintenance of heavy equipment as well as transport vehicles shall also ensure lower noise emissions.
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

- **Occupational & Passive Protection:** Ear plugs, ear muffs, etc. will be provided to workers handling high noise equipment or stone cutting operations shall protect them from high noise exposure.

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

Fly ash used materials would be utilized for paving work etc, if viable. Also, the construction waste (particularly the construction debris) will be used on the project site for leveling purposes. An approximate saving of 5% to 7% is proposed to be achieved.

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

**Solid Waste during Operation Phase**

Solid waste and other waste to be generated from the proposed project will be classified as given in **Table-13**.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Types of Solid waste and other waste</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Food Waste (garbage)*</td>
<td>Wastes from the kitchen including preparation, cooking and serving of food.</td>
</tr>
<tr>
<td>2.</td>
<td>Rubbish*</td>
<td><strong>Combustible (Primary Organic):</strong> Paper, cardboard, cartons, wood, boxes, plastics, rags, cloths, beddings, leather, rubber, grass, leaves. <strong>Non-combustibles (Primary Inorganic):</strong> Metals, tin cans, metals foils, dirt, stones, bricks, ceramics, crockery, glass bottles, other metal refuses.</td>
</tr>
<tr>
<td>3.</td>
<td>Street Waste*</td>
<td>Street sweeping, dirt, leaves, catch basin dirt, animal dropping, contents of litter receptacles dead animals.</td>
</tr>
<tr>
<td>4.</td>
<td>Horticultural waste*</td>
<td>Tree trimming, leaves, waste from parks and gardens etc.</td>
</tr>
<tr>
<td>5.</td>
<td>General domestic waste from office and administration</td>
<td>Paper, General Domestic Waste etc.</td>
</tr>
</tbody>
</table>
The proposed project is expected to generate certain types of wastes which would include both non-hazardous and some hazardous wastes. The non-hazardous wastes generated at the project would be municipal solid waste including paper & cardboard wastes, food wastes, plastic wastes etc. STP sludge and other solid waste would also generate.

It is estimated that total quantity of municipal solid waste generated will be approx 3,449.85 kg/day from the proposed project.
Collection:
The solid waste expected to be generated by the population. A door to door collection will be carried out by private vendors which will be selected by the Residential Welfare Association.

Segregation:
- The solid waste expected to be generated by the population in the proposed project can be broadly categorized into bio-degradable and non-biodegradable. These solid wastes will be collected separately by putting three types of separate bins at the source of generation. For the biodegradable waste green bins will be provided, for the recyclable waste blue bins and for the non-recyclable waste dark grey bins will be provided.

The proposed Project is also expected to generate following categories of hazardous wastes:

---

**Figure-12: Solid Waste Management during Operation Phase**

- **Biodegradable**
- **Non-Biodegradable**
- **Organic Waste**
- **Final disposal through Government approved agency, or disposed to MSW site**
- **Disposed to MSW sites for composting**
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

- Used Oil - from DG sets
- Oil Contaminated Wastes - maintenance operations, etc.

Disposal:
- Organic waste will be stored temporarily at the site and it will be disposed at the MSW site for composting.

- Overall it would be ensured that all waste fractions are appropriately recycled/ disposed of through authorized recyclers/re-refiners/contractors. Records will be kept regarding amount and characteristics of all types of wastes.

- Paper & cardboard wastes, plastic wastes, metal wastes and other recyclable wastes will be sold to authorized contractors.

- The STP's sludge will be properly collect, store and used as manure or will be disposed through authorized agencies/or used for horticultural purposes.

- As regards hazardous wastes, the building management staff of the proposed project will review the proposed operations and make a thorough "applicability analysis" of the Hazardous Waste Rules, to identify specific wastes, to be generated in the proposed project, that shall be categorized as hazardous wastes. The management staff would then manage hazardous waste as per the prevailing rules. The management staff of the proposed project would ensure compliance with all the conditions on a continual basis.

- Hazardous wastes shall be stored in secured places with adequate secondary containment and labelling as per the requirements of Hazardous Waste Rules.

- Appropriate records of hazardous wastes generation and disposal (in Form-3, Form-4, Form-9, Form-13 etc.) shall be maintained as per the requirements of MoEF &CC’s Rule.

- The used oil and oil-contaminated wastes shall be disposed of through authorized recyclers/re-refiners. Any other hazardous wastes, generated on-site, shall be sold only to authorized contractors.

9. ENERGY CONSERVATION

9.1. Give details of the power requirements, source of 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?
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

Consultant - Ascenso Enviro Pvt. Ltd.
Summary of Power demand and Power back-up

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total proposed power requirement</td>
<td>3,820 KVA</td>
</tr>
<tr>
<td>Proposed Source of supply</td>
<td>Paschimanchal Vidyut Vitran Nigam Limited (PVVNL).</td>
</tr>
<tr>
<td>Back Up source</td>
<td>3,700 KVA</td>
</tr>
</tbody>
</table>

Energy Conservation Measures:

- Provision of solar water heater for supply of hot –water for various uses.
- Fly ash bricks shall be used.
- Use of LED lights in circulation area and in toilets.
- P.V. Cell system shall be installed for all street and compound lighting.
- The external surfaces of all the buildings will have granite stone cladding up to first floor level and aluminum composite panels cladding above to have maintenance free external façade of the building.
- All roofs shall be insulated with foam concrete to reduce the heat gain through the roof.
- Use of adequate window areas for getting natural light and ventilation.
- Use of electrical fittings, fans, A/C pumps and plants with ultra star rating to save electricity.

- To minimize the energy consumption & power load, building can be designed and constructed according to Energy Conservation Building Code 2007 which sets minimum energy standards for buildings.

The proposed project will adopt various energy conservation measures. The range of these energy efficiency measures can be broadly categorized under:

- Architectural Design Features;
- Energy saving preventive practices; and
- Behavioral change and raising awareness.

Energy conservation program will include measures taken for both energy demand as well as supply management.
The energy conservation efforts may consist of the following mitigation measures:

a. **Architectural Design Features**
   - Most of the external surface of the building will be designed in a way to have an air gap between the wall surface and the external skin. This should reduce the transmission of heat into the building as the heat would get dissipated into the air gap to an extent. Landscaping will be carefully considered within the overall architectural concept.

b. **Energy Saving Practices:**
   - Purchase of energy efficient appliances.
   - Constant monitoring of energy consumption and defining targets for energy conservation.
   - Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.
   - Use of Light Emitting Diodes (LED) and low voltage lighting.

c. **Behavioral Change for Reducing the Consumption**
   - Train all staff and operators for energy efficiency measures.
   - Promoting staffs’ awareness on energy conservation.
   - Training of staffs on methods of energy conservation and to be vigilant of such opportunities.
   - Turn on all lights when not in use, especially in conference rooms and turn down remaining lighting levels where ever possible.

**Passive Solar Design Considerations**

Following are the consideration adopted for passive solar design of the buildings in the proposed project:
• Maximum openings would be towards the north to get natural light that will not unduly heat up the interiors.
• Least opening would be provided towards southern and western walls so as to cut out the hot incident rays of the sun.
• Windows provided would be shaded adequately by designing double layer glass glazing so that no direct rays of sun can come into the building.

Most of the external surface of the building will be designed in a way to have an air gap between the wall surface and the external skin. This should reduce the transmission of heat into the building as the heat would get dissipated into the air gap to an extent.

As an endnote, the design has been a conscious effort to make a modern building with local materials and will not use excessive amount of glass and steel.

9.2 What type of, and capacity of, power back-up to you plan to provide?
Type of power back-up = Diesel Generator Sets
Proposed Capacity of D.G. Sets = 2*1250+ 2*600 KVA
Total Capacity of Backup = 3700 KVA
Total Number of D.G. sets = 4

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 panel will have maximum light transmission but low solar heat radiation. This will reduce quantity of heat inflow into the building. Single pane glass of 0.25 inches thickness with visible transmittance up to 85% day lighting may be used.

The Single pane glass (clear/tinted) with a transmission coefficient of ‘U factor’ as 3.3 W/m² °C (for clear) and ‘U factor’ as 3.4 W/m² °C (for tinted) may be used for composite climate zone. The Solar heat gain coefficient (SHGC) is 0.59 (clear) and 0.42 (tinted).

9.4. What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project.
Passive solar design in Architecture: Solar design is the use of architectural features to replace the use of grid electricity and fossil fuel with the use of solar energy and decrease the energy needed in a home or building with insulation and efficient lighting and appliances.

Architectural features used in solar design include:
• Residential building is North – South Oriented. North side never gets direct solar exposure. South side is easy to shade.
• Buildings have overhangs and terraces to achieve mutual shading.
• Fly ash bricks to minimize heat gain
• Roof insulation to minimize heat gain through roof.
• Efficient reflective glass to reduce heat gain
• Use of CFL Lights in common areas.
• Use of energy star rated pumps and motors
• Trees to shade paved areas.
• Expected Energy Savings: Approximately 15% because of measures mentioned above.

9.5. Does the layout of streets & buildings 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.
Yes, the streets and building is designed to maximize the potential of solar energy devices. The Building has been given sufficient roof area to provide space for installation of solar water heaters.

9.6. Is shading effectively used to reduce cooling/heating loads? 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?
Yes. Shading has been effectively used to reduce the cooling loads. The following techniques have been adopted:
• For walls on the east and west side of the building a maximum of 10% window to wall ratio is recommend to minimize solar radiations, which further helps minimize cooling/ventilation.
• Living areas to be aligned to get maximum north south light and services areas are to be located on the western side.
• Shading is used to increase cooling effects in the building.
• There will be less numbers of openings on the west side and ore numbers of openings on south side
• Projections such as balconies are provided on the south direction such that summer sun is stopped and winter sun is let in.
• Promoting residents awareness on energy conservation.

9.7. Do the structures use energy-efficient space conditioning, lighting and mechanical systems?
Suitable energy optimization will be adopted during the calculation of the energy load of the proposed project. The space heating load will be minimized using passive solar structure, suitable building envelop materials. Use of incandescent and halogen lamps will be avoided and
energy efficient compact fluorescent lamps /LED will be used for all common area. The light in
the car parking will be designed to achieve 33%, 66 % and 100% illustration to suit the
occupation of the premises.

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

Heat emission from the proposed construction can be from the following sources: Heat absorbed from
the paved and concrete structures, heat generated from equipments / appliances, and due to increased
population in the proposed project site. However the heat generated will not be significant and will be
dissipated in the lush greens and open areas provided within the project site. Hence it can be concluded
that the heat island effect shall not be a concern for the concerned project.

Moreover, Green cover will be provided at site and will incorporate such design considerations that
control formation of heat islands.

The buildup of indoor air contaminants is contributed by inadequate ventilation, contamination from
inside and outside the building, besides microbial contamination and contamination from building
fabric. The measures proposed for maintaining indoor air quality is presented in Table 14.

<table>
<thead>
<tr>
<th>Sr.no.</th>
<th>Indoor air contaminant</th>
<th>Source</th>
<th>Health Effects</th>
<th>Measure to be considered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Volatile organic compounds (VOCs)</td>
<td>Paints, Cleaning compounds, glues, photocopiers, “Spirit duplicators, signature machines, Tobacco smokes, dried out floor drains, cosmetics and other personal products</td>
<td>Nausea, Dizziness, Eye, respiratory tract, mucous membrane irritation, headache and fatigue</td>
<td>Adequate ventilation</td>
</tr>
<tr>
<td>2.</td>
<td>Miscellaneous inorganic gases which included ammonia, Hydrogen sulfide, sulphur dioxide</td>
<td>Window cleaners, acid drain cleaners, combustion products, tobacco smoked, blue print equipment</td>
<td>Eye, respiratory tract, mucous membrane irritation, aggravation of chronic respiratory diseases.</td>
<td>Adequate ventilation</td>
</tr>
<tr>
<td>3.</td>
<td>Asbestos</td>
<td>Insulation and other building material such as floor tiles dry</td>
<td>Asbestos is normally not a</td>
<td>Avoidance of use of asbestos in</td>
</tr>
</tbody>
</table>
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-values or the R values of the individual components.

The building envelope for external walls will be made of bricks, concrete and steel. The R and U values building material will be considered as per ECBC norms at the designing stage. The Thermal characteristic is provided in **Table-15** below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Source of Acute Health Effects</th>
<th>Buildings and Equipment to the Extent Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Synthetic fibers</td>
<td>Fibrous glass and mineral wool</td>
<td>Irritation to the eyes, skin and lungs dermatitis</td>
</tr>
<tr>
<td>5.</td>
<td>Carbon Dioxide</td>
<td>Unvented gas, improperly vented devices, processes or operations, which produce combustion products, human respiration.</td>
<td>Difficulty concentrating, drowsiness, increased Respiration rate.</td>
</tr>
<tr>
<td>8.</td>
<td>Ozone</td>
<td>Copy machines, electrostatic air cleaners, electrical arcing, and smog</td>
<td>Eye, respiratory tract, mucous membrane irritation; aggravation of chronic respiratory diseases.</td>
</tr>
</tbody>
</table>
9.10. What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.

(1) Fire Prevention - covering aspects of fire prevention pertaining to design and construction of buildings on passive fire protection measures, also describing the various types of building materials and their fire rating.

(2) Life Safety - covering life safety provisions in the event of fire and similar emergencies, also addressing construction and occupancy features that are necessary to minimize danger to life from fire, smoke, fumes or panic.

(3) Fire Protection - Covering the significant appurtenances and their related components and guidelines for selecting the correct type of equipment and installation meant for fire protection of the building, depending upon the classification and type of the building

General:
IS: 1809-1979 deals with methods of testing structural members of different material for their fire safety. For
a) Fire resistance ratings required for various structural and non-structural members to be used for different classes of construction.

b) The fire resistance (also described as fire endurance.) is the time duration the member or assembly can withstand the fire test without failure. The usual fire resistance ratings for structural assemblies, members, doors etc. are: 1/2 hr., 1hr., and 2hrs. 3hrs. & 4 hrs.

Table-15: Thermal Characteristic of Building

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Building Envelope</th>
<th>U-Factor (W/m²·ºC)</th>
<th>R-Value (m²·ºC/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Roof</td>
<td>0.409</td>
<td>2.1</td>
</tr>
<tr>
<td>2</td>
<td>Opaque wall</td>
<td>0.44</td>
<td>2.1</td>
</tr>
<tr>
<td>3</td>
<td>Vertical Fenestration</td>
<td>3.30 (max.)</td>
<td>SHGC:0.25(max)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(for WWR less than or equal to 40%)</td>
</tr>
</tbody>
</table>
A 1hr. rating indicates that the assembly/member can withstand the standard test for minimum 1hr. without failure by any one of the failure criteria listed in the fire test protocol for e.g., A test result showing:

- Stability - 120
- Integrity - 120
- Insulation - 15

Would mean that a specimen failed in respect of insulation after 15 mins, but complied with the other 2 criteria for at least 120 mins.

These were the 3 criteria originally adopted from BS 476 Part 8. However, BS 4422 Part-2, which was subsequently published, replaced these 3 terms with:

(i) Resistance to collapse (for stability)
(ii) Resistance to flame penetration (for integrity)
(iii) Resistance to excessive temperature rise on the unexposed face (for insulation).

(c) Building design and construction concepts and practices, besides ensuring the safety of buildings against the effects of fire outbreaks, have also to cater to the structural stability requirements of earthquake resistance (especially in earthquake prone zones) as well as to wind loads.

Adequate fire protection facilities will be installed including fire detectors, fire alarm and fire fighting system. All fire protection facilities would be designed as per the National Building Code.

- Fire Service Access : (AS PER NBC-2005 CLAUSE 2.4.6)
- Open Spaces:
- The open spaces around or inside a building shall conform to the requirements of Part-3 Development Control

Rules and General Building Requirements:-

- For high rise buildings, the following additional provisions of means of access to the building shall be ensured (see Part 3 Development Control Rules and General Building Requirements):
  - The width of the main street on which the building abuts shall not be less than 12m and one end of this street
    (a) Shall join another street not less than 12m in width;
    (b) The road shall not terminate in a dead end; except in the case of residential building, up to a height of 30m.
    (c) The compulsory open spaces around the building shall not be used for parking; and
(d) Adequate passageway and clearances required for fire fighting vehicles to enter the premises shall be provided at the main entrance; the width of such entrance shall be not less than 4.5 m. If an arch or covered gate is constructed, it shall have a clear head-room of not less than 5m.

The fire service personnel will be able to get hose lines to all portions of the building. Fire Tender, Rescue Tender, Hydraulic Platform access roads will be wide enough to support the equipment used by the fire service. They also will be able to support the weight of Fire Tender/Rescue Tender/ Hydraulic Platform. Access roads will be provided for emergency uses designated as fire lanes and vehicle parking will be prohibited.

In order to prevent fire there shall be horizontal and vertical cut off. Horizontal cut off done by way of compartmentation and Vertical cut off done by way of provision of roof more over for horizontal/vertical spread/prevention of fire we will consider the following (As per Section 3.4.8.3 of NBC-2005)

Openings in walls or floors which are necessary to be provided to allow passages of all building services like cables, electrical wirings, telephone cables, plumbing pipes etc. shall be protected by enclosure in the form of ducts/shafts having a fire resistance of not less than 2 hr. The inspection door for electrical shaft/ducts shall be not less than 2hrs. and for other services shafts/ducts, the same shall have fire resistance not less than 1hr.

Medium and low voltage wiring
Running in shafts/ducts, shall either be armoured type or run through metal conduits. Further, the space between the conduits pipes and the walls/slabs shall be filled in by a filler material having fire resistance rating of not less than one hour.

Note: - In case of buildings where it is necessary to lower or lift heavy machinery or goods from one floor to the other, it may be necessary to provide larger openings in the floor. Such openings shall be provided with removable covers which shall have the same strength and fire resistance as the floor.

**Fire fighting water suppliers:**
Adequate quantity of Water supply will be maintained in underground tanks as per National Building Code / National Fire Protection Association will be available for fire service to fight a fire in a building. All fire safety system will be run from fire control room as provided in project. Fire hydrants are provided all around the project site.

**Static Water Storage Tanks:**
A satisfactory supply of water for the purpose of fire fighting shall always be available in the form of underground/terrace level static storage tank with capacity specified with arrangements for replenishment by means of alternative source of supply at the rate of 1000 litres per minute for underground static tank. When this is not practicable, the capacity of static storage tank(s) shall be increased proportionately in consultation with the local fire brigade.

The static storage water supply required for the above mentioned purpose shall entirely be accessible to the fire engines of the local fire service. Provision of suitable no: of manholes shall be made available for inspection, repairs, insertion of suction hoses etc. The covering slab shall
be able to withstand the vehicular load of 45 tonnes equally divided as a four point load when the slab forms a part of pathway/driveway.

The domestic suction tank connected to the static water storage tank shall have an overflow capable of discharging 2250 litres per minute to a visible drain point from which by a separate conduit, the overflow shall be conveyed to a storm water drain.

(a) To prevent stagnation of water in the static water storage tank, the suction tank of the domestic water supply shall be fed only through an overflow arrangement to maintain the level therein at the minimum specified capacity

(b) The static water storage tank shall be provided with a fire brigade collecting head with 4 nos: 63 mm diameter (2 nos: 63mm diameter for pump with capacity 1400l/min.) instantaneous male inlets arranged in a valve box at a suitable point at street level and connected to the static tank by a suitable fixed pipe not less than 150mm in diameter to discharge water into the tank when required at the rate of 2250 litres per minute, if tank is in the basement or not approachable for the fire engines.

The floors of areas covered for the means of exits shall be illuminated to values not less than 1 ft candle (10 lux) at floor level. In auditoriums, theatres, concert halls and such other places of assembly, the illumination of floor exit/access may be reduced during period of performances to values not less than 1/5 ft candle (2 lux)

The total occupants from a particular floor must evacuate within 2.5 minutes for Type-1 construction, 1 1/2 min for Type-2 construction 1 min for Type-3 construction.

NFPA 550, Guide to the Fire Safety Concepts Tree, provides tools to assist a fire safety practitioner in communicating fire safety concepts and methods. The Fire Safety Concepts Tree provides an overall structure to analyse various fire safety concepts or strategies.

In this instance, NFPA 550 will be used to analyse various strategies to manage the exposed and more specifically the occupants of a building.
Using the Fire Safety Concepts Tree one can evaluate the effectiveness of limiting the occupants that are exposed to the fire or safeguarding the occupants who are exposed to a fire. Most designs incorporate a combination of the two strategies. Limiting those that are exposed to the fire is typically done by compartmentation, possibly by defining a maximum area or occupant load for a fire compartment or smoke compartment Occupant Evacuation or Relocation.

The first step in evacuating or relocating occupants is to provide a means by which movement is caused. This is done by detecting the fire, signaling the need to move, and providing instructions for the occupants.

The fire event may be detected by manual or automatic means and the means by which the fire is presumed to be detected is often regulated by prescriptive building and fire codes or by the performance design. The same codes or design approach will then determine the threshold for which a fire alarm system is required based upon occupancy classification, number of occupants, or height of the building. In those buildings for which the code or the design approach does not require a fire alarm system, there is a presumption that a means exists by which the occupants will be notified. In the instances where a fire alarm system is not provided, one would hope that the design professional has communicated this to the building owner to ensure that proper emergency procedures will be in place to alert the occupants when movement is necessary.

The fire fighting system in the proposed project site will be done according to National Building Code 2005. Following provisions are required to be made according to National Building Code 2005. The fire fighting system has been designed considering the following codes, manual and guidelines:

- National Building Code of India (NBC);
• Latest relevant NFPA codes, USA, in particular NFPA – 13, 14, 20 & 22;
• IRI guidelines;
• As per requirement of fire officer/local fire approving authorities; and
• As per Indian Standard Code for Fire Protection (IS Codes)

Response in case of Fire

• Required response during in the event of a fire should be described in signs located in the lobby.
• On sighting a fire, it should be immediately informed to the environment manager giving the exact location and type of fire in detail.
• Initiate the Emergency Response Team for fires.
• If the fire is small, engage in extinguishing the fire using the nearest fire extinguisher.
• Guide the Emergency Response Team staff to the emergency assembly point.
• The Emergency Response Team should immediately inform the nearest dispensary and security force. If required a fire tender should be summoned.
• The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads then the manager in charge should inform the district authorities and call for external help.
• The Emergency Response Team will provide immediate relief to the injured residents at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition.

General Instructions for Occupants in case of Fire

• Get out of buildings as quickly and as safely as possible.
• Use the stairs to escape. When evacuating, stay low to the ground.
• If possible, cover mouth with a cloth to avoid inhaling smoke and gases.
• Close doors in each room after escaping to delay the spread of the fire.
• If in a room with a closed door.
• If smoke is pouring in around bottom of the door or if it feels hot, keep the door closed.
• Open a window to escape or for fresh air while awaiting rescue.
• If there is no smoke at bottom or top and the door is not hot, then open the door slowly
• If there is too much smoke or fire in the hall, slam the door shut.
• Stay out of damaged buildings.
• Check that all wiring and utilities are safe.
• After evacuation assemble to the Assembly points marked as refuge areas till further instruction
Fire fighting system is proposed to prevent and control fire outbreaks for the project. The fire fighting system will consist of portable fire extinguishers, hose reel, wet riser, yard hydrant, automatic sprinkler system, and manual fire alarm system. The project will also be provided with automatic fire detection and alarm system.

9.11. If you are using glass as wall material provides details and specifications including emissivity and thermal characteristics.

Glass panel will have maximum light transmission but low solar heat radiation. This will reduce quantity of heat inflow into the building. Single pane glass of 0.25 inches thickness with visible transmittance up to 85% day lighting may be used.

The Single pane glass (clear/tinted) with a transmission coefficient of ‘U factor’ as 3.3 W/m² -°C (for clear) and ‘U factor’ as 3.4 W/m² -°C (for tinted) may be used for composite climate zone. The Solar heat gain coefficient (SHGC) is 0.59 (clear) and 0.42 (tinted).
9.12 What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration.
Reduced air infiltration combined with proper ventilation can not only reduce energy bills but it can also improve the quality of indoor air. Outdoor air that leaks indoor makes it difficult to maintain comfort and energy efficiency. In addition, air leakage accounts for 25-40% energy used for heating and cooling in a typical building. For this purpose the building has been designed in a compact manner, leaving ventilation shaft in between buildings for facilitating the escape of hot exhaust air.

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.
- The Energy efficient lighting will be done with the use of CFL and LED lamps. Additionally solar energy will be used for hot water provision.
- Use of Solar energy for street lightening will be explored.

10. ENVIRONMENT MANAGEMENT PLAN
10.1. The Environment Management Plan would consist of all mitigation measures for each item wise activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of 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 site including fire.
The mitigation measures suggested for the impacts identified on the various environmental components due to the project activities are given in this section. A detailed environmental management plan is presented in Table-16 to mitigate all the identified environmental impacts that are found to be significant.
**Table-16: Environmental Management Plan – Construction Phase and Operational phase**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground Water Quality</td>
<td>Ground Water Contamination</td>
<td>Construction Phase</td>
<td>• Soak pit or septic tank will be provided and treated sewage will be used for construction purposes.</td>
<td>No significant impact as majority of labors would be locally deployed.</td>
<td>In an unlikely event of soil and ground water contamination. Remediation measures shall be implemented.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Operation Phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Proponent will provide the STP to treat the sewage of Project.</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ground Water Quantity</td>
<td>Ground Water Depletion</td>
<td>Construction Phase</td>
<td>• Not Applicable</td>
<td>No significant impact on ground water quantity envisaged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Operation Phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Groundwater will not be used during operation phase. The required water will be met through the municipal supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Rainwater harvesting scheme.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Black and Grey water treatment and reuse.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Storm water collection for</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table-16: Environmental Management Plan – Construction Phase and Operational phase**

Consultant- Ascenso Enviro Pvt. Ltd.
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>Surface Water Quality</td>
<td>Surface water contamination</td>
<td>Construction Phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Surface runoff from site during construction activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Silt traps and other measures such as additional onsite diversion ditches will be constructed to control surface run-off during site development.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operation Phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Domestic water will be treated in STP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No off site impact envisaged.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Excess of water will be discharged as per CPCB standards.</td>
</tr>
<tr>
<td>4.</td>
<td>Air Quality</td>
<td>Dust Emissions</td>
<td>Construction Phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Suitable control measures will be adopted for subsiding the PM level in the air as per air pollution control plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not significant because dust generation will be temporary and will settle fast due to dust suppression techniques (wet).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>During construction phase the contractors are advised to facilitate masks for the labors. Water sprinklers will be used for suppression of dust.</td>
</tr>
</tbody>
</table>
### Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

<table>
<thead>
<tr>
<th>Emissions of SPM, SO$_2$, NO$_2$ and CO</th>
<th>Construction Phase</th>
<th>Operation Phase</th>
<th>Regular monitoring of emissions and control measures will be taken to reduce the emission levels.</th>
</tr>
</thead>
</table>
| • Operation of construction equipment and vehicles during site development.  
  • Running D.G. sets (back up) | • Rapid on-site construction and improved maintenance of equipment  
  • Use of Low sulphur diesel if available  
  • Use of clean fuel if available  
  • Providing Footpath and pedestrian ways within the site.  
  • Green belt will be developed with specific species to help to reduce PM level  
  • Use of equipment fitted with silencers  
  • Proper maintenance of | Not significant.  
  • Use of Personal Protective Equipment (PPE) like earmuffs and earplugs during construction activities. |
| Not significant.  
  DG sets would be used as power back-up required.  
  No significant increase in noise level is expected from the project’s activities.  
  There are no sensitive receptors located within the vicinity of site. | Use of Personal Protective Equipment (PPE) like earmuffs and earplugs during construction activities. |
### Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

<table>
<thead>
<tr>
<th>5. Noise Environment</th>
<th>Operation Phase</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Running DG sets (for power back up)</td>
<td>Provision of noise shields near the heavy construction operations and acoustic enclosures for DG sets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction activity will be limited to day time hours only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operation Phase</td>
<td>No significant impact due to suitable width of Greenbelt.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Belt Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Development</td>
<td>Development of silence zones to check the traffic movement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DG set rooms will be equipped with acoustic enclosures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Construction debris will be collected and suitably used on site as per the solid waste</td>
<td></td>
</tr>
<tr>
<td>6. Land Environment</td>
<td>Soil contamination</td>
<td>No significant impact. Impact will be local, as waste generated will be reused for filling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction Phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disposal of construction debris</td>
<td></td>
</tr>
</tbody>
</table>
Operation Phase

- Dumping of municipal solid waste on land.
- Used oil generated from D.G. sets

It is proposed that the solid waste generated will be managed by an authorized agency.
- Collection, segregation, transportation and disposal will be done as per MSW Management Rule, 2000 by the authorized agency.
- Used oil generated will be sold to authorized recyclers

Since solid waste is handled by the authorized agency, waste dumping is not going to be allowed. Not significant.
Negligible impact.

7. Biological Environment (Flora and Fauna)

Displacement of Flora and Fauna on site

Construction Phase

Site Development

Important species of trees, if any, will be identified and marked and will

The site has scanty vegetation
<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Phase</td>
<td><strong>Suitable green belts will be developed as per landscaping plan in and around the site using local flora</strong></td>
<td>Beneficial impact.</td>
</tr>
<tr>
<td>Construction Phase</td>
<td><strong>Project development as per the Ghaziabad master Plan.</strong></td>
<td>No negative impact.</td>
</tr>
<tr>
<td>Operation Phase</td>
<td><strong>Project will provide employment opportunities to the local people in terms of labor during construction and service personnel (staff, securities, gardeners etc) during operations</strong></td>
<td>Beneficial impact</td>
</tr>
</tbody>
</table>

8. **Socio-Economic Environment**

- **Population displacement and loss of income**
- **Construction activities leading to relocation**
- **Site operation**
Proposed Residential Complex at Plot No. 04/BS – 02(GH-03) Siddhartha Vihar, District - Ghaziabad, Uttar Pradesh.

<table>
<thead>
<tr>
<th>9.</th>
<th>Traffic Pattern</th>
<th>Increase of vehicular traffic</th>
<th>Construction Phase</th>
<th>Operation Phase</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Heavy Vehicular movement during construction</td>
<td>Heavy Vehicular movement will be restricted to daytime only and adequate parking facility will be provided</td>
<td>No negative impact</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vehicular movement will be regulated inside the project with adequate roads and parking lots in the site.</td>
<td>No major significant impact</td>
</tr>
</tbody>
</table>
Environmental Monitoring Plan

It is proposed to monitor essential parameters for ambient air quality, ambient noise quality, ground water quality, and waste water quality both during the construction and operation phases of the project. However, the monitoring schedule for the compliance report is given in Table-17.

**Table-17: Environmental Monitoring Schedule for Compliance**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Particulars</th>
<th>Monitoring Frequency</th>
<th>Duration of Sampling</th>
<th>Important Monitoring Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ambient Air Quality Monitoring</td>
<td>Project site</td>
<td>Once in 6 Months</td>
<td>24 hr continuously except CO (8 hourly) PM$<em>{10}$, PM$</em>{2.5}$, SO$<em>{2}$, NO$</em>{2}$ &amp; CO</td>
</tr>
<tr>
<td>3</td>
<td>Ambient Noise Level</td>
<td>Near DG set</td>
<td>Once in 6 Months</td>
<td>8 hr continuous with 1 hr interval Noise level in dBA</td>
</tr>
<tr>
<td>4</td>
<td>Ground/Drinking Water Quality Monitoring</td>
<td>Ground Water – at project site</td>
<td>Once in 6 Months</td>
<td>Grab Sampling Parameters specified under IS:10500, 2012</td>
</tr>
<tr>
<td>5</td>
<td>Soil Quality</td>
<td>At the green belt area</td>
<td>Twice in a year</td>
<td>Samples will be collected from three different depths viz., 30cm, 60cm, and 100cm below the surface Parameter for soil quality: pH, texture, electrical conductivity, organic matter, nitrogen, phosphate, sodium, calcium, potassium and Magnesium.</td>
</tr>
</tbody>
</table>

Environmental Monitoring:

Various environmental protection and mitigation measures have been suggested in the previous Chapter/section for ensuring compliance with the stipulated environmental regulations and applicable standards. Also, there are specified environmental monitoring and record keeping requirements for operating facilities that the proposed Project will have to comply with. Though record keeping would be largely an in-house activity, environmental monitoring within and outside of the proposed Project would be carried out through recognized environmental laboratories as per the requirements of MoEF &CC.
The purpose of environmental monitoring is to evaluate the effectiveness of implementation of EMP by periodically monitoring the important environmental parameters within the impact area, so that any potential adverse impacts are detected and timely action can be taken. In order to ensure compliance with the applicable regulatory requirements, the Project plans to conduct the following environmental monitoring activities.

**Wastewater Quality Monitoring and Record Keeping**

The wastewater discharges from the proposed Project will mainly comprise of domestic sewage and other wastewater discharges from drinking water points, toilets, washbasins, food court and kitchen, backwashing of filters (used in water treatment) etc.

Therefore, as per the requirements of the Water (Prevention and Control of Pollution) Act 1974, the Project will apply to UPPCB for the Consent to Establish. Before starting the operation, the Project will apply to UPPCB for the Consent to Operate for Wastewater Discharges and thereafter periodically renew its Consent to Operate. Subsequently, whenever there is a change in the operations, the Project will get the requisite amendments in its Consent.

The Project would maintain an inventory of all sources of wastewater and maintain records of waste water quality and quantity for the wastewater streams, as required. The Project will ensure that wastewater analysis is conducted for all regulated parameters as per UPPCB’s specification or as per conditions of Consent to Operate and to ensure compliance with any other specifically applicable standards. The frequency of wastewater quality monitoring would be decided in consultation with the UPPCB officials. Care will be taken to ensure that wastewater analysis is conducted at such a frequency that potential variations due to various operational factors are recorded.

**Noise Level Monitoring and Record keeping**

The Project would maintain an inventory of all point and non-point sources of noise emissions and identify regulated sources, if any, if specified in the UPPCB’s Consent to Operate for Air Emissions. Main source of noise would be DG sets. But as DG sets with acoustic enclosure has been proposed, there would be minimal chance of noise pollution. However, the Project management would conduct noise level monitoring at the specified locations within, on the fence line/boundary, and outside the Project’s premises to ensure compliance with the specific standards and conditions of the Consent to Operate. The locations of the noise monitoring stations and frequency of noise level monitoring would be decided in consultation with the UPPCB officials. The noise level monitoring would be conducted at such a frequency that potential variations due to various operational factors are recorded.
Awareness and Training

Training and human resource development is an important link for achieving sustainable operation of the facility and environmental management. For successful functioning of the project, relevant EMPs will be communicated to the residents of the project. Everyone will be made aware of importance of their various environmental responsibilities including waste segregation and storage, water and energy conservation, etc. This awareness will be provided through documents and periodic meetings. They will be informed of their responsibilities for successful operation of various environmental management schemes inside the Project premises. Relevant personnel at site will be trained for the following:

- Applicable EH&S regulations and compliance requirements for the same.
- Collection, Segregation, Storage and Disposal of solid and hazardous wastes.
- Operation and maintenance of Sewage Treatment Plant and recycling system
- Techniques for waste minimization, water conservation and energy conservation, etc.
- Functioning of the Project’s Environmental Management System (EMS) including environmental monitoring, reporting and documentation needs.
- Requirements and responsibilities in case of an emergency as per emergency response plan.

Environmental Monitoring Program during Construction period

Based on the above, the following environmental monitoring program during construction activities is proposed for the Project. The monitoring program would be discussed and approved by UPPCB are given in Table-18.

**Table-18: Proposed Monitoring Program for Construction Phase of the Project**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type</th>
<th>Locations</th>
<th>Parameters</th>
<th>Period and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ambient Air Quality Monitoring</td>
<td>As per requirement</td>
<td>SO₂, NO₂, PM₁₀, PM₂.₅ and CO</td>
<td>As per UPPCB’s requirements</td>
</tr>
<tr>
<td>2.</td>
<td>Ambient Noise Monitoring</td>
<td>As per requirement</td>
<td>Noise level Lₐₑq both during daytime and nighttime</td>
<td>As per UPPCB’s requirements</td>
</tr>
<tr>
<td>3.</td>
<td>Water Quality Testing (Potability)</td>
<td>(i) Any operational borewell (ii) One of the</td>
<td>Drinking water parameters as per IS 10500:2008.</td>
<td>As per UPPCB’s requirements</td>
</tr>
</tbody>
</table>
S. No. | Type | Locations | Parameters | Period and Frequency
--- | --- | --- | --- | ---
1. | Ambient Air Quality Monitoring | As per requirement | SO₂, NO₂, PM 10, PM2.5 and CO | As per UPPCB’s requirements
2. | Ambient Noise Monitoring | As per requirement | Noise level L<sub>eq</sub> both during daytime and night time | As per UPPCB’s requirements
3. | Water Quality Testing (Potability testing) | (iii) Any operational borewell (iv) One of the Drinking Water Point | Drinking water parameters as per IS 10500:2012. | As per UPPCB’s requirements
4. | Treated Wastewater Quality | Inlet and outlet of the STP | Parameters for assessing compliance with standards for recycling and horticulture use | As per UPPCB’s requirements

### Post-Project Environmental Monitoring Program

Based on the above, the following post-project environmental monitoring program is proposed for the Project. The monitoring program would be discussed and approved by UPPCB are given in Table-19.

**Table-19: Proposed Monitoring Program for Operational Phase of the Project**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type</th>
<th>Locations</th>
<th>Parameters</th>
<th>Period and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ambient Air Quality Monitoring</td>
<td>As per requirement</td>
<td>SO₂, NO₂, PM 10, PM2.5 and CO</td>
<td>As per UPPCB’s requirements</td>
</tr>
<tr>
<td>2.</td>
<td>Ambient Noise Monitoring</td>
<td>As per requirement</td>
<td>Noise level L&lt;sub&gt;eq&lt;/sub&gt; both during daytime and night time</td>
<td>As per UPPCB’s requirements</td>
</tr>
<tr>
<td>3.</td>
<td>Water Quality Testing (Potability testing)</td>
<td>(iii) Any operational borewell (iv) One of the Drinking Water Point</td>
<td>Drinking water parameters as per IS 10500:2012.</td>
<td>As per UPPCB’s requirements</td>
</tr>
<tr>
<td>4.</td>
<td>Treated Wastewater Quality</td>
<td>Inlet and outlet of the STP</td>
<td>Parameters for assessing compliance with standards for recycling and horticulture use</td>
<td>As per UPPCB’s requirements</td>
</tr>
</tbody>
</table>

### Environmental Documentation

Documentation and reporting of environmental performance is an important management tool for ensuring sustainable operation of the Project. Documents/Records shall be maintained for
regulatory, monitoring and operational issues. Typical documentation requirements for the “Project” are summarized in Table-20.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PARTICULARS</th>
</tr>
</thead>
</table>
| Air Emissions (incl. Noise) | • Consent to Establish from UPPCB  
                          • Consent to Operate for Air Emissions from UPPCB  
                          • Operational details of DG sets, and air pollution control equipment including number of hours of operation, fuel usage, etc.  
                          • Ambient Air Quality and Stack Emissions Monitoring records  
                          • “Type Approval Certificates” and “Conformance Labels” for the DG sets  
                          • Ambient Noise Monitoring Records |
| Water Supply          | • Water Quality Monitoring records  
                          • Water Cess Returns |
| Wastewater Discharges | • Consent to Establish from UPPCB  
                          • Consent to Operate for Wastewater Discharges from UPPCB  
                          • Details of quantity of wastewater discharged from various sources and discharged from the outlet of the STP for recycling/into the sewer (if any)  
                          • Operational details of STP including number of hours of operation, chemical usage, in-process wastewater quality, etc.  
                          • Wastewater Quality and Quantity Monitoring records |
| Waste Management      | • Permission for disposal of solid wastes from concern municipality/authority  
                          • Wastes Management Inventory including details of quantity of wastes generated on-site and mode of their disposal  
                          • Inventory of wastes stored on-site  
                          • Records of hazardous wastes stored on-site (in Form-3) (if generated)  
                          • Annual Returns for hazardous wastes (in Form-4 and Form-13) to UPPCB  
                          • Documentation related to off-site transportation and disposal of hazardous wastes (including Form-9 and Form-10) |
| Environmental Statement | • Submission of Environmental Statement to UPPCB before 30th September every year |
| Petroleum Storage     | • License from PESO for storage of HSD and other petroleum substances (based on their quantities)  
                          • Inventory of petroleum substances stored on-site both at storage |
<table>
<thead>
<tr>
<th>PARAMETER</th>
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<td>and usage locations</td>
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<td>• Regular integrity testing/inspection reports for the storage tanks</td>
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