FORM-1 A

(Only for construction projects listed under item 8 of the Schedule)

CHECK LIST OF ENVIRONMENTAL IMPACTS

Name of the project/s – Proposed group housing project **"One World Belvedere-I"** located in integrated Township**"One World"** at Village-Baghamau, District.-Lucknow (U.P)

1. LAND ENVIRONMENT

(Panoramic View of the Project site are attached)

1.1 Will the existing landuse get significantly altered from the project that is not consistent with the surroundings? (Proposed landuse must conform to the approved Master Plan / Development Plan of the area. Change of landuse if any and the statutory approval from the competent authority is 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.

Proposed group housing project **"One World Belvedere-I"** located inside integrated Township **"One World"** at Village-Baghamau, District.-Lucknow (U.P).Environment clearance for this township project has already been issued vide letter no. **2003/Parya/SEAC/1665/2013/TA(J) dated 22/10/2013**. Due to modification/change in the project proposal the Project Proponent has applied for a revised environment clearance for the integrated township project **"One World"** which is already appraised at EAC level and recommended for Environment clearance. In addition to this we are applying for separate EC for this Group Housing Project.

The existing land use will not get altered from the project as the current land use of the project is Residential Use as per the Lucknow Master Plan 2021 and the proposed development will be as per the approval and building bye-laws. Earlier the land use was agricultural or barren but now it has been changed to Residential Use as per Lucknow Master Plan 2021.

Site is open land and does not involve activities of any type. It is anticipated that the construction activities of the proposed project would not have an adverse effect on the land use in the project area. The development of the green belt and other landscape would enhance the visual aesthetics of the area.

- The site has already been approved for Residential development as per Master Plan of LucknowDevelopment Authority (refer **Annexure-I**).

- Map showing location of the proposed project is shown in Fig. 1.
- Site layout plan is enclosed as **Annexure IV.**

The Surrounding features present around the site includes:

- Sarsawan village -3.2 km (SW)Mastemau village-3 km(S)
- Bharwara STP -1.7 km (NE)
- Charbagh Railway Station -11 km (N)
- Kathauta lake 4.8 km (N), Kukrail Reserve Forest 10 km (NW)
- Hazratganj – 9 km & Shaheed path – 1 km.

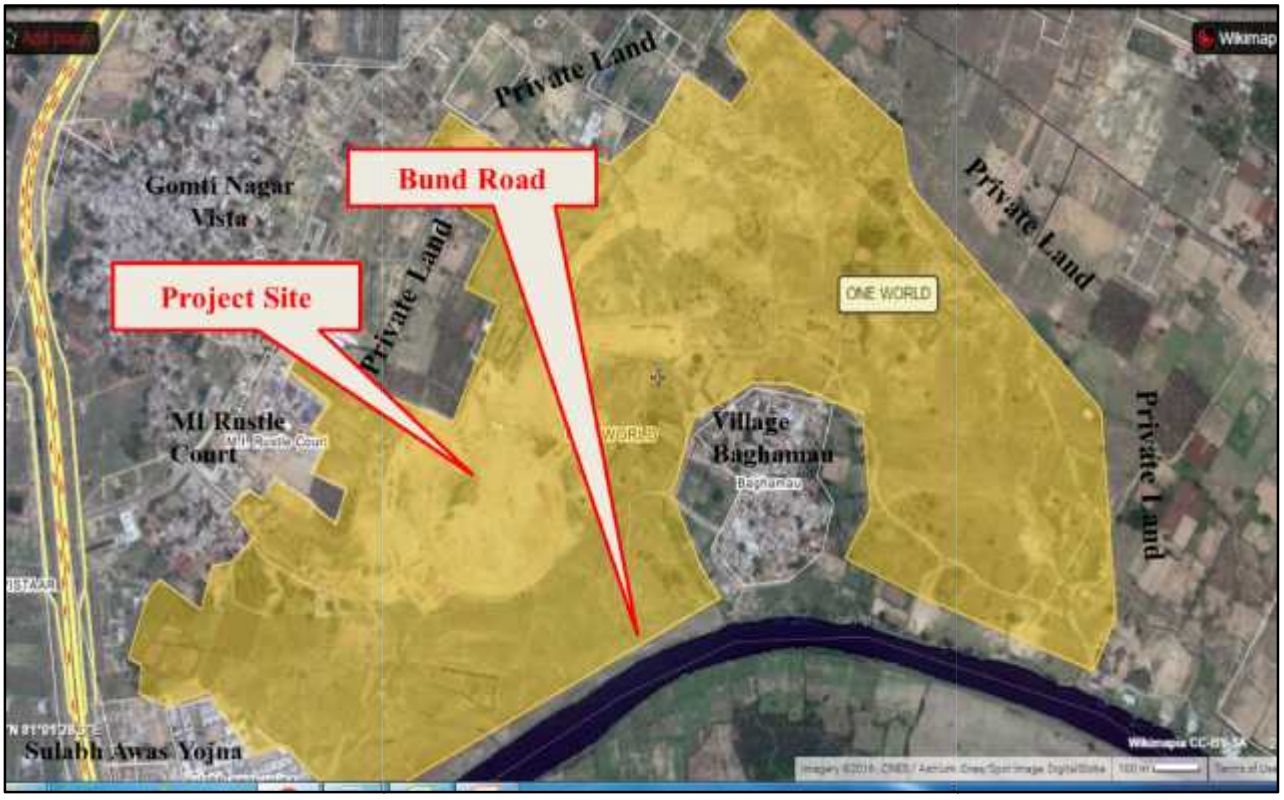

Fig.1: Location of Proposed Project Site

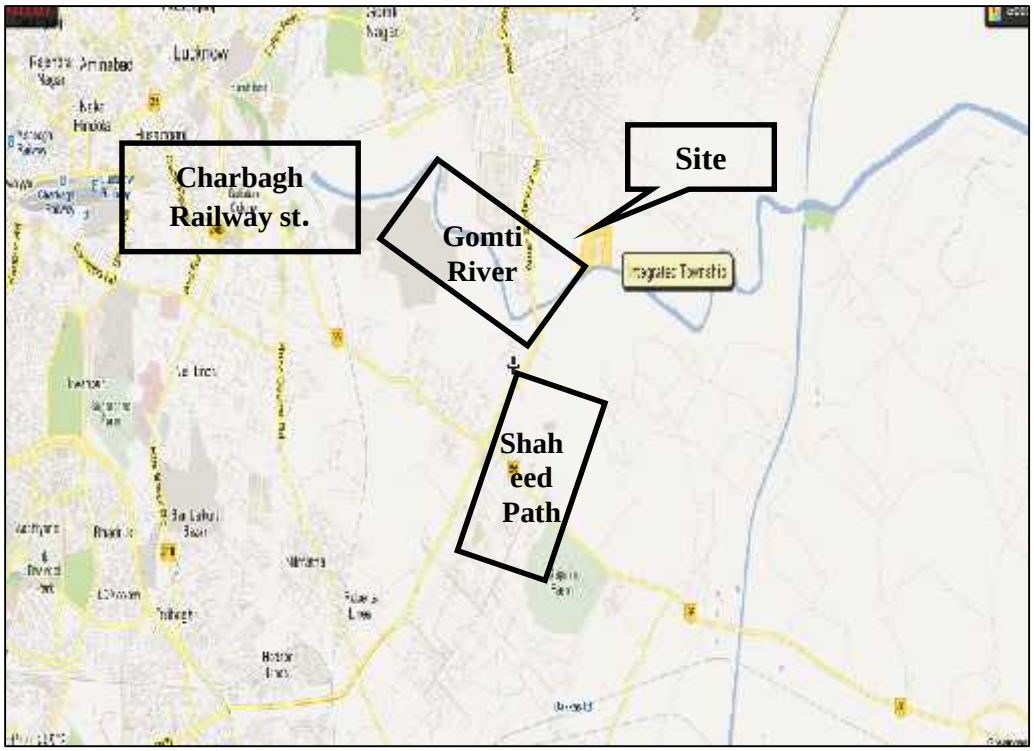

Fig. 2: Site and Surroundings within 10 km from proposed Project site

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

i) Site Details:

Table 1: Site Specific Details

Items	Details
Location	Village Baghamau, Distt.Lucknow, UP
Latitude & Longitude	26°49'25"N 81°1'33"E
Site Elevation (m)	112 m
Total Plot Area	9139.60 m^2
Category	B, Type- 8(a),Building & Large Construction Project
Land Use	Residential as per LDA Master Plan, 2021
Type of facilities	Public and Semi public utility
Nearest Highway	Lucknow bypass road (Shahid Path)
Nearest railway station	Gomti Nagar – 5 Km, Charbagh Rly. Station.- 11 km
Nearest airport	Amousi – 18 km
Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres,	Kukrail Reserve Forest 10 km (NW)

Items	Details
National parks, Wildlife sanctuaries)	
Rivers/Lakes	Kathauta lake 4.8 km (N)&Gomti River –400 m
Archaeological important places	Cemetery of Lamartiniere (7 km), Dilkusha Garden – 6 km &ShahnajafImambara – 8.6 km,
Seismic zone	Seismic Zone-III as per 2002 map.
Defense installations	Lucknow Cantonment- 6 km

Table -2:Area Statement

S.no.	Description	Area in sqm.	No./%
1.	**Plot Area**	**9139.60**	**100**
2.	Permissible Ground Coverage	3198.86	35
3.	Achieved Ground Coverage	2126.02	23.26
4.	Permissible FAR(2.50)	22849.00	2.50
5.	**Achieved FAR (2.49)**	**22754.18**	2.49
6.	Open Area(Plot Area- Ground Coverage) (9139.60-2126.02)	7013.58	
7.	Basement Area Fire escape Mumty and Machine room Balcony **Total Non-Far Area**	6435.54 67.68 335.36 316.82 **7155.4**	
8.	**Total Built up area** (Total Non-Far Area + FAR)	**29909.58**	
9.	Permissible No. of Units@200 units/HAC	183 units	
10.	Number of units provided	112 units	
11	Green area required 15% of plot area	1370.94	15
12.	Green area achieved (15.7%)	1435.47	15.7
13	**Required no. of parking**@ 1.5 ECS/Unit + 10% Visitor Parking		185 ECS
14	**Provided no. of Parking** Basement Surface **Total**	 87 ECS 156 ECS 243 ECS	
15	No. of Trees Required (one tree @ 80 m^2 of total open area)	88	
16	No. of trees proposed	104	
17	No. of Towers(G+13)	Tower 1&2 Tower 3&4	4
18	Estimated Population	Residents: 560(@ 5 person per unit)	

	(including retail)	Visitors: 56 Staff/ employees:28
19.	Power requirement & source	975 KW & UPPCL
20.	Power backup (DG Sets)	2500 KVA
21.	Sewage Generation	Amount of waste water generated : 45 KLD The sewage will be discharged into Sewer lines and will be further treated into CSTP of One World.
22.	Solid waste	Domestic waste : 298 kg/day Horticultural waste : 5.31 kg/day E- waste : <1kg/day

Table-3: Development Mix

Items	**Details**		
Area Utilization	**Towers**	**Number of Units**	**Number of Floors**
	Tower 1&2		
	Type 1(4 BHK)	56	G+13
	Type 2(3 BHK)		
	Tower 3&4		
	Type 1(4 BHK)	56	G+13
	Type 2(3 BHK)		

Table 4: Land use Distribution

S. No.	**Category**	**Area (sq. m.)**
1.	Ground Coverage	2126.02
2.	Road+ Internal circulation	5578.11
3.	Green Area	1435.47
Total Plot Area		**9139.60**

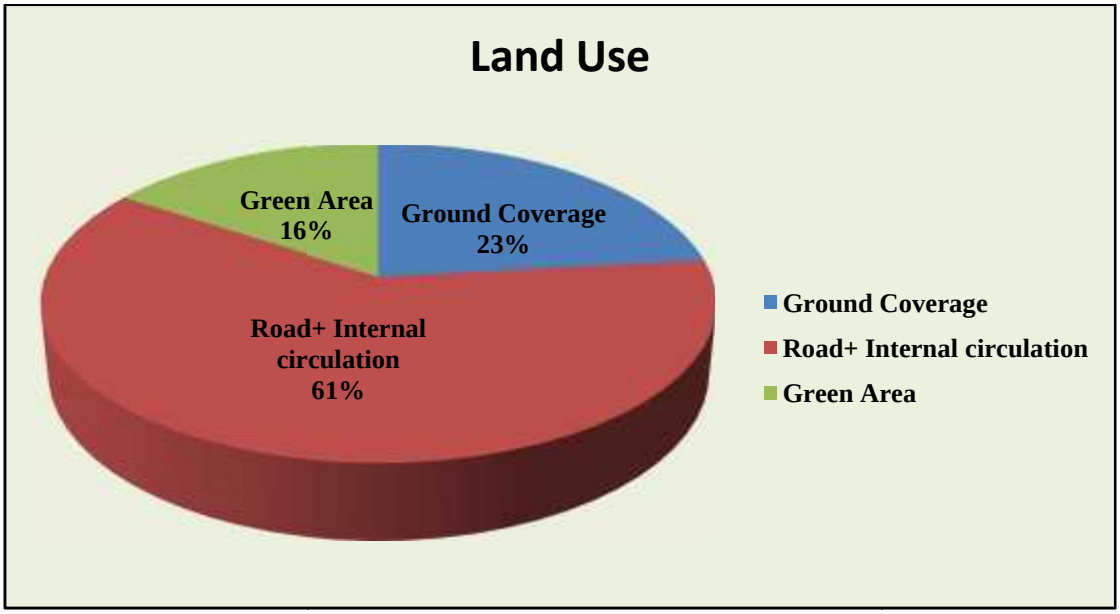

Fig. 3: Landuse map of the proposed project

Connectivity:

The project site is located inside an integrated township "One World" at Baghamau village near Shaheed path which provides excellent connectivity to major cities like, Faizabad, Sitapur, Barabanki etc. The Group Housing **"One World Belvedere-I"** will have two Entry/Exit through 24 m wide internal road, one from East and another from North -West direction.

Shaheed Path is 1 km from proposed site. NH-56 (Sultanpur Road) is 3 km and NH-28 is 6 km from proposed project. The entry/exit points have been marked on the layout plan. The project site is well connected to network of roads leading from various parts of the city. The details of connecting facilities to the project site are given below:

Location	Distance
Lucknow -Faizabad Road(NH- 28)	6.0 km
Amar Shaheed Path	1.0 km
Lohia Path	7.0 km
Charbagh Railway Station	11 km
Malhaur Railway Station	3.5 km
Amausi International Airport	16 km

Water consumption

During the construction stage, water will be sourced primarily with private water tankers. It is estimated that water demand during the construction phase may vary from 8 to 10 KLD.

During the project operational stage, water supply will be done through Ground water supply. The total water requirements of the Project will be 57 KLD. The fresh water demand of the project is 37 KLD and 20 KLD of treated water from STP which accounts for approx. 35 % of total water requirement. Use of treated water will reduce load on ground water ad make the project sustainable.

Wastewater

The total wastewater in operation phase will be 45 KLD. CSTP 2 of capacity 2500 KLD based on aerobic treatment technology will be installed in township. The waste water from this group housing will be sent to CSTP 2 of township and 20 KLD water will be recycled for low end uses including flushing, and Horticulture.

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 landuse disturbance to the local ecology).

The impact due to the proposed project may be increase in the traffic loads, increase in noise levels during construction activities, and dust emission, emanating from various construction activities. Due care will be taken during construction as well as operational phase to minimize the impact on surroundings such as excavation, shielding of construction site, wetting of roads and stockpiles etc.

There will not be any significant impacts of the proposed activity on the existing facilities adjacent to the proposed site, as the Authority has already provided all the necessary facilities such as connectivity, roads, and power supply etc. keeping in view the land use as per Master Plan.Project proponent will provide the efficient water supply, sewerage and drainage facilities. There is no disturbance to the local ecology. 15% of the plot area will be developed as green. The project will have positive impact on the existing environment. The extent of impact on the native species is proportional to the area of disturbance, since the project site is falling in the city itself so no significant disturbance is anticipated.

Fig. 4: Showing immediate site and surroundings

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).

There will be some land disturbance due to the upcoming project as the project will involve clearing, grading and construction of impervious surfaces.

Following mitigation measures will be used to mitigate the same:

- Land Clearance will be kept to minimum.
- Construction planning will be done to minimize exposed soil during times of the year when the potential for erosion is high, for example during summer.
- Site will be stabilized and erosion control measures will be adopted during any pause in construction.
- Suppression measures, such as promptly watering exposed area will be taken in account when visible dust is observed.
- Stockpiles will be located with the slope not greater than2:1 (horizontal or vertical).
- Size and number of stockpiles will be kept minimum and will be located away from drainage line.
- **Soil Type:**

The area is fairly plain and subsoil strata are alluviums deposited by water courses, geologically the litho log sections show dominant of sand percentage.

There will be no significant land disturbance resulting in erosion, subsidence or instability.

- **Erosion / Subsidence:**
- Project will provide ample green space. Therefore, there will no soil erosion, subsidence or instability problems.
- **Seismicity:**

  According to the Indian Standard Seismic Zoning Map, the area under study falls in Zone-III (refer Fig.4). Suitable seismic coefficients in horizontal and vertical directions will be adopted while designing the structures.

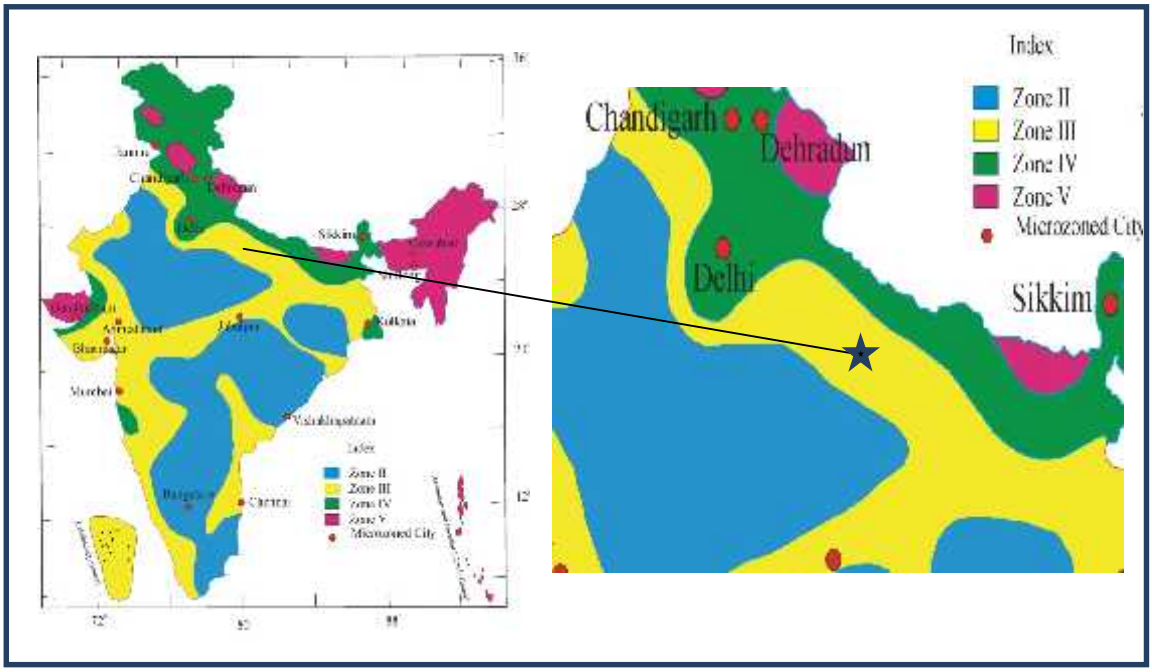

Fig. 5: Map Showing Seismic Zones in India, 2002

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).

The project will increase the paved area and thus the runoff from the project area is expected to increase due to reduced infiltration. There will be no alteration of natural Drainage System. The natural slope is towards the Gomti River which is southern boundary of the project site. Elevation of the project is 113 m from mean sea level. The runoff generated from roof top will be used for ground water recharging through rain water harvesting system. Hence, there will be no alteration to natural drainage system. The drainage pattern of the site is in line with the natural drainage system.

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.)

Approx. 20,000 cum. earth materials will be excavated during initial construction phase shall be reutilized into backfilling and leveling. Little cutting & filling will be done as the site is fairly plain. The top soil excavated during construction will be first temporarily stored in an area earmarked and then partly shall be used in landscaping only to fill up low lying areas around the project site and rest of the soil shall be transported to the designated disposal site in tune with the local norms.

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

- Water Requirement (Construction Phase): 8-10 KLD
- Source of water: Private water tankers will be the primary source of water requirement during construction phase and incase of shortage of water.
- Construction Debris (Bricks, Cement, Concrete and Mortar) generated will be reused in road construction, backfilling and leveling, spare debris (if any) will be disposed off as per the norms.
- Ready mix concrete will be used as far as possible.
- The fertile top soil will be reused for horticultural purpose.
- Spillage of oil from the machineries will be properly collected and disposed off.
- Septic tank with soak pit or mobile toilets shall be provided to take care of waste water generated from site (labor camps and site office)
- Domestic solid waste generated will be managed as per MSW (M & H) Rule.

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

No wetlands are present in and around the project site. Soil excavated during construction phase will be used in filling low lying areas within the project site. The nearest water body from the site is GomtiRiver which southern boundary of the project site.

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

Wastes which will be generated during the construction phase include the following:

- Excavated materials from earthworks (e.g. cuttings, foundation etc),
- General construction waste (e.g. wood, packing material, scrap metal, concrete and empty cement bags);
- Hazardous wastes generated by general site practices (e.g. vehicle and plantmaintenance/servicing);
- Municipal wastes generated by site workers.

Most of the construction waste will be reused in road construction; landscaping and surplus will be sold to recyclers.

Excavated Materials from Earthworks

Maximum percentage of excavated material will be re-used within premises for different purposes. The excess earth would only be the construction wastes and will not cause any health hazards.

Municipal Waste & Other waste

Municipal wastes comprise food wastes, packaging and waste paper. Generation rate of solid waste from labour colony will vary from place to place due to habits and living condition. Approximately 0.25 Kg/capita/day of municipal waste may be expected during construction phase.There will be approx. 50 workers on site during peak construction phase and the total anticipated waste generation will be 12.5 kg/day. Garbage bins will be placed on the strategic locations to cater the waste and maintain the hygienic conditions on site. The collected waste material will be disposed through authorized waste management agency.

Some amount of debris, cuttings and construction materials may be observed at construction site. However the quantity of their waste materials would be very small and limits up to the construction site only. Contamination by these wastes would be negligible and would be collected time to time during construction phase and disposed off accordingly.

The Impact on soil during construction phase will be marginal and reversible in nature.

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, Source and Water Balance

A provision of 86 lpcd (liters per capita per day) for domestic water requirements shall be made. This in accordance with the Manual of Water Supply, Central Public Health and Environmental Engineering Organization (CPHEEO), Ministry of Housing, Government of India (GOI).
The water consumption comes out to be 86 lpcd for domestic and 30 lpcd for commercial after installing the following water saving practices.

1. Using low flushing systems- using efficient water saving toilets with dual flush systems, thus saving about 50 percent of water.
2. Sensor based fixtures- these reduce about 0.4 liters per flush.
3. Low flow faucets along with other water saving devices resulting in 25 to 50 percent water.
4. Low flow shower with flow rates at 7.5Lpm @ 80 psi
5. Other pressure reducing devices to reduce from 80 psi to 65 and 50 psi thus reducing water consumption by 10 – 25%

Source:Manual on Norms and Standards for Environmental Clearance of Large Scale Projects, MoEF.

The details of total water requirement for the project and its breakup, source of water and water balance in both construction and operation phase are given below:

Table 4: Water Balance in Construction Phase

S. No.	Particulars	Water Requirement		Wastewater Generation	
		Total Population	Quantity (KLD)	Quantity (KLD)	Remarks
1.	Domestic Water for labour	50 workers	@ 45 lpcd 2.25 Will be met by contractor	2.0	@ 85% Wastewater will be disposed into Septic Tank
2.	Dust Suppression		3.0	-	Losses
3.	Washing of Construction Equipment		3.0	2.4	20% loss on washing; rest will be collected and reused for curing after necessary treatment
4.	Curing		2 KLD Reused	-	Losses
	Total		10	4.4	

The total water requirement for the project is 10 KLD and total waste water generated in the construction phase will be 4 .4 KLD which will bemanaged through septic tanks and soak pits.

Table 5: Water Requirement Calculations

S. No.	Description	unit/Area (in m^2)	Total Occupancy	Rate of Fresh water demand (lpcd)	Total Fresh Water (KLD)	Rate of Flushing water demand (lpcd)	Total Flushing/ Recycled water (KLD)	Total Water Requirement (KLD)
Residential								
1.	**Group Housing**	112 units	560	65	36	21	11.76	48
2.	**Visitors**(10 %)		56	5	0.28	10	0.56	1.0
3.	**Staff**(5%)		28	30	0.84	15	0.42	1.26
Total water demand (drinking & Flushing)					**37**		**13**	**50**
4.	Horticulture area	1435.47 m^2		5 l/sqm.			7	7
Total					**37**		**20**	**57**

Water/ Waste water Details	
Fresh water	37 KLD
Flushing	13 KLD
Horticulture / Landscape	7 KLD
Total water requirement	**57 KLD**
Waste water	45 KLD
Source of water - Ground Water Supply	
Waste water: 45KLD , which will be treated in Combined STP 2 of **" One World"** an integrated Township having capacity 2500 KLD	

The total water requirement for the project is 57 KLD. Out of the total water requirement, 37 KLD is the fresh water requirement and 45 KLD will be the total waste water generated which will be treated into CSTP of capacity of 2500 KLD at One World siteand utilized within the project for Flushing & Horticulture.

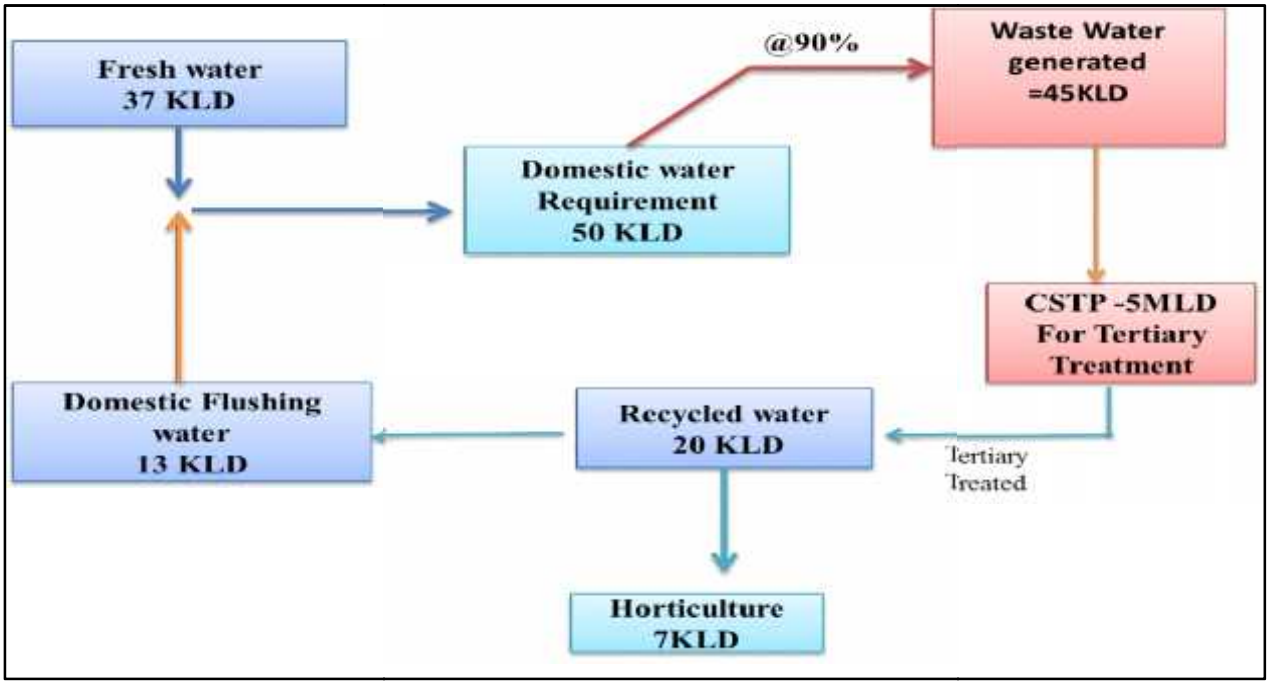

Fig. 6: Water Balance Diagram(Non-monsoon)

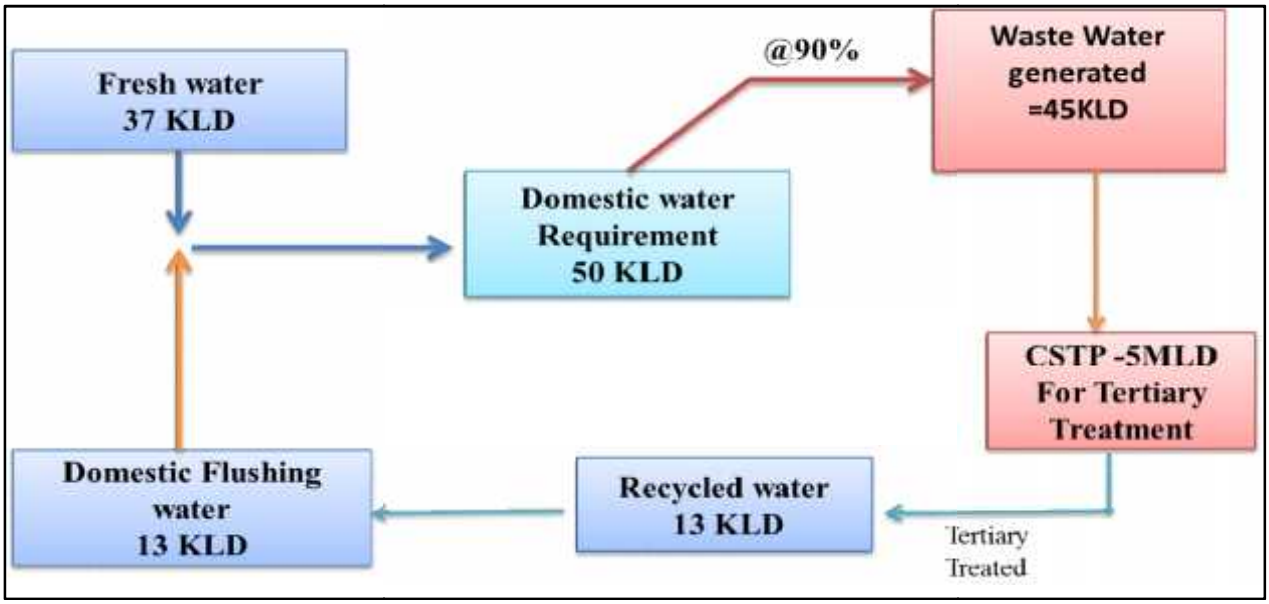

Fig. 7: Water Balance Diagram (Monsoon)

Note: The Generated waste water from the proposed project will be treated in the CSTP 2 of Integrated Township "One World" having a capacity of 2500 KLD and Tertiary treated water will be recirculate for flushing and other low end uses.

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

Lucknow utilizes two sources of water to meet customers' needs:

Gomti Surface Water: The present supply from surface water is met through river Gomti through its water works at Aishbagh and Balagunj. Lucknow Jal Sansthan supplies the water

supply to Lucknow city. Another water works is under construction stage at Gomti Nagar. The water works will also get water from Sharda canal which will benefit the residence of Gomti Nagar and Trans – Gomti area. The present Supply through Jal Sansthan is as follows:

- Supply through Aishbagh Water works -172 MLD
- Supply through Balagunj water Works - 70 MLD

Total Surface Water Supply - 242 MLD

Ground Water: Ground water is a natural occurrence. Ground water supply is met through deep, shallow tubewells, Indiamark II Handpumps & Indira wells through Jal Sansthan as follows:

- Supply through more than 350 tubewells - 185 MLD
- Supply through 5000 India Mark II Handpumps - 25 MLD
- Supply through 55 Indira wells - 28 MLD.

Total Ground water supply - 238 MLD.

Thus the total supply for entire Lucknow city at present is 480 MLD out of which surface contributes 242 MLD and Ground water contributes 238 MLD.

Water will be supplied from Ground Water.

Fresh water demand	37 KLD
Recycled water	20KLD
Total Water Demand	57 KLD

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).

The supply is through Ground water supply, the quality of water is drinkable as per norms. Physical, Chemical, Biological characteristics with class of water quality will be provided in the Conceptual Plan.

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).

20 KLD of water will be met through recycling of treated wastewater for Flushing, Horticulture etc.which will be 35% of total water demand. Details of water usages are as follows:

Water/ Waste water Details	
Fresh water	37 KLD
Flushing	13 KLD
Horticulture / Landscape	7 KLD
Total water requirement	**57 KLD**
Waste water	45 KLD

Source of water - Ground Water Supply
Waste water: 45 KLD , which will be treated in Combined STP 2 of **" One World"** an integrated Township having capacity 2500 KLD

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 is no diversion of water from other users. No significant depreciation in ground water level will be envisaged as the ground water adjusts itself.

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).

The waste water generated from residential complex (i.e. 45 KLD) will be treated in the CSTP 2 of One world 2500 KLD. 20 KLD will be recycled after Tertiary Treatment for various low end uses including toilet flushing and horticulture purposes. All the waste water generated will be treated in STP. No increase in pollution load expected.

Table 7: Estimated Characteristics of Treated and Raw Sewage

Parameter	Raw Sewage (Influent)	Treated Sewage (After Secondary Treatment)	Treated Sewage (After Tertiary Treatment)
pH	7.5 – 8.5	6.5- 8.5	6- 8
BOD_3 at 27^0C (mg/l)	250 - 350	< 30	< 5
COD (mg/l)	400 - 500	< 100	< 10
Suspended solids (mg/l)	250 - 450	< 100	< 5
Oil and Grease (mg/l)	30	< 10	< 1

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

The rainwater will be collected through piped drains and conveyed into rainwater harvesting system. All storm water drains have been designed for adequate size and slope such that there shall not be any flooding on the site. It shall be ensured that no wastewater shall enter into storm water drainage system. Water harvesting pits have been proposed for augmentation of ground water. The rainwater collected from the rooftop will be conveyed into the rainwater harvesting system consisting of Desilting-cum-filter chamber and borewells for recharge into the groundwater and a storage tank with a capacity of 17 m^3. Rain water from paved and green areas will percolate naturally through capillary action and augment the water table. RWH will be

initially done only from the roof top. However the rain water pits have been proposed for the whole area. No demand will be met from the process.

Analysis of the observed data on intensity duration of rainfall of past records over a period of years in the area is necessary to arrive at a fair estimate of intensity-duration for given frequencies. The longer the record available, the more dependable is the forecast. In Indian conditions, intensity of rainfall adopted in design is usually in the range of 40mm/hr. The intensity of precipitation for design of drainage scheme has been taken 40 mm/hr.

The desilting tanks are used to remove silt and other floating impurities from rainwater. Desilting tank is like an ordinary container having provision for the inflow, outflow and overflow. Apart from removing silt it holds the excess amount of water till it is soaked up by the recharge structure. The bottom of tank will have unpaved surface to allow standing water to percolate into the soil.

Table 8: Storm Water Calculation

Peak Run off				
Max, Rainfall Intensity 40 mm/hr				
Location	**Runoff Coefficient**	**Area m^2**	**Rainfall intensity (in m)**	**Peak Run off in m^3/hr.**
Roof Area	0.8	2126.02	0.04	68.03
Paved area	0.6	5578.11	0.04	133.87
Green Area	0.2	1435.47	0.04	11.48
Total Runoff m^3/hr.				**213**

Runoff Potential

Total Runoff = 213 m^3/hr.

Roof top runoff= 68 m^3/hr.

Taking 15 minutes Retention Time, Total volume of storm water = 213/4= 53 m^3

Particular	Size	Volume
Desilting Chamber	2.0 m x 2.0 m x 1.5 m	6 m^3
Recharge Pit	2.5 m x 2.5m x 3 m	18.75 m^3
Total Effective Volume		24.75 m^3

Hence No. of pits required = 53/ 24.75 = 2.15 pits or 2 pits

No. of Pits Required for Roof top rainwater harvesting:

Roof top Runoff = 68 m^3/hr

Taking 15 minutes Retention Time, Total volume of storm water = 68/4=17 m^3

Hence No. of pits required = 17/ 24.75 = 0.68 Pits or 1 Pits

No. of pits Provided: 2

Note: RWH will be initially done only from the roof top. Runoff from green and other open areas will be done only after permission from CGWB.

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?

Maximum storm rainfall of 40 mm has been assumed on the past experience. The project will increase the paved areas and thus the runoff from the project area is expected to increase due to reducedinfiltration. No adverse impacts are envisaged due to proposed project on the run off characteristics of the area as adequate arrangements have been made to trap the rainwater and suitable storm water drainage system has been provided.

During the post-construction phase, runoff from the project shall not be allowed to stand and create water logging or enter into the road side or nearby drain. Adequate measures shall be taken to collect such run off and either shall be reuse or stored in recharging pits. Suitable garlanding drain as per the existing contours of the plot will be developed. There is no landscape change planned. The project will not aggravate the problems of flooding or water logging in any way, as the topography is plain.

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).

There will be little impact on the groundwater by the proposed project. Water is used from Ground water supply.

Actually the groundwater will be augmented further as rainwater harvesting is proposed. The rainwater collected from Roof top will be sent for ground water recharging through 1 RWH pits. 68m^3/hr of water is available for ground water recharge which will recharge through RWH pits.

Hence no adverse impacts are envisaged due to the project on the ground water quality and the level. Maximum recharging of the underground aquifer will be done.

Ground water status of Lucknow District:

Area of Lucknow city forms a part of central Ganga plains and is piled up of alluvial sediments of Quaternary age and can be classified as Newer and Older Alluvium. The Newer alluvium occurs

in the active flood plains of river Gomti at topographic low areas. The sediments in the Newer Alluvium are generally micaceous greysands, silt and clay belonging to Upper Pleistocene to Recent age group. The Older Alluviums occur at topographic high areas & do not get flooded. The sediments in Older Alluvium are generally sand of various grades, clays, kankar, and silt. Alternate beds of sand and clay occur with intermixing of kankar bed. These sediments belong to upper to middle Pleistocene age. Ground water occurs in the pore spaces of unconsolidated alluvial sediments in the zone of saturation under phreatic and semi-confined conditions. In deeper aquifers it occurs under semi confined to confined conditions.

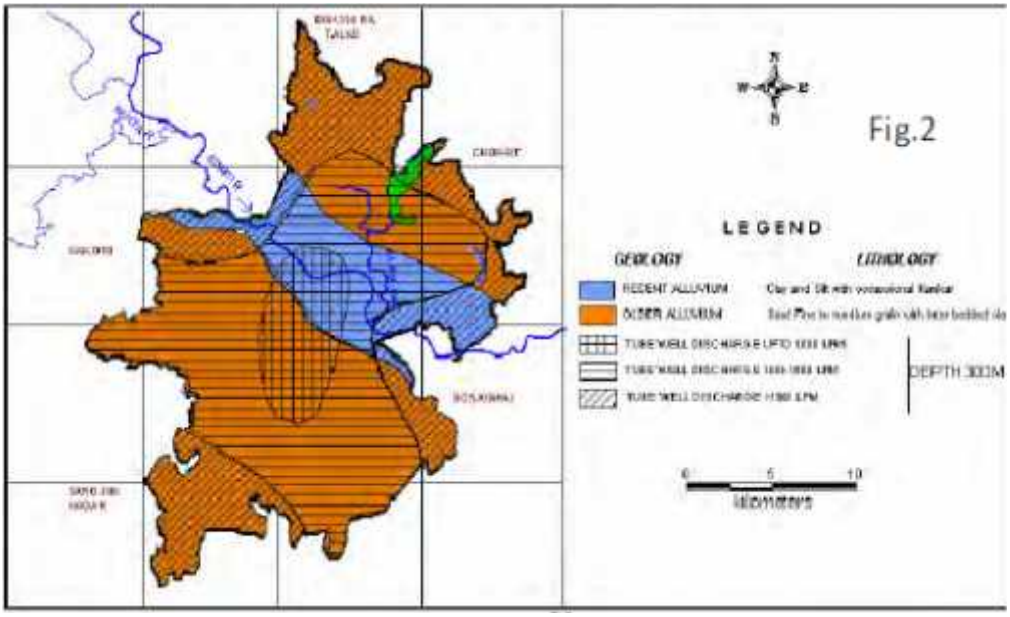

Fig. 8: Hydrogeology of Lucknowdistrict

Hydrogeology: The site being located on alluvial plains has good recharging capacity. The site is low lying as such the water logging occurs for shorter durations during the rainy season. This helps in the water recharging of the area proposed for township.

The soil having good retaining capacity yields enough water to sustain moderate level tube wells. The water level in the area fluctuates between pre to post monsoon varies from 1 to 1.5 m. The existing sources of water in and around the project are dug-cum bore wells and shallow tube wells. The water table in the area is at around 45-4m depth.

Potential Aquifers

A total number of 31 exploratory wells, 5 Piezometres have been constructed by CGWB to know the aquifers geometry of the district. Total five tier aquifer system exists in the Lucknow City

which is as follows. The aquifer material in these groups is sands of various grades, clays, kankar and silts.

Aquifer Group		
S. No.	**Aquifer Group**	**Depth Range (mgbl)**
1.	First Aquifer Group	00.00-150.00
2.	Second Aquifer Group	160.00-240.00
3.	Third Aquifer Group	260.00- 370.00
4.	Fourth Aquifer Group	380.00-480.00
5.	Fifth Aquifer Group	483.00-680.00

The occurrence of ground water is quite encouraging in northern and north eastern part of the city in Janakipuram, along Kursi Road and Chinhat. Moderate yield potential lies in the North West and western part of the city. To augment the demand of the future mega city, all ground water abstractions shall be done from Trans–Gomti area in the north and north east and beyond Sarojani Nagar. Further flood plains of Gomati river can be exploited by constructing shallow tubewells, radial wells, collector wells, rainy wells. These structures may be taken up in the upstream of Gaughat.

Permission from CGWA for ground water extraction for the township has been obtained. The proposed group housing will be constructed inside the township.

2.10 What precautions/measures are taken to prevent the run-off from construction activities polluting land & aquifers? (Give details of quantities and the measures taken to avoid the adverse impacts).

Surface water quality may be affected with the discharge of the runoff from the project site. The impact to the surface water bodies could arise from the increased soil erosion from excavated site, only to increase in the suspended particles and turbidity of runoff water from the site. However, this impact will be temporary in nature and would be observed in first rain only and as soon as the rain is over, excavated soil at site would be stabilized therefore the surface water quality during rains will be impacted marginally for very short duration. Plantation of trees will start from construction phase itself. No runoff will be disposed outside the project boundary except in rare conditions.

Effective measures will be adapted to reduce the storm water run-off from the construction site-

- Ensuring vehicles stick to the access track.
- Cleaning all mud and dirt deposited on roads from construction-related activities.
- Excavation work will not be carried out during monsoon season.
- Constructing a fence around the site to trap sediment whilst allowing water to flow through.
- Diverting up-slope water with turf and not mixing mortar in locations that will drain into storm water system.

- Preventing wastewater from brick cutting activities and stockpiles entering the storm water system.
- Construction material will be stored in temporary shed at the earmarked place and will be covered ensuring that no leachate or spoilage of land occurs.
- Curing water will be sprayed and, after liberal curing, all concrete structures will be painted with curing compound & covered with gunny bags, then the water will be sprayed.
- 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.

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).

Since the existing topography is congenial to surface disposal, a network of storm water pipe drains has been planned adjacent to roads. All building roof water will be brought down through drain water pipes. Proposed storm water system consists of pipe drains, catch basins and seepage pits at regular intervals for rain water harvestings and ground water recharging. The storm rainfall of 30 mm/hr. has been considered for designing the storm water drainage system.

Detailed storm water management plan will be implemented and regular inspection and cleaning of drains will be carried out.

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

Sewerage and solid waste will be generated from temporary labour camps on site, which will be temporary in nature during the initial construction phase. Bins shall be placed near the camps for solid waste collection. The solid waste will be properly disposed as per MSW Rules 2000. The sewage will be disposed through septic tank or mobile toilets and STP and discharge into One world sewers. Therefore during, construction there will not be any unsanitary conditions around the project area.

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 from residential complex (i.e. 45KLD) will be treated in the CSTP 2 of 2500 KLD. 20 KLD will be recycled after Tertiary Treatment for various low end uses including toilet flushing and horticulture purposes.

2.14 Give details of dual plumbing system, if treated waste is used for flushing of toilets or any other use.

Dual Plumbing with different color pipes will be provided for utilization of recycled water for flushing, DG, and horticulture.

3. VEGETATION

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

No, the project will not pose any threat to the biodiversity of the locality. The project site was an open or agricultural land near village Baghamau. As the project site do not contain any water body, therefore, no scope of disturbance to the aquatic flora will be involved. Moreover, quite a number of trees will be planted. The species will be predominantly native in nature so that they merge with the local ecosystem.

Biodiversity rich area like Gomti river and Kukrail Reserve Forest lies at a distance of about 400 m, and 10 km respectively (aerial distance), National Botanical Research Institute (NBRI)-6 km.

All the waste (liquid/solid/gases) will be treated and managed as per Rules. The impact due to proposed project will not be there. Some of the Flora-Fauna found in the region is listed below:

Flora of the study area (Secondary sources): Ashoka, Chitwan, Scholar Tree, Neem, Kaner, Amaltas,Gulmohar, Peepal, Bottle Brush & Bottle Palm etc.

Fauna of the Study area (Secondary sources): Mostly domestic animal's viz. Dog, Cat, Horse, Donkey & Cattle etc.

Avifauna: Common Crow, Chukar Partridge, Duck, Hornbill & Rain Quail etc.

Endangeredand Threatened Species

Endangered and threatened animals of India have been listed in the Schedule I and Schedule II of the Wildlife (Protection) Act 1972 (amended in 2001). No threatened, rare, endangered, or endemic species were observed during the survey in core zone. In Study Area following species were observed.

Schedule I: Birds: Peafowl (*Pavocristatus*)

Schedule II: Reptiles: Indian cobra (*Naja naja*), Crocodile (*Crocodylus niloticus*) and Alligator (*Gavialis gangeticus*)

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

There will be no damage to the floral diversity, and every precaution will be taken to preserve them. The green belt will be developed in the project.
The plant species around the site are local tree species and no rare or endangered tree species are found.

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).

Due care will be taken to protect the important site features:

- Tree plantation will be done to protect the site features such as topsoil erosion, ground water attenuation and avoiding contamination by leachate.
- The excavated soil will be stored at earmarked places protected from contamination and from polluting the existing features and will be used for surface leveling and for creation of landscaped areas.
- Piling will not be done so as to minimize the impacts on the existing structures in the nearby areas.

Adequate measures will be taken to minimize the likely impacts of the proposed project on the surrounding as well as the project site itself and documented in the Environmental Management Plan.
General principles in greenbelt design considered for this study area:

- Type of pollution likely air, noise, and water and land pollution generated from the activities at the site.
- Agro-climatic zone and sub-zone where the greenbelt is located
- Water quantity and quality available in the area
- Soil quality in the area.

Total landscaped area proposed for project is 1435.47m^2. A combination of evergreen and ornamental flowering trees, palms, shrubs and ground covers will be planted along the sides of the roads and in open spaces & sat back area within the complex. The details will be given in Conceptual Plan.

Landscaping is an important element in altering the microclimate of a place. Proper landscaping reduces direct sun from striking the buildings and heating up building surfaces, prevents reflected light carrying heat into a building from the ground or surfaces, creates different airflow patterns and can be used to direct or divert the wind advantageously by causing a pressure difference.

Shade created by trees and the effects of grass and shrubs reduce air temperature adjoining the building and provide evaporative cooling. A study shows that the ambient air under a tree is 2^0C to 2.5^0C lower than that for adjacent un-shaded areas.

Parks & Avenue Plantation

Ornamental trees with spreading branches, shade giving with colorful flowers for students/staff to relax and suitable patches of lawns shall be provided. The following trees proposed to be planted in the proposed project.

- Trees with colonial canopy with attractive flowering.
- Trees with branching at 10 feet and above.
- Trees with medium spreading branches to avoid obstruction to the traffic, fruit trees to be avoided because children may obstruct traffic and general movement of public.

The selection of plant species for the development depends on various factors such as climate, elevation and soil. The list of plant species, which can be suitably planted, and having significant importance are provided in Table-12.

Table-9: List of Plant Species to be planted in the Green Area

S. No.	Scientific Name	Standard Name	Time when flowering/Fruiting Occurs
1	*Ficus benjamina*	Ficus	January- March
2	*Plumeria indica*	Frangipani	January- March
3	*Tecoma stans*	Piliya	August-October
4	*Lagerstroemia speciosa*	Jarul	March-June
5	*Bauhinia variegata*	Kanchan	May-June
6	*Cassia fistula*	Amaltas	March-June
7	*Emblica officinalis*	Amla	January
8	*Erythurina indica*	Dadap	July-August
9	*Delonix regia*	Gulmohar	February-June
10	*Nyctanthes arbortristis*	Harsingar	Throughout the year
11	*Butea monosperma*	Palash	Feb-April

4.0 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 site is situated in semi-urban ecosystem which possesses faunal species are well adapted to the human dominated areas. Therefore, this project will not be barrier for movement of any faunal

species. Existing trees, shrubs and herbs of surrounding area of site will attract the arboreal species.

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

There is no impact on the avifauna of the area. Due to the provision of plantation on the project site it is expected that site will attract small fauna.

4.3 Prescribe measures such as corridors, fish ladders etc to mitigate adverse impacts on fauna.
As there is no displacement of fauna, no mitigation measures are required and provided.

5.0 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 and DG set emission due to project is not going to cause significant increase in atmospheric concentration of gases and will not result in heat island formation. The minor impacts of emissions from traffic will be neutralized by developing a thick green belt along the periphery and internal road side. To minimize the effect of emissions, adequate stack height as per CPCB standards will be provided.

During construction phase, dust emissions will be the main pollutants associated within on-site roads, (paved and unpaved), stockpiles and material handling. Regular water sprinkling will be done and construction material will be transferred in trucks covered with tarpaulin.

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.

The impacts of dust and gaseous pollutants due to different construction activities will be localized. All necessary measures will be taken.

I. Dust:

Sources: Site preparation, excavation, construction, traffic.

Type: Area Source, Line Source

Extent: Localized

- Water spraying at dust generation sources/area.
- All transportation vehicles will be suitably covered to prevent dust from the trucks and overloading of the vehicles and vehicles will be PUC certified.

II. Smoke:

Sources: vehicular exhaust, DG set

Type: Line sources, Point Sources

Extent: Localized

Mitigation:

- D.G. set will be provided with adequate safe stack-height above the terrace level of the building to regulate the emission within the permissible norms.
- Low-sulphur-content fuel will be used which will help to contain the emissions within the permissible range.

III.Odorousfumes:

Sources: Unsanitized conditions, in door finishing

Type: Gases, vapors, fumes, dusts, fibres, mists.

Extent: localized

Mitigation:

- Avoid unsanitized conditions
- VOC free paints will be used
- Properly ventilated workspace

No negative impact outside of site. Dust emissions from excavation, air emission from machinery and other construction activities. Dust reduction measures such as road watering and periodic maintenance of road, equipment use of personal protective equipment. Most of the concrete to be used at site will be ready mix concrete which is available from nearby factories.

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.

Adequate provision will be kept for car/vehicles parking at the proposed project as per State bye laws.

The project complex will have traffic entry/exit from the 24 m wide road one from North-west direction and another is east direction. The entry/exit points have been marked on the layout plan. The project site is well connected to network of roads leading from various parts of the city.

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

The site layout plan showing movement pattern is enclosed. The Proposed Group Housing project will have two Entry/Exit through 24 m wide internal road one from East and another from North - West direction.

Table 10: Parking Required & Parking Provided

Required no. of parking@ 1.5 ECS/Unit + 10% Visitor Parking: **185 ECS**	
Parking Provided	
Basement Parking	87 ECS
Open/ Surface parking	156 ECS
Total Proposed Parking Space	**243 ECS**

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.

During the construction phase, some noise will be generated through the operation of construction machines, excavators, DG set, etc. Following measures should be taken; into consideration to mitigate the noise at construction site:

- Efforts shall be made to the extent feasible not to use such excavation/ construction machines, which generate noise levels much more than 85 dB (A),
- Silencers shall be fitted on construction machines and DG set,
- Acoustic enclosures should provide to DG set at the construction site,
- Earmuff and other protecting, devices shall be provided to labour working in high noise generation machines.

During post construction phase, adverse impacts of noise will be mitigated by adopting following measures.

- DG set will be silent type and provided with the anti-vibration pads.
- Administrative control by display of slogans and signages.
- Green belt/plantation along the internal roads will also work as noise harriers.

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.

Impacts on Air Quality and Noise levels due to DG Sets& other equipments

Noise will be emitted during construction due to operation of construction machinery like transit mixture, concrete pumps, tower cranes, Air compressors etc. Vulnerable receptors would not be significantly affected. Noise generated in this phase would be spread throughout the site depending upon equipment operation at a location. Impact on onsite workers are expected to be high but reduced substantially with use of PPE like earplugs and earmuffs.

One of the major sources of noise during operational phase will be the diesel based generator which will be housed in the basement. Impacts on ambient air during operation phase would be due to emissions from the stacks attached to stand by DG sets only during grid power failure

Mitigation Measures

- Back up DG sets will comply with the applicable emission norms.
- Adequate stack height for DG sets will be provided as per norms.
- Back up DG sets will be used only during power failure.
- Monitoring of emissions from DG sets and ambient air quality will be carried out as per norm.
- DG Sets will be of silent type with anti-vibration pads.

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 proposed construction in any way will not result in the obstruction of a view, scenic amenity or landscapes, which has already been considered during planning.

The architecture of the proposed project will be in accordance with the architecture of the residential buildings of the township and in the area. The project will have good ambience and state of art infrastructures. The proposed constructions in any way will not result in the obstruction of a view, scenic amenity or landscapes. The complex is well planned with plenty of open space, green areas and amenities.

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

The development in the project-influenced area is as per the development plan. Hence no adverse impacts are anticipated from new constructions on the existing structures in this area.

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

The architectural design of the project is in accordance with the guidelines of Lucknow Development Authority, Building Bye-laws and National Building Code of India.

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

There are few anthropological or archaeological sites or artifacts nearby. (as per ASI): Cemetery of Lamartiniere (7 km), Dilkusha Garden – 6 km & Shahnajaf Imambara – 8.6 km.

7.0 SOCIO-ECONOMIC ASPECTS

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

The proposed project will attract residents from nearby densely populated cities like Lucknow, Barabanki and Kanpur. This will result in decongestion of city's population and will provide healthy living opportunities. Along with this various short term and long term employment opportunities will be generated during construction and operation phase of the project and this will have significant positive impacts on social and demographic structure of nearby local population and villages.

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

Site is located on vacant land earmarked for Residential landuse. Proposed project siteis located inside the integrated township **"One World".** All the social setup like Primary School, Degree College, Roads, Electricity and open market are available in vicinity of site. Good employment and development opportunity in the area near Shaheed Path is present because of availability of natural and manmade resource like Highways, Water & Power. Several projects are being planned or under construction in the vicinity.

There are various facilities which are being proposed inside an integrated township like school, commercial shops and community centre, hospital, EWS/LIG, Villas etc.

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

Based on the nature and type of impacts, the assessment has been divided into three category i.e. positive, negative and negligible impacts. For example the positive impacts are: job creation for men and women, better utilization of land, preservation of environment, and infrastructure development. Long term impacts have taken into account i.e. relocation, demography, aesthetics, accessing utilities, and impact on archeological sites.

Job opportunity: During the social impact assessment process, meetings were held with the neighboring community to listen to their specific concerns. The key question raised by the local community was the employment opportunities that would be generated in the area. The benefit relate to the direct employment associated with the construction of the facility.

Benefits to women: The proposed project is likely to generate jobs for the women labor during construction as well other jobs during operation phase. Once the residents move in, there is likely to be a huge demand for "domestic help". This could open up new additional employment opportunities to women who were otherwise mostly exposed to strenuous farm labour.

Appreciation in land value: With the housing project coming in the area the prices of the land will appreciate considerably. Hence the proposed project will have beneficial impact.

Aesthetics Environment: The architectural character of the new building, the vistas and landscaped areas created would improve the aesthetics of the area.

Transport: Additional traffic in the area is a matter of concern to the local people. This effect would be prominent during construction as well as operation phase. Though the probability of inconvenience faced due to the frequency of truck movement during construction phase would be negligible compared to traffic on any national highway or state highway. The proposed prospect of better transport facility in terms of the Shaheed Path and Faizabad road along the eastern boundary of the site further makes this factor insignificant.

During operation phase, the vehicular movement would be of passenger car and buses that will cause higher noise exposure in the villages. Though the noise levels expected from the planned operating conditions has been assessed and is likely to be within acceptable levels.

Safeguards

The social management plan has been designed to take proactive steps and adopt best practices, which are sensitive to the socio-cultural setting of the region.

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 major materials required for construction of the proposed project will be steel, cement, bricks, metal, flooring tiles/stones, sanitary and hardware items, electrical fittings, water, etc.

- Conventional construction material will be used outsourced from authorized vendors/sellers.
- All 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.

- Low embodied energy material like ready mix concrete, fly ash bricks 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?

Mitigation Measures for Air Pollution (Construction Stage)

To minimize the adverse impact due to air pollution during construction following measures will be taken.

- Transportation of construction material will be done with suitable covering like tarpaulin cover.
- Water sprinkling shall be done at the location where dust generation is anticipated.
- Raw material handling yard will be enclosed from all sides.
- To minimize the occupational health hazard, proper personal protective gears i.e. mask will be provided to the workers who are engaged in dust generation activity.
- The trucks used for transport will be thoroughly checked for emission parameters and properly maintained.
- The raw materials transport will be avoided during the peak hours to reduce traffic load.

Mitigation measures for Noise Pollution (Construction Stage)

- Administrative as well as engineering control of noise will be implemented. To prevent occupational hazard earmuffs / earplugs shall be given to the workers working around the operating plant and machinery emitting high noise levels.
- Use of such machinery emitting high noise levelsshall not be allowed during night hours.
- Careful planning of machinery operations and scheduling of operations shall be done to minimize such impacts.
- Unloading of construction material will not be done during night.

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

Waste from construction like excavated earth, empty cement bags, paper carton and iron rods etc will be reused/recycled as far as possible. Empty plastic cement bag and other plastic waste will be used in road construction. The waste generated as PPC cement, reinforced steel, ceramic tiles will be used as a construction material.

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

The philosophy of solid waste management will be to encourage the four R's of waste i.e. waste reduction, reuse, recycling, and recovery (materials & energy). Regular public awareness meetings will be conducted to involve the residents in the proper solid waste management plan, options and techniques.

Estimation of solid Waste

On the basis of the solid waste being collected in different cities, the per capita rate of solid waste generation has been adopted as 0.5 kg per day per person for residents, 0.25 kg per day per person for staffs and 0.15 kg per day per person for visitors, Horticulture waste @ 15 kg /acre, and e-waste @ 0.15kg/capita/year. Thus the anticipated municipal solid waste worked out as below:

Table 11: Solid Waste generation

S. No.	Particulars	Population	Waste generated in kg/day
1.	Residential (@0.5kg/day)	560	280
2.	staff (@0.25 kg/day)	56	14
3.	Visitors (@0.15kg/day)	28	4.2
Total Solid waste generated			Approx. 298 kg/day
4.	Horticulture Waste (@ .0037kg/m^2/day)		5.31 Kg/Day
5.	E-Waste (0.15 kg/C/year)		<1 Kg/Day

Collection and Segregation of waste

- A Door to Door and floor to floor system through service lift or garbage chute shall be provided for collection of solid waste generated.
- Adequate number of colored bins (green and Blue - separate for Bio-degradable and Non Bio-degradable) are proposed to be provided
- Provision of temporary storage of solid waste shall be done for 48 hours at site.
- Recyclable waste will be sold to authorized contractor/agencies.
- Hazardous waste (Spent Oil) & e-waste will be stored at separate place. Used oil will be sold off to authorized recyclers while there will be buy-back arrangements with the supplier for DG Set batteries.
- Litter bin will also be provided in open areas like commercial spaces, parks & play grounds etc.

Transportation, Treatment & Disposal

As per Solid Waste Management Rules, 2016, Municipal solid waste including garden litter will be collected at earmarked garbage collection centre in group housing, Biodegradable waste will be processed in on site Organic Waste Converters for manure production and rest non biodegradable waste/ recyclable waste will be segregated & collected on common solid waste collection center of the township, from where it will be transported to the nearest processing facility by the hired authorized waste collectors for their treatment and disposal.

Following steps have been proposed for collection, treatment and disposal of MSW:

- Step 1: Segregation of MSW at source and collection from the households.
- Step 2: Transportation of MSW to collection centre of the township.
- Step 3: Transportation to facility.
- Step 4: Segregation of MSW at facility for processing.
- Step 5: Shredding of the compostable waste to desired particle size.
- Step 6: Treatment of biodegradable waste through composting/Biogas generation.
- Step 7: Disposal of non biodegradable waste into sanitary landfill facility/ used for making paving tiles.

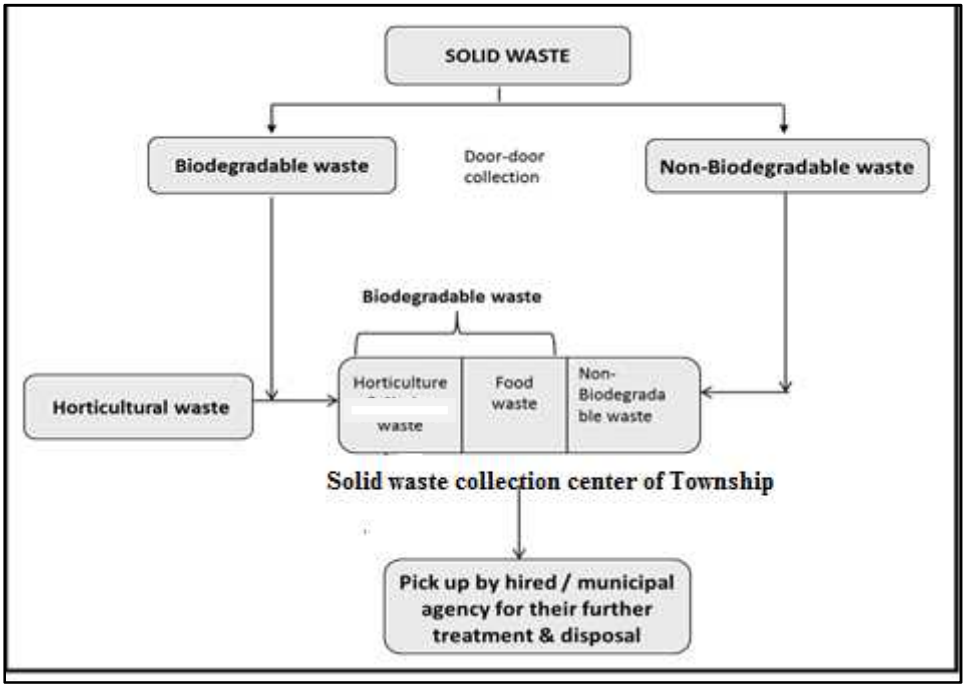

Fig 9: Municipal Waste Management Flow Diagram

E-Waste

E-Waste (Management & Handling Rule, 2016) Electronic waste, popularly known as 'e-waste' can be defined as waste electrical and electronic equipments whole or in part or reject (such as CDs, floppies, keyboards, monitors, power plug, batteries, etc.) which have become obsolete due to:

- Advancement in technology

- Changes in fashion, style and status
- Nearing the end of their useful life.

Responsibility of Consumer or Bulk Consumer

According to E-Waste (Management & Handling Rule, 2016) responsibility of Consumer or Bulk Consumer is given below:

- Consumer or Bulk Consumer of electrical and electronic equipment shall ensure that e-waste generated by them is channelized to authorized collection centers or registered dismantlers or recyclers or is return back to the pick-up or take back services provided by the producers.
- Bulk consumers shall maintain records of e-waste generated by them in Form-2 and make records available to UPPCB.

The e-waste generated from the proposed project would be suitably managed through assistance from E-parisira.

The mantra of "Reduce, Reuse, and Recycle" applies here also.

- Reduce generation of e-waste through smart procurement and good maintenance.
- Reuse still functioning electronic equipment by donating or selling it to someone who can still use it.
- Recycle those components that cannot be repaired. To identify organizations who reuse or recycle electronics.

8.ENERGY CONSERVATION

8.1 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?

Electricity Requirement
Total Electricity Requirement= 975 KW
Source of Electricity: U.P Power Corporation Ltd.
Backup Supply: DG set of 2500 KVA.

Energy Conservation Measures & Management Plan:

In the Operational Phase, appropriate energy conservation measures & management plan will be adopted in order to minimize the consumptions of non-renewable energy. The following practices will be adopted.

- The water supply pumping system will be provided with variable speed drive to conserve energy at part load.
- LEDs and T-5 lamps will be used.

- 50% street lighting will be powered by solar lighting. LED will be used in place of sodium lamps.
- The DG sets will be automatically controlled to optimize the usage based on the actual load requirement at any given time. These measures will effectively cut down the electricity/ diesel consumption.

8.2 What type of and capacity of power back up to you plan to provide?

Power requirement: 975 KW
Source of Power: U.P Power Corporation Ltd.
Back up DG sets: 2500 KVA

8.3What are the characteristics of the glass you plan to use? Provide specifications of its characteristics related to both short wave and long wave radiation?

The proposed project, being a group housing project will not involve significant use of glass. This is a group housing project and very little of glass will be used mainly for windows.

8.4 What passive solar architectural features are being used in the building? Illustrate the Applications made in the proposed project.

Efforts will be taken for energy conservation using passive solar architecture, wherever it is possible. Projections, shades, façade elements will be provided.

8.5 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 layout of buildings has been done as per sun path analysis so that the design cutsdirect radiations of critical hours specific to the orientation.
- Emergency lighting will be provided with Generator set.
- Solar energy will be used for street lighting.
- 50% of street lights will be powered by solar lighting. Also automatic light sensors will be installed to facilitate automatic off-on action resulting in significant amount of energy saving.

8.6 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?

- Pergolas, projections, facade elements will be provided to reduce cooling loads. Green areas and open areas will be so spaced that a reduction in temperature is achieved.
- Roofs will be painted with reflective, aluminum based paints with solar reflectance ranging from 0.3-0.6. This will result in less absorption of sunlight causing 40% back reflection and less heating of building structures during summer season.

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

Yes, the rooms will be so dimensioned that effective air conditioning can be carried out. Common/Public areas will be cooled by natural ventilation. The design of the buildings will be such that maximum use of natural lighting can be achieved. The walls, roofs and openings will be so designed that influx of heat is minimum.

Energy Efficient Features:

- Maximum utilization of natural light.
- LEDs& T-5 lighting fixtures in the common areas and Truelite fluorescent lamps in basements.
- Use of solar lights partly in open areas and landscaped area.
- Appropriate thermal insulation in walls and roofs to reduce heat gain and loss.
- Glazing glass: to keep the U value as per ECBC.
- External glazing will be below 40% of the total vertical surface as per ECBC.

8.8 What are the likely effects of the building activity in altering the microclimates? 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 complex. However the heat generated will not be significant and will be dissipated in the lush greens and open areas provided within the premises. Hence it can be concluded that the heat island effect shall not be a concern for the concerned project.

8.9 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 U-values of the roof, external wall and fenestration of the building will meet the requirements as specified in the Energy

Conservation Building Code (ECBC)

S.No.	Component	Material Used	Permissible U-Value as per ECBC (W/m^2-^0C)
1	Roof	Concrete	0.409
2	External wall	Brick	0.44
3	Fenestration	Glass Facade	3.3

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

Adequate fire protection facilities will be installed including fire detectors, fire alarm and fire fighting system to guard the building against fires. All fire protection facilities are designed as per the latest National Building Code. The approvals in this regard have been obtained.

Fire Safety

The building materials shall be of appropriate fire resistance standard. Further, design of school building will be as per NBC, 2005, which include following provisions:

- The electrical systems shall be provided with automatic circuit breakers activated by the rise of current as well as activated by over current.
- Fire detection systems.
- Manual operated Fire Alarm systems at appropriate places.
- Double door and Double stairs in building will be provided.
- Bell Mouth Traffic entry/exit from 24 m wide road.
- Access for fireman.
- Provision of Mechanical ventilation for air conditioned room will be made.
- Adequate fire fighting requirement shall be taken into account while designing the electrical distribution system.
- Fire NOC will be taken for the high rise buildings and all the stipulated conditions will be incorporated in the project design.

Sprinkler system

- The Basements will be equipped with sprinkler system of fire fighting and the sprinkler heads shall be distributed as per the National Building Code. The sprinkler pump will be suitable for automatic operation when there is a drop of pressure in the system. Sprinklers shall be provided throughout the basement area with separate sprinkler risers as required.

All the risers shall be provided with installation control valves and a hydraulic alarm. An electrical sensor flow switch will be provided on each floor and connected to the fire control panel in the security room, to identify the affected floor immediately.

- The building will conform to the provisions of National Building Code as well as theprovisions of State Fire Safety by Laws and will be provided with adequate arrangement to overcome fuel hazards to the satisfaction of authority.

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

The project being a group housing & Area Development, will not involve significantly use of glass as wall material.

8.12 What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration.

Adequate provisions are provided to mitigate the effects of air infiltration

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

Solar Energy will be used for external lighting. No other technologies are viable in the case. Solar Water Heating Systems will be used.

9. ENVIRONMENT MANAGEMENT PLAN

Environment Management Plan will be provided with Conceptual Plan.