

## FORM -I A

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

### CHECKLIST OF ENVIRONMENTAL IMPACTS

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

#### 1. LAND ENVIRONMENT

(Attach panoramic view of the project site and the vicinity)

Kindly Refer **Annexure - 1 (a)** Aerial view of the site, Page No.33.

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 the land use if any and the statutory approval from the competent authority should be submitted). Attach maps of (i) site location, (ii) surrounding features of the proposed site (iii) the site (indicating levels and contours) to appropriate scales. If not available attach only conceptual plans.

No, the project site is designated as Residential (Main) zone as per revised master plan of BDA-2015. Also, land has been converted from agricultural to residential purpose. CDP and land conversion is enclosed as **Annexure 1(a)** Page No.31-34.

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.

Sl. No.	Particulars		Details
1.	Total land area		35,713.51 Sqmt (8A 33G)
2.	Total built up area		1,14,571.31 Sqmt
3.	No. of units		588 Nos. and a clubhouse
4.	Height of the Building (Maximum)		87.95 m
5.	Total water consumption	Construction phase	For Domestic
			For Construction
			Operation phase
6.	Power requirement	During Construction phase	Power
			DG
		During Operation phase	Power
			DG
7.	Connectivity		Bannerghatta Main Road & Nice Ring Road.
8.	Parking Needs		Required
			Provided

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)

Due to good architectural views and well-designed landscape, the project is expected to enhance the aesthetics of the surroundings and hence does not alter the local ecosystem.

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 residential apartment has been employed with professionally designed landscaping to avoid the erosion of texturally disturbed soil.

**Soil Type:** Silty Sand

**Slope Analysis:** Project site is sloping from South West to North East direction with 5m contour level difference. Excavation and filling activities will be carried out as per the site scenario to minimize soil disturbance.

**Vulnerability to subsidence:** The soil is not vulnerable to subsidence. Excavation and filling activities will be carried out as per the site scenario to minimize soil disturbance and other required precautionary measures has been taken care to avoid the subsidence within the site.

**Seismicity:** The project site is located in the Seismic Zone – II, which is classified as the low damage risk zone.

1.5. Will the proposal involve alteration of natural drainage systems? (Given details on a contour map showing the natural drainage near the proposed project site)

No. Internal storm water drain with pre-cast perforated cover will be provided within the site in order to carry out the storm water in to the recharge pits to recharge the ground water and in case of worst rainfall excess will be routed to the external storm water drain. Hence there won't be any alteration of natural drainage systems from the proposed project.

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

The total quantity of excavation in the project site is estimated to be 44,673 m<sup>3</sup>. It is proposed to re-use for back filling, for landscaping and for road formation. The excavated top soil will be stored for reusing it for landscaping.

Sl. No.	Particulars	Quantity in m <sup>3</sup>	In Percentage
1.	Total Excavated Earth	44,673	100
Management:			
a.	Back Filling in foundation	8,934	20.0
b.	For landscaping	11,159	25.0
c.	For Roads formation	10,293	23.0
d.	For Site Formation	6,478	14.5
e.	For preparation of soil block for STP room, DG room etc	3,127	7.0
f.	Excess to be carted out	4,682	10.5

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

The domestic and construction water requirement during the construction phase of the project will be met by authorized external tanker water suppliers.

The water used for construction gets consumed into chemical reactions with cement and also partly gets evaporated. Hence, there will be no wastewater generation from this. However, there will be discharge of domestic wastewater to the tune of 5.4KLD and is proposed to be collected in collection tank & from there it will be lifted to BWSSB sewage treatment plant through external agencies for further treatment.

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 -

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)

Construction wastes don't cause any health hazard. It is estimated that about 114m<sup>3</sup> of inert construction debris would be generated. These are planned to be reused within the site for road and pavement formation. Project proponents are not going to provide laborer colony for the proposed project, Hence there will be less generation of domestic solid waste, which will be handed over to BBMP authorized vendors for further processing.

## 2. WATER ENVIRONMENT

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

### Construction:

1. Water Requirement for construction activities : 42 KLD  
(Proposed to be sourced from external authorized suppliers)
2. Domestic water requirements (labourers) :6.0 KLD  
(Proposed to be sourced from external authorized suppliers)

### Operation:

1. Total water requirement : 417 KLD
2. Source of water : BWSSB

Water Balance chart is provided in **Annexure 2a** Page No. 41-43.

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

-NA-

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

NA, since the water demand for the project will be met by BWSSB.

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)

During operation stage tertiary treated water from the STP to the tune of about 357 KLD. Out of this, 132KLD shall be used for flushing of toilets, about 118KLD shall be used for landscaping, and remaining 107 KLD will be discharged to BWSSB Sewer line / used for Avenue Plantation.

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

- No -

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

The details of domestic wastewater generated from the project are as below:

Quantity, KLD	380
pH	6.0-8.0
Suspended Solids, mg/l	150
BOD <sub>5</sub> , mg/l	250-350
COD, mg/l	500-600

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

These details are enclosed in the **Annexure – A2**Page No.46-47.

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 be no impact on the runoff characteristics from the proposed project. Internal storm drains will be provided within the site in order to carry out the storm water into the recharge pits to recharge the ground water which will be provided with perforated pre-cast cover all along the site boundary as well as in walk way & pavements. Excess will be routed to external storm water drain. Hence it won't cause any flooding or water logging problems.

2.9. What are the impacts of the proposal on the G/W? (Will there be tapping of g/w; give the details of g/w table, recharging capacity, and approvals obtained from competent authority, if any)

No G/W tapping; No adverse impacts.

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

The concrete is proposed to be sourced from ready mix plants, and hence there will not be any runoff due to concrete making. Care shall be taken during mortar preparation and curing to avoid runoff. However, if found necessary, during construction, separate cache pits shall be constructed to collect runoff. This shall be allowed to settle and clear water shall be reused for construction purposes.

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)

The proposed project has well designed rainwater harvesting facilities which will ensure the minimum outfall of storm water from the site. The rooftop rainwater shall be collected and used for secondary purposes after pre-treatment. The surface run off shall be routed into the recharge pits provided within the site through the internal storm water drain and excess storm water will be routed to the external storm water drain.

The details on the rainwater harvesting facilities and runoff quantity are as furnished in the **Annexure – A2** Page No.46-47.

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)

No unsanitary condition prevails, as the construction laborers are hired from nearby places and no labor colony are proposed. There would be generation of domestic sewage to the tune of about 5.4KLD due to construction employees, which will be collected in collection tank and from there it will be lifted to BWSSB sewage treatment plant through external agencies for further treatment. There will be less generation of domestic solid wastes; as there is no provision of labor colony. The generated domestic solid wastes from the construction employees will be handed over to BBMP.

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

The sewage generated is about 376KLD. This sewage is treated in a sewage treatment plant with a designed capacity of 380KLD and the treated water will be utilized for secondary purposes like gardening, flushing etc.

Sewage generation and treatment details are enumerated in **Annexure-1(e)**, Page No 37-39.

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

It is intended to use treated wastewater for secondary purposes such as flushing of toilets, and for gardening, hence dual plumbing system will be adopted for the proposed project.

### **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 proposed project Site is located and surrounded with main residential developments; hence there is no threat to the biodiversity.

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

Proposed site consists of few coconut trees, mango trees, Silver trees, Tamarind trees and Honge trees and few unused old structures; these will be cleared during site formation.

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 project planning includes extensive plantations along the site periphery and also professionally designed landscape and greenery on natural ground. It is intended to develop a green belt area of about 15,941.79 Sqmt, i.e. 54.61 % of total site area.

### **4. FAUNA**

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

No.

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

No.

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

No.

### **5. AIR ENVIRONMENT**

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

The major sources of air pollution from the project are from

(a) DG Sets

(b) Additional Vehicular Traffic

The DG set shall be procured strictly on their compliance with the applicable regulatory norms. They will also be provided with chimney with sufficient height as per the CPCB norms for the proper dispersion of pollutants.

It is expected that there will be a marginal increase in the pollutant levels due to vehicular emissions from operational traffic. However, the occupants shall be encouraged to use mass transit system and optimal use of vehicles. The impacts from the proposed project is marginal, hence doesn't cause heat island effect.

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 major gaseous emissions come from the DG set and the additional vehicular traffic due to the project. The impacts due to DG sets will be minimal as the gaseous emissions shall be kept within the limits.

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. Sufficient parking space is being provided and the details are depicted in the below table

<b>Description of Unit</b>	<b>No. of Units</b>	<b>Cars/ unit</b>	<b>Total in Nos.</b>
Residential Apartment (with BUA less than 150 Sqmt)	588	1	588
Visitors Car Parking (10%)	--	--	59
Club House	1 (1,680.68sqmt)	1 Car/ 50 Sqmt	34
<b>Total Car Parking Required</b>			<b>681</b>
<b>Car parking Provided</b>			
		Basement-2	220
		Basement-1	145
		Ground Floor	100
		First Floor	80
		Second Floor	80
		Surface Parking	60
<b>Total Car Parking Provided</b>			<b>685</b>



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.

No. Conservatively it can be estimated that there would be approximately as many number of units of the occupants own the four wheelers. Thus the total additional traffic of about 685 Nos. of four wheelers on the road may be expected after the construction is completed. And during construction period there will be a traffic movement due to transport of construction materials, tools and tackles, required for construction. However this is only a temporary phenomenon that exists only during the construction phase of the project.

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

The major source of noise in the proposed project would be mainly within the utility section, specifically DG Set. However, DG is proposed as a standby arrangement. Besides, it will be located in closed and acoustically designed compartment (noise attenuating enclosure) and hence no impact due to noise is envisaged. Detailed calculation of emission parameters from the proposed DG sets are mentioned in **Annexure 3 (b)**, Page No.45.

## **6. AESTHETICS**

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

No, the proposed construction doesn't cause any obstruction of a view. Moreover, there are no scenic amenities or landscapes in the surroundings of the project.

6.2. Will there be any adverse impacts from new construction on the existing structures?

No.

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

NA

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.

No such sites existing in the project surroundings.

## 7. SOCIO-ECONOMIC ASPECTS

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

Yes. As the proposed project is a residential apartment, it is estimated that there will be increase in the population of about 3,234 persons. It is expected that there will be an increase in literate rate on an assumption that all the residents of the apartment are literate. Also assuming 50% of the inhabitants belong to working class, so the working class of people in the vicinity of the project site is expected to rise. Apart from this, there will also be increased job opportunities from the project in terms of commercial establishments to serve the basic needs of the residents and the maintenance labour requirements of the project after completion. Presuming the inhabitants to be of non-agricultural sectors, there will be no reduction in the agricultural populace.

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

<b>Facilities</b>	<b>Approximate Aerial Distances from the site</b>
Shanimahathma Temple	70 m from the project site
Sherwood High School	70 m from the project site
Royal Hermitage Layout Club House	400m from the project site
Vijayashree Hospital	1.3km from the project site

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

No. The proposed project is a residential development project and its impacts are not expected to reach beyond a radius of about 1km. There are no sacred sites or sensitive places in the vicinity of the 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 the building materials and their energy efficiency)

No; the proposed project involves the use of building materials with low-embodied energy and high strength; as an alternative to the conventional materials.

The quantity and list of construction materials used in the proposed project are enclosed in the **Annexure – 2(c). Page No.45.**

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

Generation of noise and emissions from construction equipment, materials handling and movement of trucks and other vehicles used in construction work and also from vehicular traffic due to transport of construction materials, tools and tackles, required for construction. However this is only a temporary phenomenon that exists only during the construction phase of the project, hence the impact will be negligible.

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

Yes. Recycled concrete aggregates, construction debris will be reused for backfilling, hard paved area and road area formation within the site. Extent of savings would be achieved is about Rs.34, 300/-.

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

In the proposed project the solid waste is collected by door to door collection system. Further the wastes will be segregated as biodegradable and recyclable waste, wherein the biodegradable wastes will be processed in organic waste converter, and recyclable wastes such as plastic materials, metals and glass are hand over to authorize waste recyclers also E-waste will be handed over to authorized recyclers.

## **9. ENERGY CONSERVATION**

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

### **Power Requirement & Primary Source of Energy:**

Source : BESCO  
Operational Phase : Energy requirement of 4,260 kVA

### **Energy Back Up:**

Construction Phase : DG set of 180kVA Capacity with fuel consumption of 37.7 l/hr  
Operation Phase : DG sets of 630 kVA of 5Nos. with the fuel consumption of 660l/hr

**The details regarding Energy Savings is as below:**

<b>Sl. No.</b>	<b>Description</b>	<b>Savings in lakh kWh units/yr</b>	<b>Savings in %</b>
1.	Power Savings through Solar Heater and Street Light	3.5	3.1
2.	Power Savings through HF Ballast	0.8	0.7
3.	Power savings on Cu. Wound transformer	1.3	1.2
4.	Power savings through Provision for LED	21.3	19.0
<b>Total</b>		<b>26.9</b>	<b>24.0</b>
<b>Total requirement of loads is = 112.23lakh kWh units/yr</b>			
<b>Percentage of saving in power</b>		<b>24.0%</b>	

9.2 What type of, and capacity of, power back-up do you plan to provide?

Diesel engine driven generator of 630 kVA -5 Nos. will be proposed for power back up.

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

Glass of low emission & low solar heat gain single glazed of thickness 4mm are proposed.

<b>Type of Glass</b>		<b>Clear Glass</b>
<b>Standard Thickness (mm)</b>		4 mm
<b>Light Characteristics</b>	Reflectance %	7.9
	Transmittance %	88.3
<b>Solar Energy</b>	Reflectance %	7.2
	Transmittance %	81.4
	Absorption %	11.3
<b>U Value</b>	Summer kcal/m <sup>2</sup> /hr/°c	5.75
<b>Shading co-Efficient</b>		0.97
<b>Solar Factor</b>		84.4

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

The buildings are designed to harvest the natural solar lighting as far as possible by providing appropriate fenestrations. The buildings are provided with thermal insulation materials, Sun Shades and Dense Vegetation.

Other applications provided

1. Good cross ventilation is ensured in the building designs.
2. Windows in living areas are set in with terraces in front.
3. Blocks are oriented at an angle to minimize adverse effect of Southern side.
4. Shorter face of building is placed towards South.
5. Lift block and non-habitable areas are faced towards west side.

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 proposed residential apartment will comprise of solar heating & solar street lighting, hence utilizing maximum solar energy. The details are as enumerated in Item 9.1.

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?

- Sufficient open space will be provided between wings to allow free flow of air.
- Provision of cantilever Balconies and Chajjas for Sun Shade.
- Provision of thermal insulation for Top Floor Roof.
- Individual rooms have large windows with chajjas overhangs to cutoff harsh sunlight to keep interior cooler.
- Medium size windows for better natural light and ventilation.
- Maximum setback is maintained for permitting free flow of air and maximum natural light for all inhabitants.
- Special heat reflecting paints will be used for the terrace and external walls.

9.7. 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.

Lighting and mechanical systems is being proposed for this project. Details mentioned in Item no. 9.1. There will be no air conditioning facility for the proposed project, the usage of CFC and HCFC is nil.

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?

- Sufficient open space will be provided between wings to allow free flow of air.
- Provision of cantilever Balconies and Chajjas for Sun Shade.
- Provision of thermal insulation for top Floor Roof.
- Traffic and parking separated from Landscape/ play area by use of individual parking and podium concept.
- Site plan was conceptualized based on free flow of movement integrating and maximizing green.
- Building are laid in checkered pattern and wide apart from each other to enhance air circulation
- Individual rooms have large windows with chajjas overhangs to cutoff harsh sunlight to keep interior cooler
- Medium size windows for better natural light and ventilation
- Maximum setback is maintained for permitting free flow of air and maximum natural light for all inhabitants
- STP and rain water harvesting is provided to utilize the available resource, replenish and recharge them

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.

<b>Type of Construction</b>	<b>U Values, in W/m<sup>2</sup>°C</b>
Wall Area (Hollow Block Concrete, Single Skin, Outside Rendered, Inside Plastered)	1.7
Glazing, Single Glazing; Exposure South, Sheltered	3.97
Roof	1.25

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

The proposed project is a development of residential apartment consisting of 588 Nos. of residential units and a club house, which is sprawled across 3 towers with configuration of 2B+G+26UF/27UF with 87.95m height. The Project has been designed based on all the relevant fire safety as per NBC norms. Fire extinguishers are deployed throughout the

residential building. Fire hydrants around the building, fire hose cabinets at every floor and automatic sprinklers system will be provided. Frequently Fire Mock Up drills will be conducted.

Systems Proposed for the Residential Building includes

1. Fire water tank of capacity 350 Cum will be provided for immediate action to arrest the fire accident.
2. Fire Extinguishers for common areas and Signage.
3. Wet Risers through the dedicated shafts till terrace with valves as required.
4. Manual Fire Alarm system for Entire Building.
5. Public Address system.
6. Sprinkler system for entire building including upper and lower basement which will be used for Parking of two and four wheelers.
7. Landing Hydrants on all floors near each staircase with necessary accessories.

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

NA; as the proposed project is a development of residential project, no walls is made of glass; wherein only windows have single glazed doors. Clear glasses are used for the windows, which is of low emission & low solar heat gain characteristics.

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

Not Applicable, as there will be any use of CFC & HCFC chillers.

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.

About 24.0% of the total energy would be saved by adopting energy conservation measures, out of which about 3.1 % of energy could be saved by using solar energy, which are detailed in Item 9.1.

## **10. ENVIRONMENTAL MANAGEMENT PLAN**

The Environmental Management Plan acts as a key tool which comprises all the 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 cause of emergency such as accidents at the site including fire.

Details enclosed in **Annexure -10**, Page No.49-65.