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.31.

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, as per the Revised Master Plan-2015 the proposed project site is designated as Public/Semi Public zone. We have applied for change of land use to commercial purpose. CDP, Site location, surrounding features of the proposed site are enclosed in **Annexure – 1** (a) Page No.29-33.

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				9,116.127 Sqmt (2Acres 10.10Guntas)
2.	Total built up ar	·ea			54,358.69 Sqmt
3.	Type of project	e of project			Commercial Building
4.	Height of the Bu	ilding			58.95 m (Maximum)
5.	Total water	Construction For Domesti		nestic	3.0 KLD
	consumption	phase For Consti		struction	38 KLD
		Operation phase		9	200KLD
6.	Power	During Construction		DG	50 kVA
	Requirement		phase		
		During		Power	2,500 kVA
		Operation phase		DG	DG Set of 1,500 kVA of 2 Nos. & 500
					kVA of 1 No.
7.	Connectivity				Cubbon Road
8.	Parking Needs	Requ		Required	729 Nos.
				Provided	738 Nos.

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)

No. The proposed Commercial building has been employed with professionally designed landscaping to avoid the erosion of texturally disturbed soil.

Slope Analysis: As per the site scenario, the project site is sloping from North to South direction with 3.6m level difference. Excavation and filling activities will be carried out as per the site scenario to minimize soil disturbance.

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, the proposal doesn't involve alteration of natural drainage system. Internal storm water drain with pre-cast perforated cover will be provided within the site in order to carry out the storm water into the recharge pits to recharge the ground water.

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 excavated earth is proposed to re-use within the site for back filling. The excavated top soil will be stored for reusing it for landscaping.

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 2.4KLD and is proposed to be collected in a 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 55m³ 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 labor colony for the proposed project, Hence there will be less generation of domestic solid waste, which will be handed over to external 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 : 38KLD (Proposed to be sourced from external authorized suppliers)
- 2. Domestic water requirements (labourers) :3.0 KLD (Proposed to be sourced from external authorized suppliers)

Operation:

Total water requirement : 200KLD
 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?

Not Applicable.

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)

Not Applicable.

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 180 KLD. Out of this, 120 KLD shall be used for flushing of toilets; about 5 KLD shall be used for gardening and 55 KLD shall be used for HVAC.

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	180
рН	6-9
Suspended Solids,	400
mg/l	
BOD ₅ , mg/l	250-350
COD, mg/l	600-800

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

Rain water harvesting facility will be provided to harvest both roof runoff and surface runoff water. The volume of rain water available for harvesting from roof area is 60 cum. Hence, rain water storage tank of capacity 60 cum is proposed. The total runoff from Open Space is estimated to be 47 cum. Hence, 10 Nos. of Recharge pits have been provided to recharge the ground water.

These details are enclosed in the **Annexure - A2 Page No.45-46.**

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 an impact on the runoff characteristics from the proposed project. The proper management like rain water harvesting facility will be proposed to reduce the impact. The terrace rain water will be harvested and collected in storage sump and the same will be used after prior treatment. Internal Garland drains will be provided within the site in order to carry out the storm water from landscape and hardscape into the recharge pits, to recharge the ground water. 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 impacts.

No G/W tapping.

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 a well-designed rainwater harvesting facility 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. The details on the rainwater harvesting facility and runoff quantity are as furnished in the **Annexure – A2 Page No.45-46**

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 labourers are hired from nearby places and no labour colony are proposed. There would be generation of domestic sewage to the tune of about 2.4KLD 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 labour colony. The generated domestic solid wastes from the construction employees will be handed over to BBMP authorized vendors.

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 180 KLD. This sewage is treated in a sewage treatment plant with a designed capacity of 180 KLD and the treated water will be utilized for secondary purposes like HVAC, gardening and flushing etc, Sewage generation and treatment details are enumerated in **Annexure –1(d) Page No.35-38**.

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 the treated wastewater for secondary purposes such as flushing of toilets, HVAC and 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 commercial Units hence there is no threat to the biodiversity.

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

No.

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 1,371.927 sqmt, i.e. 15.15 % 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:

- (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 a chimney having 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 officials 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.

Majority of the gaseous emissions are from the DG sets 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.

Total FAR Area Proposed	36,451.81 Sqmt	
Total No. of Car parks required @ 1 Car Park per 50	729	
Sqmt. of FAR area	,	
Total Required	729	
Car Parking Provided		
Basement -1st Floor	179	
Basement -2 nd Floor	284	
Basement -3 rd Floor	275	
Total Provided	738	

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

Movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc. are shown in the site plan.

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. 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. Conservatively it can be estimated that there would be an additional traffic of approximately 738 four wheelers after the construction is completed.

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 from the DG Sets. However, the 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 the emission parameters from the proposed DG sets are mentioned in **Annexure3 (b)**, **Page No.44**.

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 view.
- 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.

Yes; Cubbon Park is at a distance of 100m from the project site.

7. SOCIO-ECONOMIC ASPECTS

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

Yes. As the proposed project is a Commercial Building, it would experience a floating population of about 4,203 persons due to this project alone. Apart from this, there will also be increased job opportunities due to the project in terms of commercial establishments to serve the basic needs of the employees. But, the overall socio-economic conditions would improve due to this high profile office space.

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

Facilities	Approximate Distances from the site
RNIS College	400 m from the project site
Institution of Agriculture	460 m from the project site
Technology	
Calvary Grace Biblical Church	150 m from the project site
Sparsh Hospital	240 m 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 commercial building development 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(b) Page No.44.**

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 are mainly 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. Optimal routes shall be planned for the transportation of construction materials. Use of better fuel such as HSD and proper scheduling of trips (during less traffic hours) are being proposed to address these issues. Barricades will be provided all around the site to diminish the noise and dust emissions, which avoids public nuisance. Water sprinkling will be adopted during construction to suppress the dust emission.

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.16, 200/-.

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

Solid wastes shall be collected separately as biodegradable (organic) and non-biodegradable (inorganic) wastes in separate bins provided in each building. Biodegradable wastes will be processed in an Organic Waste Converter and non-biodegradable wastes such as plastic materials, metals and glass are hand over to BBMP. Hazardous wastes like waste oil from DG sets, used batteries, etc. will be handed over to KSPCB authorized hazardous waste recyclers and also E-waste like CDs, computers, etc will be handed over to KSPCB authorized E-waste 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 : BESCOM

Operational Phase : Energy requirement of 2,500 kVA

Transformers : 2,000 kVA -2Nos.

Energy Back Up:

Operation Phase : DG set of 1,500 kVA of 2 Nos. & 500 kVA of 1 No. with the fuel

consumption of 419.04 l/running hour.

The details regarding Energy Savings is as below:

Sl. No.	Description	Savings in lakh kWH units/yr	Savings in %	
1.	Power savings through Solar lighting	46,728	0.75	
2.	Power savings through HF Ballast	1,27,721	1.31	
3.	Power savings on Cu. Wound transformer	1,28,618	1.32	
4.	Power savings through LED	3,67,656	3.0	
5.	Power savings on HVAC	19,27,275	19.3	
Total l	Total Energy Saved with above measures 25,97,998 25.68			
Total requirement of loads is = 25.97 lakh kWH units/yr				
I	Percentage of saving in power	25.68%		

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

Diesel engine driven generators of 1,500 kVA of 2 Nos. & 500 kVA of 1 No. 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.

Type of Glass		Clear Glass
Standard Thickness		4 mm
(mm)		
Light Characteristics	Reflectance %	7.9
	Transmittance %	88.3
Solar Energy	Reflectance %	7.2
	Transmittance %	81.4
	Absorption %	11.3
U Value	Summer	5.75
	kcal/m²/hr/ºc	
Shading co-Efficient		0.97
Solar Factor		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 are:

- 1. Good cross ventilation is ensured in the building designs.
- 2. Windows in office 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 Commercial Building will comprise of solar street lighting basement 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?

Yes. Shading requirements vary according to climate and building orientation.

Principles to maximize the shading of walls and the Roof:

- Use external shading devices with lighter colors over openings which reflect more heat
- Planting of trees to shade the building, particularly windows, to reduce unwanted glare and heat gain
- Advanced glazing solutions such as solar films and tinted glass may be appropriate as a secondary measure on east and west elevations
- Use of tinted glass on north facing windows designed to let in winter sun is avoided
- By keeping the area of glazing on east and west elevations to a minimum wherever possible
- Sufficient open space will be provided between wings to allow free flow of air
- 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 is a provision of Air Conditioning facility for the proposed project, but there is no usage of CFC & HCFC chillers. There will be provision for the HVAC system in the proposed project. The features of the HVAC are given below

FEATURES OF HVAC

- Combination of water cooled and air cooled chillers
- ➤ Variable speed primary and secondary chilled water pump sets
- Variable speed drive for air handling units
- Variable speed drive for secondary pump sets
- > Ozone friendly refrigerant for AC units
- Building automation system resulting in energy saving

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 Chajjas for Sun Shade
- Provision of thermal insulation for top floor roof
- Traffic and parking separated from Landscape 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
- Medium sized 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.

Type of Construction	U Values, in W/m ² °C
Wall Area (Hollow Block Concrete,	
Single Skin, Outside Rendered,	1.7
Inside Plastered)	
Glazing, Single Glazing; Exposure	3.97
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 Commercial Building sprawled across 3B+G+14UF. The maximum height of the building is 58.95m. The Project has been designed based on all the relevant fire safety as per NBC norms. Fire extinguishers are deployed throughout the buildings. Fire hydrants around the building, fire hose cabinets at every floor and automatic sprinkler system will be provided. Fire Mock Up drills will be conducted frequently.

Systems Proposed for the office Building include:

- 1. Fire Extinguishers for common areas and Signages.
- 2. Wet Risers through the dedicated shafts till terrace with valves as required.
- 3. Manual Fire Alarm system for the entire building.
- 4. Public Address system.
- 5. Sprinkler system for the entire building including upper and lower basement which will be used for Parking of two and four wheelers.
- 6. 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.

Yes, it is estimated that partial exposed surface area of the building is proposed to be covered with glass as wall material. All vision glass panels used in the project are dark tinted, reflective and tinted with low - E coating. Spandrel glass panels are dark tinted. Clear glass is being used only for the entrance lobby and thus it is protected from the solar heat gained by the building's natural shading.

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 CFC & HCFC chillers are not used.

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 25.68% of the total energy would be saved by adopting energy conservation measures which are detailed in Item 9.1. Out of this 0.75% of energy will be sourced from solar lighting systems.

10. ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan acts as a key tool which comprises of 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.48-64**.