FORM I A

FORM- I A

SECTION 1- LAND ENVIRONMENT

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

No, the existing land use will not get significantly altered. The proposed project is modernisation of existing Rajiv Gandhi Education City in an area of 2006.50 acres. There is no current land use change for the modernisation project. The existing land use of the project site is as per the approved land use by Town and Country Planning, Haryana.

Site Location on Toposheet is enclosed as **Annexure.**

Site Location on Google Map is enclosed as **Annexure**.

Layout maps are enclosed as **Annexure.**

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

LAND REQUIREMENT

Total Area of Education City	:	2514.52 Acres
Area under Existing Abadi / Sites / CLU Granted Area	:	508.02 Acres
Land Acquired in phase I	:	2006.50 Acres
Existing Planned Area	:	1703.00 Acres

The requirement of total land is same but there is slightly modification in planned area due to minor alterations in the project plan.

Table: Land Details in EC letter and Modified Plan

S. No.	Details of Area	Area as per EC letter (in Acres)	Area as per modified plan (in Acres)
A)	Land Acquired in Phase - I	2006.50	2006.50
B)	Area falling in Greenbelt / E P Expressway	258.00	258.00
C)	Area under Water body, Canal, Minor	45.50	45.50
D)	**Net Planned Area**	**1703.00**	**1703.00**
i	**Area under Educational Plots**	**436.18**	**535.65**
ii	Area under Commercial (Multiplex, Shopping Arcades, Hotels, F F S etc.)	82.31	82.31
iii	Area under Transportation (Multilevel Car Parking, Bus Station, Electrical Bus Station etc.)	75.78	75.78
iv	Area under Water Treatment Plant, ESS, STP	64.37	64.37
v	Area under Health Facilities	30.53	30.53
vi	**Area under Residential** (Area under village Planning, Residential Houses, Hostels, Staff Quarters etc.)	**346.05**	**329.34**
vii	Area under Public and Semi-public facilities	175.81	175.81
viii	**Area under Roads and Parks**	**491.97**	**400.11**
ix	**Media Centre and Communication Tower Satellite receiving station**	**--**	**9.10**
	Total Area	**2006.50**	**2006.50**

WATER REQUIREMENT

As the proposed project is modernisation of existing project hence there will not be additional requirement of water. However, the water requirement for existing project was estimated at 44000 KLD out of which the fresh water requirement is approx. 31000 KLD. It was proposed to use 13000 KLD of treated water. The demand of water will be met partly (75 %) from two numbers of Ranney wells of 10 MLD capacity and partly (25 %) from ground water.

POWER REQUIREMENT

Source of Power and Power Requirement

The total power requirement for the existing Rajiv Gandhi Education City is approx. 107 MVA. The source of power supply to the city is Uttar Haryana Bijli Vitran Nigam Limited (UHBVNL).

Details of Power back-up

To meet the power requirement during the power failure, DG sets with total capacity of 9 MVA will be installed in residential and Edu-residential area and additional 20 MVA will be installed for residential and others sectors except commercial blocks. The fuel required to run these DG sets will be approx. 5.8 KLD.

To reduce the dependency of power on conventional sources, it is proposed to install solar power system in park and parking with an approx. capacity of 1 MW. The existing educational institutions have installed their own solar power system.

CONNECTIVITY

The education city has better connectivity and transportation facilities with the nearby cities. The education city is itself located on National Highway-44 which provides the connectivity of the site with the District Headquarter of Sonipat district and other districts of Haryana and Punjab State towards Northern side and also connects with the NCT of Delhi towards southern side. The project site is well connected to National Capital Territory of Delhi at a distance of approx. 08 kms. The southern side of the project is adjacent to the Eastern Peripheral Expressway which connects the site with the Baghpat, Ghaziabad, Greater Noida, Faridabad and Palwal Districts. The nearest railway station is Sonepat Railway Station at a distance of 11.50 km (NW) from the project site which provides it connectivity with the major railway stations of the country. The nearest bus stand is Sonepat Bus stand at a distance of 11 kms which provides bus connectivity with the other nearby states. The nearest airport is Indira Gandhi International (IGI) Airport, Palam, New Delhi at a distance of approx. 42.50 kms (South).

COMMUNITY FACILITIES

The modernisation of Rajiv Gandhi Education City has envisaged for alteration in community facilities like boosting plant and Sewage treatment plant by using modern treatment facilities. The proposed

project has also envisaged for alteration in electric sub-station by using modern equipment and electronics.

The existing community facilities are as follows:

Table: Community Facilities

S. No.	Name of Facilities	Area (in Acres)
1.	Multisystem Medical Centre	10.67
2.	Central Library and Archives	07.74
3.	Media Centre and Communication Tower Satellite-Receiving Station	09.10
4.	Youth Centre (International youth Hostel, indoor sports, court games, club, science exhibition)	16.00
5.	Service Apartments	09.00
6.	SPV/Civic Centre	02.40
7.	International University Centres	30.35
8.	Multi-level car parking with bus station	18.20
9.	Post office / Police Station / fire station/ Admin.	05.50
10.	Health Facility	24.32
11.	Hostel and staff quarters	23.65
12.	Taxi Stand	03.71
13.	Electric Bus Station	15.06
14.	Administration Building	16.68
15.	Hostel	26.29
16.	Ancient Haryana Museum	02.75
17.	Ancient Indian University Museum	01.23
18.	Hotels	10.89
19.	Service Apartment/Guest Houses/ Plotted Housing	16.37
20.	Multiplex, Shopping Arcades, Discotheques, Restaurants, Indoor Stadium	42.57
21.	Entertainment Centre, techno Market hub, shopping, arcades, weekly markets, food court	09.72

22.	Convention Centre, seminar Rooms, Art gallery, Auditorium big & Small Theatres, stadium	27.14
23.	Multi-level car parking with bus station	13.28
24.	Hostel	19.16
25.	Multi-level car parking with bus station	22.96
26.	Staff Housing	27.32
27.	Staff Housing	08.71
28.	Water Treatment Plant	13.91
29.	Staff Housing	48.25
30.	Water body (lake)	12.50
31.	Post office / Police Station / fire station/ Admin.	04.50
	Total	**499.93**

PARKING FACILITIES

The existing Rajiv Gandhi Education City has adequate provision for parking of cars/two-wheelers/bicycles for students, faculties, residents and visitors. The parking is in form of multilevel car parking with bus station. There is also additional parking space for visitors so as not to disturb the internal traffic and allow smooth movement of vehicles. The existing total Parking space for the city is 54.44 acres.

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

The Proposed project activity shall have no significant impact on surroundings as there is no so much construction works. Only the existing facilities will be modernised by using modern equipment in ESS and using latest technologies in STP. There is also slightly modification in commercial area and residential area development. Hence, the construction activities will be in limited manner. Moreover, the existing project being a well-planned activity results in organized open spaces and green areas. About 258 acres. of the area is earmarked for landscaping and is in development phase. The community facilities like STP, Boosting Plant, ESS will be modernised in the existing Rajiv Gandhi Education City. The proposed modernisation is being carried out in existing project area which is as per plan of Town and Country Planning, Haryana and Building Bye-Laws of Haryana. Hence, the land use is also not going

to change. The existing greenbelt and further development of greenbelt will have an overall positive impact on the area and will not cause any disturbance to the local ecology.

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

There shall be no land disturbance resulting in erosion, subsidence and instability as it is almost flat land. The site falls under the zone IV as per the seismic zone map of India and indicating high damage risk zone. The project will be earthquake resistant considering the latest provisions of Indian Standards Codes. The soil type found in the area is Silty Clay. The pH value observed at two locations was 7.53, and 7.88 which shows the soil is slightly alkaline in nature. The water holding capacity observed was in range of 58-61 % showing the silty clayey characteristic of soil. The detailed soil analysis result has been provided as **Annexure**.

1.5 Will the proposal involve alteration of natural drainage system?

The proposed project activities will not cause any alteration of any natural drainage route. No perennial or non-perennial drainage system is found to exist in the project area or being obstructed by the 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?)

During the development of residential, commercial and community facilities, some excavation works may occur. The excavated soil will be generated from basement excavation & foundation works which will be used during cut and fill operations. The top soil will be preserved for landscaping purpose only.

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

Water Supply

Water requirement during construction phase and Operation Phase will be met from water supply system of Yamuna river as well as ground water. The total water requirement for the project is estimated to be 44000 KLD and fresh water requirement is 31000 KLD. The water for construction activity will be met from surface water.

Waste Handling

The Precast technology will be the primitive formation used for the construction in the proposed project. Hence, the construction waste like construction debris, left over cement and mortars, cement concrete blocks etc will be generated to the minimum extent which will be used as granular subbase (GSB) layer of pavement and internal road development.

Excavated soil will be reused for backfilling and the top fertile soil will be reused for horticulture purpose only. Spent oil will be properly collected and handed over to authorized recycler. Wastes generated from the labour camps will be properly managed according to Solid Waste Management Rules, 2016.

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).

The project site is a flat land and the surroundings are characterized by a rural stretch. There is a low-lying area which is old mining area of approx. 110 acres near the village Patla inside the education city. The low-lying area will be filled and utilised for the education city.

There are no wetlands found within the project premises. Hence, there is no alteration due to proposed project.

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).

No health hazards are expected during the construction phase. The labourers will be provided with face masks to minimize dust inhalation. A significant portion of the construction waste generated at site will be re-used for land levelling/back filling. Waste concrete will be reused as aggregate in construction process. The construction wastes will be managed as per Construction and Demolition Waste Management Rules, 2016.

Domestic Waste generation by construction labours: The quantity of domestic waste generated will be very little, as mostly local labourers will be employed. However, the wastes generated will be collected and disposed off as per the provision of Solid Waste Management Rules, 2016.

Used oil generated from DG sets: The quantity of used oil generated is estimated to be 3.5 KL per annum which will be stored in Metal / HDPE drums and transferred to the authorized recycler.

Solid Waste Generation

The proposed project will adopt a systematic approach for solid waste collection and disposal. Solid waste generated from the project will be collected properly and will be managed as per Solid Waste Management Rules, 2016. The solid waste so generated will be first segregated into biodegradable and non-biodegradable wastes. Separate colour coded trash bins will be provided for collection of biodegradable and non-biodegradable wastes. This arrangement will help to manage the disposal of wastes at the source. The biodegradable wastes will be collected in green colour bins. The project proponent has proposed for installing facilities for composting of biodegradable wastes. After composting, the compost will be used as manure in the greenbelt and for horticulture purposes.

The non-biodegradable wastes will be collected in blue colour bins and wastes may further be segregated into plastics, glass, metals etc which will help in disposal of these wastes as per Solid Waste Management Rules, 2016. The inert solid waste will be transported to a govt. designated landfill site.

SECTION 2- WATER ENVIRONMENT

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

The total water requirement for the project is approx. 44000 KLD out of which the fresh water requirement is approx. 31000 KLD. The demand of water will be met partly (75 %) from two Ranney wells of 10 MLD capacity each and partly (25 %) from ground water.

Table: Calculations for Water Demand

S. No	Particulars	Water Requirement (KLD)
1	Residential	5400
2	Floating Population	1350
3	Educational area	12060
4	Parks and Play Ground	6700
5	Road Side Plantation	2125
6	Commercial Use	900
7	Transportation Use	1080
8	Public Utilities	1260
9	Public and Semi-Public Building	2160
10	Reserve Area	4500
11	Hotels	500
12	Unaccounted Water Requirement	5705
	Total	**43740**
13	Water Requirement for Fire Fighting	100
	Grand Total	43840
	Say	44000
14	30% Water Requirement to be met through recycled water (30% of 44,000 KLD i.e. 13200, say 13000)	13000
15	Balance Demand	31000
	Total Net Water Requirement	**31000 KLD or 31 MLD**

WATER BALANCE DIAGRAM

Table: Comparative Details of Water Consumption & Wastewater generation

S. No.	Particulars	Water requirement (KLD)
1	Total Water Demand	44000
2	Total Fresh Water Requirement	31000
3	Water for reuse after treatment	13000
4	Waste water Generation	25000
5	STP capacity	25000

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

Water for construction activities will be taken from Ranney Wells. During operation phase, water requirement will be met partly (75 %) from two Ranney Wells of 10 MLD capacity each and partly (25 %) from ground water. The discharge in River Yamuna towards Delhi is controlled from Hathini kund Barrage from Yamunanagar District in Haryana State. The maximum discharge from barrage is 28,200 m^3/s. The annual flow of river is about 10,000 cubic billion metres (cbm; 8.1 billion acre·ft). The groundwater availability in the area is 12975 ham as per CGWB Report, 2013.

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 quality of drinking water will be as per IS:10500 to be used in the education city. Rest of the utilities viz. gardening, firefighting, building construction, sprinkling, etc. shall use the water directly without any treatment since the water quality of both the ground and surface water does not possess any adverse characteristics.

The water quality will be monitored by the MoEF&CC / NABL approved laboratory periodically.

The water quality of ground water has been analysed and the parameters have been found within the limits. The pH value observed ranges between 7.43-7.44 which shows the water is neutral. The colour

and taste of water are agreeable. The TDS ranges between 524-550 mg/l. The bacteriological analysis shows absence of coliform and E. coli. The detailed analysis of ground water is given as **Annexure**.

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

It is estimated that 13000 KLD of treated wastewater from STP will be reused to reduce the fresh water requirement of the educational city. The treated wastewater will be reused in park and playground, roadside plantation, flushing and other cleaning purposes.

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).

No, there will not be any diversion of water from other users.

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)

It is expected that the project will generate approx. 25000 KLD of wastewater from the project. The wastewater will be treated in STP at premises of the educational city. There will be an incremental BOD load of 0.1875 kg/day that will be added in case of the treated water generated from the proposed STPs in the RGEC is discharged in any drain or water course.

The performance of the STP is presumed to treat the sewage to the extent of 7.5 mg/ltr in an average.

The following are the expected input characteristics of the wastewater:

a. Sewage Characteristics before treatment**:**

a)	Duration of flow to STP	24 hrs
b)	Temperature	Ambient ± 2^{o}C
c)	pH	6.5-7.5
d)	Colour	Pale
e)	T.S.S. (mg/l)	450-600 mg/l

f)	BOD_5 (mg/l)	250-400 mg/l
g)	COD (mg/l)	600-800 mg/l

b. Final discharge characteristics (After Treatment)

a)	Temperature of discharge	45°C
b)	pH value	6 - 8.5
c)	BOD (5 day at 20°C)	7.5
d)	COD	25
e)	Total Suspended Solids	10
f)	Total Dissolved Solids	900
g)	Grease and Oil	10

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

There is proposal to meet the water requirement from water harvesting facilities. It is proposed to construct two wells in every building for rainwater harvesting. Along roadside, the wells will be constructed at a distance of 400 m. A total of 18 wells have been proposed for rainwater harvesting. The facility will be developed only to recharge ground water. The existing project has been provided with the system for storm water collection for harvesting of rainwater and to recharge the ground water table.

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?

After the modernisation and operation of the project; the rainwater will be channelized to rain water harvesting structures through the storm water drainage network developed in the city & shall be used to recharge the ground water after preliminary treatment. The runoff is estimated to be 128,04,480.00 cubic feet assuming the 1/10" average rainfall in the district. To collect such huge quantity of water, an artificial lake in an area of 06.00 ha with 6.1 m depth will be created.

Hence, there will be no impact of land use changes occurring due to proposed project and it will not aggravate the problem of flooding or water logging in any way.

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)

The proposed project will not cause any significant impact on ground water as almost three fourth of water requirement will be met from Ranney Wells. Also, the water requirement during the construction phase will be met through surface water. To reduce the freshwater demand and hence the groundwater stress, treated wastewater will be reused for park and playground, road side plantation etc.

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

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

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

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

Most of the storm water produced on site will be collected through channelized storm water drainage system for ground water recharge. An artificial lake in an area of 06.00 ha with 6.1 m depth will be created for this purpose. Several management practices will also be followed for storm water management:

- Regular inspection and cleaning of storm drains.

- Avoid application of pesticides and herbicides before monsoon season.
- Conducting routine inspections to ensure cleanliness.
- Provision of silt traps in storm water drains.
- Good housekeeping practices in the above areas.

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

No. Mostly local laborers will be employed during the construction phase and thus negligible quantities of wastes will be generated. Mobile toilets / Toilets will be provided and the wastewater generated will be treated in mobile STP.

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).

For collection, treatment and safe disposal of sewage, STP having total capacity of 25 MLD have been proposed in the premises of educational city. The education city has currently STP of 7.5 MLD capacity which is using Activated Sludge process. After the completion of whole city, the STP will be upgraded to 25 MLD capacity. It is expected that 13000 KLD of treated water will be reused for various purposes like horticulture, flushing, cleaning etc.

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

Dual plumbing system that utilizes separate piping systems for freshwater and recycled wastewater for flushing has been laid for the separate buildings within the education city. The recycled water will be reused for gardening, flushing etc.

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, there is no threat to the biodiversity due to the proposed modernisation activity. Moreover, proper greenbelt development within the project site will enhance the local ecosystem.

There is no ecological sensitive zone, which provides habitat and movement for any kind of animals in the immediate vicinity of the proposed area. No permanent aquatic ecosystem with significant ecological resources is also found within the study area. No ecologically sensitive area falls within the project site. Hence, no ecological/ biological threat has been anticipated.

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

The area is devoid of thick vegetation and does not supports any significant vegetation. There will be only clearing of grasses, small plants and some shrubs. The project does not support any significant vegetation and no clearing of any large trees will be taken.

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 development of greenbelt and landscaping has been undertaken to minimize the likely impacts and to enhance the aesthetics of project area. The total landscape area for the existing project is 258 acres.

Along Eastern Peripheral Expressway, greenbelt in an area of 222 acres have been provided having dimension of 100 m width and 4.5 m length. Along NH-44, greenbelt in an area of 36 acres have been provided. The development of greenbelt inside the education city is in process.

The development of greenbelt with native plant species will enhance the aesthetic value of the region and will also provide an excellent habitat for various faunal groups. Evergreen, tall and ornamental trees have been proposed to be planted inside the premises. This will provide a clean, healthy and beautiful green environment within the proposed project. The list of plants to be planted for further greenbelt development is given below:

Table: List of tree species

S. No.	Scientific Name	Common Name
1.	*Aegle marmelos*	Wood Apple/ Bel
2.	*Albizzia lebbeck*	Siris
3.	*Alstonia scholaris*	Saptaparni
4.	*Annona squamosa*	Sharifa
5.	*Anogeissus pendula*	Dhaura
6.	*Anthocephalus cadamba*	Kadamb
7.	*Azadirachta indica*	Neem
8.	*Bauhinia purpurea*	Khairwal
9.	*Bauhinia variegate*	Kachnar
10.	*Cassia fistula*	Amaltas
11.	*Callistemon citrinus*	Bottle Brush
12.	*Casuarina equisetifolia*	Jungali saru
13.	*Cordia sebestena*	Lal Lasora
14.	*Crataeva religiose*	Garlic Pear Tree
15.	*Dalbergia sissoo*	Sissoo
16.	*Delonix regia*	Red Gulmohar
17.	*Diospyros embryopteris*	Gaab
18.	*Emblica officinalis*	Amla
19.	*Ficus religiose*	Peepal
20.	*Ficus virens*	Pakhad
21.	*Jacaranda mimosifolia*	Neeli Gulmohar
22.	*Kydia calycina*	Bharanga
23.	*Lagerstroemia flos-reginae*	Jarul
24.	*Mangifera indica*	Mango
25.	*Melia azedarach*	Bakayan
26.	*Millingtonia hortensis*	Neem Chameli
27.	*Moringa oleifera*	Sehjan/Drumstick
28.	*Morus alba*	Shahtoot
29.	*Peltophorum pterocarpum*	Peela Gulmohar

30.	*Pongamia pinnata*	Karanj
31.	*Polyalthia longifolia*	False Ashoka
32.	*Plumeria alba*	Champa
33.	*Putranjiva roxburghii*	Putijia
34.	*Roystonea regia*	Royal Palm
35.	*Syzygium cumini*	Jamun
36.	*Tamarindus indicus*	Imli
37.	*Terminalia arjuna*	Arjun
38.	*Terminalia bellerica*	Baheda
39.	*Thuja occidantalis*	American arbovitae

Table: List of shrubs, herbs & ground covers

S. No.	Scientific name	Common Name
Shrubs		
1.	*Bougainvillea spectabilis*	Booganbel
2.	*Cassia javanica*	Pink Shower
3.	*Cestrum nocturnum*	Night Blooming Jasmine
4.	*Citrus aurantium*	Nimbu
5.	*Gardenia latifolia*	Papda
6.	*Hibiscus rosa-sinensis*	China Rose
7.	*Hiptage benghalensis*	Madhavi Lata
8.	*Ixora parviflora*	Ixora
9.	*Jatropha panduraefolia*	Peregrina
10.	*Mimusops elengi*	Maulsari
11.	*Murraya exotica*	Orange Jasmine
12.	*Nerium oleander*	Kaner
13.	*Nyctanthes arbortristis*	Harsingar
14.	*Tabernaemontana coronaria*	Chandni
15.	*Thevetia peruviana*	Pili Kaner
Ground Cover		
16.	*Alternanthera ficoidea*	Partyyime alternanthera

17.	*Golden duranta*	Sheenas Gold

4. FAUNA

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

No. The existing land use around the site is rural area and does not provide a habitat for wild species. The core area has little vegetation mainly consisting of herbs and grasses. Hence, no presence of any fauna was detected. Only commonly found birds and some reptiles like garden lizards etc were seen.

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

The project will not have any direct or indirect impacts on the avifauna of the area. However, planting of fruit bearing trees in the proposed Greenbelt will be an attraction to the local bird population. Common native variety of trees and ornamental flowering species will be planted in the green space which will attract avifauna & hence, will have direct positive impact on the local avifauna and will provide nesting sites to local birds.

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

There are no any corridors, fish ladders etc. in the area. Hence there will be no any effect to fauna species.

5. AIR ENVIRONMENT

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

The traffic will increase during construction phase and after operation of the proposed project. Increased traffic due to proposed project will not cause any significant increase in atmospheric concentration of gases and do not result in heat island formation. The development of greenbelt in the city will help in abatement of air pollution. After Modernisation, DG sets will be provided with appropriate stack height and will be operated only during power failure.

Ambient air monitoring has been carried out for the proposed project on 07 March and 11 March 2019. The detailed test reports have been attached as Annexure.

Ambient Air Quality

The baseline studies for air environment covers reconnaissance, identification of specific air pollutants expected to have significant impacts from the proposed project and assessing their prevailing levels in ambient air at representative locations within the impact zone around the project site. The baseline status of air environment in this study has been assessed through reconnaissance in project area and a systematic air quality surveillance programme.

The ambient air quality monitoring program was finalized as per EIA guidance manual – Building Construction and Township and Area Development Projects. The parameters like PM_{10}, $PM_{2.5}$, SO_x, NO_x, and CO was monitored at selected four location and analysis of pollutants was done as per standard IS codes.

Locations of AAQ Monitoring Stations

An assessment of baseline air quality was undertaken to establish the status of exposure of the receptors. This assessment was accomplished by examining sources of air emissions within the study area and by conducting a site-specific background sampling program.

The basic considerations for designing air quality surveillance programme within 500 m as per EIA guidance manual include:

- Nature of Project (Building Construction)
- Meteorological Conditions
- Topography
- Selected Pollution Pockets in the Area and Likely impact area

Keeping the historical meteorological conditions, topography, physical features, sensitive locations and current and anticipated pollution loads in mind and based on the reconnaissance survey of the project area, a monitoring framework for air quality in the study area has been drawn up. A total of 4 numbers of monitoring locations have been selected to assess the existing air quality on 7 and 11 March, 2019 for the proposed project.

The monitoring locations are as follows:

Table: Location of Ambient Air Quality Monitoring Stations

Location No.	Location
AAQ 1	Near Ashoka University
AAQ 2	Bahalgarh
AAQ 3	Near Motilal Nehru School of Sports
AAQ4	Near SRM University

Monitoring Results of Ambient Air Quality

The parameters levels of most of the parameters are found well within the prescribed limits of NAAQ index by CPCB. The PM 10 level at SRM University, Bahalgarh, Motilal Nehru school of Sports, Ashoka university is slightly more than the prescribed limits. PM 2.5 is slightly higher at Motilal Nehru School of Sports and Bahalgarh. The ambient air quality monitoring results are attached as **Annexure**.

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.

During the construction phase of the project, the principal source of air pollution will be dust from exposed site areas, stockpiling, and movement of vehicles along unpaved roads, excavation of earth and handling of construction materials.

In addition, there will also be gaseous emissions from construction vehicles and various construction equipments. Various equipments require diesel oil as fuel being the sources of gaseous emissions. The major gaseous pollutants, which get emitted from diesel-powered equipment and vehicles, are PM, CO, NO_x and SO_2.

Construction machineries and transport vehicles having PUC certificate will be allowed to operate in the city.

Emission from construction vehicles will not lead to any adverse impacts. Moreover, under normal operation, equipments with proper maintenance are unlikely to cause any significant emissions and hence

gaseous emissions are expected to be minimum. Thus, ground level concentrations in ambient air environment are not expected to exceed the prescribed limits as per CPCB guidelines.

During operation phase, DG sets will be used only in case of power failure. DG sets have been identified as the only major source of gaseous and particulate emission. PM_{10}, $PM_{2.5}$, SO_2, NO_x and CO emissions are expected due to fuel combustion in generator sets. As the DG sets will be operated for back-up power supply only, therefore the impact of generation of gaseous pollutants in the ambient environment would be negligible. Proper maintenance of vehicles & DG sets, sprinkling of water on roads and construction site are some of the measures that would reduce the impact during construction phase.

Sources of Air pollution during operational phase

The gaseous emission from vehicles.

Emissions from DG set while in operation only during power failure.

Mitigation measures:

- The traffic congestion will be avoided by proper parking arrangement and maintaining smooth traffic flow.
- Regular PUC check-up for vehicles.
- DG sets with enclosure will be used.
- Regular maintenance of DG sets shall be done & low sulphur diesel shall be used.

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

The proposal will not create any shortage of parking space for vehicles. The existing RGEC has adequate provision for parking of cars/two-wheelers/bicycles to students, staffs, residents and visitors. There shall also be additional parking space for visitors so as not to disturb the internal traffic and allow smooth movement of vehicles. Parking provisions are according to building bye law requirements; well organized parking arrangement has been designed for the project. The total Parking space allotted in the existing project is 54.44 acres.

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

It will be ensured that internal road will be developed to facilitate smooth flow of traffic within the proposed site. The design of the horizontal and vertical alignment, sight distance, sections, medians and intersections will be as per the relevant IRC: 64 (Indian Road Congress) codes. Internal roads of sufficient width, footpaths/ pedestrian pathways have been well planned for the project

The main entry to the proposed land will be through 60 m wide and 30 m wide road, 12 m wide and 18 m wide road, 24 m wide and 30 m wide road and 45 m wide roads will be used for internal communication. Pedestrian pathways, bicycle tracks and footpaths of adequate widths will be provided for pedestrian safety and to reduce the vehicular movement within site.

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.

Yes, there will be a slightly increase in the traffic volumes due to the proposed project activities in form of transportation vehicles of construction material and construction machineries like Trucks, JCBs and Road rollers etc. To mitigate noise generation during construction phase, it will be ensured that construction material transport will be strictly limited to daytime hours and only PUC (Pollution under Control) certified vehicles will be used for the same.

During the operation phase of the project, it is estimated that due to influx of students, visitors etc and various activities within city, the vehicular movement mainly two-wheelers and light motor vehicles on the roads will increase thereby increasing the noise levels.

To mitigate traffic noise generation during operation phase, a detailed traffic management plan will be implemented for abatement of noise emissions. The entry and exit points for the proposed project site will be designed in such a way that a proper loop movement of vehicles will be ensured within the site to avoid traffic congestion leading to noise pollution. Moreover, honking will be prohibited within the premises and in the area to its close proximity. The effect of noise will be further minimized by plantation on the sides of internal roads, on the open spaces inside and around the periphery of whole project site. Trees planted along road & periphery would act as noise barrier and will reduce the noise level.

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

During operation, DG sets will be the major sources of noise pollution. But, operation of DG set will not have any significant impact. Since DG set will not be operational continuously and moreover it will be placed away from educational institutions etc. and will be used only during power failure and also DG set will be provided with suitable acoustic enclosures, hence no or minimal impact is anticipated.

Mitigation Measures for Impacts of DG Sets on Ambient Air Quality:

- Back up DG sets will comply with the applicable emission norms.
- Adequate stack height for DG sets will be provided as per norms of CPCB.
- 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 norms of CPCB.
- Low Sulphur fuel will be used to run DG sets.

Noise and Vibration Control Measures for DG sets:

- DG room will be provided with acoustic lining / treatment to insure 25 dB (A) insertion loss as per the regulations
- Adequate exhaust mufflers will be provided as per norms to limit the noise.
- Vibration pads will be used to run these DG sets to minimize the vibration effect.

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?

There will be no obstruction of view or scenic beauty or landscape is anticipated as the project site lies in a rural area. Furthermore, the existing education city was planned in such a way that the organized open spaces and landscaped areas will improve the aesthetics of the education city.

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

No adverse impacts on the existing structures has been anticipated due to modernisation of existing project.

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

There are no typical urban form & urban design influencing the design criteria. The existing project strictly followed the Area Building Regulation of NBC. All norms on Ground Coverage, FAR, Height, Setbacks, Fire Safety Requirements, Structural Design and other parameters are strictly adhered to.

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

No anthropological or archaeological sites or artifacts are found near or within the site area.

7 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 is modernisation of existing Rajiv Gandhi Education City. After the operation of project, there will be influx of population in the form of students, staffs & visitors. It is anticipated that a residential population of 40,000 and floating population of 30, 000 will be attracted by the education city.

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

The details of existing social infrastructure around the project are as follows:

Name/ Identity	**Aerial distance (within 15 km.) Proposed project location boundary**
Hospital	
SRM Hospital	4.0 km SE
Govt. Primary Hospital, Jakhauli	5.0 km East

Angoori Devi Charitable Hospital, Bahalgarh	3.7 kms North
FIMS Hospital, Sonipat	6.0 kms NW
Schools	
Govt. Middle School, Asawarpur,	3.25 kms North
Honey Modern High School, Bahalgarh	3.3 kms North
Bal Jagriti Modern School, Bahalgarh	3.5 kms North
KDM Public School, Bahalgarh	3.7 kms North
Presidium Public School, Sonipat	7.1 km NW
Places of worships	
Sai Tample, RGEC	0.2 km North
Jain mandir, Asawarpur	0.5 km East
Mahadev Temple, Seoli	1.0 km East
Shani Temple, Seoli	1.5 km East
Community Facilities	
Allahabad Bank, Rai	1.1 kms NW
RBL Bank, Asawarpur	2.0 kms North
Post Office, Rai	0.2 kms South
Police Station, Rai	1.0 kms NW

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

The proposed project will be constructed within the designated site as per the defined building by-laws of government. There are no sacred sites, or cultural heritage within the proposed project site. Hence, no adverse impact in this regard is anticipated.

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 proposed project is modernisation of existing RGEC. The project proponent will provide vacant land to the individual institutions for construction of their buildings. The institution buildings will be constructed by their owners. The RGEC will construct commercial, residential buildings and STP, WTP and other infrastructure facilities. For conservation of energy in construction of buildings, several measures have been undertaken.

Embodied energy is the energy consumed by all of the processes associated with the production of a building material, from the mining and processing of natural resources to manufacturing, transport and product delivery. Choices of materials and construction methods can significantly change the amount of energy embodied in the structure of a building, as embodied energy content varies enormously between products and materials.

Purpose	Building Materials	Energy Efficient Building material used along with other building material (for areas other than plotted)	Energy Embodied
Foundation	Concrete, Pillar, Beam, Concrete Block, Bricks and Stone	• Use of lightweight concrete (aluminium powder added to lime produces a lightweight cementation material). • Ready-mix concrete or high-volume fly ash concrete or pozzolana material Blended Portland cement (BPC) concrete for construction will be used.	Low Low
Wall	Bricks & ACC blocks, Stone Cladding, Plaster, Bricks	• Clay fly ash burnt bricks • Fly ash sand lime bricks • Precast stone blocks (waste stone pieces with lean cement concrete, obliterates plaster) • Autoclaved Aerated Concrete Blocks • Plaster	Low High Low High High
Roof	RCC	RCC	High
Finishing	Plaster, Paints	• Rice husk board	Low

		• Jute stalk board panels • Cement bonded composite panelling • Products utilizing industrial waste, agricultural waste, such as fibrous gypsum plaster boards. • Paint/epoxy resin paint for external surfaces.	Low High Low High
Flooring	Stone, Marble	• Tiles will be used • Particle boards will be used • Marble, Granites will be used	Low High
Windows and doors	Wood	• Aluminium will be used • Medium density fibreboard doors and windows • Glass	High High High
Footpath	Concrete	• Fly ash blocks, Concrete Blocks and construction debris	Low
Boundary wall	Bricks, Cement, Sand, POP	• Fly Ash Blocks	Low

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

Yes, transportation and handling of material will be resulting in air pollution, and noise pollution. Trucks will be used for transportation of construction material and other machineries and vehicles of staffs will result in air and noise pollution. The mitigation measures for this are as follows:

Mitigation Measures for Air Pollution during Construction Stage:

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

Mitigation Measures for Noise Pollution during Construction Stage:

- Administrative as well as engineering control of noise will be implemented.

- Isolation of noise generation sources and temporal differentiation of noise generating activities will ensure minimum noise at receiver's end.
- To prevent any occupational hazard, earmuff / earplug shall be given to the workers working around construction plant & machinery emitting high noise levels.
- Use of such plant or machinery shall not be allowed during night time. Careful planning of machinery operation and scheduling of operations shall be done to minimise such impact.

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

Yes, Following Recyclable waste will be used in roads;

- Cement bags, plastic bags etc. will be used in roads (Energy Saving: 15-20%)
- Construction debris like Concrete will be recycled and will be used in parking area and road area (Energy Saving: 20-30%).
- Sub Stratum removed during foundation & excavation will be used for plot filling & making pathways (Energy Saving: 20-30%).
- Brick work wastage will be used for pavements and parking area (Energy Saving: 40%).
- Cut Tiles & chips will be used in creating pathways in the landscape area & rest will be sent to the construction & demolition facility (Energy Saving: 20-25%).
- No recycled materials used in structures. However, fly-ash mixed cement, concrete shall be used (Energy Saving: 5-10%).
- In road construction fly-ash will be utilized. Recycled materials will be bought from outside sources and will be used as fillers in base and sub-base of the carriageway, footpaths pavements or pedestrian way, as needed.

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

The existing education city has a systematic approach for solid waste collection and disposal. An area of 9.20 Acres has been earmarked for the solid waste management facility.

Collection of Waste

The waste will be collected and kept in different colour coded bins. Biodegradable waste and non-biodegradable waste will be collected in separate bins. The bins will be emptied into the main bins.

Segregation of Waste

The solid waste of the project will be segregated into biodegradable waste and non-biodegradable. The recyclable wastes like paper, glass, plastic, metals etc will be sold to scrap vendors. The management of solid waste will be followed a per Solid Wastes Management Rules, 2016.

Disposal of Waste

From the main bins, service provider will collect biodegradable waste (Consisting of kitchen waste, wood, leaves and branches etc) from green bins and it will be disposed off in organic waste convertor and converted to compost as per Solid waste management rules, 2016. Non-biodegradable wastes having recyclable waste (Paper, Plastic, Glass, Metals etc) will be given to authorized recycler. The solid waste shall be disposed off as per Solid Waste Management Rules, 2016.

9. ENERGY CONSERVATION

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

Source of Power and Power Requirement

The power requirement for the existing project of RGEC will be approx. 107 MVA. The power for modernisation will be met through this existing power requirement. There are total two nos. of 33 KVA substation which would be established within educational city. The source of power supply to proposed modernisation of city is 220 KVA substation of Haryana Vidyut Prasar Nigam Limited (HVPNL).

Details of Power back-up

To meet the power requirement during the power failure, 9 MVA DG sets have been proposed as a source of power backup for residential and edu-residential of the RGEC. An additional 20 MVA DG set has also been proposed further for residential area. The DG sets will be equipped with acoustic enclosure to minimize noise generation and adequate stack height for proper dispersion of emissions.

Energy Conservation Measures & Management Plan: Energy conservation will be one of the focuses during the project planning and operation stages. The conservation efforts would consist of the following:

ARCHITECTURAL DESIGN TECHNIQUES

The proposed site plan is designed to capture the positive seasonal climatic forces to mitigate building's resource consumption and environmental impacts. Various measures which have been included in the design are as follow:

- Glass with improved U- value and SHGC to reduce energy demand in perimeter spaces and to reduce localized solar gains and urban heat island effect.
- Design for Day lighting- building facade configuration to allow for deeper penetration of natural daylight.
- Building massing to allow for self-shading of exposed surfaces.
- High efficiency lighting to reduce the installed lighting power (Watt/m^2) thereby reduces the building electric use
- Planting of drought tolerant/native plants and trees for reduction in water consumption and hence electric energy.

ADOPTION OF LIGHTING ENERGY

- Use of energy efficient lighting equipment's, like lamps, luminaries (LED in all common areas like lift lobbies, corridors etc), Low loss electronic ballast and control devices. Proper utilization of daylight and control glare from windows.
- Maintenance of lighter finishes of ceiling, walls and furnishings.

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

To meet the power requirement during the power failure, DG sets have been proposed as a source of power backup to the residential and edu-residential of RGEC. A total of 9 MVA D.G. sets for residential and edu-residential and additional power back up of additional 20 MVA to residential and commercial have been proposed for the total project. The fuel required to run these DG sets will be approx. 5.8 KLD.

Also, it is envisaged to install solar power system of 1 MW capacity in the education city.

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

Plain glass will be used in residential colonies & Double reflective glass in commercial parts of the proposed project.

Specification of Glass (Single reflective glass) is given below:

'R' Values (in Sq m. Deg C/ Watt): 0.14

'U' Values (in Watts/ Sq m. Deg C): 7.1

Solar Heat Gain Co-efficient: 0.82

Specification of Glass (double reflective glass) is given below:

'R' Values (in Sq m. Deg C/ Watt): 0.30

U' Values (in Watts/ Sq m. Deg C): 3.3

Solar Heat Gain Co-efficient: 0.11

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

Passive solar design refers to use of the sun's energy for the heating and cooling of spaces. Pergolas, projections, façade elements, metal louvers will be provided for sun shading to reduce the heat influx into the building and thus reduce the air conditioning loads. The following passive solar architectural features will be used in the building:

- The design features of the building will consider adequate cross ventilation within and outside the buildings by providing doors and windows on both the windward and leeward sides of the building.
- Proper underdeck or over deck thermal insulation of roof structures and walls will be followed to reduce the U value.
- External solar shading will be used to minimize problem of glare and overheating in the summer.

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

Yes, Layout of buildings has been done as per the sun path analysis so that the design cuts off direct radiations of critical hours which are specific to the orientation. Solar energy will be harnessed to meet various energy requirements of the project.

It is proposed to install solar photovoltaic panels to power external lighting for the site as per the HAREDA norms/ guidelines. External lighting which includes lighting along the driveways & landscape pathways is proposed to be on Solar. Location of these solar panel has been designed so as to maximize its exposure to the Sun, which would result in Energy Savings.

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

Pergolas, projection, façade elements, metal louvers will be provided to reduce cooling loads. Green area and open areas will be so spaced that a reduction in temperature is achieved. The following techniques have been adopted:

- The total window to wall ratio of the building will be optimized.
- Shading will be used to increase cooling effects in the buildings.
- Promoting awareness on energy conservation
- Training of staff on methods of energy conservation and to be vigilant to such opportunities.

The overall design of building layout has adequately taken care of shading factor into consideration and will result in significant savings in energy consumption. Maximizing the use of daylight in both common areas and within the office space is a key aspect of the design, to reduce the need for artificial lighting.

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

Yes. Space conditioning will be provided as per the norms of National Building Code. The walls and rooms will be insulated such that air conditioning load is reduced. Well-designed building structures will allow natural light to enter. Measures prescribed in Energy Conservation Building Code will be adopted to reduce the heat influx by walls, roofs and openings. Only prescribed quality of glasses will be used.

The project will also ensure use of energy efficient lighting like use of LEDs and ventilation. This will be done by incorporating modern architectural designs and techniques. Energy efficient building orientation has been considered while designing building envelope.

There will be no use of CFC and HCFC free chillers as there are no provision of chillers. Energy efficient motors will be used only to lift water to overhead water tanks and for firefighting systems. As per IS-2165, energy efficient motors shall be used.

The RGEC has installed two Transformers of 10 MVA capacity and 19 Transformers have been proposed.

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

The likely effects of the activity in altering the micro-climate are as follows:

Heat emissions from the proposed construction may be from the following sources:

- Heat absorbed from the paved and concrete structures
- Heat generated from equipment/appliances.
- Heat increase due to population increase in the proposed project.

However, the heat generated will not be significant and will be dissipated in the greenbelt area and open areas provided within the project area. To counter the heat absorbing effect, facade of low U & R Value will be provided, hence it can be concluded that the heat island effect shall not be a concern for the concerned project.

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

The thermal characteristics of the building Envelope comprising of Roof, wall and glass would be in conformance to ECBC requirement.

S. No	BUILDING MATERIAL PROPOSED WITH U & R VALUES	'R' Values (in Sq m. Deg C/ Watts)	'U' Values (in Watts/ Sq m. Deg C)
1	Wall	2.28	0.44

	Fly ash Brick & ACC Blocks wall both side thick sand cement plaster with insulation.		
2	**Roof** RCC slab with mud phuska & clay tiles with insulation.	2.04	0.49
3	**Glass** (for commercial area only) (Double reflective glass)	0.30	3.3

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

Firefighting measures shall be adopted as per the guidelines of NBC. A fire station has been proposed for the project. External yard hydrants will be installed around the proposed buildings and galvanized steel fire hose boxes/cabinet (weather proof) will be installed.

DISASTER MANAGEMENT PLAN

PRECAUTION & MITIGATORY METHODS TO PREVENT DISASTERS:

- Project is planned to reduce the impact of disasters and to encourage recovery.
- A disaster management cell would be established which will take care of post disaster scenario.
- It would be a volunteer kind of set-up and professionals can also be hired in case of eventuality.
- Complex management and maintenance agency will prepare an integrated, comprehensive management plan.

PRECAUTION & MITIGATORY METHODS TO PREVENT DISASTERS:

(Fire Hazard)

- Fire safety has been considered and would follow all the safety norms and regulations as per the NBC and other related Indian Standards.
- All electrical cables would be underground and sophisticated modern electrical distribution system to reduce risk of fire.
- Special firefighting equipment like Automatic Fire Detection and alarm system, automatic Sprinkler System etc. would be installed as per the NBC standards.

- Risk assessment with onsite disaster management plan will be specified to fire, smoke and other emergency conditions.
- Emergency Response team shall be formed which will comprise of personal control room, security personnel, Trainer and External services from Fire Department, Police and Hospital.
- Proper training and security drill shall be conducted.
- CCTV, checking at the entrances, communication system for security staff to coordinate during emergency shall be provided.

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

It is proposed to use plain glasses for residential buildings and & double reflective glasses for commercial part.

Specification of Glass (Single reflective glass) is given below:

'R' Values (in Sq m. Deg C/ Watt): 0.14

'U' Values (in Watts/ Sq m. Deg C): 7.1

Solar Heat Gain Co-efficient: 0.82

Specification of Glass (double reflective glass) is given below:

'R' Values (in Sq m. Deg C/ Watt): 0.30

U' Values (in Watts/ Sq m. Deg C): 3.3

Solar Heat Gain Co-efficient: 0.11

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

The design features of the proposed building will consider adequate cross ventilation within and outside the buildings by providing doors and windows on both the windward and leeward sides of the building. Operable facade will be used to allow for natural ventilation during shoulder season and night time. Proper Inflow and outflow of air shall be maintained and proper dilution shall be provided by using air exhaust to maintain air quality.

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

- Solar energy will be used inside the project.
- Street lighting & common area lighting will be on solar power.
- Installation of solar photovoltaic panel as per HAREDA norms / guidelines.

10. ENVIRONMENT MANAGEMENT PLAN

10.1 Introduction

The Environment Management Plan (EMP) is a site-specific management plan which is developed to ensure the implementation of project in an environmentally sustainable manner where all stakeholders like contractors and subcontractors, including consultants, assess the potential environmental risks that may arise from the project and take appropriate mitigation measures to reduce the impacts. EMP also ensures the implementation of project in accordance with the approved design by taking appropriate mitigation actions to reduce adverse environmental impacts during its life cycle. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the sites including fire. Also, the plan outlines roles and responsibility of the key personnel and contractors who will be in-charge of the responsibilities to manage the project site.

The EMP is generally prepared in accordance with rules and requirements of the MoEF&CC and CPCB/ SPCB. The key benefits of the EMP are that it offers proper means of managing environmental performance thereby allowing it to contribute to improve environmental quality. The other benefits include cost control and improved relations with the stakeholders.

EMP includes four major elements:

Commitment & Policy: The management will strive to provide and implement the Environmental Management Plan that incorporates all issues related to air, water, land and noise etc.

Planning: This includes identification of environmental impacts, legal requirements and setting environmental objectives.

Implementation: This comprises of resources available to the developers, accountability of contractors, training of operational staff associated with environmental control facilities and documentation of measures to be taken.

Measurement & Evaluation: This includes monitoring, counteractive actions and record keeping.

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

The components of the environmental management plan, potential impacts arising out of the project and mitigation measures are as follows.

10.2 EMP for Air Environment

10.2.1 Construction Phase

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

Air quality management during construction phase

- Construction equipment and transportation of construction material will be operated using diesel and will contribute to SPM and gaseous emissions.
- Most of the equipment will be mobile and the emissions will be fugitive, hence impacts will be localized in nature
- Sprinkling of water to control fugitive emissions
- Barricading of construction site to reduce dispersion of dusts
- PPE for construction workers
- Avoid transportation of construction material during night time.

10.2.1.1 Dust Control Plan

The most cost-effective dust suppressant is water because water is easily available on construction site. Water can be applied using water trucks, handled sprayers and automatic sprinkler systems. Furthermore,

incoming loads could be covered by tarpaulin sheets to avoid loss of material in transport, especially if material is transported off-site.

10.2.1.2 Procedural Changes to Construction Activities

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

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

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

10.2.2 Operation Phase

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

Air quality management during operational phase

- DG sets with suitable Stack height will be installed
- Control measures as stipulated by MoEF and CPCB/APPCB will be strictly implemented
- A Greenbelt in an area of 258 acres will be developed which will act as sink for the pollutants

10.2.2.1 Diesel Generator Set Emission Control Measures

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

10.2.2.2 Vehicle Emission Controls and Alternatives

During construction, vehicles will be properly maintained to reduce emission. Inside the education city, vehicles having "PUC" certificate will be allowed to enter.

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

10.2.2.3 Greenbelt Development

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

Table: List of tree species that can be used as a Barrier to air pollution

S. No.	Scientific Name	Common Name
1.	*Aegle marmelos*	Wood Apple/ Bel
2.	*Albizzia lebbeck*	Siris
3.	*Alstonia scholaris*	Saptaparni
4.	*Annona squamosa*	Sharifa
5.	*Anogeissus pendula*	Dhaura
6.	*Anthocephalus cadamba*	Kadamb
7.	*Azadirachta indica*	Neem
8.	*Bauhinia purpurea*	Khairwal
9.	*Bauhinia variegata*	Kachnar
10.	*Cassia fistula*	Amaltas
11.	*Callistemon citrinus*	Bottle Brush
12.	*Casuarina equisetifolia*	Jungali saru
13.	*Cordia sebestena*	Lal Lasora
14.	*Crataeva religiosa*	Garlic Pear Tree

15.	*Dalbergia sissoo*	Sissoo
16.	*Delonix regia*	Red Gulmohar
17.	*Diospyros embryopteris*	Gaab
18.	*Emblica officinalis*	Amla
19.	*Ficus religiosa*	Peepal
20.	*Ficus virens*	Pakhad
21.	*Jacaranda mimosifolia*	Neeli Gulmohar
22.	*Kydia calycina*	Bharanga
23.	*Lagerstroemia flos-reginae*	Jarul
24.	*Mangifera indica*	Mango
25.	*Melia azedarach*	Bakayan
26.	*Millingtonia hortensis*	Neem C hameli
27.	*Moringa oleifera*	Sehjan/Drumstick
28.	*Morus alba*	Shahtoot
29.	*Peltophorum pterocarpum*	Peela Gulmohar
30.	*Pongamia pinnata*	Karanj
31.	*Polyalthia longifolia*	False Ashoka
32.	*Plumeria alba*	Champa
33.	*Putranjiva roxburghii*	Putijia
34.	*Roystonea regia*	Royal Palm
35.	*Syzygium cumini*	Jamun
36.	*Tamarindus indicus*	Imli
37.	*Terminalia arjuna*	Arjun
38.	*Terminalia bellerica*	Baheda
39.	*Thuja occidantalis*	American arbovitae

Table: List of shrubs & ground covers to be planted

S. No.	Scientific Name	Common Name
Shrubs		
1.	*Bougainvillea spectabilis*	Booganbel
2.	*Cassia javanica*	Pink Shower
3.	*Cestrum nocturnum*	Night Blooming Jasmine
4.	*Citrus aurantium*	Nimbu
5.	*Gardenia latifolia*	Papda
6.	*Hibiscus rosa-sinensis*	China Rose
7.	*Hiptage benghalensis*	Madhavi Lata
8.	*Ixora parviflora*	Ixora
9.	*Jatropha panduraefolia*	Peregrina
10.	*Mimusops elengi*	Maulsari
11.	*Murraya exotica*	Orange Jasmine
12.	*Nerium oleander*	Kaner
13.	*Nyctanthes arbortristis*	Harsingar
14.	*Tabernaemontana coronaria*	Chandni
15.	*Thevetia peruviana*	Pili Kaner
Ground Cover		
16.	*Alternanthera ficoidea*	Partyyime alternanthera
17.	*Golden duranta*	Sheenas Gold

10.3 EMP FOR NOISE ENVIRONMENT

10.3.1 Construction Phase

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

- Construction activities like concreting, mixing, casting and material movement are primary noise generating sources and expected to produce noise levels in the range of 70-85 dB (A)

- Major construction work will be carried out during day time only and the anticipated noise levels will be confined to the project site itself.
- Barricading of the construction site will be done.
- Construction equipment generating minimum noise will be chosen
- Vehicles and construction equipment with internal combustion engines without proper silencer will not be allowed to operate at the construction site
- Earmuffs will be provided to the workers and safety procedures would be put in place to ensure that workers are wearing the ear-muffs

10.3.1.1 Time of Operation: Noisy construction equipment would not be allowed to work at night time.

10.3.1.2 Job Rotation and Hearing Protection: Workers employed in high noise areas will be employed on shift basis. Hearing protection such as earplugs/muffs will be provided to those working very close to the noise generating machines.

10.3.2 Operation Phase

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

- Providing DG sets with acoustic enclosures.
- Operators will be provided with ear mufflers working near operating DG sets and pump house
- Development of green area and rich canopy to attenuate the high noise levels.

10.3.2.1 Noise Emission Control Technologies

The DG set room will be provided with acoustic enclosure to have minimum 25 dB (A) insertion loss or for meeting the ambient noise standard whichever is on higher side as per EP Act, GSR 371 (E) and its amendments. It would be ensured that the manufacturer provides acoustic enclosure as an integral part along with the diesel generators set.

10.4 EMP FOR WATER ENVIRONMENT

10.4.1 Construction Phase

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

- Avoid excavation during monsoon season
- Care would be taken to avoid soil erosion
- Any area with loose debris within the site shall be planted
- To prevent surface and ground water contamination by oil and grease, leak-proof containers would be used for storage and transportation of oil and grease. The floors of oil and grease handling area would be kept effectively impervious. Any wash off from the oil and grease handling area or workshop shall be drained through impervious drains
- Collection and settling of storm water, prohibition of equipment wash downs and prevention of soil loss and toxic release from the construction site are necessary measure to be taken to minimize water pollution
- All stacking and loading area will be provided with proper garland drains, equipped with baffles, to prevent run off from the site, to enter into any water body.
- Mobile toilets will be provided to treat the sanitary wastewater generated during construction period
- Construction during monsoon period will be avoided to the extent possible.

10.4.2 Operation Phase

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

10.4.2.1 Water Source Development

Water source development shall be practiced by installation of scientifically designed Rain Water Harvesting system. Rainwater harvesting promotes self-sufficiency and fosters an appreciation for water as a resource. It also serves as a measure to recharge ground water in an overexploited area like Sonipat.

10.4.2.2 Minimizing Water Consumption

Consumption of fresh water will be minimized by combination of water saving devices and other domestic water conservation measures. Further, to ensure ongoing water conservation, an awareness program will be introduced for the residents. Treated water will be reused for parks and horticulture etc to reduce fresh water demand. The following section discusses the specific measures, which shall be implemented:

Domestic and Commercial Usage

- Use of water efficient plumbing fixtures (ultra-low flow toilets, low flow sinks, water efficient dishwashers and washing machines). Water efficient plumbing fixtures uses less water with no marked reduction in quality and service
- Leak detection and repair techniques.
- Sweep with a broom and pan where possible, rather than hose down for external areas.
- Meter water usage: Implies measurement and verification methods.
- Monitoring of water uses is a precursor for management.

Horticulture

- Drip irrigation system shall be used for the lawns and other green area. Drip irrigation can save 15-40% of the water, compared with other watering techniques. Recycled water will be used for horticulture.
- Plants with similar water requirements shall be grouped on common zones to match precipitation heads and emitters.
- Use of low-angle sprinklers for lawn areas.
- Select controllers with adjustable watering schedules and moisture sensors to account for seasonal variations and calibrate them during commissioning.
- Place 3 to 5 inches of mulch on planting beds to minimize evaporation.

10.4.2.3 Promoting Re-use of Water after Treatment and Development of Closed Loop Systems

Two schemes are suggested for reuse and recycling namely:

1) Storm Water Harvest

Storm water harvesting will be utilized for artificial recharge of ground water sources.

2) Recycling of treated water from STP

It is proposed to use treated water from STP for parks and playground, flushing, landscaping etc. Approx. 13000 KLD of treated water is proposed to be reused.

10.4.2.4 Waste Water Treatment Scheme

The waste water generated from the RGEC will be treated in proposed STP. The waste water generated from the project will be approx. 25000 KLD. To treat such quantity of wastewater, a STP of capacity 25000 KLD has been proposed. The detailed wastewater treatment facility has been given in conceptual plan. Currently, STP of capacity 7.5 MLD is operational in the city. After completion of whole project, STP will be upgraded to 25 MLD capacity.

10.4.2.5 Storm Water Management

Most of the storm water produced on site will be harvested for ground water recharge. The rainwater harvesting system has been proposed for Rajiv Gandhi educational city. Thus, proper management of this resource is a must to ensure that it is free from contamination.

Contamination of Storm Water is possible from the following sources:

- Diesel and oil spills in the diesel power generator and fuel storage area
- Waste spills in the solid / hazardous waste storage area
- Oil spills and leaks in vehicle parking lots
- Spillage of sludge from sludge drying area of sewage treatment plant

To check the above-mentioned impacts, several management practices will be undertaken which are as follows:

- Regular inspection and cleaning of storm drains
- Covered waste storage areas
- Avoid application of pesticides and herbicides before wet season
- Secondary containment and dykes in fuel/oil storage facilities
- Provision of silt traps in storm water drains
- Good housekeeping practices in the above areas

10.5 EMP FOR LAND ENVIRONMENT

10.5.1 Construction Phase

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

10.5.1.1 Construction Debris

Construction debris is bulky and heavy and re-utilization and recycling is an important strategy for management of such waste. As concrete and masonry constitute the majority of waste generated, recycling of this waste by conversion to aggregate can offer benefits of reduced landfill space and reduced extraction of raw material for new construction activity. This is particularly applicable to the project site as the construction is to be completed in a phased manner.

Mixed debris with high gypsum, plaster, shall not be used as fill, as they are highly susceptible to contamination, and will be send to designated solid waste landfill site. Metal scrap from structural steel, piping, concrete reinforcement and sheet metal work shall be removed from the site by construction contractors. A significant portion of wood scrap will be reused on site. Recyclable wastes such as plastics, glasses, fibre insulation etc shall be sold to recyclers.

10.5.1.2 Hazardous waste

Construction sites are sources of many toxic substances such as used oil from DG sets and construction machineries, paints, solvents, wood preservatives, pesticides, adhesives and sealants. Hazardous waste generated during construction phase shall be stored in sealed containers and disposed off as per the Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Some management practices to be developed are:

- The used oil estimated to be generated from DG sets is approximately 3.5 KL per annum. This will be stored in metal / HDPE containers and will be handled and disposed off as per Hazardous and Other Waste (Management and trans-boundary movement) Rules, 2016. It will be sent to authorized recyclers approved by SPCB.

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

Even with careful management, some of these substances may be released into air, soil and water and many are hazardous to workers. With these reasons, the best choice is to avoid their use as much as possible by using low-toxicity substitutes and low VOC (Volatile Organic Compound) materials.

10.5.1.3 Waste from Temporary Made Shift Tents for Labours

Wastes generated from temporary made shift labour tents will mainly comprise of household domestic waste, which will be managed by the contractor of the site. The wastewater generated will be channelized to the septic tank.

10.5.1.4 Top Soil Management

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

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

- Construction of erosion prevention troughs/berms.

10.5.2 Operational Phase

The philosophy of solid waste management at the proposed project will be to encouraging the four R's of waste i.e. **R**eduction, **R**euse, **R**ecycling and **R**ecovery (materials & energy). Regular public awareness meetings will be conducted to involve the residents in the proper segregation and storage techniques. The Environmental Management Plan for the solid waste focuses on three major components during the life cycle of the waste management system i.e., collection and transportation, treatment or disposal and closure and post-closure care of treatment/disposal facility.

10.5.2.1 Collection and Transportation

During the collection stage, the solid waste of the project will be segregated into biodegradable waste to be collected in green coloured trash bin and non-biodegradable waste to be collected in blue coloured trash bin. The recyclable wastes will be sent off to recyclers. Proper guidelines for segregation, collection and storage will be prepared as per Solid Waste management Rules, 2016. The collection of waste and transported

To minimize littering and odour, waste will be stored in well-designed containers/ bins that will be located at strategic locations to minimize disturbance in traffic flow. Care would be taken such that the collection vehicles are well maintained and generate minimum noise and emissions. During transportation of the waste, it will be covered to avoid littering.

10.5.2.2 Disposal

With regards to the disposal/treatment of waste, the management will make a team to take proper corrective measure/ the authorized agency for waste management and disposal of the same on the project site during its operational phase.

For the management of Solid waste, Organic Converter will be provided. Also, as there is proposal for a construction of hospital, hence, an Autoclave with shredding facilities will be provided for the management of Solid Waste generated from the hospital.

10.6 EMP FOR ECOLOGICAL ENVIRONMENT

The project is modernisation of existing education city. Hence, there will be no clearing of vegetation and no significant loss of vegetation. The modernisation of RGEC will further enhance the development of greenbelt and create a better environment for its students, staffs, visitors and residents. The project requires the implementation of following choices exclusively or in combination.

10.6.1 Construction Stage

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

10.6.2 Operation Stage

10.6.2.1 Avenue Plantation

Selection of the plant species would be done on the basis of their adaptability to the existing geographical conditions and the vegetation composition of the region.

The selection of avenue trees will be according to below mentioned characteristics:

1. Trees with colonial canopy with attractive flowering
2. Trees with branching at seven feet and above
3. Trees with medium spreading branches to avoid obstruction to the traffic
4. Fruit trees to be avoided because children may obstruct traffic and general movement of public

10.6.2.2 Green Belt Development Plan

The plantation matrix adopted for the green belt development includes pit of 0.3 m × 0.3 m size with a spacing of 5 m x 5 m. In addition, earth filling and manure may also be required for the proper nutritional

balance and nourishment of the sapling. It is also recommended that the plantation has to be taken up randomly and the landscaping aspects could be taken into consideration.

Multi-layered plantation comprising of medium height trees (7 m to 10 m) and shrubs (5 m height), herbs and ground cover have been proposed for the green belt. In addition, creepers will be planted along the boundary wall to enhance its insulation capacity.

10.6.2.3 Selection of Plant Species for Green Belt Development

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

1. The species should be fast growing.
2. The species should be wind-firm and deep rooted
3. The species should form a dense canopy
4. As far as possible, the species should be indigenous and locally available
5. Species tolerance to air pollutants like SO_2 and NO_x should be preferred
6. The species should be permeable to help create air turbulence and mixing within the belt
7. Trees with high foliage density, leaves with larger leaf area and hairy on both the surfaces.
8. There should be no large gaps for the air to spill through
9. Ability to withstand conditions like inundation and drought
10. Soil improving plants (Nitrogen fixing, rapidly decomposable leaf litter)
11. Attractive appearance with good flowering and fruit bearing
12. Bird and insect attracting tree species
13. Sustainable green cover with minimal maintenance.

10.7 EMP for Socio-Economic Environment

The proposed project has been envisaged in keeping the socio-economic development of the area. The Project focuses on the following components:

10.7.1 Income Generation/Employment Opportunity during Construction and Operation Phase

The project would provide employment opportunity during construction and operation phase. There would also be a wide economic impact in terms of generating opportunities for direct and indirect occupation

within and around the educational city. The main principles considered for employment and income generation opportunities are out lined below:

- Direct employment Teaching faculty, Non-teaching staff, Management team and other labours are employed during operational phase at Rajiv Gandhi Educational City. Indirect employments are commercial activity inside/ outside of the educational city.
- Employment opportunity for local people during construction phase
- Conditions of employment would address issues like minimum wages and medical care for the workers. Contractors would be required to abide to employment priority towards locals and abide by the labour laws regarding standards on employee terms and conditions.

10.8 EMP FOR ENERGY CONSERVATION

Energy conservation program will be implemented through measures taken both on energy demand and supply. It was one of the main focus during the complex planning and operation stages. The conservation efforts would consist of the following:

10.8.1 Architectural design

- Maximum utilization of solar light will be done.
- Maximize the use of natural lighting through design.
- The orientation of the buildings will be done in such a way that maximum daylight is available.
- The green areas will be spaced, so that a significant reduction in the temperature can take place.

10.8.2 Energy Saving Practices

- Energy efficient LED lights will be provided within the complex.
- Constant monitoring of energy consumption and defining targets for energy conservation. Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels.

10.8.3 Behavioural Change on Consumption

- Promoting resident awareness on energy conservation
- Training staff on methods of energy conservation and to be vigilant to such opportunities.

10.9 ENVIRONMENTAL MANAGEMENT SYSTEM AND MONITORING PLAN

For the effective and consistent functioning of the proposed project, an Environmental Management system (EMS) would be established at the site. The EMS would include the following:

- An Environmental management cells.
- Environmental Monitoring.
- Personnel Training.
- Regular Environmental audits and Correction measures.
- Documentation of standards operation procedures, Environmental Management Plan and other records.

10.9.1 ENVIRONMENTAL MANAGEMENT CELL

Apart from having an Environmental Management Plan, it is also proposed to have a permanent organizational set up charged with the task of ensuring its effective implementation of mitigation measures and to conduct environmental monitoring. The major duties and responsibilities of Environmental Management Cell shall be as given below:

- To implement the environmental management plan.
- To assure regulatory compliance with all relevant rules and regulations.
- To ensure regular operation and maintenance of pollution control devices.
- To minimize environmental impact of operations as by strict adherence to the EMP.
- To initiate environmental monitoring as per approved schedule.
- Review and interpretation of monitored results and corrective measures in case monitored results are above the specified limit.
- Maintain documentation of good environmental practices and applicable environmental laws for a ready reference.
- Maintain environmental related records.
- Coordination with regulatory agencies, external consultants, monitoring laboratories.
- Maintenance of log of public complaints and the action taken.

10.9.2 ENVIRONMENTAL MONITORING

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

Table: Suggested Monitoring Program for Modernisation of Education City

S. No.	Type	Locations	Parameters	Period and Frequency
1.	Ambient Air Quality	Project Site	Criteria Pollutants: SO_2, NO_2, $PM_{2.5}$, PM_{10}, CO	Half yearly (24 hr average samples) during construction phase and annual during operation phase.
2.	Groundwater	Project site	Drinking water parameters as per IS 10500.	Half yearly
3.	Ambient Noise	Project site	dB (A) levels	Half yearly (Hourly day and night time L_{eq} levels) during construction phase and every year during operation phase.
4.	Potable water Quality	Water Supply	As per IS 10500 Potable water standards	Half yearly
5	Soil quality	Project site	Organic matter, C, H, N, Alkalinity, Acidity, heavy Metals and trace metal,	Half yearly
6.	Waste Characterization	Project Site	Physical and Chemical composition	Daily
7.	Treated water	Outlet of STP	BOD, MPN, coliform count, etc.	Daily

10.9.3 Environmental Audits and Corrective Action Plans

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

10.9.4 Environmental Budget

The project authorities have made estimated budgetary provisions for implementation of EMP to mitigate the adverse impacts on air, water, noise and vibration, ecology etc. through installation of STP, greenbelt development, providing DOCC, sprinklers, autoclave and organic waste converter etc.

Table: Environmental Management Plan Budget

Description of Management plan	Tentative Budget (INR)
Sewage Treatment Plant	10,34,000,00.00
Greenbelt Development	1,05,000,00.00
DOCC for gensets	87,000,00.00
Sprinklers	2,000,00.00
Organic Waste Converter	1,00,000,00.00
Autoclave with shredding facilities	25,000,00.00
Total Cost	**13,53,000,00.00**

10.9.5 Corporate Environmental Responsibility

The MOEF&CC has mandated additional budgetary provision for CER vide OM dated 01.05.2018 in addition to EMP Budget for environment protection. The proposed modernization of Education city is a brownfield project hence, the CER budget applicable will be 0.25% of total project cost i.e. 1788 crores. The CER budget for the proposed project comes out to be Rs. 447 lakhs. The CER funds will be used for development and maintenance of village ponds in nearby areas of education city, providing public toilets under Swachh Bharat Scheme and providing drinking water facilities to the nearby villages.

The summary of EMP is given in below table:

S. No.	Environmental components	Potential Impacts	Potential Source of Impact	Controls Through EMP & Design	Impact Evaluation	Remedial Measures
1.	Ground Water Quality	Ground Water Contamination	**Construction Phase** Wastewater generated from temporary labour tents.	No surface accumulation will be allowed.	No significant impact as majority of labours would be locally deployed	Mobile toilets will be provided to workers.
			Operation Phase Discharge from the project	The STPs will treat the wastewater discharged from the project.	No negative Impact on Ground water quality envisaged.	Rainwater harvesting system is proposed to increase the ground water level.
2.	Ground Water quantity	Ground Water Depletion	**Construction Phase** Extraction of Ground Water for construction	Ground water will not be extracted for construction activity.	No Significant impact	Water for construction will be taken from surface water.
			Operation Phase Extraction of Ground Water for domestic use	The water requirement for operation phase will be met from Ranney Wells and ground water.	No significant Impact on ground water quality is envisaged as no extraction of ground water is proposed	Rain Water harvesting scheme has been provided to recharge ground water table.
3.	Surface Water Quality	Surface Water Contamination	**Construction Phase** Surface Run-off from site during construction activity.	Silt traps and other measures such as additional onsite diversion ditches will be constructed to control surface run-off during site development.	No offsite impact is envisaged as no surface water receiving body is present in the core area.	

			Operation Phase Discharge of domestic wastewater to STP	Domestic waste water will be treated in STP.	No offsite impact envisaged.	The recycled water will be reused within the project site
4	Air Quality	Dust Emissions	**Construction Phase** All heavy construction activities and transportation of materials like sand, cement, bricks etc	Sustainable control measures will be adopted for mitigating the dust emissions.	Not significant impact because dust generation will be temporary and will settle fast due to dust suppression techniques like sprinkling of water.	During construction Phase the Contractors will be advised to provide masks for the labours. Water Sprinklers will be used for suppression of dust during construction phase.
		Emission of PM, SO2, NO2, CO	**Construction Phase** Operation of construction equipment and vehicular movement during site development and running of DG Set	Rapid on-site Construction and Improved maintenance of construction equipment's and machineries. DOCC will be provided in each and every DG set	No significant impacts	Regular monitoring and control measures will be taken to reduce the emission. Use of Personal Protective Equipment's (PPE) like earmuffs and earplugs will be emphasized.
			Operation Phase Power generation by DG set during Power Failure.	Use of low sulphur content diesel and Greenbelt will be developed with specific species to reduce PM level.	Not significant impacts are envisaged as there are no sensitive receptors located within	Stack height of DG set will be kept above the tallest tower as per CPCB norms.

			Emission from Vehicular traffic in use	Use of equipment fitted with silencers and proper maintenance of equipment	the vicinity of site. DG set would be used only during power failure.	Solar power System of 1 MW is proposed.
5	Noise Environment	Generation of Noise	**Construction Phase** Use of machineries and operation of DG sets	Provision of noise shields near heavy construction and DG set will be enclosed in acoustic case. Construction activity will be only during day time	No significant impacts with proper mitigation measures	
			Operation Phase Noise due to vehicular movement Operation of DG set during Power Failure	Green Belt Development and marking of silence zones will help in reduction of noise. DG set rooms will be equipped with acoustic enclosures	No significant impact	Suitable width of greenbelt will be developed
6	Land Environment	Soil Contamination	**Construction Phase** Disposal of construction debris	Construction debris will be collected and suitably used on site as per the solid waste management plan for construction phase	No significant impact. Impact will be local, as waste generated will be reused for filling of low-lying areas etc.	
			Operation Phase Generation of municipal solid waste and used oil from D.G. set	It is proposed that the solid waste generated will be managed as per Solid Waste Management rules, 2016	Negligible impact	An area of 9.20 acres has been earmarked for solid waste management.

				Used oil will be sold to authorized recyclers of HSPCB		
7	Biological Environment (Flora and Fauna)	Displacement of Flora and Fauna on Site	**Construction Phase** Site development during construction	The area is devoid of trees. Only herbs and some shrubs are present at site.	No impact	Greenbelt development will help in improving microclimate and aesthetics of the area.
			Operation Phase Increase in green covered area	Suitable green belts will be developed as per landscaping plan in and around the site using local flora	Beneficial Impacts	Landscape is being developed in an area of 258 acres.
8	Socio-Economic Environment	Change in demography of area	**Construction Phase** No displacement of population as construction will be on vacant land	Employment opportunities will be generated in form of construction labours and staffs.	Beneficial impacts on local people	
			Operation Phase Site operation	Employment will be provided in form of many services, gardeners, staffs, security personnel etc.	Beneficial impacts on local people	Population of 40,000 in form of students, staffs, faculties and floating population of 30,000 will be benefitted.
9	Traffic Pattern	Increase in vehicular movement	**Construction Phase** Movement of construction machineries and other vehicles	Heavy vehicular movement will be restricted to day time only and adequate parking facilities will be provided	No negative impact	

			Operation Phase Movement of vehicles of residents of colony, visitors, commercial vehicles	Vehicular movement will be regulated inside the project area with adequate roads and parking facilities in proposed area	No major significant impact. Greenbelt will be developed to reduce any impact due to vehicular movement.	Adequate parking space in an area of 54.44 acres has been provided for smooth traffic movement.