सत्यमेव जयते

Validity expires on 05/03/2025

Proceedings of the State Environment Impact Assessment Authority Kerala

Present : Prof. (Dr.) K.P. Joy, Chairman, Dr. J. Subhashini. Member. Sri. P.H.Kurian, I.A.S; Member Secretary.

Sub: SEIAA - Environmental Clearance for the proposed Residential Building Project of Mr.Viju Varghese, Deputy General Manager (MEP) of Artech Realtors Pvt Ltd in Sy. Nos. 60,64,65,66,67 & 68 at Sasthamangalam Village and Thiruvananthapuram Taluk, Kerala, -Granted - Orders issued.

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, KERALA

File No. 1106/EC/SEIAA/KL/2017 Dated, Thiruvananthapuram 06/03/2018

Ref:
1. Application dated on 24.10.2016 from Mr.Viju Varghese, Artech Realtors Pvt Ltd, Thiruvananthapuram District
2. Minutes of the 72nd meeting of SEAC held on 08th& 09th May 2017.
3. Minutes of the 75th SEAC held on 29th & 30th June 2017
4. Minutes of the 82nd meeting of SEAC held on 25th November 2017
5. Minutes of the 79th meeting of SEIAA held on 9th January 2018.
6. Affidavit dated 14/02/2018 from Mr.Viju Varghese, Deputy General Manager (MEP) & the Authorized signatory of M/s Artech Realtors Pvt Ltd, Thiruvananthapuram

Environmental Clearance No.28 /2018

Mr.Viju Varghese, Deputy General Manager (MEP), Artech Realtors Pvt Ltd, Artech House, TC/24/2014(1), Thycaud, Thiruvananthapuram, 695014, vide his application received on 24.10.2016, has sought Environmental Clearance under EIA Notification, 2006 for the proposed Residential Project in Sy. Nos. 60, 64, 65, 66, 67 & 68 at Sasthamangalam Village and Thiruvananthapuram Taluk, Thiruvananthapuram District, Kerala. It is interalia, noted that the project comes under the Category B, 8(a) of Schedule of EIA Notification 2006. No forest land is involved in the present project.

Details of project as furnished by the applicant are as follows:-

BASIC INFORMATION OF BUILDING PROJECT

PART A	
PROJECT DETAILS	
File No	1106/EC/SEIAA/KL/2017
Name /Title of the project	Artech Rainforest, Residential Building Project

	at Jawahar Nagar, Sasthamangalam Village, Thiruvananthapuram		
Name and address of project proponent.	M/s Artech Realtors (p)ltd Artech House, TC /24/2014 (1) Thycaud, Thiruvananthapuram Pin 695014		
Owner of the land	Mr. T.S Asok through Power of Attorney		
Survey Nos. District/Taluk/ and Village etc.	Survey Nos	60, 64, 65, 66, 67 & 68	
	Village	Sasthamangalam	
	Taluk and District	Thiruvananthapuram	
Category/Sub Category and Schedule	8 (a), Category (B2)		
Date of submission of Application	08th November 2016		
Total Built up Area& No. of Floors	Total construction built-up Area	27,627.842m^2	
	No. of floors	2B+G+15 Floors	
No of apartments	80 Apartments		
Height of the building from the ground level	2B+G+15 Floors i.e., 48 m above GL		
GPS Co-ordinate	Latitude	8°31'3.74" N	
	Longitude	76°57'50.20" E	
Brief description of the project.	Total plot area	4088 m^2	
	FSI	3.8	
	Total construction built-up area	27,627.842m^2	
	Coverage	40.06%	
	No. of Flats	80	
	Height of the building:	2B+G+15	
Is it a new Project or expansion/modification of an existing project?	New Project		
Details of the Project Cost	INR 3565.15 lakhs		
If CRZ recommendation applicable?	Not Applicable		
Distance from nearby habitation	Thiruvananthapuram CBD		
Distance from nearby forest, if applicable	None at 15 km radius		
Distance from protected area, Wildlife Sanctuary, National Park etc.	None at 15 km radius		
Distance from nearby streams/rivers/National Highway Roads and Airport	Water Bodies	Maruthankuzhy river	Aerial distance - 1.3 km
		Akkulam Lake (estuary)	Aerial distance - 6.0km
		Arabian Sea (Laccadive Sea)	Aerial distance - 7.3km
	Nearest Road	PWD road	
	Nearest Airport	Trivandrum	Aerial distance -9

<table>
<tr><td></td><td></td><td>International Airport</td><td>km</td></tr>
<tr><td>Is ESA applicable? If so, distance from ESA limit</td><td colspan="3">Not Applicable</td></tr>
<tr><td colspan="4">IMPACT ON WATER</td></tr>
<tr><td>Details of water requirement per day in KLD</td><td colspan="3">Total Water requirement for the Project
<table><tr><td>Description</td><td>Quantity of water required (KLD)</td></tr><tr><td>Construction phase</td><td></td></tr><tr><td>For workers (domestic)</td><td>0.45</td></tr><tr><td>For workers (flushing)</td><td>2.3</td></tr><tr><td>For construction activity</td><td>15 (Average, depending on the construction activity)</td></tr><tr><td>Operation phase (Non Monsoon Season)</td><td></td></tr><tr><td>Domestic</td><td>51</td></tr><tr><td>Flushing</td><td>25</td></tr><tr><td>Gardening</td><td>10</td></tr><tr><td>Swimming pool</td><td>5</td></tr><tr><td>Total</td><td>91KLD</td></tr><tr><td>Operation phase (Monsoon Season)</td><td></td></tr><tr><td>Domestic</td><td>51</td></tr><tr><td>Flushing</td><td>25</td></tr><tr><td>Swimming pool</td><td>5</td></tr><tr><td>Total</td><td>81 KLD</td></tr></table></td></tr>
<tr><td>Water source/sources.</td><td colspan="3">Water from the Kerala Water Authority, rainwater harvesting, and one bore well water</td></tr>
<tr><td>Details of water requirements met from water harvesting.</td><td colspan="3">Rainwater harvesting system will be constructed for the project. Thiruvananthapuram has an average annual rain fall of 1500 mm. This will be available distributed in nearly 70 rain days scattered over monsoon spells and a few summer showers. This will be stored in underground tank of capacity 401.58 m3 and used in the fill and draw mode during rainy days. Un-stored rain water will be used to charge ground water through recharge pits and rain gardens. The storm water detention devices to be installed are detention tanks, rain gardens and rain water harvesting tank.</td></tr>
<tr><td>What are the impacts of the proposal on the ground water?</td><td colspan="3">One open wells and one bore well already exist at the site and were installed by the earlier owners of the land for irrigation. Rainwater harvesting system will be installed for the recharge of ground water</td></tr>
<tr><td colspan="4">WASTE MANAGEMENT</td></tr>
<tr><td>Explain the facilities for Liquid waste Management</td><td colspan="3">Sewage treatment plant with capacity to treat 112 KLD will be constructed to treat waste water. Disinfected effluent meeting CPCB standards will be used for flushing, irrigating the landscape and for washing access roads. Design basis of treatment plant – MBBR (Moving Bed Bio Reactor)</td></tr>
</table>

<table>
<tr><td>Solid Waste Management</td><td>The total quantity of solid waste expected is 336 kg/day. Out of which 101 kg/day will be non-biodegradable (including recyclables and domestic hazardous) and 235 kg/day will be biodegradable. The project proponents have proposed provision for segregation and collection of biodegradable and non-biodegradable waste within the premises. Biodegradable waste will be treated in biogas plant. The non-biodegradable waste will be handed over to recyclers. Sludge from STP will be digested in the STP. Residual sludge will be filtered, cake will be stabilized with lime and resulting manure will be used for landscaping. The domestic hazardous waste will be handed over to authorized waste collectors.</td></tr>
<tr><td>E-Waste Management</td><td>Any e-waste generated during the operation phase of the project will be handed over to authorized e-waste collection centres.</td></tr>
<tr><td>Facilities for Sewage Treatment Plant</td><td>Sewage treatment plant with capacity to treat 112 KLD will be constructed to treat waste water. Disinfected effluent meeting CPCB standards will be used for flushing, irrigating the landscape and for washing access roads. Design Basis of Treatment plant is Moving Bed Bio Reactor.</td></tr>
<tr><td>How much of the water requirement can be met from the recycling of treated waste water? (Facilities for liquid waste treatment)</td><td>All secondary requirements like flushing (25 KLD) and gardening (10 KLD) will be fulfilled by treated sewage from STP. Excess treated sewage during non-monsoon (24 KLD) and monsoon seasons (34 KLD) will be polished through subsurface flow engineered wetland (integrated with landscape) and disposed to the existing urban drain.The water requirement met from the recycling of treated waste water is as follows
<table>
<tr><th>Description</th><th>Quantity of water required (KLD)</th><th>Source of water supply</th></tr>
<tr><td>Flushing</td><td>25</td><td>Treated sewage from STP</td></tr>
<tr><td>Gardening</td><td>10</td><td>Treated sewage from STP</td></tr>
</table></td></tr>
<tr><td>What is the incremental pollution load from waste water generated from the proposed activities?</td><td>During operation phase, the project will generate 66 KLD of sewage and will be treated in fully fledged Sewage Treatment Plant by MBBR process. Treated sewage will be reused for flushing and gardening. Excess treated sewage during non-monsoon and non-monsoon season shall be polished through subsurface flow engineered wetland and discharged to existing urban drain. During rainy season, this drain has good flow. Discharge of 24 KLD in the dry season would establish a flow in the drain and will avoid septic conditions.</td></tr>
<tr><td>How is the storm water from within the site managed?</td><td>The maximum rainfall event for Trivandrum is 43.2 mm/hr.The maximum allowable peak discharge for the area (pre-development scenario) is 97m3/hr. for a rainfall event of 43.2 mm/hr. The peak discharge in the post development scenario for the same rainfall event will be 130m3/hr.
Storm water runoff will be minimized by intercepting the same in</td></tr>
</table>

	rain water harvesting tank and recharge pits. However, storm water drains in the project area are designed to carry runoff from a rain event of 120 mm/h, which takes care of a scenario with no rain water harvesting or recharge. The details of the storm water management plan as well as the storm water management layout are given in EC. Six detention tanks with capacity 10 m3 each and 60 rain gardens with capacity 0.5 m3each will intercept and detain the storm water at the sitc. After installing this storm water management devices the post development runoff will be less than the pre development run off.
Will the deployment of construction laborers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation)	➢ On site accommodation will not be provided to the construction workers as they are from the nearby localities and they will have their permanent accommodation offsite. Labourers employed by contractor will be accommodated offsite as per contract terms. ➢ During construction phase, temporary toilets with connection to septic tank and soak pit will be provided per shift workers. Hence there will not be unsanitary conditions around the project site. ➢ Regular segregation and disposal of solid waste generated by these workers shall be as per Municipal Solid Waste Management Rules and Construction and Demolition Waste Management Rules, 2016. ➢ First aid and medical facilities will be provided to all the employees and labourers working on the site. ➢ Proper housekeeping will be maintained throughout the premises. ➢ Pest and vector control measures will be done on site by avoiding stagnant water.
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)	Sewage treatment plant with capacity to treat 112 KLD will be constructed to treat waste water. Disinfected effluent meeting CPCB standards will be used for flushing, irrigating the landscape and for washing access roads Design Basis of Treatment plant is Moving Bed Bio Reactor. The treatment will include the following unit/ equipment **Preliminary Treatment:** • Screen Chamber • Oil & Grease Trap • Raw Sewage Collection Tank (Equalizer) • Raw Sewage Transfer pumps **Biological Treatment (Secondary Treatment):** • MBBR Bioreactor • Secondary Clarifier • Sludge pump for feeding into biogas plant and for residual sludge treatment

<table>
<tr><td></td><td>Tertiary Treatment:
• Filter feed tank
• Pressure Sand Filter (PSF)
• Activated Carbon Filter (ACF)
• UV disinfection system</td></tr>
<tr><td>Give details of dual plumbing system if treated waste is used for flushing of toilets or any other use.</td><td>Recycling of treated sewage for flushing and gardening. Colour coding for dual plumbing system shall be done as per standard practices</td></tr>
<tr><td colspan="2">TRAFFIC MANAGEMENT</td></tr>
<tr><td>Sufficiency of Parking Space (Explain)</td><td>The project proponents have proposed to provide well organized parking arrangement
<table>
<tr><td>Category</td><td>Parking Area provision</td></tr>
<tr><td>4 wheelers</td><td>142 numbers</td></tr>
<tr><td>2 wheelers</td><td>530.00 m^2</td></tr>
<tr><td>Handicapped</td><td>4 numbers</td></tr>
</table>
Since the project has adequate space for parking, no parking shortage is expected</td></tr>
<tr><td>Widthofaccess road</td><td>10m wide</td></tr>
<tr><td colspan="2">ENERGY CONSERVATION</td></tr>
<tr><td>Details of power requirement and source of supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?</td><td>Power requirement during the operation phase
<table>
<tr><td>Purpose</td><td>Power requirement</td><td>Source of Power</td></tr>
<tr><td>Residential</td><td>1100 kVA</td><td>KSEB Transformer</td></tr>
<tr><td>Residential</td><td>250 kVA</td><td>DG Sets (In case of power failure)</td></tr>
</table>
The energy consumption will be reduced by the use of solar energy lighting devices in the driveways and the garden. This is expected to save 10kW//month.</td></tr>
<tr><td>What type of, and capacity of power back-up to you plan to provide?</td><td>DG sets will be provided for power back up. One DG set of 250 kVA will be used.</td></tr>
<tr><td>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?</td><td>The project site is located in a place with predominantly tropical climate. Glass used should preferably avoid long and wavelengths (IR and UV). Soft glass which absorbs UV with special features to reflect IR radiation will be used for glazing. Typically locally available Saint Gobain™ neutral glass Evolite® or its equivalent will be used. Typical specifications are light transmission 50%, solar factor 0.5, shading coefficient 0.58 and U-value 5 (0.88 W/m2 K).
Glass is not used as a wall material</td></tr>
<tr><td>What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project</td><td>The following passive solar features are incorporated in the building design:
➢ Orientation : Building is oriented to take advantage of north facing during summer, partly compromising alignment with access road
➢ Open spaces equivalent to atrium are provided in interconnected rows of building
➢ This provides partial shading from solar exposure from east and west for dwelling units coming on the interior side
➢ Distributes breeze in summer to majority of units
➢ In general the design and orientation of the building helps to avoid solar heat build-up and induces cooling to living spaces</td></tr>
<tr><td>Does the layout of streets & buildings maximize the</td><td>The building orientation and alignment are laid out in such a way that solar heating of the walls is minimized (at no time solar heating is</td></tr>
</table>

<table>
<tr><td>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</td><td>needed since minimum night temperature is 23°C.) Front side of the building is access entry with aesthetically laid garden. This area can be partly used for solar energy harvesting. However, it is planned to install PV array on roof top on the south facing side. This will partly shade the roof.</td></tr>
<tr><td>Is the shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of Walls on the East and the West and the Roof? How much energy saving has been effected?</td><td>The building is located at a place predominantly with tropical features, especially hot and humid climate. Cooling is the preferred feature. Vertical walls on the east and west will be painted with white or partial coloured paints with low heat absorption.</td></tr>
<tr><td>Do the structure use energy-efficient space conditioning, lighting and mechanical systems? Provide technical details. Provide details of transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions? Are you using CFC and HCFC free chillers? Provide specifications.</td><td>Being a multiunit, affordable housing project central air conditioning is not provided. For common facilities like street lighting, common space illumination and water treatment facilities, electrical devices with green energy star certification will be used.</td></tr>
<tr><td>What are the likely effects of the building activity in altering the micro-climates? Provide a self-assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects?</td><td>Un-shaded roof portion will be provided with expanded poly styrene sheet insulation to reduce adverse thermal effect. Paved areas will be covered under the canopy of shade trees in the landscape. Open spaces will be covered with grass turf and with garden shrubs so that heat absorption by paving materials and open soil can be minimized. Irrigation of landscape with treated effluent will keep the surroundings cool. This will mitigate heat island effect to a large extent.</td></tr>
<tr><td>What are the thermal characteristics of the building envelope? (a) Roof (b) external walls; and (c) fenestration? Give details of the materials used.</td><td>The following materials are used in the construction of walls and roof. Their thermal properties are also given.
<table>
<tr><th>Material</th><th>Thermal mass C kJ/K m^2</th><th>Thermal inertia (J m^2 K-1 S -0.5)</th></tr>
<tr><td>Cement plastering</td><td>1.480</td><td>1033.02</td></tr>
<tr><td>Brick wall</td><td>1.601</td><td>1139.69</td></tr>
<tr><td>EPS insulation</td><td>0.032</td><td>33.55</td></tr>
<tr><td>Cellular concrete</td><td>0.739</td><td>372.78</td></tr>
<tr><td>Dense concrete</td><td>2.120</td><td>1920.98</td></tr>
</table>
Roof will be insulated with a layer of EPS to mitigate roof based heat island effect.</td></tr>
<tr><td>What is the rate of air non-conventional energy technologies are utilized in the overall energy</td><td>Solar energy proposed to be utilized for hot water supply as well as for common area and outdoor lighting. Solar PV units of 15 KW capacities will be installed to meet power demand for lighting up the common spaces and outdoors. It is proposed to save 24 kW/month by the use of</td></tr>
</table>

<table>
<tr><td>consumption? Provide details of the renewable energy technologies used.</td><td>solar energy</td></tr>
<tr><td>Details of renewable energy (non – conventional) used.</td><td>Solar energy proposed to be utilized for hot water supply as well as for common area and outdoor lighting. Solar PV units of 15 KW capacities will be installed to meet power demand for lighting up the common spaces and outdoors. It is proposed to save 24 kW/month by the use of solar energy</td></tr>
<tr><td colspan="2">IMPACT ON AIR ENVIRONMENT</td></tr>
<tr><td>What are the mitigation measures on generation of dust, smoke , odours, fumes or hazardous gases</td><td>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 will be used as per CPCB norms
➢ Proper maintenance of DG sets shall be done and Low sulphur fuel shall be used</td></tr>
<tr><td>Details of internal traffic management of the site.</td><td>The project proponent will provide adequate driveways and walkways. To avoid queuing of the vehicle along the road the gate for the vehicle will be set back at least to accommodate one car entering the apartment and sufficient space for the cars taking exit from the apartment. Sufficient splay will be provided for the entry/exit for necessary sight distance</td></tr>
<tr><td>Details of noise from traffic, machines and vibrator and mitigation measures</td><td>The proposed project being residential development with commercial/retail area, the source of noise is mainly vehicular noise. The project proponents have proposed to provide smooth roadways with signage and well organized parking arrangement and maintaining smooth traffic flow which would help in reducing traffic congestion and noise levels. Trees in the green belt would act as noise barrier and will reduce the noise level. Heavy vehicles are not expected to ply in the internal roads. Hence there will not be any perceptible vibration effects due to traffic.</td></tr>
<tr><td>Air quality monitoring in detail</td><td>The project has adequate vehicular parking. The traffic peak occurs between 9.30 am and 10.30 am. The increase in traffic estimated by the project is less than 2% of the present traffic volume. Hence its impact would be insignificant.
The details of background air quality levels are given in the table below.
<table>
<tr><td rowspan="2">Parameters</td><td rowspan="2">Unit</td><td colspan="3">Value reported</td><td rowspan="2">NAAQ Standards</td></tr>
<tr><td>A1</td><td>A2</td><td>A3</td></tr>
<tr><td>PM_{10}</td><td>$\mu g/m^3$</td><td>68.2</td><td>58.4</td><td>60.1</td><td>100</td></tr>
<tr><td>$PM_{2.5}$</td><td>$\mu g/m^3$</td><td>16.5</td><td>14.2</td><td>13.9</td><td>60</td></tr>
<tr><td>SO_2</td><td>$\mu g/m^3$</td><td>10.1</td><td>9.7</td><td>9.2</td><td>80</td></tr>
<tr><td>NO_2</td><td>$\mu g/m^3$</td><td>11.4</td><td>12.5</td><td>10.8</td><td>80</td></tr>
<tr><td>CO</td><td>$\mu g/m^3$</td><td>1.0</td><td>0.7</td><td>0.6</td><td>2</td></tr>
</table></td></tr>
<tr><td>Will the proposal create shortage of parking space for vehicles? Furnish details of the present level of transport infrastructure and measures proposed for improvement including the traffic management at the entry & exit to the project site.</td><td>The project proponents have proposed to provide well organized parking arrangement
<table>
<tr><td>Category</td><td>Parking Area provision</td></tr>
<tr><td>4 wheelers</td><td>145 numbers</td></tr>
<tr><td>2 wheelers</td><td>530.00 m^2</td></tr>
<tr><td>Handicapped</td><td>4 numbers</td></tr>
</table>
Since the project has adequate space for parking and maneuvering facility, no parking shortage is expected.</td></tr>
<tr><td>Provide details of the</td><td>The project proponent will provide adequate driveways and walkways.</td></tr>
</table>

<table>
<tr><td>movement patterns with internal roads, bicycles tracks, Pedestrian pathways, footpaths etc., with areas under each category</td><td>The project site is directly accessible from a 10 m wide PWD road. The circulation plan is showing the details of the internal roads, walkways etc. are shown in Annexure of EC. The circulation plan ensures smooth traffic into, inside and at the exit of the site.</td></tr>
<tr><td>Will there be significant increase in traffic noise & vibrations? Give details of the sources and the measures proposed for mitigation of the above.</td><td>The proposed project being residential development with commercial/retail area, the source of noise is mainly vehicular noise. The project proponents have proposed to provide smooth roadways with signage and well organized parking arrangement and maintaining smooth traffic flow which would help in reducing traffic congestion and noise levels. Trees in the green belt would act as noise barrier and will reduce the noise level. Heavy vehicles are not expected to ply in the internal roads. Hence there will not be any perceptible vibration effects due to traffic.</td></tr>
<tr><td>What will be impact of DG sets & other equipment's on noise levels & vibration in & ambient air quality around the project site? Provide details</td><td>D.G. Sets will be operated only in case of power failures during operational phase. The pollutants like SPM, SO_2 that may arise from emissions from D.G. sets will be discharged through chimney with exhaust discharged into the atmosphere at building height (48 m) + 1.2 m above roof.
D.G. sets are with inbuilt acoustic enclosures to reduce the noise of D.G. sets while in operation. Plantation of trees would act as noise barrier and will reduce the noise level.</td></tr>
<tr><td colspan="2">IMPACT ON BIODIVERSITY AND ECO RESTORATION PROGRAMMES</td></tr>
<tr><td>Will the project involve extensive clearing or modification of vegetation (Provide details)</td><td>The project does not involve extensive clearing or modification of vegetation. The list of existing trees in the site is given in the table below. There are no endangered species in the site. All the trees were cleared and handed over to the project proponent by the owner of the land.
<table>
<tr><td>Common Name (Malayalam)</td><td>Number of trees in the site</td></tr>
<tr><td>Coconut trees (Thengu)</td><td>45</td></tr>
<tr><td>Flame of the forest</td><td>7</td></tr>
<tr><td>Others</td><td>3</td></tr>
</table></td></tr>
<tr><td>What ate the measures proposed to minimize the likely impact on vegetation (details of proposal for tree plantation/ landscaping)</td><td>An area of 1400 m2 is allocated for green belt. In addition, the sides of the internal roads will be provided with garden plants. The rain gardens will accommodate shrubs. The details of the Tress species selected is given in the EC</td></tr>
<tr><td>Is there any displacement of fauna – both terrestrial and aquatic – If so what are the mitigation measures?
Presence of any endangered species or red listed category (in detail)</td><td>No, there will not be any displacement of fauna –both terrestrial and aquatic or creation of barriers for their movement. The site is in the urban setting on the mild slope of a hillock.</td></tr>
<tr><td colspan="2">SOCIO- ECONOMIC ASPECTS</td></tr>
<tr><td>Will the proposal result in any change to the</td><td>No, There will be maximum influx of 1762 people. These are people looking for affordable housing in the city and will enhance the</td></tr>
</table>

demographic structure of local population? Provide the details.	metropolitan structure of the city.
Give details of the existing social infrastructure around the proposed project	The project site is located in the within 5 km radius of Thiruvananthapuram City. Educational institutions, engineering colleges and hospitals such as the Trivandrum Medical College, Regional Cancer Centre, etc. are located within 10 km radius. Civil amenities police station, hospitals, places of worship and recreation facilities are also available within 10 km radius.
Will the project cause adverse effects on local communities, disturbances to sacred sites or other cultural values? What are the safeguards proposed?	There is no place of sacred nature in the immediate vicinity of the site. As this project is a residential development with a small retail area, it will not cause adverse effects on local communities, disturbance to sacred sites or other cultural values.
Out of the total plot area % of spaces provided for i)Recreational facility ii)Parking iii)Open Spaces	Recreational facility - 310 m^2 Parking - Parking is provided in the Basement Floors itself Open Spaces - 2450.35 m^2
BUILDING MATERIALS	
May involve the use of building materials with high –embodied energy. Are the construction materials produced with energy efficient process? (Give details of energy conservation measures in the selection of building materials and their energy efficiency)	Pozalona Portland cement shall be used which already contains 15% Fly ash. Construction materials from nearest source are chosen to minimize energy consumption for transportation. Construction materials like aggregates are purchased from within 25 km, thus the embedded transportation energy is only 25 km-tons. Cement will be procured from the nearest factory located at Tirunelveli, Tamil Nadu.
Transport and handling of materials during construction may result in pollution, noise & public nuisance. What measures are taken to minimize the impacts?	The material required for construction activities shall be procured from company's authorized / approved vendors only. The vendor's performance is monitored periodically. In case of urgency or non-availability of materials from authorized/approved vendors, it will be procured from the open market to maintain the pace of the work. The mode of transport for above materials will be by trucks and / or by trailers. ➢ The construction material will be carried in properly covered vehicles ➢ Security staff presents at site will supervise loading and unloading of material at site ➢ Construction material will be stored at identified site/ temporary go downs at site ➢ The material handling location will be surrounded by a sheet wall.
Are recycled materials used in roads and structures? State the extent of savings achieved?	The construction waste will be used for laying the internal roads.
Give details of the	➢ Segregation of three types of garbage i.e. biodegradable, non-

methods of collection, segregation & disposal of the garbage generated during the operation phases of the project.	biodegradable and domestic hazardous shall be done ➢ Non- biodegradable garbage: Shall be segregated into recyclable and non-recyclable waste ➢ Recyclable waste: Shall be handed over to recyclers ➢ Biodegradable garbage shall be treated in Biogas plant and slurry will be fed to the STP ➢ The domestic hazardous waste shall be handed over to authorized waste collectors
RISK MANAGEMENT	
Are there sufficient measures proposed for risk hazards in case of emergency such as accident at the site during construction & post construction phase.	This is residential cum commercial project. Hence hazardous materials will not be handled except for fuels used in vehicles, and special oils used in vehicles and machinery.
Storage of explosives/hazardous substance in detail	This is residential project. Hence hazardous materials will not be handled except for fuels used in vehicles, and special oils used in vehicles and machinery.
What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans	The project proponents are implementing a fire safety plan based on National Building Code. The emergency/ disaster management plan is enclosed as Annexure 10 in EC.
Litigation/court cases if any	No
AESTHETICS	
Will the proposed constructions in any way result in the obstruction of a view, scenic amenity or landscapes? Are these considerations taken into account by the proponents?	The project site is in the midst of occupied land with high rise buildings. The proposed construction will not cause any obstruction of a view, scenic amenity or landscapes
Will there be any adverse impacts from new constructions on the existing structures? What are considerations taken into account?	The proposed buildings are coming up on a parcel of land well separated from existing buildings either by road width plus set back distance or with vacant land. There will not be any adverse impacts from the new construction on the existing structures
Whether there are any local considerations of urban form & urban design influencing the design criteria? They may be explicitly spelt out.	The project site is not covered by any master plan for development. As such there is no restriction on the design, except those imposed by building rules and regulations. The building rules and regulations are compiled and clearance will be obtained from State Town Planning Department.
Are there any anthropological or archaeological sites or artifacts nearby? State if any other significant	No. There are no anthropological or archaeological sites or artefacts nearby the site

features in the vicinity of the proposed site have been considered		
Details of CSR activity and the amount set apart per year	Summary of CSR Activities (Rs. In Lakhs)	
	Promotion of Health Care	2.5
	Promotion of Education including Special Education	5.2
	Contribution to PM's National Relief Fund	2
	Ensuring Environmental Sustainability	16
	Total	Rs. 25.7 Lakhs
Details of NABET approved EIA Consultant engaged-Their name, address and accreditation details	ULTRA-TECH Environmental Consultancy and Laboratory Door No. 27/2957 A1, First Floor, Vaniampilly, K P Vallon Road, Kadavanthra, Kochi - 682020. Mob : +91 9895 200 526 NABET Accreditation No: NABET/EIA/1417/RA010	
Details of Authorized Signatory and address for correspondence	Mr Viju Varghese General Manager (MEP) Artech Realtors Pvt Ltd Artech House, TC/24/2014(1) Thycaud, Thiruvananthapuram, 14 Tel: 9388189889, Email: viju@artechrealtors.com	
SUMMARY AND CONCLUSION		
Overall justification for implementation of the project.	The project site has many complexes in its vicinity. The project site is very near to Kanaka Kunnu Palace, Nanthancodu and Trivandrum Zoo and Museum. The project site is easily accessible to all offices and major hospitals such as Sree Ramakrishna Asramam Hospital, S K Hospital, and Trivandrum Medical College etc. The tourist destinations such as Akkulam Tourism Village, Trivandrum Zoo and Museum are also nearby. The project will also create / add job opportunities for support staff like Security, Maintenance, Household Workers etc.	
Explanation of how adverse impact has been mitigated.	Environmental Management plan has been prepared considering all the likely adverse impacts. Proper implementation of the Environment Management plan as well as proper monitoring of the environmental parameters will ensure that all adverse impacts have been mitigated.	

2. The proposal was placed in the 72nd meeting of SEAC held on 08th& 09th May 2017. The Committee appraised the proposal based on Form 1, Form I A and conceptual plan. The Committee decided to defer the item for field inspection. The committee also directed the proponent to submit the additional documents/ details. Accordingly the proponent submitted the following additional documents.

1. *Revised Water Balance Statement.*
2. *A sketch showing the proposed drainage facility.*
3. *Revised enhanced CSR Commitment.*

The Sub Committee consisting of Sri V Gopinathan, Chairman,Sri S. Ajayakumar member and Sri John Mathai, member has conducted the site visit on 09th June 2017.
The report stated that

The proposal is for a residential building. The plot is sloping down from the abutting road and basement parking is provided. Following are the observations based on the site visit.

1. *Parking for 142 cars and adequate space for two wheelers are provided. Manoeuvring facility is adequate.*

2. *Entry is to the front main road of the Jawaharnagar. To avoid queuing of the vehicle along the road the gate for vehicle should be set back at least to accommodate one car entering the apartment and sufficient space for cars taking exit from the apartment. Sufficient splay shall be provided for entry/ exit for necessary sight distance.*
3. *Rain water harvesting capacity of 7 days requirement shall be provided.*
4. *The yield test results of open well and bore well shall be provided.*
5. *Excess storm water from the site is planned to be disposed on to the narrow drain on the northern side. The connectivity of this drain to the nearest stream should be ensured.*

3. The proposal was considered in the 75th SEAC held on 29th & 30th June 2017. The Committee decided to defer the item for submission of the yield test results of the open and bore wells proposed at the site. The proponent has submitted the additional documents sought by SEAC.

4. The proposal was again placed in the 82nd meeting of SEAC held on 25th November 2017. The Committee appraised the proposal based on Form 1, Form I A, field inspection report of the Sub Committee and all other documents submitted with the proposal. The Committee decided to Recommend for issuance of EC subject to general conditions in addition to the following specific conditions.
   1. *Parking for 142 cars and adequate space for two wheelers are provided. Manoeuvring facility is adequate.*
   2. *Entry is to the front main road of the Jawaharnagar. To avoid queuing of the vehicle along the road the gate for vehicle should be set back at least to accommodate one car entering the apartment and sufficient space for cars taking exit from the apartment. Sufficient splay shall be provided for entry/ exit for necessary sight distance.*
   3. *Rain water harvesting capacity of 7 days requirement shall be provided.*
   4. *Excess storm water from the site is planned to be disposed on to the narrow drain on the northern side. The connectivity of this drain to the nearest stream should be ensured.*

The proponent has made a commitment for Rs.25 lakhs for CSR activities to be carried out in consultation with the local body.

5. The proposal was considered in the 79th meeting of SEIAA held on 9th January 2018. Authority accepted the recommendation of SEAC and decided to issue EC subject to general conditions and the specific conditions suggested by SEAC.

As per the landmark judgment dated 3rd September 2017 of the Principle Bench of National Green Tribunal (NGT), developers should give a satisfactory explanation on the facilities provided for open space, recreational grounds and parking facilities at the project site as they have an important bearing on the life of people. The above direction has to be complied by the Proponent.

2% of the total project cost should be set apart for CSR activities for taking up welfare activities of the local community in consultation with the local body. The CSR amount

should be utilized before the completion of the project and should be included in the annual account of the company and the expenditure statement should be submitted to SEIAA along with the compliance report after getting certified by a Chartered Accountant. A notarised affidavit for the commitment of CSR activities and also agreeing all the above specific and general conditions should be submitted before the issuance of EC. The proponent has submitted the affidavit vide ref 6th cited satisfying all the general and specific conditions recommended by SEIAA and has also stated that 2% of the total project cost will be set apart for CSR activities in consultation with the local panchyath for the welfare of the local community.

6. Environmental Clearance as per the EIA notification 2006 is hereby accorded for the proposed Housing Project 'Artech Rainforest' of Mr.Viju Varghese, Deputy General Manager of Artech Realtors Pvt Ltd, Artech House, TC/24/2014(1), Thycaud, Thiruvananthapuram, in Survey Nos. 60, 64, 65, 66, 67, & 68 of Sasthamangalam Village, Thiruvananthapuram Taluk, Thiruvananthapuram District, of total built-up area 27,627.842m^2, subject to the conditions mentioned in para 4th & 5 above. The clearance will be subject to all the environmental impact mitigation and management measures envisaged by the project proponent in the documents submitted to SEIAA, and the mitigation measures specified. The assurances in form 1A of the application (Appendix 1I) and clarifications given by the proponent will be deemed to be part of these proceedings as if incorporated herein. Also the general conditions for projects other than mining appended hereto and the following green guidelines will be applicable and have to be strictly adhered to.

Green Guidelines

1. Adequate rain water harvesting facilities shall be arranged for.
2. Technology and capacity of the STP to be indicated with discharge point (if any) of the treated effluent.
3. Effluent water not conforming to specifications shall not be let out to water bodies.
4. Maximum reuse of grey water for toilet flushing and gardening and construction work shall be ensured.
5. Dual plumbing for flushing shall be done.
6. Provisions for disposal of e-wastes, solid wastes, non-biodegradables and separate parking facility for the buildings shall be provided.
7. Generation of solar energy to be mandatory for own use and/or to be provided to the grid.
8. There shall be no compromise on safety conditions and facilities to be provided by the project proponent, which shall be ensured for occupation, regularization or consent to operate.

7. Validity of the Environmental Clearance will be seven years from the date of issuance the subject to earlier review in the event of noncompliance or violation of any of the conditions stipulated herein.

8. Compliance of the conditions herein will be monitored by the Directorate of Environment and Climate Change or its agencies and also by the Regional Office of the Ministry of Environment and Forests, Govt. of India, Bangalore.

i) Necessary assistance for entry and inspection by the concerned officials and staff should be provided by the project proponents.

ii) Instances of violation if any shall be reported to the District Collector, Thiruvananthapuram to take legal action under the Environment (Protection) Act 1986.

iii) The given address for correspondence with the authorized signatory of the project is, Mr.Viju Varghese, Deputy General Manager (MEP), Artech Realtors Pvt Ltd, Artech House, TC/24/2014(1), Thycaud, Thiruvananthapuram – 695 014.

Sd/-
P H.Kurian I.A.S
Member Secretary (SEIAA),

To
Mr.Viju Varghese,
Deputy General Manager (MEP),
Artech House,
TC/24/2014(1),
Thycaud, Thiruvananthapuram – 695 014.

Copy to

1. MoEF Regional Office, Southern Zone, Kendriya Sadan, 4th Floor, E&F Wing, II Block, Koramangala, Bangalore-560034
2. Additional chief Secretary to Government, Environment Department,
3. The District Town Planner, Thiruvananthapuram
4. Tahsildar, Thiruvananthapuram Taluk
5. Member Secretary, Kerala State Pollution Control Board, Pattom,Thiruvananthapuram
6. Chairman, SEIAA
7. The Secretary, Thiruvananthapuram Corporation
8. Website
9. Stock File
10. O/c

STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY KERALA

Forwarded /By Order

Administrator (SEIAA)

GENERAL CONDITIONS *(for projects other than mining)*

(i) Rain Water Harvesting capacity should be installed as per the prevailing provisions of KMBR / KPBR, unless otherwise specified elsewhere.

(ii) Environment Monitoring Cell as agreed under the affidavit filed by the proponent should be formed and made functional.

(iii) Suitable avenue trees should be planted along either side of the tarred road and open parking areas, if any, inclusive of approach road and internal roads.

(iv) The project shall incorporate devices for solar energy generation and utilization to the maximum possible extent with the possibility of contributing the same to the national grid in future.

(v) Safety measures should be implemented as per the Fire and Safety Regulations.

(vi) STP should be installed and made functional as per KSPCB guidelines including that for solid waste management.

(vii) The conditions specified in the Companies Act, 2013 should be observed for Corporate Social Responsibility.

(viii) The proponent should plant trees at least 5 times of the loss that has been occurred while clearing the land for the project.

(ix) Consent from Kerala State Pollution Control Board under Water and Air Act(s) should be obtained before initiating activity.

(x) All other statutory clearances should be obtained, as applicable, by project proponents from the respective competent authorities including that for blasting and storage of explosives.

(xi) In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Authority.

(xii) The Authority reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.

(xiii) The stipulations by Statutory Authorities under different Acts and Notifications should be complied with, including the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.

(xiv) The environmental safeguards contained in the EIA Report should be implemented in letter and spirit.

(xv) Provision should be made for supply of kerosene or cooking gas and pressure cooker to the labourers during construction phase.

(xvi) Officials from the Regional of MOEF, Banglore who would be monitoring the implementation of environmental safeguards should be given full co-operation, facilities and documents/data by the project proponents during their inspection. A complete set of all the documents submitted to MoEF should be forwarded to the CCF, Regional Office of MOEF, Bangalore.

(xvii) These stipulations would be enforces among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control Pollution) at 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.

(xviii) Environmental Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

(xix) Any appeal against this Environmental Clearance shall lie with the National Environment Appellate Authority, if preferred, within a period of 30 days as prescribed under section 11 of the National Environment Appellate Act, 1997.

(xx) The project proponent should advertise in at least two local newspapers widely circulated in the region, one of which (both the advertisement and the newspaper) shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the Department of Environment and Climate Change, Govt. of Kerala and may also be seen on the website of the Authority at www.seiaakerala.org. The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same signed in all pages should be forwarded to the office of this Authority as confirmation.

(xxi) A copy of the clearance letter shall be sent by the proponent to concerned GramaPanchayat/ District Panchayat/ Municipality/Corporation/Urban Local Body and also to the Local NGO, if any, from whom suggestions / representations, if any, were received while processing the proposal. The Environmental Clearance shall also be put on the website of the company by the proponent.

(xxii) The proponent shall submit half yearly reports on the status of compliance of the stipulated EC conditions including results of monitored data **(both in hard copies as well as by e-mail)** and upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the respective Regional Office of MoEF, Govt. of India and also to the Directorate of Environment and Climate Change, Govt. of Kerala.

(xxiii) The details of Environmental Clearance should be prominently displayed in a metallic board of 3 ft x 3 ft with green background and yellow letters of Times New Roman font of size of not less than 40.

(xxiv) The proponent should provide notarized affidavit *(indicating the number and date of Environmental Clearance proceedings)* that all the conditions stipulated in the EC shall be scrupulously followed.

SPECIFIC CONDITIONS

I.Construction Phase

i. "Consent for Establishment" shall be obtained from Kerala State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.

ii. All required sanitary and hygienic measures should be in place before starting construction activities and to be maintained throughout the construction phase.

iii. A First Aid Room will be provided in the project both during construction and operation of the project.

iv. Adequate drinking water and sanitary facilities should be provided for construction workers at the site, Provision should be made for mobile toilets. The safe disposal of wastewater and solid wastes generated during the construction phase should be ensured.

v. All the topsoil excavated during construction activities should be stored for use in horticulture/landscape development within the project site.

vi. Disposal of muck during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.

vii. Soil and ground water samples will be tested to ascertain that there is no threat to ground water quality by leaching of heavy metals and other toxic contaminants.

viii. Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate watercourses and the dump sites for such material must be secured so that they should not leach into the ground water.

ix. Any hazardous waste generated during construction phase, should be disposed off as per applicable rules and norms with necessary approval of the Kerala State Pollution Control Board.

x. The diesel generator sets to be during construction phase should be low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.

xi. The diesel required for operating DG sets shall be stored in underground tanks and if required, clearance from Chief Controller of Explosives shall be taken.

xii. Vehicles hired for bringing construction material to the site should be in good condition and should have a pollution check certificate and should conform to the applicable air and noise emission standards and should be operated only during non-peak hours.

xiii. Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures should be made to reduce ambient air and noise level during construction phase, so as to conform to the stipulated standards by CPCB/KSPCB.

xiv. Fly ash should be used as building material in construction as per the provisions of Fly Ash Notification of September, 1999 and amended as on 27th August 2003. (The above condition is applicable Power Stations).

xv. Ready mixed concrete must be used in building construction.

xvi. Storm water control and its re-use per CGWB and BIS standards for various applications.

xvii. Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices referred.

xviii. Permission to draw ground shall be obtained from the Computer Authority prior to construction/operation of the project.

xix. Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.

xx. Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.

xxi. Use of glass may be reduced by upto 40% to reduce the electricity consumption and load on airconditioning. If necessary, use high quality double glass with special reflective coating in windows.

xxii. Roof should meet prespective requirement as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfil requirement.

xxiii. Opaque wall should meet perspective requirement as per energy Conservation Building Code which is proposed to be mandatory for all airconditioned spaces while it is aspirational for non-airconditioned spaces by use of appropriate thermal insulation material to fulfil requirement.

xxiv. The approval of the competent authority shall be obtained for structural safety of the buildings due to earthquake, adequacy of fire fighting equipments, etc. as per National, Building Code including protection measures from lightening etc.

xxv. Regular supervision of the above and other measures for monitoring should be in place all through the construction phase, so as to avoid disturbance to the surroundings.

xxvi. Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the protect proponent if it was found that construction of the project has been started without obtaining environmental clearance.

II. **Operation Phase**

i. The installation of the Sewage Treatment Plant (STP) should be certified by an independent expert and a report in this regard should be submitted to the Ministry before the project is commissioned for operation. Treated affluent emanating from STP shall be recycled / reused to the maximum extent possible. Treatment of 100% grey water by decentralised treatment should be done. Discharge of unused treated affluent shall conform to the norms and standards of the Kerala State Pollution Control Board. Necessary measures should be made to mitigate the odour problem from STP.

ii. The solid waste generated should be properly collected and segregated. Wet garbage should be composted and dry/inert solid waste should be disposed off to the approved sites for land filling after recovering recyclable material.

iii. Diesel power generating sets proposed as source of back up power for elevators and common area illumination during operation phase should be of enclosed type and conform to rules made under the Environment (Protection) Act, 1986. The height of stack of DG sets should be equal to the height needed for the combined capacity of all proposed DG sets. Use low sulphur diesel. The location of the DG sets may be decided with in consultation with Kerala State pollution Control Board.

iv. Noise should be controlled to ensure that it does not exceed the prescribed standards. During night time the noise levels measured at the boundary of the building shall be restricted to the permissible levels to comply with the prevalent regulations.

v. The green belt of the adequate width and density preferably with local species along the periphery of the plot shall be raised so as to provide protection against particulates and noise.

vi. Weep holes in the compound walls shall be provided to ensure natural drainage of rain water in the catchment area during the monsoon period.

vii. Rain water harvesting for roof run-off and surface run-off, as plan submitted should be implemented. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease. The borewell for rainwater recharging should be kept at least 5 mts.above the highest ground water table.

viii. The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.

ix. Traffic congestion near the entry and exit points from the roads adjoining the purposed project site must be avoided. Parking should be fully internalized and no public space should be utilized.

x. A Report on the energy conservation measures confirming to energy conservation norms finalise by Bureau of Energy Efficiency should be prepared incorporating details about building materials & technology, R & U Factors etc and submit to the Ministry in three months time.

xi. Energy conservation measures like installation of CFLs/TFLs for the lighting the areas outside the building should be integral part of the project design and should be in place before project commissioning. Use CFLs and TFLs should be properly collected and disposed off/sent for recycling as per the prevailing guidelines/rules of the regulatory authority to avoid mercury contamination. Use of solar panels may be done to the extent possible.

xii. Adequate measures should be taken to prevent odour problem from solid waste processing plant and STP.

xiii. The building should have adequate distance between them to allow movement of fresh air and passage of natural light, air and ventilation.

III Post Operational Phase

Environmental Monitoring Committee with defined functions and responsibility should foresee post operational environmental problems e.g. development of slums near the site, increase in traffic congestion, power failure, increase in noise level, natural calamities, and increase in suspended particulate matter etc. solve the problem immediately with mitigation measures

For Member Secretary, SEIAA