

ENVIRONMENTAL IMPACT ASSESSMENT OF RESIDENTIAL TOWNSHIP

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Abstract - Environmental Impact Assessment (EIA) can broadly be defined as a study of the effects of a proposed project, plan or program on the environment. The legal, methodological and procedural foundations of EIA were established in 1970 by the enactment of the National Environmental Policy Act (NEPA) in the USA. At the international level, lending banks and bilateral aid agencies have EIA procedures that apply to borrowing and recipient countries. Most developing countries have also embraced and are in the process of formalizing EIA through legislation. The paper highlights the evolution to current status, the legal framework, concepts, processes and principles of EIA and associated studies. To prepare an effective and sustainable EIA it is necessary to conduct a baseline survey of the existing environmental attributes. It helps to evaluate anticipated environmental impacts to the proposed activities and in formulating a scientific Environmental Management Plan. Irrespective of magnitude of operation, attempts have been made to maintain ecological balance of the study area.

Key Words: EIA ,Township, accessibility, planning, strategies, Development.

1. INTRODUCTION

Before the First World War, rapid industrialization and urbanization in western countries was causing rapid loss of natural resources. This continued to the period after the Second World War giving rise to concerns for pollution, quality of life and environmental stress. In early 60s, investors and people realized that the projects they were under taking were affecting the environment, resources, raw materials and people. As a result of this, pressure groups formed with the aim of getting a tool that can be used to safeguard the environment in any development. The USA decided to respond to these issues and established a National Environmental Policy Act in 1970 to consider its goal in terms of environmental protection. The USA became the first country to enact legislation on EIA. This was the first time that EIA became the official tool to be used to protect the environment. The United Nations Conference on the Environment in Stockholm in 1972 and subsequent conventions formalized EIA. At present, all developed countries have environmental laws whereas most of the developing countries are still adopting it. Multilateral and bilateral lenders included EIA requirements in their project eligibility criteria [1].

Environmental Impact Assessment (EIA) is a process of identifying, predicting, evaluating and mitigating the

biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. These studies integrate the environmental concerns of developmental activities into the process of decision-making. EIA has emerged as one of the successful policy innovations of the 20th Century in the process of ensuring sustained development. Today, EIA is formalized as a regulatory tool in more than 100 countries for effective integration of environmental concerns in the economic development process. The EIA process in India was made mandatory and was also given a legislative status through a Notification issued by the Ministry of Environment and Forests (MoEF) in January 1994. The Notification, however, covered only a few selected industrial developmental activities. While there are subsequent amendments, the Notification issued on September 14, 2006 [1].

2. METHODOLOGY FOR CLEARANCE OF THE PROJECT

Conditions of approval may ensure monitoring by the proponent, post project analysis and independent auditing. Thus, Environmental Impact Assessment helps in harmonizing the developmental activities with the environmental concerns. It is an imperative requirement to understand the basic concepts concerned to the pollution control and the environmental impact assessment in an overall objective of the sustainable development. As per the notification, the project is categorized as Category “B1” project which necessitates obtaining the Environmental Clearance (Builtup area is greater than 1,50,000 m²).

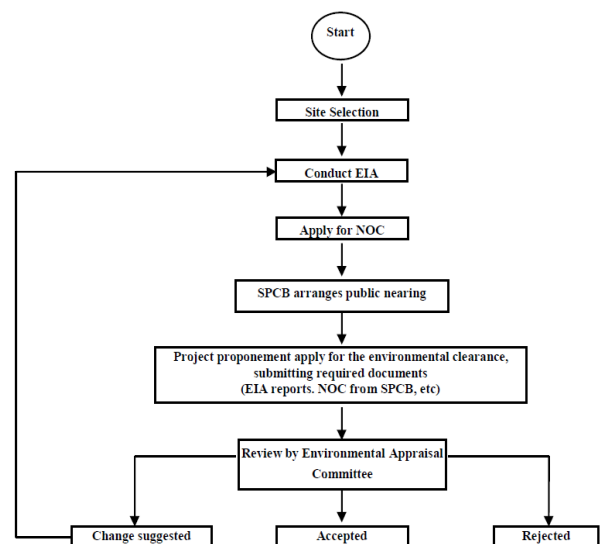


Fig - 1: Environmental Clearance Processes flow chart

3. STUDY AREA

Holiday Constructions private Limited (HCPL) are the developers of MY HOME RESIDENTIAL APARTMENTS at Nidamaru Village, Mangalagiri Mandal, Guntur District, Andhra Pradesh. Government of India, Ministry of Environmental Forests, New Delhi have issued an Environmental Impact Assessment (EIA) Notification SO 1533, of 14-09-2006. As per the notification, the project is categorized as Category "B1" project which necessitates obtaining the Environmental Clearance (Builtup area is greater than 1,50,000 m²). The notification has exempted the above establishments from holding the Public Hearing. HCPL proposes to develop this residential complex in an area of 27.17 acres falling under Survey Nos. 48, 67 and 78 at Nidamaru Village Of the total area of 27.17 acres, plot area earmarked for apartments is 22.17 acres. The proposed Residential Apartments will be developed into magnificent township.

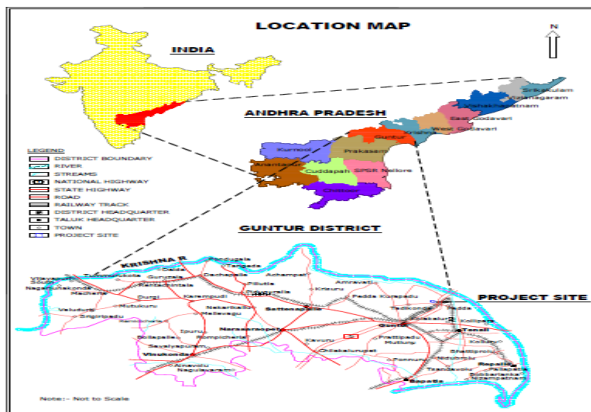


Fig -2: Shows study area of the project

Table -1: Salient features collection as per MoEF&CC

FEATURE	DETAILS
Site Location	Nidamaru Village, Mangalagiri Mandal, Guntur District, Andhra Pradesh.
Latitude	16°25'58.02" - 16°25'58.24" N
Longitude	80°31'48.42" - 80°31'50.16" E
Elevation, m above MSL	24
Maximum & Minimum Temperature, °C	45 (in May) & 10 (in December)
Annual Rainfall, mm	1031.60 mm
Relative Humidity, %	35-83%
Average Wind Speed, km/h	5-10

Topography	Flat terrain
Nature of Soil	Sandy loam to silty loam
Nearest Villages	Navuluru - 1.1 km - N Mangalagiri - 1.1 km - E Bapujinagaram - 1.2 km - WSW
Nearest Highway	National Highway (NH-5) connecting Vijayawada - Chennai, 2.90 km - SE
Nearest Railway station	Mangalagiri RS at 1.50 km - E
Nearest Airport	Gannavaram (Vijayawada) - 28.0 km - ENE
Water bodies	Krishna River - 9.30 km - NE Western Delta Main Canal - 7.00 km - E Guntur Canal - 3.60 km - ESE Kuragallu Lake - 2.80 km - WNW
Nearest Forests	Tadepalle RF - 3.40 km - ENE Mangalagiri RF - 1.80 km - E
Historical sites	Mangalagiri Temple - 2.10 km - E Amaravathi Temple - 13.20 km - ENE Pedakakani (Sivalayam) - 12.40 km - SSW Tenali Temple - 25.40 km - SSW Undavalli Caves - 7.16 km - NE

The Site of My Home is located at Nidamaru Village, Mangalagiri Mandal, Guntur District, Andhra Pradesh . The Project Site is a part of the Survey of India Toposheet No. 65/D/11. The site falls (A) 16°26'11.85"N - 80°33'8.22"E (B) 16°26'14.10"N - 80°32'56.68"E (C) 16°26'21.43"N - 80°32'57.32"E (D) 16°26'22.37"N - 80°33'8.53"E North latitude and East Longitude with an average altitude of 24 m above MSL. Nearest railway line connecting Rajahmundry - Guntur of South Central Railway line is at a distance of 1.1 km to SE direction from the Project Site.

Table-2: Details of Flats

S.No	Name of the flat	Maximum demand (in kw)
1	3 bed room flats	8736
2	2 bed room flats	2240
3	Street lights	20
4	Parking lights	20
5	Club	50
6	Water pumping	56
7	Lifts	270
	Total	11392

Vijayawada is major town at a distance of 12.3 km in ENE direction. Guntur district is at a distance of 18.0 km in SW direction. The National highway (NH-5) connecting

Vijayawada to Chennai is at a distance of 2.5 km SE. The nearest railway station is Mangalagiri RS at 1.5 km in E direction. The proposed new Capital ‘Amaravathi’ is at a distance of 10.70 km – NW. There are no national parks, elephant/tiger reserves within 10km radius of the study area. Uppalapadu Bird Sanctuary is located at distance of 15.45 km – SSW.

Table -3: Landuse Pattern

S.NO	PARTICULAR	AREA (ACRES)
1	Built-up area	5.18
2	Internal Roads	7.39
3	Open space	4.44
4	Total area	4.98
5	Others (club house)	0.18
Total		22.17

4. SOCIO ECONOMIC DATA COLLECTION

4.1. Age Distribution

The age of each individual is collected from the onboard surveys and the Figure below indicates the age groups. Age 15 to 25 shows more in number when compared to remaining age group.

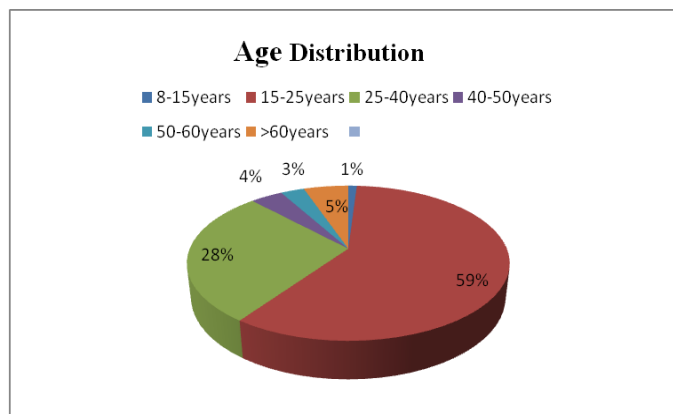


Chart -1: Age Distribution of The Villagers

4.2. Profession

The diagram represents the 60% of the students, 27% of the employs, 8% of the farmers, 3% of the labour and 2%of the others are travel in the public transportation. The Students are Every day travel from home to inistitute by using public transport only.

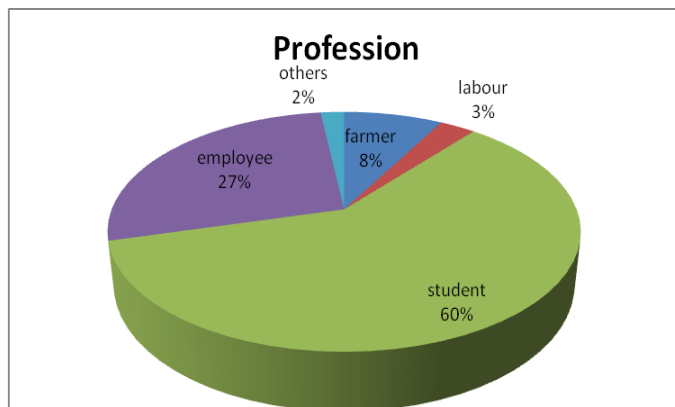


Chart -2: Profession of the Villagers

4.3. Income Levels

In this study area the maximum income levels below 10000Rs.the area more containing formers and labor. and next maximum income level is10000 to 20000 these are mainly employs

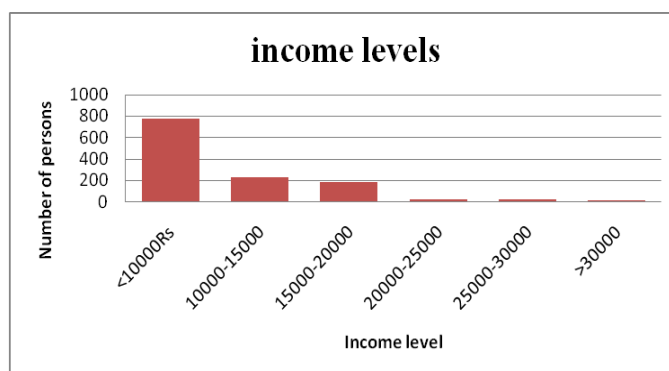


Chart -3: Income Levels of The Villagers

4.4 Analysis of Public & Private Transport Demand

Public transport demand may depend on various factors, ranging from travel behavior parameters (travel cost, travel time, trip length, accessibility ratio, comfort level, frequency, convenience etc). Although for the purpose & context of our study area we selected only the parameters of travel behavior as they directly affected the demand generation in our context. Thus, the selected parameters were trip purpose, trip length, and accessibility. These parameters were selected on the basis of a detailed stated preference survey conducted for understanding the travel behavior of the study area.

4.5 Number of trips by Public and private transport

Both the public and private trips is collected from the surveys and it is segregated based on vehicle type like Two-Wheelers, Three-Wheelers, Four-Wheelers, Buses. Figure shows that out of all vehicles type 31% are bus users.

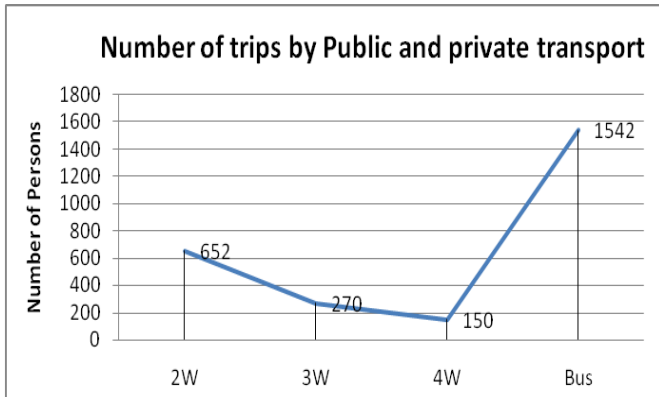


Chart -4: Trips generated by the public & private transport

4.6 Private transport demand

Respondents were asked to identify, in a fixed choice question, why they are choosing private transport. The respondents indicating each problem were shown in figure.

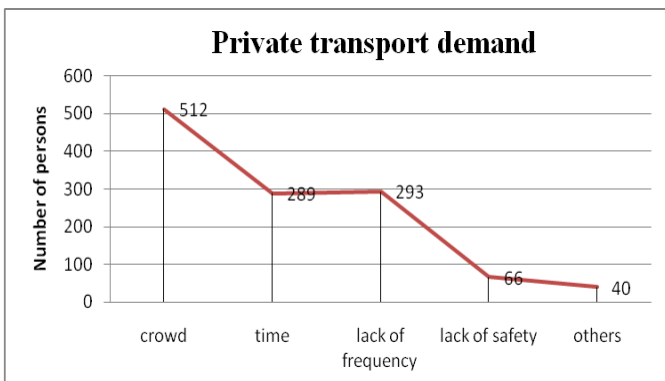


Chart -5: shows the Private transport demand

5. BASELINE DATA COLLECTION

5.1 Water

Water for construction will be sourced from Borewells/Tankers. The water requirement during construction phase has worked out considering concrete curing, Mortar mixing and curing for block work, Mortar mixing and curing for plastering, Floor finishes, Roof works/screed, Sprinkling for dust suppression and Domestic Water for construction will be sourced from HMWSSB. The water consumption during construction is estimated to be about 250 m³/day.

5.2 POWER

The power requirement of the building will be sourced from APSPDCL. The total power requirement of the complex for 2016 flats for all electrical appliances is estimated to be about 12000 kW, which will be sources from grid.

5.3 WATER SUPPLY SYSTEM

The total water requirement of the complex in operational phase including maintenance of the complex is estimated to be 900 m³/day. Estimation of water demand is given below :

The per capita consumption considered : 145 lpcd.
Occupancy level 5 persons per flat .

5.4 Water Requirement

Domestic Water Demand -10080 X 145 : 1461600 lpd

Club House : 10000 lpd

Utility/service usage : 10000 lpd

Total Water demand : 1481600 lpd

Treated Wastewater Generation : 1185280 lpd

Reusing of treated effluent for : 403200 lpd

flushing – 10080 X 40

Services and club house : 10000 lpd

Landscape and car wash 15 % of usage : 219240 lpd

Total treated wastewater for recycling : 632440 lpd

Remaining treated water let into storm : 552840 lpd

Total water demand after : 849160 lpd

reusing treated water say (50000 lit provision for swimming pool) : 900000 lpd = 900 m³/day

The main source of water for the project would be from municipal supply. HCPL has applied for permission from the Central Ground water department for withdrawal of ground water during operational phase.

5.5 WATER STORAGE

HCPL will provide the tanks of following capacity for storage of water.

Table 4: Water tank capacity of the study area

	OVERHEAD TANK		UNDER GROUND SUMP CAPACITY	
	Numbers	Capacity, m ³	Numbers	Capacity, m ³
Domestic water tank - Ground water	40 (capacity - 17 m ³ each)	680	28 (capacity - 137 m ³ each)	3036
Municipal water tank - Drinking	72 (capacity - 6 m ³ each)	432	28 (capacity - 130 m ³ each)	3640

water	each)			
Fire Fighting tank	112	1112	56	6676

Water from the separate over head storage tanks (i.e drinking, domestic use and flushing) will be supplied through separate pipelines to each flat.

5.6 Drainage Network System & Sewage Treatment Plant

Sufficient drainage network system will be provided to collect the sewage from all the flats. The network will be provided with inspection chamber as per the requirement. The sewage collected through the network will be routed to the proposed two sewage treatment plants proposed in Northern direction.

The total sewage generation from the complex will be about 720 m³/day. HCPL will construct one full fledged sewage treatment plant of 1000 m³/day for treating the sewage. A separate piping network will be provided to use the treated sewage for use in flushing of toilets and sprinkling on lawns.

5.7 Importance Of The Project To The Region

The aim of Residential Apartments venture is to work out a concept of self-sufficient neighborhoods, complete with work-live-play environment, incorporating the latest state of the art technology in terms of technical know-how, convenience and comfort on the housing front. It is the amalgamation of high quality office space with luxurious, executive, residential apartments with recreation facilities, meticulously landscaped, aesthetically approached, conducive from business as well as living. The concept involves developing growth centers where all facilities of housing, banking, communication links, industrial units, roads and infrastructure can comfortably co-exist. It aims at de-linking from the main city, and forming self contained centers serving as a mini cities where people work and live on a day-to-day basis, and the need to access the main city would be few and far in between.

Now Vijayawada is emerging as a developing city, accounting for a substantial portion of the nation's investments and profits, both in the public and private sector. Keeping in view of need for development of infrastructure, many construction companies have come forward to take up the development of infrastructure including commercial complexes.

After determining the OAL in the study area the following areas are having poor accessibility levels, comparing to the remaining areas.

5.8 Construction Machinery

Table 5: Constructional machinery of the study area

Sl. No.	Equipment	No. of units
1	Tower crane (electrically operated)	4
2	Hoists - (Diesel operated)	4
3	Vibrators - (electrically operated)	30
4	Saw machine & cutting tools	8
5	Site office computers	2
6	Water Pumps	20
7	Concrete Truck Mixers	10
8	Concrete Pump	2

5.9 Climatology

In general the climate of this area is dry. Summer starts from mid of February and continues up to first week of June, when the monsoon breaks. The monsoon continues till the end of October. Winter is between November and middle of February. The peak of summer is in May. The maximum temperature is about 45 degree Celsius. During the cold months of December the temperature falls to 12°C. The average rainfall of the district is 1031.60 mm. The maximum & minimum Temperature Humidity recorded during summer season is given in following table.

Table- 6: Climatological condition of the study area

SL.NO.	PARAMETERS	MAXIMUM	MINIMUM
1.	Temperature (°C)	45	27
2.	Humidity (%)	83	35

6. AMBIENT AIR QUALITY (AAQ)

Ambient air quality of the study area has been assessed through a network of four ambient air quality stations. The locations of ambient air quality stations are given below

Table-7: Details of the Near by villages

Station Code	Village Name	With Respect To Project Site	
		Direction	Distance (Km)
A1	Project Site	---	---
A2	Navuluru	N	1.10
A3	Mangalagiri	E	0.90
A4	Bapujinagaram	WSW	1.20

The ambient air quality locations are presented in Fig-3.1. The values of SPM, SO₂ and NO_x monitored at the above locations are given below.

Table-8: Summary of Ambient Air Quality

CODE NO	LOCATION NAME	98 TH PERCENTILE VALUES			
		SPM	RPM	SO ₂	NO _x
A1	Project Site	159	66	15.3	16.5
A2	Navuluru	166	68	15.8	17.4
A3	Mangalagiri	163	64	16.3	18.1
A4	Bapujinagaram	151	59	15.4	17.2

7. NOISE ENVIRONMENT

Noise levels were measured in the vicinity of the project at four locations. The noise monitoring location are presented. Details of the location and noise levels are given below:

Table-9: Summary of Noise environment

Station Code	Location	Distance (Km)	Direction w.r.t Project Site
N1	Project Site	---	---
N2	Navuluru	1.10	N
N4	Mangalagiri	0.90	E
N5	Bapujinagaram	1.20	WSW

Table 10: Equivalent Noise Levels In The Area

Station Code	Location	dB (A)		
		Day Equivalent	Night Equivalent	Day-Night Equivalent
N1	Project Site	53.1	50.4	57.3
N2	Navuluru	55.6	50.9	58.4
N3	Mangalagiri	54.3	50.8	57.9
N4	Bapujinagaram	51.4	58.6	55.5

8. WATER ENVIRONMENT

The nearest surface water source is Kuragallu Lake located at about 2.80 km from the Project Site. Guntur Canal and Western Main Branch are located at a distance of about 3.60 km and 5.10 km respectively. The ground water table is located at about 200 feet below the ground level. Water quality of the two bore wells and drinking water supplied in the area has been assessment for parameters as per the Indian standard IS 10500 (drinking water standard).

9. ENVIRONMENTAL MANAGEMENT CELL

- Provide solid waste handling facilities such as waste bins across the estate and ensure that they are often emptied to enhance maximum cleanliness.
- Ensure that solid waste generated at the homes, is regularly disposed of appropriately at authorised dumping site
- Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises during night hours.

CONCLUSION

The proposed My Home Residential Apartments will have numerous positive impacts including creation of employment, quality shelter, improved infrastructure, increase in national housing stock and increase in revenue among others has outlined in the report.

The negative environmental impacts that will result from establishment of the project which include increased population without adequate services and amenities; increased pressure on infrastructure; air pollution; water pollution and generation wastes among others which however can be mitigated.

The proponent of the proposed project shall be committed to putting in place several measures to mitigate the negative environmental, safety, health and social impacts associated with the Development cycle of the proposed housing project. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the EMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects.

It is also proposed that the positive impacts that come from such activities shall be maximized as much as achievable. It is expected that these measures will go a long way in ensuring the best possible environmental acquiescence and performance standards.

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