PREFEASIBILITY REPORT

FOR

PROPOSED INDUSTRIAL ESTATE

250.745 ACRES

AT

VILLAGE: KRISHNAMPALEM

TALUK: RAMBILLI

DISTRICT: VISAKHAPATNAM

STATE: ANDHRA PRADESH

BY

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PREFEASIBILITY REPORT

1. INTRODUCTION

1.1 ABOUT THE PROJECT PROPONENT

Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC), an undertaking of Govt. of Andhra Pradesh, is a premier organization in the state, vested with the objective of providing Industrial infrastructure through development of Industrial Parks and Special Economic Zones. Over 320 Industrial Parks have been established throughout the State, covering an extent of over 1,30,000 acres. The Industrial Parks and Special Economic Zones are playing a pivotal role, in attracting investments to the State both domestic & foreign by providing multiple incentives. Andhra Pradesh Industrial Infrastructure Corporation Ltd. was formed in 1973 by the GO No: 831 dated 10-SEP-1973 issued by Government of Andhra Pradesh.

- APIIC is spread over in all districts of A.P having 15 Zonal Offices.
- APIIC has manpower of all sectors including Administration, Engineering & Quality Assurance, Legal, Marketing, Finance & Internal Audit etc.,
- APIIC will undertake infrastructure development in its Industrial parks and takes up regular maintenance.
- APIIC is also delegated with Local Authority Powers under Panchayat Raj & Municipal Act by GoAP.

1.2 ABOUT THE PROJECT

APIIC proposes the development of Industrial Park at Krishnampalem village, Rambilli mandal, Visakhapatnam District in Andhra Pradesh. The park is proposed to be spread over 250.745 acres and cater to the socio-economic development of the region.

The proposed project attracts Environmental Clearance (EC) under Schedule 7(c) category B project, as per the guidelines of EIA notification of 2006, and the amendments thereafter.

1.3 MARKET DEMAND

Visakhapatnam has 73 Large and Medium Industries in Mining, Explosives, Power and Cement.

Industrial Development is conspicuous in Visakhapatnam urban agglomeration with the large scale industries like Hindustan Shipyard, Hindustan Petroleum Corporation, Coromandal Fertilizers, Bharat Heavy Plates and Vessels, L.G.Polymers Ltd., Hindustan Zinc Plant and the recent giant Visakhapatnam Steel

Plant and a host of other ancillary Industries. The Visakhapatnam Steel Plant is the biggest with a licensed capacity of 2.8 Million Tonnes of salable steel 3.0 Million Tonnes of Pig Iron and 8.32 Lakhs Tonnes of by product.

On the country side, agro based industries like Sugar Factories, Jute Mills and Rice Mills are there besides brick and tile units.

The Visakhapatnam Port, the largest in the country, is the ideal gateway contributing to the development of petroleum, steel and fertilizer industries.

1.3.1 Mineral Industries

It is hub for iron ore and other mineral exports of India, where iron ore from Andhra Pradesh, Odisha, Chattisgarh, Jharkhand, Madhya Pradesh is transported to the Visakhapatnam port by means of both Rail transport & Road transport and from here minerals are exported using ships to China and other countries. Visakhapatnam district and its surroundings have Bauxite reserves of 1,000 MT, manganese ore and titanium reserves in the beach sand.

1.3.2 ITES Sector

The city also owes its economic growth to the availability of an educated English-speaking workforce. English is the first language in many places of higher education in the city. This availability of a highly educated workforce allowed the entry of many ITES companies such as HSBC, IBM Daksh, Sutherland and Acclaris.

1.3.3 Apparel Industry

Brandix Apparel City is already in operation in Atchutapuram. This is specifically a textile based SEZ spread over 1000 Acres. Currently this has foreign textile

manufacturers like Pioneer Elastic Fiber, Ocean India, Quantum Clothing, Fountain Set group, Limited Brands, etc.

1.3.4 Pharmaceutical Industry

JNPC is only the Pharma SEZ in the country, and currently JNPC has 38 pharmaceutical companies with international pharmaceutical players like Pharma Zell of Germany, Japan's Eisai Pharma, US-based Hospira Chemicals

1.3.5 Heavy Industries

Other heavy industries include Hindustan Zinc Limited, GAIL, IOC Bottling Unit, BPCL Bottling Unit, Synergies Castings Ltd., Rain Calcining Limited, Coromandel Fertilizers, Hindustan Ship Yard and Bharat Heavy Plate and Vessels Limited (BHPV), Visakha Dairy, Vizag Profiles, Essar Pellet Plant, Andhra Polymers [now called as LG Polymers], Andhra cements, Andhra petrochemicals are located in Visakhapatnam District.

1.4 POTENTIAL OF KRISHNAMPALEM INDUSTRIAL PARK

Krishnampalem Industrial Park is located very close to Visakhapatnam. The site is around 38 Km from Visakhapatnam Port, nearest railway station Purushothapuramis 7 Km from site. Also the site is very close to Bay of Bengal (5 Km).

Water supply is proposed from Yeluru Canal. The site is already provided with 45 m wide approach road with internal road with of 30.0 m for smooth movement of vehicles. Nearest common TSDF facility is at Jawaharlal Nehru Pharma City, Parawada Village, Parawada Mandal, Visakhapatnam District which is located approximately at 15 Km from site.

Availability of these facilities make the site feasible for proposing Engineering Fabrication industries, fish processing units, cold storage units, food grain storage units, packaging units, , rubber goods units, spray painting, Automobile parts manufacturing units.

2. PROJECT PROFILE

2.1 LOCATION OF THE SITE

Visakhapatnam district has 3 Revenue Divisions, 43 mandals with 3108 villages. The District is industrially well developed due to the presence of Natural Harbor at Visakhapatnam.

An Industrial Park is being proposed at Krishnampalem village in Rambilli Mandal of Visakhapatnam district of Andhra Pradesh. The site is located at 6 Km from Brandix Apparel City with an area of 250.745 Acres. The Location is given in **Figure 2-1** and satellite image of the site is given in **Figure 2-2**. The salient features of the site are given in Table 2-1.

Table 2-1 Features of the Site

Item	Details
Location	Krishnampalem Village
Survey No.	24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74 ,75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86,87, 88,89,90,91,92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 137, 138, 139
Tehsil	Rambilli
District	Visakhapatnam District
State	Andhra Pradesh
Nearest Railway Station with distance	Eellamanchilli Railway Station - 10 km
Nearest Airport along with distance	Visakhapatnam Airport -40 Km
Nearest Town along with distance	Town: Eellamanchilli – 8 km
Nearest City along with distance.	City: Visakhapatnam -45 Km
Nearest Highway	NH-16 (Chennai - Kolkata) – 10 Km

2.2 SURROUNDING FEATURES

Surrounding features of the project around 10 Km radius are summarized in below **Table 2-2**.

Table 2-2 Proposed Project Surrounding Features

Sl. No	Area	Distance (Kms)
1.	Sundaram Alloys Ltd	1.5
2.	Ocean India Pvt. Ltd.	2.9
3.	Dharapalem Cheruvu	3.8
4.	Saradha River	3.8
5.	Dhanadibbalu Buddhist Stupa	4.0
6.	Panchadharala Dharmaligeshwara Temple	4.41
7.	Pilkington Automotive Ltd.	4.85
8.	Brandix Apparel City	4.9
9.	Bay of Bengal	4.9
10.	Abhijeet Ferrotech Ltd.	5.91
11.	Gov. Upper Primary School	5.76
12.	Shiva Temple	6.12
13.	Ramalayam	7.12
14.	UP School	7.42
15.	ZPH School	7.79

Figure 2.1 Location of Proposed Project Site

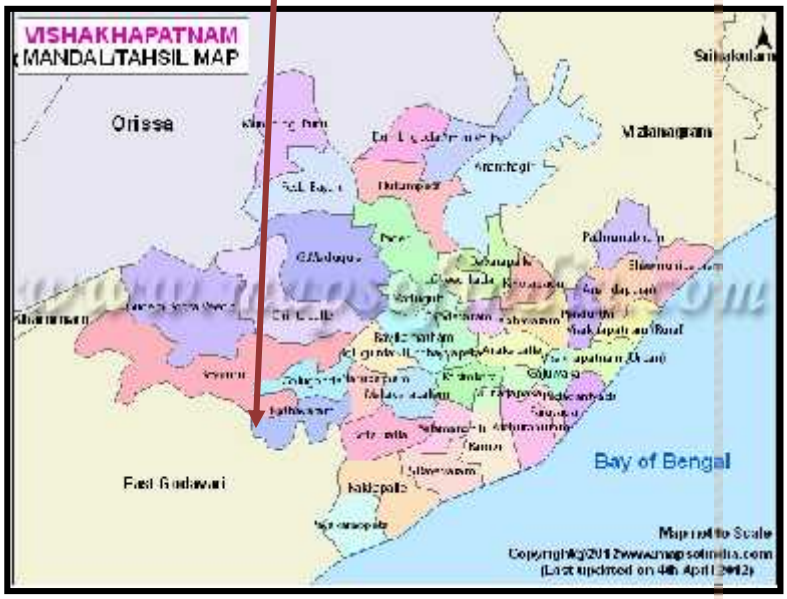


Figure 2.2 Project Site- Google Image

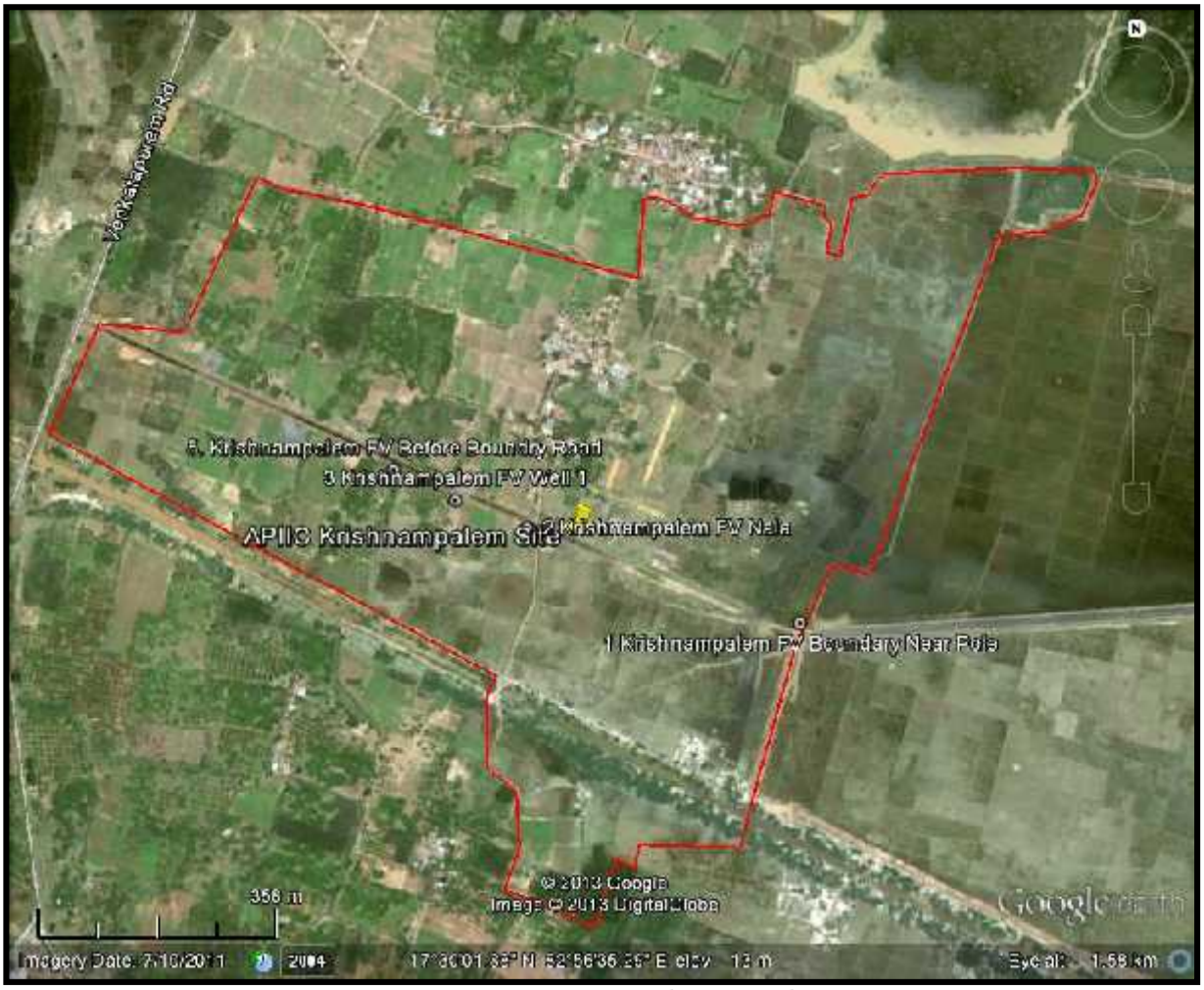


Figure 2.3 Site Photographs

Figure 2.4 10 Km radius Satellite Image showing Proposed Project site and Surrounding Features

2.3 SITE JUSTIFICATION

APIIC with the aim of industrial development has been developing industrial parks through-out the state. Visakhapatnam district has the port and Air port which will be an added advantage for the business & socio-economic development and improvement for the district. Hence APIIC has proposed the plans for the Industrial park in this district.

The connectivity of the site to port, airport, railway and road is as follows:

a. **Port Connectivity**- The site is about 40 Km away from the Visakhapatnam Port.

b. **Airport Connectivity**- The site is about 40 from the Visakhapatnam Airport .

c. **Rail Connectivity**- The site is about 10 Km from Eellamanchilli Railway Station from which railway lines could be drawn in for goods carriers.

d. **Road Connectivity-** The site is about 10 Km from NH- 16 connecting Chennai - Kolkata.

2.4 LAND FORM & LAND OWNERSHIP

The proposed area for the Industrial Estate of 250.745 Acres falling within Survey No. 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 45, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74 ,75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86,87, 88,89,90,91,92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 137, 138, 139 has been handed over to APIIC. The Land Documents and the site extent is given in **Annexure-1**.

2.5 EXISTING SITE CONTOUR

The existing site contour is given in **Annexure -2**. The site has some undulations and sloping towards the western side of the site boundary.

2.6 PROPOSED MASTER PLAN BY APIIC

The proposed area for Industrial Estate is 250.745 Acres. The Master Plan is given in **Annexure-3** and the Area breakup of Plot area is given in **Table 2-3**. Application is submitted for approval by Local Planning Authority. The acknowledgement is given in **Annexure-4.** Though the total area of the project is 250.745 Acres, a 60 m wide drain passes through the site along the southern side. The area of the drain is 16.5 Acres and hence the net usable area is 234.245 Acres.

Table 2-3 Area Break up Detail for Proposed Project

Area Break Up	Area (Acres)	Percentage (%)
Plotted Area	163.21	69.68%
Road Area	25.94	11.05%
Open space Area	25.345	10.82%
Common Facility Area	7.66	3.27%
Commercial area	12.09	5.16%
Net Usable Area	**234.245**	**100%**
60 M wide drain area	16.5	
Total	**250.745**	

2.6.1 Plotted Area

Total plotted area for the proposed site 163.21 acres. There are totally 25 plots proposed for the site. The industries are classified as Red, Orange and Green category. The individual plot area to be allotted for each industry is given in **Annexure-3, Master Plan**. Already allotment is made for three plots. The list of allotted industries is given in **Table 2-4.** Around 22 plots are vacant and the type of industries which could come in the vacant plots is given in **Table 2-5**. The allotments proposed for the vacant plots are based on the enquiry and the availability of raw materials in the district.

Table 2-4 List of Industries Proposed and Allotted

Plot no	Name of Industry	Type of Industry	Classification as per APPCB	EIA Category as A/B with conditions to be implied in APIIC park		Total Area in Acre
1	M/S Aum Saw Pipes & Industries P. Ltd.	Saw Pipes (Submerged Arc Welded Pipes)	Red	-	-	45.00
2	M/S Aum Saw Pipes & Industries P. Ltd.	Saw Pipes	Red	-	-	25.00
4	M/s Sulekha Industries	Bag Filters, Cyclone separators, ESP	Red			10.00
Total				-	-	**80.00**

Table 2-5 Details of allotted Industry

S.No	Industry	Manufacturing capacity proposed	Raw materials used
1	M/s Sulekha Industries	400 MT/Month in Phase I Upto 1000 MT/Month	Mild steel, Rolled sections, stainless steel
2	M/S Aum Saw Pipes & Industries P. Ltd.		Steel

Table 2-6 Tentative List of Industries Proposed

Sl.No	Type of Industry Proposed	Classification as per APPCB	EIA Category as A/B with conditions to be implied in APIIC park	
1	Engineering Fabrication Works	Red		
2	Commercial Area		-	-
3	Chilling Plant, Cold Storage	Orange	-	-
4	Fish processing and packaging	Orange	-	-
5	Fish & Poultry feed	Orange	-	-
6	Iodized salt manufacturing	Orange	-	-
7	Packaging material from vegetable fibre	Orange	-	-
8	Repairing of electric motor and generator	Orange	-	-
9	Polythene & plastic processed products manufacturing	Green		
10	Bicycle, baby carriage assembling	Green	-	-
11	Saw Mill	Green	-	-

Sl.No	Type of Industry Proposed	Classification as per APPCB	EIA Category as A/B with conditions to be implied in APIIC park	
12	Spray painting	Orange	-	-
13	Automobile servicing, repairing and painting	Orange	-	-
14	Printing press	Green	-	-
15	Ceramic color manufacturing	Green	-	-
16	Rubber goods industry	Green	-	-
17	Tyres & tubes retreading (without boiler)	Green	-	-
18	Automobile body building	Red	-	-
19	Fibre glass production and processing	Red	-	-
20	Commercial Area		-	-
21	Storage of food grains	Orange		
22	Electrical & electronics items assembling	Green	-	-
Total Available area for proposed industries– 98.85				

2.6.2 Open Area

Open area of which 10% will be provided by APIIC which can be used for Green belt development. The open area allotted is 25.35 Acres.

2.6.3 Road Area

Internal roads will be provided by APIIC. Total area of 25.94 Acres are allotted for providing internal roads. The Traffic Circulation Plan is given in **Annexure-5.**

2.6.4 Common Facility Area

Total area allotted for common facilities is 7.66 Acres. This includes an Administration Building is proposed in the plot and common Facilities like Bank, ATM, canteen, post office, weigh bridge, truck parking area, fire station and Occupational Health Centre is proposed to facilitate the Industries within the Estate.

It is proposed to provide truck parking area for 50 trucks in within an area of 3500 Sqm.

Apart from this raw water storage tank, waste processing area, electrical substation is proposed. The total area allotted for common facilities is 18750 Sqm.

Also 12248 Sqm is proposed to be allotted for small vendors

3. RESOURCE REQUIREMENT

3.1 WATER REQUIRMENT

3.1.1 Construction Phase

Water requirement during the construction phase will be around 200 KL per day for development of Infrastructure facilities. The water will be sourced from the Yeluru canal which is around 15 Km from site.

Approximate people working will be around 250 nos.

S.No	Activities	Water Requirement (KLD)
1	Labors	15
2	Construction water	135
3	Other activities	50
Total		**200**

3.1.2 Operation Phase

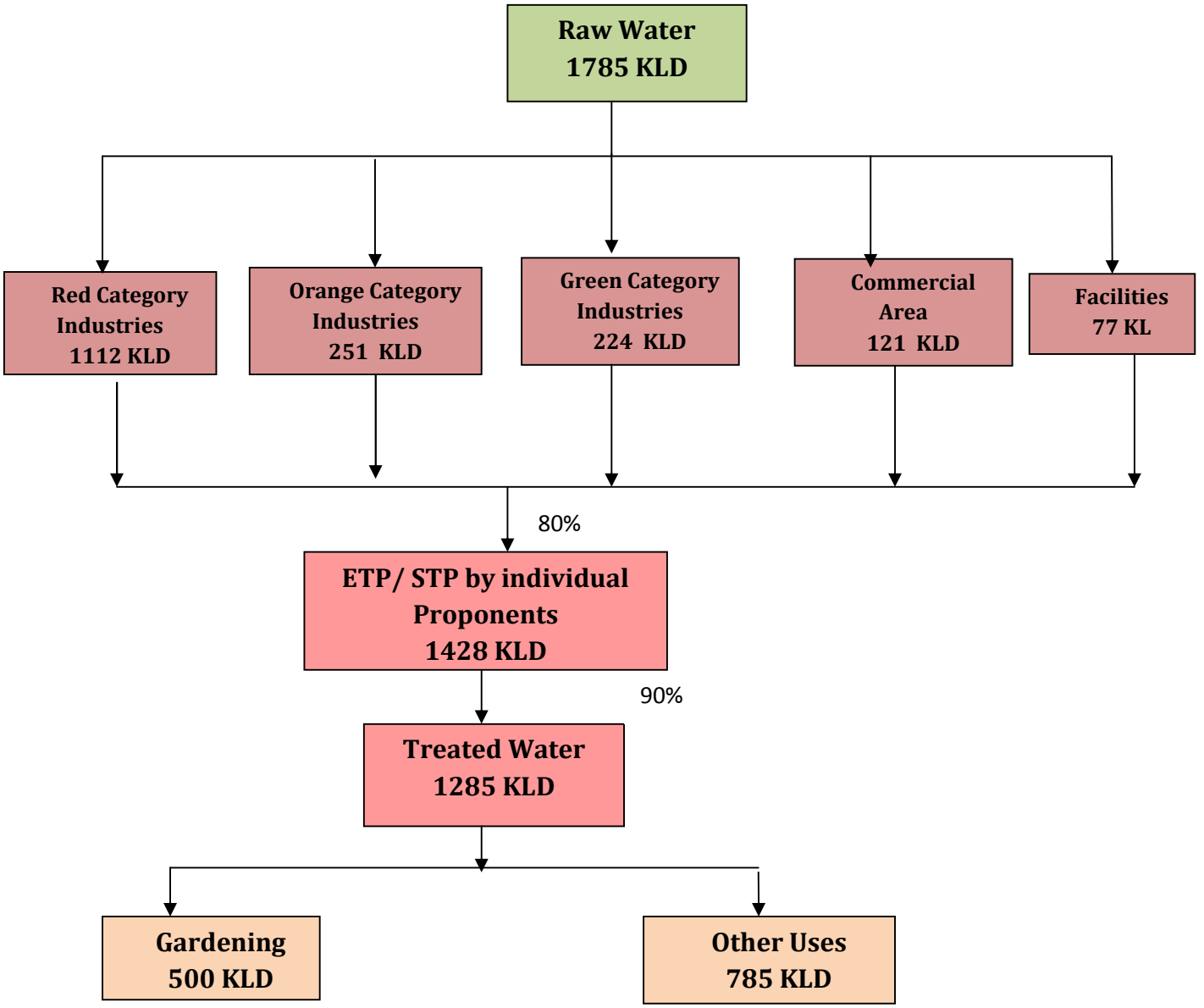
During Operation Phase, the water requirement is approximately calculated as 10 KL/ acre. The total plotted area calculated for water requirement is 178.5 Acres (including commercial area and common facilities). Hence the water requirement is calculated as approximately 1785 KLD, taking into consideration the water requirement for facility area. The water supply line from the raw water tank to the industries is given in **Annexure -10**

The water will be sourced from the Yeluru canal which is around 15 Km from site. The Government Order is given in **Annexure- 7**.

Table 3-1 Water Requirement for different Industries

S.No	Type of Industry	No. of Industries	Area in Acres	Total Water Requirement @ 10 KL/ Acre (KLD)
1	Red category	6	111.19	1112
2	Orange category	9	25.11	251
3	Green category	8	22.45	224
4	Commercial Plot	2	12.09	121
5	Common Facilities		7.66	77
Total		**25**	**178.5**	**1785**

Figure 3.1 Water Balance



3.2 POWER AND FUEL REQUIREMENT

The overall power requirement for the proposed project is approximately, 10 MVA and the source of power is APEPDCL.

Table 3-2 Power Requirement Breakup

S.No.	Type of Industry	No. of Industries	Power Requirement	Total Power Requirement
1	Engineering & Fabrication	5	600 kVA	3000 kVA
2	Packaging/ processing	6	300 kVA	1800 kVA
3	others	12	250 kVA	3000 kVA
4	Common facilities		250 kVA	250kVA
5	Street lighting		25 kVA	25 kVA
				8075 kVA

The Transformer capacity for the proposed project will be 10 MVA. Application for Power supply to APEPDCL is given in **Annexure-11.**

Individual industries will have their own power backup facilities.

3.3 STORM WATER DRAINAGE

It is proposed to provide storm water drain along the boundary of the site and road. The layout is given in **Annexure-9.** Excess storm water will be led to the nearby drain based on the site contour.

3.4 MANPOWER REQUIREMENT

The proposed project required about 250 personnel during construction phase and 1000 personnel during operation phase.

3.5 MATERIALS REQUIREMENT

All construction materials will be procured locally from 50 km radial area.

3.6 PROJECT SCHEDULE WITH TIME LINE

The project schedule is given in Table 3-3.

Table 3-3 Project Schedule

S.No	Description	Month																						
		May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15
1	Environmental Clearance																							
2	CFE																							
3	Roads																							
4	Storm Water Drain																							
5	Water Line																							
6	Substation & Power Line																							
7	Admin & common facilities																							
8	Allotment of Incustries																							

4. EXISTING ENVIRONMENTAL SETTINGS

4.1 CLIMATE

The district has differing climatic conditions in different parts of it. Near Coast the air is moist and relaxing, but gets warmer towards the interior and cools down in the hilly areas on account of elevation and vegetation. April to June is warmest months. The Temperature gets down with the onset of South West Monsoon

4.2 TEMPERATURE

The mean maximum temperature begins to raise from the middle of February and reaches a maxi-mum of about 300C in May. With the onset of the south-West monsoon into the District early in June, there is appreciable drop in temperatures and the weather becomes more pleasant. In the beginning of November, the decrease in both the day and night temperature is rapid. December is the coldest month with the mean daily maximum temperature at 28.6° C(83.8°F) and the mean daily minimum Temperature at 13.6°C(56.5°F).

4.3 HUMIDITY

During the South-West monsoon season the relative humidity is generally high, ranging between 70 and 80 percent on the average. Humidity decreases from the post monsoon season onwards. The driest part of the year is the summer season when the humidity is generally between 30 and 35 percent in the afternoon.

4.4 RAINFALL

The District receives annual normal rainfall of 1202 MM of which south-west monsoon accounts for 53.9% (June to September) while North-East monsoon (October to December) contributes 24.8% of the normal rainfall. The rest is shared by summer showers and winter rains. Agency and inland Mandals receive larger rainfall from the Sourth West Monsoon, while Coastal Mandals get similarly larger rainfall from North- East monsoon. But both the monsoons play truant, variations of South-west monsoon accounting for 15.3% of normal and North-west monsoon to

33.2% of normal. since even the years of normal rainfall are characterized by long dry spells during one or more parts of the crop season, the district experiences drought conditions too often, as no major irrigation system exists to cushion the vagaries of the monsoon.

4.5 GEO MORPHOLOGY AND SOIL TYPES

The geomorphic units such as inselbergs/residual hills, rolling plains, collivial plains, fractures, piedmont fans, and pediments were identified under structural landforms. The units wind gap, paleo channels, gully land, alluvial plain and natural levee were identified under fluvial landforms. The coastal landforms include sea cave, sea stack, red sediments, beach sands and marshy area.

4.6 DRAINAGE AND WATER BODIES

The water supply for Visakhapatnam is mainly from Godavari River. The schemes available for water supply are

a. Meghadigedda Reservoir Scheme
b. Tatipudi Reservoir Scheme
c. Raiwada Reservoir Project
d. Yeleru Left Main Canal

To meet the future requirements, Visakhapatnam Industrial Water Supply Scheme is proposed to extract 175 MGD of water from River Godavari.

4.7 SOIL

Red Loamy soils predominate with coverage of 69.9% of the villages of the district. The Soils are poor textured and easily drained. Sandy loamy soils come next with 19.2% village coverage, largely confined to the coastal areas of Nakkapalli, Payakaraopeta, S.Rayavaram, Rambilli, Atchutapuram, Paravada, Visakhapatnam, Pedagantyada, Gajuwaka and Bheemunipatnam Mandals and to certain stretches in the interior Mandals of Chodavaram, Narsipatnam, K.Kotapadu and Madugula. Black

cotton soils come up next having sizeable chunks of area in K.Kotapadu, Devarapalli, Cheedikada, Paderu and Hukumpeta Mandals. 45% of the soils in the district are low in organic content and 55% in Phosphorous content.

4.8 MINERALS

Visakhapatnam district and its surroundings have Bauxite reserves of 1,000 MT, manganese ore and titanium reserves in the beach sand.

Apart from this Rock Phasphate Apatite , Mica , Quartz , Vermiculite , Calcite Laterite, White Clay are the available mineral resources.

4.9 LAND USE

Visakhapatnam covers 4% of the total geographical area of Andhra Pradesh state. When compared to the state, Visakhapatnam has high forest coverage, miscellaneous tree coverage is minimum. Permanent pasture, cultivable waste are 1.22% and current fallow land in the district is less than the state, 6.48% Visakhapatnam is net sown area and 49% in state

Table 4-1 Land use Classification

Details	Visakhapatnam District (Ha)	Andhra Pradesh (Ha)
Geographical Area	11,16,100	2,75,04,500
Forest Area	4,41,166	62,10,369
Barren Uncultivable Land	1,30,405	20,59,435
Permanent Pastures & Grazing Area	2,849	5,71,055
Miscellaneous Trees	34,077	3,05,519
Cultivable Waste	10,863	6,58,864
Other Fallow Land	28,154	15,00,018
Current Fallows	53,385	27,19,180
Net Sown Area	72,363	1,08,42,900

Source : APDES- Districts at a Glance 2010

4.10 CROPPING PATTERN

The cropping pattern of Kharif and Rabi is practiced. The following table shows the cereals that are cultivated in Visakhapatnam and Andhra Pradesh. The cropping intensity of the District is 98 while that of state is 104.97. This indicates that most of the farmers do only single cropping a year.

Table 4-2 Cropping Pattern(Ha)

Type of Crop	Visakhapatnam	Andhra Pradesh
Paddy	117551	4751309
Jowar	985	254317
Bajra	5978	67326
Maize	6770	743446
Ragi	22955	42322

Source: Department of Agriculture, Andhra Pradesh

4.11 IRRIGATION SOURCES

The main ground water structures for domestic and irrigation purposes are hand pumps, shallow tube wells, cavity wells and deep tube wells.

Areas irrigated by groundwater account for about 97% of the total irrigated area. Out of the total irrigated area which is 790 sq.km in Visakhapatnam district as much as 770 sq.km of land is irrigated by shallow and deep tube wells. The total number of private tube wells in the district is 21,340. The area supported by canal water irrigation is only 10 sq.km. Most of the ground water irrigation is done by private shallow tube wells.

4.12 FORESTS

More than the one third of the area in the District is covered by forest. The forests are of moist and dry deciduous type. The common species available in them are Guggilam, Tangedu, Sirimanu, Kamba, Yagisa, Nallamaddi, Gandra, Vepa etc. Bamboo shrubs are sparsely scattered. But forest area in the district has been showing a quiescent decline since 1955-56 perhaps due to podu practice, indiscriminate grazing and browsing.

To stem this, regeneration programmes are being carried out like rising of Teak, Silver trees. Coffee plantations are done, as the agency areas are found suitable agronomically for coffee growth. Coffee plantations have been raised in about 10000 Acres in Chinthapalli, Minimuluru, Devarapalli and Ananthagiri regions by different agencies for different purposes.

By the forest Department to conserve soil, by the Coffee board to evolve cultures suited to non-traditional areas and by the Girijan Corporation and the I.T.D.A. to wean out tribals from the pernicious practices of "Podu Cultivation.

4.11 INDUSTRIES

Visakhapatnam Export Processing Zone located at Duvvada Village is allotted for setting up an Export Oriented Industry.

Jawaharlal Nehru Pharma City located at Parwada, 33 Kms from Visakhapatnam town is allotted to promote Bulk Drug, Pharma and chemical industries.

A.P. Special Economic Zone in Atchutapuram and Rambilli Mandals is proposed for Multi product Industries.

4.12 SOCIO ECONOMIC ENVIRONMENT

The Population of the District as per 2011 census and the percent growth is given in Table 4-3.

Table 4-3 Population of the District

	2011 Census			2001 Census		
Vishkapatnam	Persons	Male	Female	Persons	Male	Female
Total	4290589	2138910	2151679	3832336	1930197	1902139
Urban	2254667	1113234	1141433	2301437	1149912	1151525
Rural	2035922	1025676	1010246	1530899	780285	750614

Source: Census 2011 & 2001

List of Schools in Krishnapalem village is given in Table 4-4

Table 4-4 List of Schools in Krishnapalem village

Pudur Mandal	Primary School	Middle School	Secondary School	Total
Primary Schools	1	0	0	1

Source: DISE

Lis t of Medical Facilities in Pudur Mandal is given in Table 4-5

Table 4-5 Medical Facilities in Krishnapalem villages

Pudur Mandal	Under APVVA	PHC	Govt. Dispensary	PH sub C	PPU	GCH	Total
Allopathy	-	1	-	1	-	-	2

Source: NHRM

5. ENVIRONMENTAL MANAGEMENT PLAN

5.1 INTRODUCTION

Environmental Management Plan (EMP) is aimed at mitigating the possible adverse impact of a project and ensuring the existing environmental quality. The EMP converse all aspects of planning, construction and operation of the project relevant to environment. It is essential to implement the EMP right from the planning stage continuing throughout the construction and operation stage. Therefore the main purpose of the Environmental Management Plan (EMP) is to identify the project specific activities that would have to be considered for the significant adverse impacts and the mitigation measure required.

5.2 CONSTRUCTION PHASE

The environmental impact during the construction phase will be of short term and reversible nature and will gradually eliminate after the construction activity is over. Further the area of the unit is small in size. Still the following measures will be considered on priority basis to minimize the impacts.

5.2.1 Modification of Drainage Pattern

- Rainwater harvesting prevents the flooding of low-lying areas in the project premises.
- A basic surface drainage system will be provided for the site to avoid water runoff on to the surrounding properties and roads, especially during the monsoon months.
- If during excavation, water accumulates in the excavated areas, then it will be pumped out and disposed off into recharge soak pits of dry bore wells.

5.2.2 Materials Transportation

APIIC will insist the individual industries to comply with the following conditions and individual industries will make the contractors responsible for maintaining the following

- All fine earth materials will be covered during transportation to the site to prevent spillage and dusting.
- The cleanup of spilled earth and construction material on the main roads will be the responsibility of the contractor and should be done in a timely manner (say within 4 hours) so as not to inconvenience or endanger other road users. These requirements will be included as clauses within contracts made with relevant sub-contractors.
- The transportation of lubricants and fuel to the site will only be done in the appropriate vehicles and containers, i.e. fuel tankers and sealed drums.
- As far as possible, transport of construction materials will be scheduled for off-peak traffic hours. This will reduce the risk of traffic congestion and of road accidents on the access roads to the site.

5.2.3 Materials Storage

- The stockpiling of construction materials will be properly managed and controlled. Fine grained materials (sand, marl, etc.) will be stockpiled away from surface drainage channels and features.
- Low beams will be placed around the piles and/or tarpaulin used to cover open piles of stored materials to prevent them from being washed away during rainfall.
- Safe storage areas will be identified and retaining structures constructed prior to the arrival of material.
- Hazardous chemicals (e.g. fuels) will be properly stored in appropriate containers and these should be safely locked away. Conspicuous warning signs (e.g. 'No Smoking') will also be posted around hazardous waste storage and handling facilities.

5.2.4 Air Environment

- **Site clearance, excavation and earthmoving** -The working area for the uprooting of shrubs or vegetation or for the removal of boulders or

temporary or permanent structures shall be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet.

- **Access road -**Every main haul road shall be paved with concrete, bituminous materials, hardcore or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet.
- **Construction equipments**
  a. All machineries to be used for construction purpose will be of highest standard of reputed make and company will emphasize compliance of noise pollution control norms by these equipments.
  b. Transport vehicles and construction equipments / machineries will be properly maintained to reduce air emissions.
  c. Equipments will be periodically checked for pollutant emissions against stipulated norms.
  d. Exhaust vent of DG set will be kept at proper height to ensure quick dispersal of gaseous emissions.
- **Excavation and earth moving -** The working area of any excavation or earth moving operation should be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet.
- **Stock Piles**
  a. All loose material either stocked or transported will be provided with suitable covering such as tarpaulin, etc.
  b. Water sprinkling will be done at the location where dust generation is anticipated.
  c. Over Burden (OB) waste dumps will be sprayed with water as they are major sources of air borne particulate matter/dust.
  d. OB waste dumps will be reclaimed / afforested to bind the loose soil and to prevent soil erosion.

5.2.5 Noise Environment

- Construction activities that will generate disturbing sounds should be restricted to normal working hours.
- Workers operating equipment that generates noise should be equipped with noise protection gear. Workers operating equipment generating noise levels greater than 80 dBA continuously for 8 hours or more should use earmuffs. Workers experiencing prolonged noise levels of 70 – 80 dBA should wear earplugs.
- The construction activities will be restricted to the daytime and no construction will be practiced during night.
- Barricades will be provided around the construction site to confine noise within the site.
- To reduce the impact of air and noise pollution and to provide a clean, healthy environment, it has been proposed to create and maintain a green belt within the site and along the roadsides.

5.2.6 Water Environment

- Excavation will be avoided during monsoon season
- Check dams will be provided to prevent construction runoff from the site to the surrounding water bodies.
- Pit latrines and community toilets with temporary soak pits and septic tanks will be constructed on the site during construction phase to prevent wastewater from entering the ground water or surrounding water bodies.
- To prevent surface and ground water contamination by oil/grease, leak proof containers shall be used for storage and transportation of oil/grease.

5.2.7 Biological Environment

- The dust emissions will be suppressed by spraying water and then the activities will be carried out.
- Emissions from D.G sets and vehicles will be minimized by proper maintenance and by avoiding use of adulterant fuels and will be maintained below the standard limits prescribed by competent authority.

- Important species of trees will be identified and marked and will be merged with landscape plan.

5.2.8 Construction Waste Disposal

- The contractor should prepare a site waste management plan prior to commencement of construction work. This should include the designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal site, and a system for supervision and monitoring. Preparation and implementation of the plan must be made the responsibility of the building contractor with the system being monitored independently.
- Special attention will be given to minimizing and reducing the quantities of solid waste produced during site preparation and construction. To reduce organic waste, softer vegetation may be composted onsite and used for soil amendment during landscaping.
- Most of the construction materials like soil, bricks, concrete will be reused in the backfilling, road construction, sub-grade reparation etc. works. Metals, word scraps & bitumen junks will be recycled either within site or outside with help of the local authority. The measures like reusing materials on-site and /or donating /selling salvaged items reduces waste, virgin material use and disposal cost.
- Vegetation and combustible waste will not be burnt on the site.
- Reusable inorganic waste (e.g. excavated sand) will be stockpiled away from drainage features and used for in filling where necessary.
- Unusable construction waste, such as damaged pipes, formwork and other construction material, will be disposed of at an approved dumpsite.

5.2.9 Land Environment

- The soil will be collected separately and preserved in stacks with side slopes not exceeding 1:5. The topsoil (soil on the top 15 cm patch) will be preserved separately in a stack covered by tarpaulin. Efforts will be made

to reinstate the soil for backfilling purposes. Topsoil will be reused for horticultural areas.

- The spillage of oil from the machinery or cement residue from concrete mixer plants might contaminate the soil if not properly collected and disposed off. Thus most stringent safety and construction management norm will be implemented at site.

5.2.10 Health & Safety Measures

- Construction related activities will be confined only to project site area, hence no health related impact are envisaged within the project influenced area during the construction stage and will be limited to occupant levels.
- Proper drinking water, sanitation and first aid facility will be provided at the construction site, with trained shift supervisors, which will ensure minimum adverse occupational health impacts on the construction worker.
- A qualified and experienced safety officer shall be appointed. The responsibilities of the safety officer include identification of the hazardous conditions and unsafe acts of workers and advise on corrective actions, conduct safety audit, organize training programs and provide professional expert advice on various issues related to occupational safety and health. He is also responsible to ensure compliance of Safety Rules/ Statutory Provisions.

5.3 OPERATION PHASE

Since the proposed development is an Industrial Estate, only common facilities like Roads, Storm water drains, Rainwater harvesting pits, water supply line, Municipal Solid Waste processing area are proposed. Individual Industries upon establishment, will have their own treatment system for treating sewage/ effluent and apply for separate EC/ CFE as applicable.

5.3.1 Air Environment

- Proper stack height as per CPCB guidelines will be provided for DGs.

5.3.2 Water Environment

Water pollution from process can be divided into process and domestic wastewater.

Individual industry upon establishment will have their own facility for treating the sewage and effluent.

5.3.3 Solid and Hazardous Wastes

- During construction phase, solid waste, scrap will be generated and will be suitably disposed off.
- During operation phase, Municipal Solid waste of 650 Kg is proposed to be developed and Municipal Solid waste processing area proposed is 2000 Sqm

Waste	Quantity (kg/day)	Collection method	Disposal method
Organic	293	Bins	composting
Inorganic	357	Bins	Authorized vendors

- Apart from these individual Industries will be insisted to dispose their hazardous waste generated to the common TSDF facility at Jawaharlal Nehru Pharma City, Parawada Village, Parawada Mandal, Visakhapatnam District which is located approximately at 30 Km from site.

5.3.4 Rainwater Harvesting System

Rainwater harvesting structures are proposed for the proposed project for utilization and to recharge the water resources in the region. Rain water harvesting structures are proposed to recharge the groundwater resources in the region. The run-off water from the roof of the structures and paved areas will be collected through storm water drainage system and led to rain water harvesting structures. The Storm water drainage plan and Rainwater Harvesting facility layout is given in **Annexure-9**. Apart from this individual industries, upon establishment will be insisted to have their own rainwater storage and harvesting facility.

5.4 GREEN BELT DEVELOPMENT

The individual industries will be insisted to provide 33% green belt area in the plots. Of which 10% is already provided by APIIC as open space. Lush greenery with extensively landscaped areas will be set.

Linear planting will be carried out along the roads, mass planting will be proposed for landscaping areas. Buffer zone area will be planted with quick growing trees.

5.5 OCCUPATIONAL HEALTH AND SAFETY

The problem of occupational health, in the operation and maintenance phase is primarily due to noise, which could affect hearing. APIIC will insist the individual industries who will in turn insist the contractors on providing necessary personal protective equipments to all the workers. The working personnel shall be given the following appropriate personnel protective equipments.

- Industrial Safety Helmet;
- Safety Helmets;
- Face shield with replacement acrylic vision;
- Zero power plain goggles with cut type filters on both ends;
- Goggles;
- Welders equipment for eye and face protection;
- Cylindrical type earplug;
- Ear muffs;
- Electrically tested electrical resistance hand gloves; and
- Industrial safety shoes with steel toe.

5.6 PROJECT COST

The detailed cost break up is given below.

S.No	Activities	Cost break up	
		Proposed Expenditure (Lakhs)	Incurred Expenditure (Lakhs)
1	Layout approval, development and land use conversion charges	-	228.60

2	Preliminary survey	-	2.24
3	Internal Roads	300.0	87.81
4	Demarcation and sign board	10.0	-
5	Water supply distribution	250.0	-
6	Storm water drains	450.0	-
7	Power supply including substation	68.0	-
8	Internal Street Lights	50.0	-
9	Avenue Plantation	20.0	-
10	Construction of Bridges and CD Works for natural water courses.	50.0	-
11	Fencing around open spaces	20.0	-
12	Miscellaneous and other unforeseen activities	28.35	
Sub Total		1246.35	318.65
Total		**1565 Lakhs**	