Initial Environmental Examination

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India: Visakhapatnam-Chennai Industrial Corridor Development Program - Tranche 2

Development of Internal Infrastructure in the Start-up Area of Rambilli Industrial Cluster

Package No: VCICDP/APIIC/08A

Prepared by Government of Andhra Pradesh for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 17 November 2022)

Currency unit - Indian rupee (₹)

₹1.00 =$0.012

$1.00 =₹81.54

ABBREVIATIONS

ADB	-	Asian Development Bank
APPCB	-	Andhra Pradesh Pollution Control Board
APRDC	-	Andhra Pradesh Road Development Corporation
BGL	-	Below Ground Level
BOD	-	Biological Oxygen Demand
BIS	-	Bureau of Indian Standard
CPCB	-	Central Pollution Control Board
COVID19	-	Corona Virus Disease of 2019
DO	-	Dissolved Oxygen
DOE	-	Department of Environment
PMSC	-	Project Management and Supervision Consultant
EA	-	executing agency
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EMOP	-	Environmental Monitoring Plan
ESO	-	Environmental and Safety Officer
GOAP	-	Government of Andhra Pradesh
IEE	-	initial environmental examination
IMD	-	Indian Meteorological Department
IS	-	Indian Standard
MFF	-	Multi Tranche Financial Facility
MOEF	-	Ministry of Environment and Forests
MSL	-	Mean Sea Level
MW	-	Mega Watt
NSDP	-	Net State Domestic Product
NGO	-	Non-government organization
NH	-	National Highway
NO_x	-	oxides of nitrogen
PIU	-	Project Implementation Unit
PWD	-	Public Works Department
RF	-	Reserve Forest
ROW	-	right-of-way

WEIGHTS AND MEASURES

dBA	=	decibels
□C	=	degree Celsius
km	=	kilometer
lpcd	=	liter per capita per day
m	=	meter
mgbl	=	meter below ground level
mm	=	millimeter
mld	=	million liters per day
km^2	=	square kilometer

NOTE

In this report, "$" refers to United States dollars.

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EXECUTIVE SUMMARY

Project Description. The Asian Development Bank (ADB) approved on 20 September 2016 a multi-tranche financing facility (MFF) worth $500 million and a policy-based loan (PBL) worth $125 million for the Visakhapatnam–Chennai Industrial Corridor Development Program (VCICDP). ADB also approved on that day technical assistance (TA) worth $1 million for Capacity Development for Industrial Corridor Management in Andhra Pradesh and, on 26 September 2016, ADB administration of a $5 million grant from the Urban Climate Change Resilience Trust Fund under the Urban Financing Partnership Facility.

The VCICDP complements ongoing Government of Andhra Pradesh efforts to enhance industrial growth and create high-quality jobs. It has three outputs: (i) corridor management strengthened and ease of doing business improved, (ii) Visakhapatnam–Chennai Industrial Corridor (VCIC) infrastructure strengthened, and (iii) institutional capacity, human resources, and program management enhanced. The MFF and grant support priority infrastructure investments in the VCIC, and the PBL and TA support policy reform and institutional development in the state. The Department of Industries and Commerce (DOIC) of the Government of Andhra Pradesh is the MFF executing agency. The implementing units are Andhra Pradesh Industrial Infrastructure Corporation (APIIC), Transmission Corporation of Andhra Pradesh, Andhra Pradesh Road Development Corporation (APRDC), and Greater Visakhapatnam Municipal Corporation (GVMC).

Impact and Outcome. The impact of VCICDP will be an increased contribution of the manufacturing sector to the state's GDP, trade, and employment. The outcome will be enhanced growth and competitiveness of the VCIC. The Program-based Loan (PBL) will support policy reforms and institutional development in the state's industrial sector (Output 1); and the multitranche financing facility (MFF – two tranches) will support priority infrastructure investments in VCIC (Outputs 2 and 3). The VCICDP will develop two industrial clusters in the Visakhapatnam node—Rambilli and Nakapalli—and two clusters in the Srikalahasti–Chittoor node: Naidupeta and Chittoor–South.

Outputs. The outputs of Tranche 2 of VCICIDP are:

(1) Output 1: Visakhapatnam industrial node infrastructure strengthened. This will (i) develop internal infrastructure in the start-up area of the 160-hectare Rambilli industrial cluster; (ii) develop internal infrastructure in the start-up area of the 441-hectare Nakkapalli industrial cluster with a bulk water transmission line; (iii) widen the 13.8 kilometer (km) Atchuthapuram–Anakapalli road with features friendly to the elderly, women, children, and persons with disabilities (EWCD) for better access to National Highway 16; (iv) improve a 4.4 km access road to the Nakkapalli cluster with EWCD-friendly features; and (v) improve awareness and knowledge among the community members including women in Rambilli and Nakapalli industrial clusters and along Atchuthapuram to Anakapalli roads. Internal infrastructure in these clusters will include roads, storm water drains, water supply systems, and electric power distribution systems. Target industries in the Visakhapatnam node include pharmaceuticals, transport equipment, electronics and information technology, and textiles.

(2) Output 2: Srikalahasti–Chittoor industrial node infrastructure strengthened. This will (i) develop internal infrastructure in the start-up area of the 938-hectare Chittoor–South industrial cluster, (ii) improve a 9.5 km access road to the Chittoor-South industrial cluster with EWCD-

friendly features, (iii) improve an 8.7 km access road to the Naidupeta industrial cluster with EWCD-friendly features, and (iv) improve awareness and knowledge among the community members including women in Chittoor–South industrial cluster. Internal infrastructure in the start-up area of the Chittoor–South cluster will include internal roads, storm water drains, water supply systems, and electric power distribution systems. Target industries in the Srikalahasti–Chittoor node include machinery, food processing, electronics and information technology, and textiles.

(3) Output 3: Sustainable, green, and integrated industrial development enhanced. This will (i) roll out an updated marketing action plan for investment promotion; (ii) enhance skills of people including socially vulnerable and economically weak people; (iii) establish green corridor model operational guidelines at industrial cluster level; (iv) develop a disaster risk management plan to strengthen industrial cluster resilience under extreme weather; (v) formulate a plan for the sustainable operation and maintenance (O&M) of start-up industrial clusters; (vi) roll out a toolkit with gender-responsive and socially inclusive guidance, to integrate industrial and urban planning including industry housing in areas adjacent to industrial clusters; (vii) prepare and implement gender mainstreaming guidelines of DOIC; and (viii) disseminate knowledge of innovative corridor program designs including gender equality and socially inclusive intervention results, to other industrial clusters across the region.

This IEE for package VCICDP/APIIC/08A pertains to the output 1 for the Visakhapatnam node for development of industrial park near Rambilli village, Rambilli mandal of Visakhapatnam district in an area of 160 ha by APIIC. This IEE covers only the proposed development of start- up area which will be supported by the ADB funding. The key components included for ADB support in the startup area of Rambilli Cluster are provision of 6.5 km internal road network; provision of water supply including 3.5 MLD WTP; provision of power supply; and provision of 14.5 km storm water drains.

Purpose of the Initial Environmental Examination. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirement for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. The subproject selection criteria in the MFF's Environmental Assessment and Review Framework (EARF) has been used for screening to ensure the succeeding subprojects will not be potential Category A for environment. Project 2 of the MFF is Category B for environment per ADB SPS, 2009 and requires preparation of initial environmental examination (IEE) report.

This IEE[1] has been prepared for Package No. APIIC/08A following the EARF, Government of India laws and policies, and ADB SPS environmental requirements. This IEE will be included in the bid and contract documents. The proposed project is listed under Schedule 1 of the Government of India's Environment Protection Act (EPA) and Environment Protection Rules (EPR) and has therefore applied for securing Environmental Clearance from the Ministry of Environment and Forest and Climate Change (MOEFCC) Government of India. The proposed project also requires to meet Government of India requirements related to prevention of pollution, occupational health and safety, and labor standards. A section on required statutory clearances is included in this IEE.

Subproject Scope. Andhra Pradesh Industrial Infrastructure Corporation (APIIC) proposes to develop an industrial cluster in 1024.6 ha of land in Rambilli Mandal close to Atchutapuram SEZ.

[1] This IEE has been prepared for all major infrastructure works proposed under the subproject except CETP. CETP shall be constructed by APIIC from GoAP funds following the Design Build Operate Fund and Transfer mode after the construction of internal infrastructure (Refer Appendix 17).

The proposed cluster is connected to NH16 through the Venkatapuram road and SH17. The connectivity shall further improve through the proposed widening of Anekappalli - Achyutapuram Road under the project. A phased development approach in line with the already prepared master plan shall be adopted. The first phase shall include a start-up area of 318.58 ha. However, the land in possession of APIIC is only around 160 ha (Area 1) and balance 158 ha (Area 2) is yet to be acquired. This subproject is identified to provide internal infrastructure to area 1 (160 ha) as startup area under the ADB funding. The sub project proposed shall construct internal roads, storm water drains, internal water treatment, storage, electric sub stations, internal power distribution lines, and streetlights. Water shall be sourced from the Krishnapalem Tank that is being developed through another sub project under the project as a summer storage tank. A zero liquid discharge based CETP for Rambilli start up area is proposed and shall be taken up as DBOFT mode by APIIC.

This subproject shall have the following components; (a) Site grading of land for industrial plots; (b) 6.5 km roads which include 5.4 km of 4 lane divided road with 2 box culverts, (c) storm drain cross structures and 2 minor bridges; (d) Utility ducts, street lighting, road furniture, priority at grade junctions and pathways included for the entire length of the internal road network; (e) Flexible pavements consisting of BC, DBM, WMM and GSB is designed as per IRC 37 – 2012 for the pavement life period of 15 years; (f) 14.50 km storm water drains; (g) 3.5 MLD water treatment plant with 2 years O&M; (h) 750 KL sump at WTP; (i) 3850 m Clear Water Transmission Mains of 250, 300 and 450 mm DI K9 pipes; (j) One Ground level reservoir of 1200 KL capacity; (k) 9774 m water distribution pipeline of 150mm Diameter DI K7 pipe; and (l) Electrical works with 2 numbers 33 KV bay extension in existing 132/33 KV substation, 33KV overhead line on 12.5 m spun poles for a length of 4 km. 9131 m 33 KV UG cables. 15968 m 11 KV UG cables, 33X11 KV substation, RCC ducts for cabling and 287 poles for street lighting.

The major connectivity details of the Rambilli cluster are placed in Table below:

Major connectivity details of the Rambilli Cluster

ROAD	NH 16 (Old NH 5) SH 97	5-10 km away ~ 5.5 km
RAIL	Visakhapatnam Railway Station	55-60 km
AIRPORT	Visakhapatnam Airport	45-50 km
PORT	Visakhapatnam Port Gangavaram Port Kakinada Port	60-65 km 45-50 km 125-130 km

Future Development: The ADB financial support will be confined to the components mentioned above, however, APIIC will be developing other infrastructure within the Rambilli industrial cluster using GoAP funds that will form a part of the future facilities for this subproject. This will include additional requirements for the area such as networks for roads, sewerage, electrical and water supply distribution, CETP, etc. Comprehensive EIA (environmental impact assessment)[2] for the total area has been conducted by APIIC as a part of its Environment Clearance process, and the Environmental Clearance is expected to be secured by March 2023. APIIC will take development of remaining infrastructure and amenities after completion of works under this subproject. Subsequently, APIIC will allot vacant developed plots and factory sheds to entrepreneurs / companies for establishment of industries, allied facilities, services, commercial establishments

[2] EIA study conducted for obtaining Environmental Clearance and CFE for Rambilli Industrial Park

etc., as per prevailing regulations. Industrial area local authority (IALA) established by APIIC will manage the industrial park. Member industries and service agencies will be responsible for the establishment and operations of respective units in compliance with the applicable regulations, including EIA Notification 2006, and other regulations related to air, water, noise, hazardous waste, solid waste, health and safety, labour welfare etc. Individual industries, depending on the type and scale of operation, will conduct EIA study if required and obtain EC for their individual operations, and will obtain consent to establish (CTE) and consent to operate (CFE) from APPCB. Industries will also obtain other necessary permissions and licenses and will be responsible for compliance. Hazardous waste generated from the industrial cluster will be treated and disposed at the existing Treatment, Storage and Disposal Facility (TSDF), the Coastal Waste Management Project, located at Parawada, 21 km from the site.

Description of the Environment. The subproject site is mostly comprised of Agriculture plantation and cropland, scrub land rural built-up area. A few pockets of water bodies and settlements are also located within the site. The surrounding area up to 10 km land use comprises mostly sea (Bay of Bengal), Agriculture and crop land. There are no eco-sensitive or protected area within the vicinity of the subproject site.

Potential environmental impacts and mitigation measures. The subproject is unlikely to cause significant adverse impacts because: (i) most of the individual components involve straightforward construction and operation, so impacts will be mainly localized; (ii) in most cases the predicted impacts are localized and likely to be associated with the construction process at isolated locations and are produced because the process is invasive, involving excavation, obstruction at specific construction locations, and earth movements; and (iii) being located mainly along roads, open fields and built-up area will not cause direct impact on terrestrial biodiversity values. The potential adverse impacts can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Civil works will be implemented by contractors to be engaged by APIIC. The design and requirements are in accordance with Indian Bureau of Standards which follows international good practices. During construction, impacts will likely arise from the earthworks, materials storage, construction wastes, workers camp/s, and disturbance to residents, businesses, and traffic. These temporary impacts are common for construction activities in urban areas, and there exist well-developed methods for their effective mitigation. Contractor and subcontractor will be required to submit a site-specific environmental management plan (SEMP) prior to start of works and to ensure: (i) earthworks will be conducted during the dry season to avoid difficult working conditions that prevail during the monsoon; (ii) stockyards are located at least 300 m away from watercourses; (iii) fuel and lubricant storage areas are located away from drainage; (iv) construction wastes are minimized and disposal facilities are identified; (v) locations of workers camps, if needed are approved by implementing agency; (vi) wastewater are prevented from entering into streams, watercourses, or irrigation channels; (vii) open burning of solid wastes is strictly prohibited and strict segregation, reuse and recycling activities within the construction site and workers camp; (viii) area sensitive receptors are factored in work schedule and construction methodology; (ix) coordinate with social safeguards team for potential disturbances to roadside shops and vendors; (x) traffic management and road signages are coordinated with APIIC and local traffic police and (xi) All activities of the contractor shall be conducted in accordance with COVID19 prevention and protection policy and procedures developed under the VCICDP project and as required by the GOI and GoAP laws and consistent with WHO and other international guidelines.

During operation, impacts will likely arise from repair and maintenance of the already developed infrastructure such as roads, water supply network, power distribution lines, etc. There will be

potential impacts due to construction and operations of partner units[3] / industries which will be monitored by APIIC Environment Management Cell (EMC) to ensure that environmental compliance is met. Potential impacts during maintenance repair and maintenance activities are similar in nature with construction impacts but lesser duration and significance.

The due diligence performed by the project team was not restricted due to the COVID19 pandemic. Necessary precautions in terms of masks, social distancing and other COVID19 protocols were followed while conducting the assessments, travel and other activities by the PMSC and APIIC team.

Environment Management Plan. This IEE includes an environmental management plan (EMP) to avoid and mitigate potential impacts and risks identified in the environmental assessment. The EMP covers general mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

As this IEE and EMP is included in the bid and contract documents, the contractor and subcontractors are required to (i) comply with the measures relevant to the contractor in the IEE and the EMP; (ii) make available a budget for all such environmental measures; (iii) provide the implementing agency with a written notice of any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the subproject that were not considered in the IEE and the EMP; (iv) adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and (v) reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction.

The contractor will be required to submit to the project implementing unit (PIU) the site-specific environmental management plan (SEMP) prior to start of works to ensure site-specific conditions and mitigation measures are appropriate, practical and applicable. The SEMP will include (i) mitigation measures in line with the EMP included in this IEE including; (ii) contractor's roles and responsibilities in obtaining statutory clearances, stakeholders engagement, consultations, and grievance redressal; (iii) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (iv) monitoring program as per SEMP; and (v) budget for SEMP implementation. PIU will review the SEMP, supervise its implementation, and advise contractors on any corrective actions, if required. A copy of the approved SEMP will be kept on-site and available to stakeholders at all times.

Indicative EMP Cost. Based on the mitigation measures and monitoring program as specified in the EMP of this IEE, the indicative budget[4] for implementation is **INR 26,45,300**. The cost includes monitoring for air quality, water quality, and noise levels for baseline and during construction, capacity building, workforce, administrative and other costs (such as public consultation and information disclosure, and GRM implementation). The costs to implement mitigation measures related to construction and execution of works (signs, barricades, warning systems, traffic management, occupational health and safety, waste management and disposal, etc.) are to be covered as part of the civil works.

[3] APIIC will presently develop the industrial infrastructure and then invite units to set up their activities. While the type and nature of units coming in the industrial area may vary, APIIC EMC shall ensure that the environmental impacts from the industries during the operational phase are adequately managed and in compliance with the GOI / GoAP requirements.

[4] Environment Management Budget Appendix - 12

Consultation, Disclosure, and Grievance Redress Mechanism. The stakeholders were involved during the IEE through public consultations and on-site discussions. The views expressed by stakeholders were incorporated in the IEE and project design. IEE will be made available to the public through the ADB, APIIC websites, and contractors during construction period. The consultation process will continue during project implementation to ensure that stakeholders are fully engaged in the project and can participate in its development and implementation. A grievance redress mechanism is described within IEE to ensure that public grievances are recorded and addressed quickly.

Implementation Arrangement. The implementation arrangements put in place for the MFF, and Project 1 will continue for Project 2. Program management unit (PMU) established within Directorate of Industries by DOIC (EA), is responsible for planning, implementation, monitoring and supervision, and coordination of MFF. PMU is supported by Project implementation units (PIUs) established in Andhra Pradesh Industrial Infrastructure Corporation (APIIC) which will implement industrial infrastructure subprojects under Project 2. PMU and PIUs are supported by a Project Management and Supervision Consultant (PMSC). The institutional roles and responsibilities of PMU and PIUs are established to ensure environmental safeguards are implemented and complied with during design, construction, and operation phases. PMU is staffed with safeguards officers to oversee and ensure environmental and social safeguards compliance. APIIC has two environmental safeguards managers (one in each two zones/nodes) to oversee the day-to- day implementation of SEMPs by the contractors and ensure safeguards compliance. PMSC team with an environment specialist and a health and safety specialist based in PMU and supported by two field-based environmental engineers in Vizag and Chittoor Nodes will assist APIIC and PMU in implementation, monitoring, and reporting on environmental safeguards. Contractors will be responsible for implementing the mitigating measures during the design/construction phase, and APIIC and PMU will be responsible for monitoring. APIIC as a developer of the Industrial Park will set up an Environment Management Cell (EMC) headed by the APIIC Zonal Manager during the operations phase to oversee environmental compliance of the IP and its partner units. PMU and APIIC will ensure that necessary wastewater management facilities including CETP are established prior to start of industrial operations. APIIC has planned that these will be established on Design-Build-Finance-Operate-Transfer (DBFOT) mode after completion of internal infrastructure in start-up areas funded by ADB.

Monitoring and Reporting. PMU will be responsible for overall environmental safeguards compliance of the project. APIIC, with support from PMSC, will submit monthly monitoring reports to PMU. PMU will consolidate the monthly reports and will send semi-annual monitoring reports to ADB. ADB will approve and post the environmental monitoring reports on its website.

Conclusions and Recommendations. Based on the findings of the IEE, the infrastructure development in the proposed start up area is unlikely to cause any significant, irreversible or unprecedented environmental impacts. The potential impacts localized, temporary in nature and can be addressed through proven mitigation measures. Hence, the classification of the subproject as Category B per ADB SPS, 2009 is confirmed. APIIC has conducted an environment impact assessment for the whole of industrial cluster as per the GOI requirements and sought for Environmental Clearance which is expected by March 2023. No further study or assessment is required at this stage.

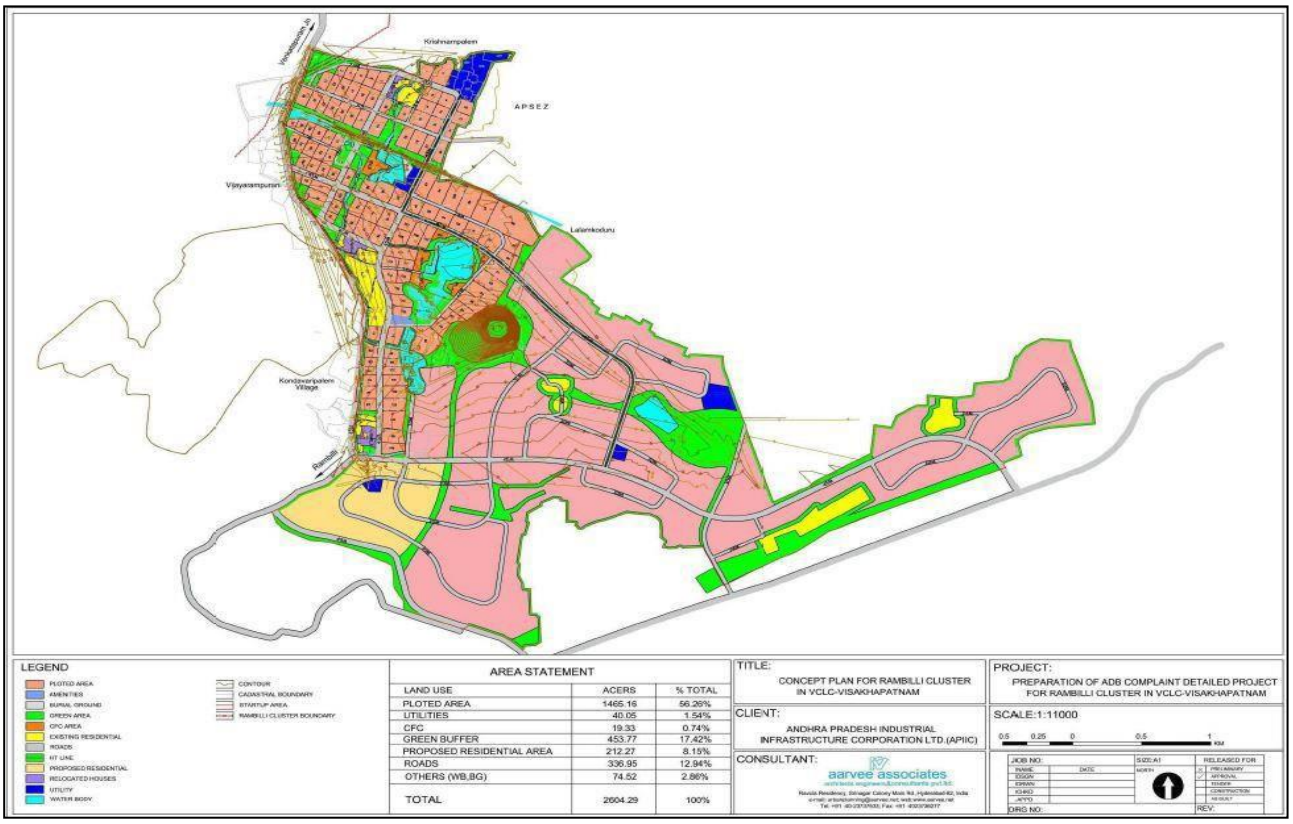
Recommendations are as follows:

- Ensure IEE including EMP is part of the bid and contract document.

- Update the IEE / EMP once the Environmental Clearance (EC) is obtained with any additional requirements as prescribed in the EC for environmental management.
- Obtain statutory clearances prior to award of contract and ensure conditions/requirements are incorporated in the subproject design and documents.
- During bidding stage, orientation on the environmental safeguard requirements are provided to interested bidders;
- Upon mobilization of the contractors, PMU and APIIC to provide a safeguards orientation per IEE and project administration manual.
- Contractor to appoint environmental safeguards nodal person responsible for environmental safeguards compliance, occupational health and safety and core labour standards.
- Submit to APIIC the site-specific EMP (SEMP) and other sub-plans as required; and
- PMU and APIIC to closely monitor contractor's implementation of the SEMP and provide guidance on corrective actions on a timely manner.

This draft IEE shall be part of tender documents. The final IEE report will incorporate results of detailed engineering design and of any additional baseline monitoring as required (e.g., air, noise, surface water quality) and will be submitted to ADB for approval and disclosure at ADB website.

Proposed Start-up Area as part of Rambilli Industrial Park



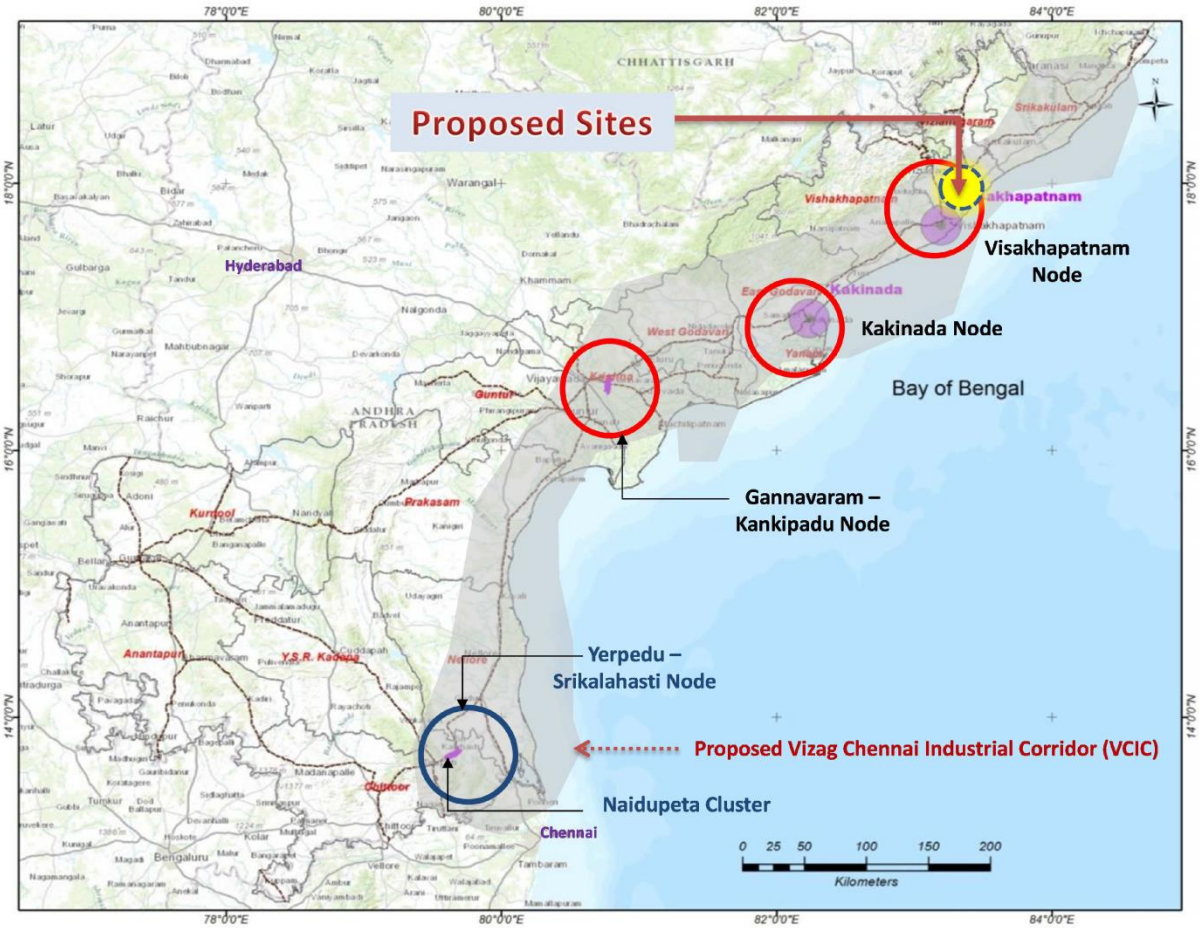
I. INTRODUCTION

A. Background

1. Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC) a wholly owned undertaking of Government of Andhra Pradesh (GoAP) has a mandate to develop industrial areas across the state. APIIC has developed around 300 Industrial Parks spread over an extent of 121,655 acres and in addition it has also developed sector specific industrial parks and special economic zones at strategic locations across the state.

2. The proposed project is development of start-up area (Infrastructure services) for Rambilli Cluster comes under the proposed Vizag – Chennai Industrial Corridor Development Programme (VCICDP). The map showing the project location is placed as Figure 1.

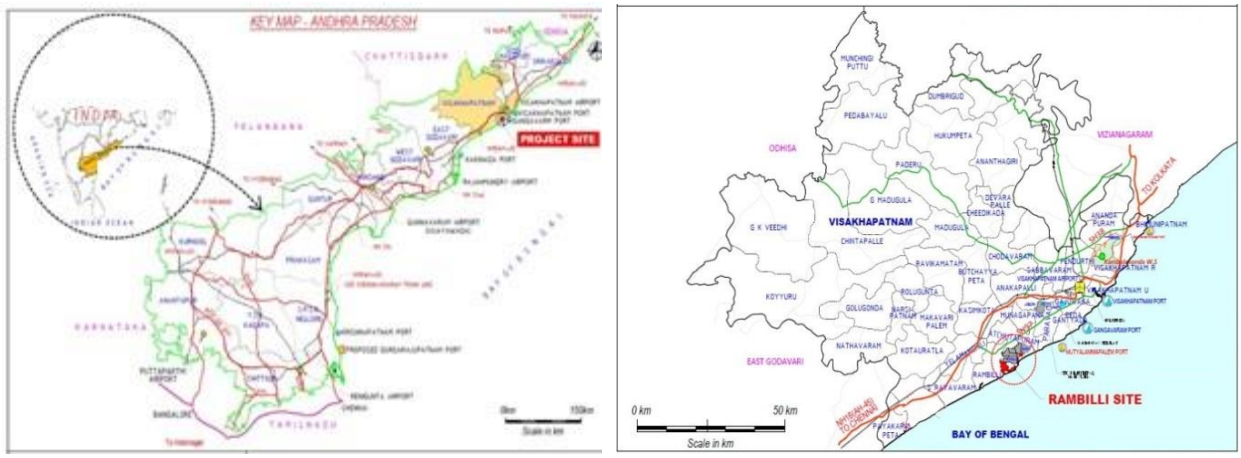
Figure 1: Map location of Industrial Clusters and Nodes of Visakhapatnam Chennai Industrial Corridor (VCIC) showing proposed site

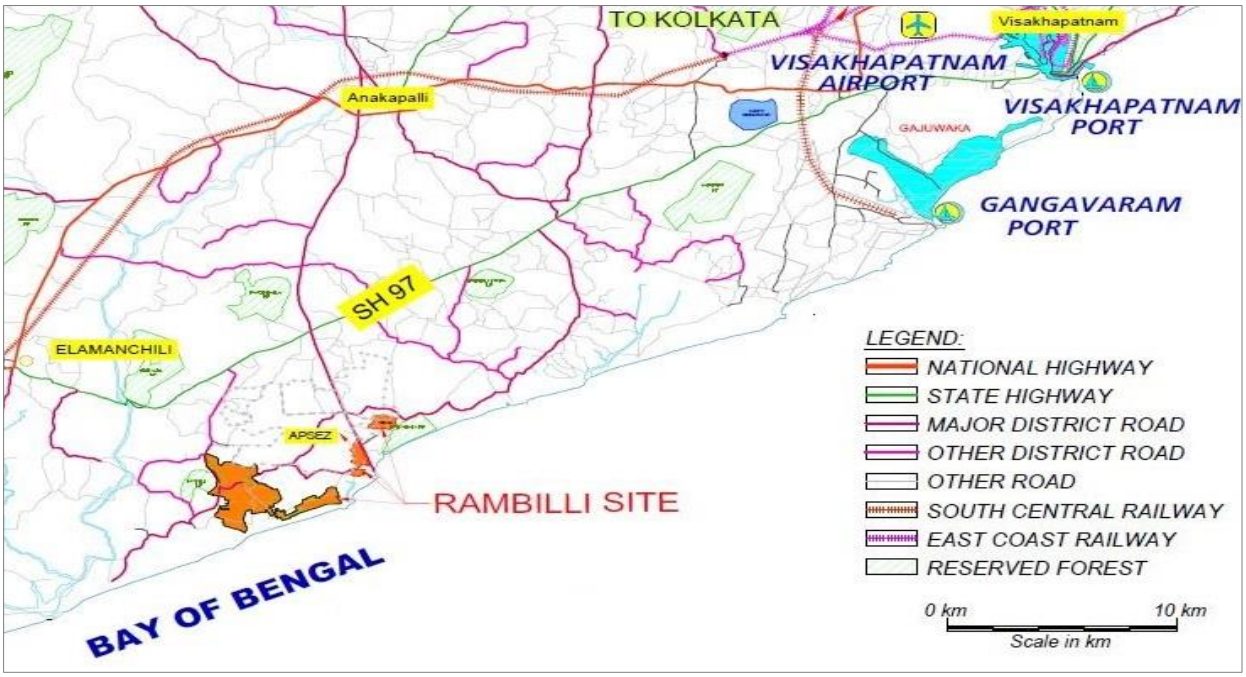


3. In view of the proposed VCIC and the envisaged developments, the demand for industrial land especially from engineering, Pharma, textile sectors is expected to increase and in order to cope up with the developments; APIIC is planning to upgrade the infrastructure in these Industrial clusters as per market needs.

4. A key map showing the project location and road, rail connectivity to the location is placed as Figure 2.

Figure 2: Key map showing the project location and its **connectivity to road, railway**





5. Rambilli cluster is part of the VCIC – Visakhpatnam node and is next to already developed SEZ with major infrastructure in place. The major connectivity details of the Rambilli cluster are placed in Table 1:

Table 1: Major connectivity details of the Rambilli Cluster

ROAD	NH 16 (Old NH 5) SH 97	5-10 km away ~ 5.5 km
RAIL	Visakhapatnam Railway Station	55-60 km
AIRPORT	Visakhapatnam Airport	45-50 km

PORT	Visakhapatnam Port Gangavaram Port Kakinada Port	60-65 km 45-50 km 125-130 km

6. Under the development of master plan APIIC has proposed the following components for the development of startup area of Rambilli Cluster:

(i) Provision of Road network
(ii) Provision of Water Supply.
(iii) Provision of Power Supply.
(iv) Provision of Sewerage System & Common Effluent Treatment Plant (CETP)
(v) Provision of Storm Water Drain

Figure 3: Proposed Start-up Area and its Surroundings

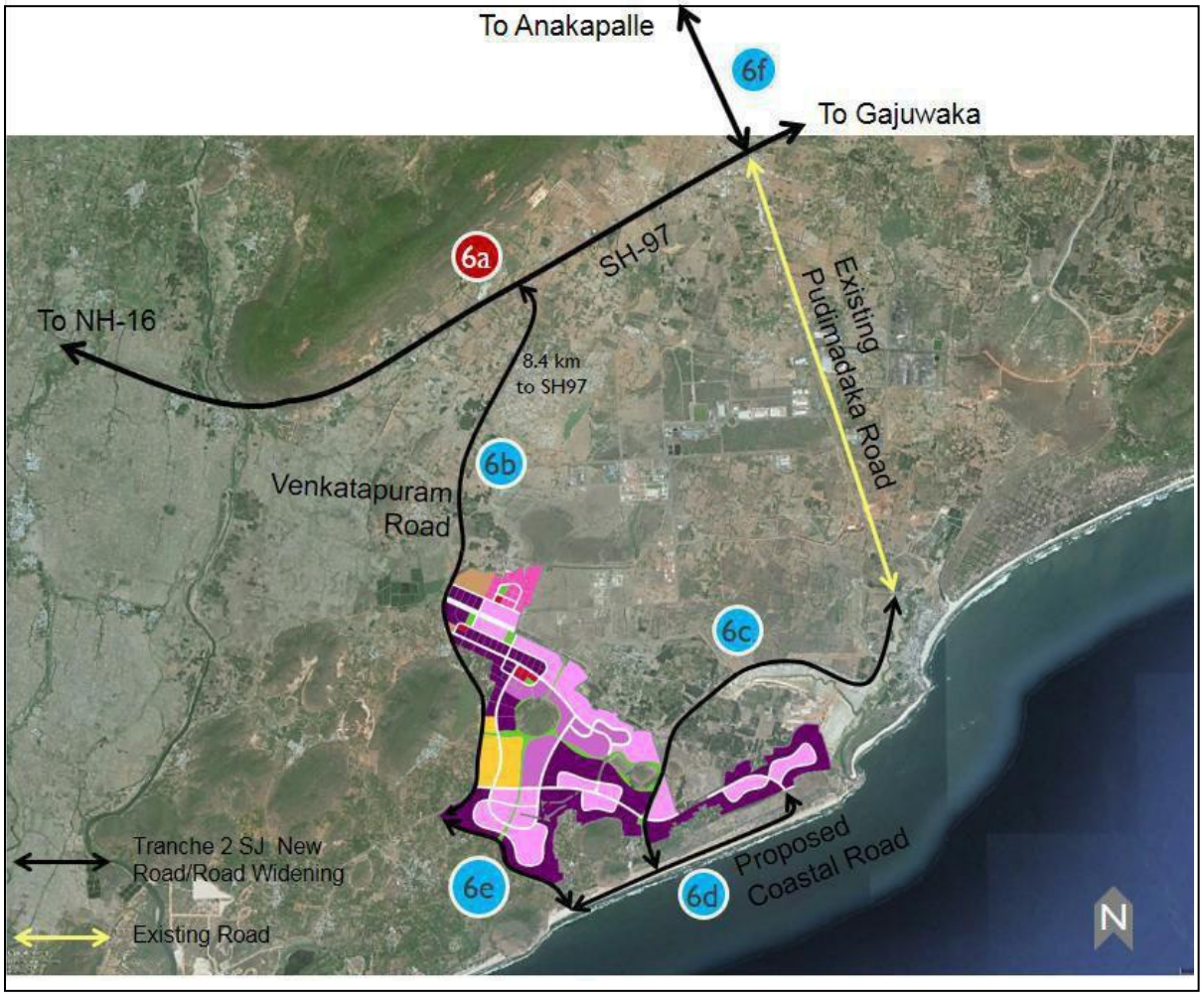
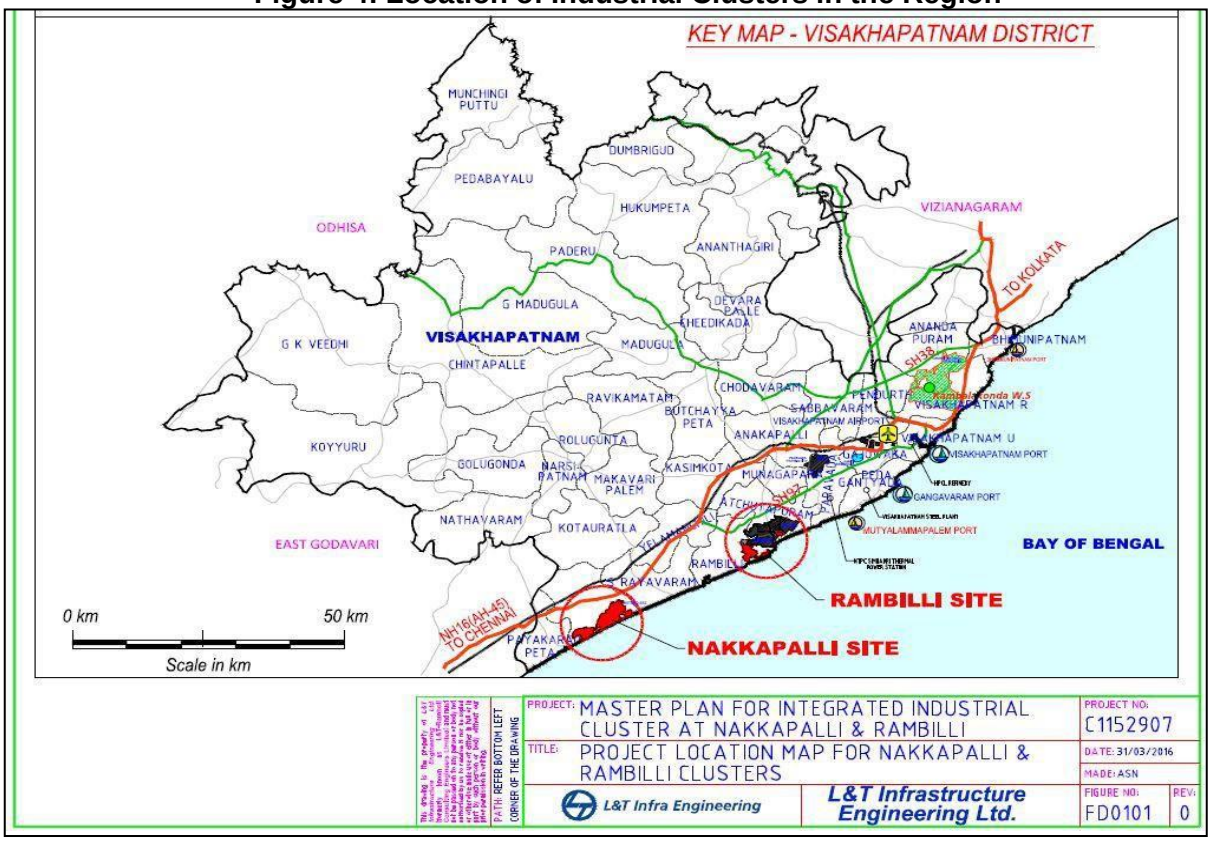


Figure 4: Location of Industrial Clusters in the Region



B. Purpose and objective of the study

7. The IEE report covers the general environmental profile of the study area and includes an overview of the potential environmental impacts and their magnitude on physical, ecological, economic, and social and cultural resources within the project's influence area during design, construction, and operation stages. An EMP was prepared that contains mitigation measures for environmental impacts during implementation of the project, environmental monitoring program, and the responsible entities for mitigation and monitoring. IEE has four basic objectives; (i) identify the environmental issues that should be taken into account due to project interventions (ii) determine the magnitude of potential environmental concerns and to ensure that environmental considerations are given adequate weight at planning/design stage (iii) identify need for further environmental studies and, (iv) suggest enhancement measures, if any.

8. The baseline environmental parameters study was conducted during March 2018 (summer season) to meet ADB requirements. This version of studies conducted for the initial project stage, with available primary and secondary data, due diligence studies and preliminary DPR reports prepared for the development of startup area of Rambilli cluster of VCIC – Visakhapatnam node. The present subproject is one of the packages in the APIIC Infrastructure development under Project 2 of VCICDP prior to initiation of civil works. It has been categorized as **Category 'B'** as per ADB norms and hence an initial environmental examination (IEE) has been conducted.

C. Extent of the IEE study

9. This IEE report has been prepared on the basis of pre-feasibility study and DPR, field investigations and surveys, stakeholder consultations and meetings to meet the requirements for environmental assessment process and documentation as per ADB's Safeguard Policy Statement (SPS, 2009). The extent of the IEE was decided considering all likely impacts and risks analyzed in the context of the project's area of influence encompassing: the primary project site(s) and related facilities like site clearance, utility shifting etc. (ii) associated facilities project viz. management and handling, storage of hazardous waste, availability and existence of hazardous waste management facilities, disposal of debris, construction camp etc. (iii) areas and communities potentially affected by cumulative impacts, and (iv) potential impact from unplanned but predictable developments caused by the project that may occur at later stage or at a different location. Present IEE report is prepared for the area 1 of Rambilli cluster i.e., 160 ha

D. IEE Methodology

10. IEE commenced with an initial site visit and review of the technical details provided by the APIIC and preceding environmental assessment reports conducted for the project site. This was followed by a reconnaissance site visit and discussion with the implementing agency to reconfirm the technical details of the proposed project including a site visit to the development of start-up area of Rambilli cluster. This helped identify environmental attributes which may get altered due to the project and incorporate additional information to the baseline environmental scenario/environmental setting of the project to meet the ADB Safeguard requirements. Further steps followed for IEE has been concisely described in following paragraphs.

(i) **Primary Data Collection**: Inventory of all environmental features viz. terrain, geologically unstable areas, waterways/water bodies, roadside vegetation, sensitive receptors, common property resources, utilities, flooding/water logging, and industries was conducted for the project sites. Since the proposed project sites are within the already allocated Industrial cluster zones of APIIC, it does not impact forest area. A proximity biodiversity assessment using IBAT was conducted and a preliminary biodiversity study[5] for the area was conducted.

(ii) **Secondary Data Collection**: Published reports, government websites, recognized institutions and relevant government departments were consulted to gather information and maps of the project influence area. For information on ambient air quality, soil quality, background noise level, surface and groundwater quality, environmental assessment done by DPR Consultant was referred.

(iii) **Public Consultation**: Besides consultations with the government agencies, consultations with local people/beneficiary population were held at all major habitations to collect baseline information to better understand of potential impacts and appreciate the perspectives/concerns of the stakeholders. Public consultation process will be conducted for the Rambilli cluster as a part of the EIA approval process and the Information gathered from that will be integrated at the detailed design stage in project design and formulating of the EMP.

(iv) **Other Tools**: Remote sensing and GIS based land use map of the study area has been reviewed through recent satellite imagery and verified on the ground. Information collected from both primary and secondary sources has been summarized in Table 2.

[5] IBAT and Biodiversity study attached as Appendix.

Table 2: Primary and Secondary Information Sources

Information	Sources
Technical Details	APIIC
Technical details of proposed components under the package	APIIC and site visits to Rambilli cluster and proposed start up area locations.
Climatic condition	Indian Meteorological Department Websites
Geology, Seismicity, Soil and Topography	State of Environment Report, Pollution Control Board, DPR and Primary Surveys
Land Use/ Land Cover	State of the Environment Report, Satellite Imagery based land use analysis
Drainage Pattern	Google Image, Detail Project Report and onsite observations
Forest/Vegetation	Forest Range Offices/State Forest Department, Andhra Pradesh
Archaeological /Cultural Heritage sites	Archaeological Survey of India
Status of fishing activity	District Fisheries offices
Air quality Noise, Soil and Water	Primary survey
Hazardous Waste Management practice and requirements	APPCB, Detailed Project Report
River geo-morphology, hydrology, drainage, flood and patterns	Detailed Project Report, Consultation and site verification
Soil profile and measures to control soil erosion	Soil Conservation Department, Govt. of Andhra Pradesh
Groundwater Conditions	Central Groundwater Board
Socio-economic environment	Different Govt. agencies/civic bodies, official websites maintained by state govt., census of India 2011, and public Consultation during the Field survey

(v) **Assessment of Potential Impacts**. Potential impacts were identified on the basis of analytical review of baseline data; review of environmental conditions at site; analytical review of the underlying socioeconomic conditions with the project influence area.

(vi) **Preparation of the Environment Management Plan**. An EMP for the project was prepared to specify the steps required to ensure that the necessary measures will be taken. The EMP includes the monitoring plan giving details of the resources budgeted and the implementation arrangements.

11. **Name and Address of the Individual Institution Preparing the Report**. The project proponent is:

Project Management Unit
Visakhapatnam-Chennai Industrial Corridor Development Program
Commission on Industries
Government of Andhra Pradesh

12. The subproject will be implemented by APIIC and the DPR has been prepared by AARVEE Associates. The IEE report has been prepared by APIIC with support from technical assistance consultants and Detailed Project Report consultants (M/s AARVEE Associates) with address at Hyderabad.

13. Initial screening and identification of potential impacts were conducted using ADB's rapid environmental assessment (REA) checklist (Appendix 5a) and the scope of the IEE was determined using a "No Mitigation Scenario – Scoping Checklist" (Appendix 5b). The study team visited the proposed site and nearby areas to identify the potential impacts (both positive and negative), met local people and conducted meetings, brainstorming sessions, field examinations, and data gathering.

14. The IEE report follows the recommended outline per ADB SPS and primarily:

(i) meets both Government of India's EPA and EPR;
(ii) provides information on the project and its environmental requirements;
(iii) provides the baseline physical, ecological, cultural and socioeconomic environments and resources in and surrounding the project's area of influence;
(iv) identifies and assesses potential environmental impacts arising from the implementation of the project;
(v) recommends measures to avoid, mitigate, and compensate the adverse impacts;
(vi) presents information on stakeholder consultations and participation during project preparation;
(vii) recommends a mechanism to address grievances; and
(viii) includes an environmental management plan.

E. Structure of the report

15. The IEE has been structured as recommended in SPS, 2009. An introduction section has been included to have a general overview of the project. Executive Summary describing critical facts, significant findings, and recommended actions has been presented in the beginning of the report. The report has been compiled and presented as follows.

Executive Summary
(i) Chapter I: Introduction
(ii) Chapter II: Policy, Legal and Administrative Framework
(iii) Chapter III: Description of Project
(iv) Chapter IV: Description of the Environment
(v) Chapter V: Anticipated Impacts and Mitigation Measures
(vi) Chapter VI: Public Consultation and information disclosure
(vii) Chapter VII: Institutional Arrangements and Responsibilities
(viii) Chapter VIII: Institution Capacity and Development
(ix) Chapter IX: Environmental Management Plan, Monitoring Plan and Grievance Redress Mechanism
(x) Chapter X: Conclusion and Recommendation

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. ADB Safeguards Policy Statement

16. ADB SPS requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, APIIC is required to comply with these requirements. Summary of the step-by-step process is discussed below in this section. Detailed discussions are provided in the ADB SPS.[6]

17. **Screening and Categorization**[7] Subprojects are to be screened for their expected environmental impacts and are assigned to a specific category (Footnote 4). Categorization is to be based on the most environmental sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, PMU shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered. In general, criteria that can trigger subproject's 'Category A' are in Section below.

18. **Environmental Assessment.** Environmental assessment shall include description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. The structure and composition of the typical IEE report is provided in Annex to Appendix 1 of ADB SPS. The IEEs of sample subprojects prepared during the ADB loan processing stage[8] may be used as model documents for VCICDP subprojects.

19. **Environmental Planning and Management.** The PMU and PIUs shall prepare environmental management plan (EMP) to be included in the IEE report. The EMP shall describe and address the potential impacts and risks identified by the environmental assessment. The level

[6] ADB. 2009. *Safeguard Policy Statement*. Manila.

[7] Per ADB SPS, (i) **Category A**: A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B**: A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible and, in most cases, mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required. (iii) **Category C:** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI**: A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

[8] Subproject packages for which IEEs have been prepared during project processing include (i) APIIC/05: Providing water supply to industrial clusters/NIMZs in southern region (including Krishnapatnam node and Sri City, (ii) APIIC/06: Development of major infrastructure and utilities in start-up area of Chittoor south cluster, (iii) APIIC/09 Development of major infrastructure and utilities in Start-up area of Nakkapalli cluster (iv) APIIC/08 Development of major infrastructure and utilities in Start-up area of Atchuthapuram (Rambilli) cluster (v) APIIC/07: Providing bulk water supply and summer storage of 95 MLD to Atchuthapuram cluster, and (vi) APIIC/07: Widening of Atchuthapuram-Anakapalle Road to 4 lane,.

of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. The EMP shall include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

20. **Public Disclosure.** APIIC, through PMU, shall submit the following to ADB for review and disclosure on ADB website. Upon receipt of acceptable reports and endorsement from the PMU, ADB will disclose the documents on ADB website so that the affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation:[9]

(i) draft IEE upon receipt;
(ii) a new or updated/final IEE and corrective action plan prepared during subproject implementation, if any; and
(iii) environmental monitoring reports submitted during subproject implementation upon receipt.

21. **Consultation and Participation.** PMU and PIUs shall carry out meaningful consultation[10] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

22. **Grievance Redress Mechanism.** APIIC, through PMU, shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject.

23. **Monitoring and Reporting.** PMU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PMU will identify the necessary corrective actions, and reflect them in a corrective action plan. PMU will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis until ADB issues a project completion report.

24. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, PMU shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

[9] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

[10] Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;1 (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

25. **Pollution Prevention and Control Technologies.** During the design, construction, and operation of the subproject the PMU and PIUs shall apply pollution prevention and control technologies and practices consistent with international good practices, as reflected in internationally recognized standards. When the Government of India regulations differ from these levels and measures, PMU shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

26. **Occupational Health and Safety.** PMU[11] shall ensure that workers[12] are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

27. PMU shall ensure to apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.[13]

28. **Community Health and Safety.** PMU shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

29. **Physical Cultural Resources.** PMU is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.

30. **Environmental Audit.** When the subproject involves existing activities or facilities, PMU is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where the subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

[11] In case where responsibility is delegated to subproject contractors during construction phase, PMU shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

[12] Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

[13] World Bank Group, 2007. *Environmental, Health, and Safety General Guidelines.* Washington, DC.

31. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by the PIUs. The PMU and PIUs shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[14] and (ii) to submit to PIU, for review and approval, a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation. No works can commence prior to approval of SEMP. A copy of the EMP or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP, or SEMP constitutes a failure in compliance and shall require corrective actions.

32. **Conditions for Award of Contract and Commencement of Work.** PMU shall not award any Works contract for a subproject until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMU has obtained ADB's clearance of such IEE. For "design, build, and operate" type contracts, PMU shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) the IEE is updated to reflect subproject's detailed design and PMU has obtained ADB's clearance of such IEE.

B. Environmental Legislation (National and State Laws)

33. Implementation of VCICDP will be governed by environmental acts, rules, policies, and regulations of the Government of India. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. Many of these are cross sector and several of them are directly related to environmental issues. The most important of these is the "Environmental Impact Assessment (EIA) Notification, 2006". In addition to the EIA Notification, 2006, there are a number of other acts, rules and regulations currently in force that could apply to VCICDP. Salient features and applicability of these legislations are provided in Table 3. This presents specific requirements for the project.

34. Appendix 2 provides the environmental standards for air, surface water, groundwater, emissions, noise, vehicular exhaust and disposal to land/agricultural use of sludge and bio-solids.[15]

[14] Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

[15] During the design, construction, and operation of the project the PMU and PIUs will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of India regulations differ from these levels and measures, the PMU and PIUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PIUs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

35. Implementation of the subproject will be governed by the national and State of Andhra Pradesh environmental acts, rules, regulations, and standards. These regulations impose restrictions on activities to minimize/mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether national, state or municipal/local. Compliance is required in all stages of the subproject including design, construction, and operation and maintenance.

36. The summary of environmental regulations and mandatory requirements for the subproject Is shown In Table 3.

Table 3: Applicable Environmental Regulations for development of startup area of Rambilli cluster – VCIC – Visakhapatnam node.

No.	Legislation	Requirements for the Project	Applicability	Permits / Licenses / NoC / Clearances / permissions
1	National Environment Policy (NEP), 2006	Project should adhere to the NEP principle of enhancing and conservation of environmental resources and abatement of pollution	The policy governing the environmental rules and legislations and is applicable to all the subprojects.	No specific permit or license is required.
2	EIA Notification, 2006	Environmental clearance (EC) from MoEFCC	The environment clearance conditions as specified shall be applicable to the subproject area consisting of 396.28 acres. Environmental Clearance is being applied for the whole area (Approximately 2532 acres).	EIA study conducted for entire industrial estate, which include start up area, and submitted to MOEFCC Environmental Clearance is expected to be obtained by March 2023.
3	Water (Prevention and Control of Pollution) Act, 1974 amended 1988 and its Rules, 1975	• Consent for establishment (CFE) and consent for operation (CFO) from APPCB • Compliance to conditions and disposal standards stipulated in the CFE and CFO	As Applicable to proposed subproject components.	CFE to be obtained before start of construction. CFO to be obtained before commencement of operations.
4	Air (Prevention and Control of Pollution) Act, 1981,	• CFE and CFO from APPCB as applicable	As applicable to proposed subproject components.	CFE to be obtained before start of construction.

No.	Legislation	Requirements for the Project	Applicability	Permits / Licenses / NoC / Clearances / permissions
	amended 1987 and its Rules, 1982	• Compliance to conditions and emissions standards stipulated in the CFE and CFO.	CFE and CFO: (i) diesel generators; (ii) hot mix plants; and (iii) vehicles emitting air pollutants.	CFO to be obtained before commencement of operations.
5	Environmental (Protection) Act, 1986 amended 1991 and the following rules/notifications: Environment (Protection) Rules, 1986 including amendments Municipal Solid Wastes (Management and Handling) Rules, 2000 Noise Pollution (Regulation and Control) Rules, 2000 Environmental Standards of Central Pollution Control Board (CPCB) Notification of Eco Sensitive Zones Wetland (Conservation and Management) Rules, 2010 Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2009	Solid waste and sludge generated at proposed facilities shall be disposed in accordance with the MSWM Rules. Compliance with noise standards Compliance to environmental standards (discharge of effluents) Restriction of activities (including construction, tree cutting, etc.) in the notified zones. There are no eco sensitive zones in or near the subproject locations. Applies to protected wetlands (Ramsar sites, wetlands in eco sensitive areas and UNESCO heritage sites & in high altitudes, and wetlands notified by Government of India) - Prohibits/ regulates activities within and near the wetlands. None of the subproject locations has protected wetlands. Rules defines and classifies hazardous waste provides procedures for handling hazardous waste. Requires Pollution Control Board's consent for handling hazardous waste. Procedure for storage of Hazardous wastes and provides procedures for recycling, reprocessing or reuse, important and export of hazardous waste.	As Applicable to proposed subproject components.	

No.	Legislation	Requirements for the Project	Applicability	Permits / Licenses / NoC / Clearances / permissions
6	Contract Labour (Regulation and Abolition) Act, 1970. The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979	Department of Labour, GoAP as principle employer. Contractor shall register with Labour Department, GoAP if inter-state migrant workmen are engaged. Adequate and appropriate amenities and facilities shall be provided to workers including housing, medical aid, travelling expenses from home and back, etc.,	Applicable to all construction/civil works. APIICs to obtain Certificate of Registration. Contractors to obtain license from designated labour officer	Obligatory before start of the work or deployment of labours
7	The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996	Cess should be paid at rate not exceeding 2% of the cost of construction as may be notified The employer is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. The employer has to obtain a registration certificate from the Registering Officer.	Applicable to any building or other construction work and employ 10 or more workers	APIIC / through its contractors to ensure that it is implemented.
8	The Child Labour (Prohibition and Regulation) Act, 1986	No child below 14 years of age will be employed or permitted to work in all the subprojects.	No child below 14 years of age will be employed or permitted to work in all the subprojects.	APIIC / through its contractors to ensure that it is implemented.
9	Minimum Wages Act, 1948	All construction workers should be paid not less than the prescribed minimum wage	Applicable	APIIC / through its contractors to ensure that it is implemented.
10	Workmen Compensation Act, 1923	Compensation for workers in case of injury by accident	Applicable	APIIC / through its contractors to ensure that it is implemented.
11	Equal Remuneration Act, 1979	Equal wages for work of equal nature to male and female workers	Applicable	Non

No.	Legislation	Requirements for the Project	Applicability	Permits / Licenses / NoC / Clearances / permissions
12	AP State Environment Policy	Follows the National Environment Policy, 2006 Project implementation should adhere to the policy aims	Applicable	Non
13	The Motor Vehicles Act, 1988	Standards for vehicular pollution and prevention control. The authority also checks emission standards of Registered vehicles, collects road taxes, and issues licenses. In August 1997, the Pollution under Control Certificate (PUC) program was launched in an attempt to crackdown on the vehicular emissions in the States. All the vehicles that will be used in construction of the subprojects will have to comply with the PUC norms set down under this act.	Applicable	Pollution under control certificate is required for the construction vehicles.
14	Coastal Regulation Zone (CRZ) [16] Notification 6th January 2011 Central Government have declared the coastal stretches of seas, bays, estuaries, creeks, rivers and back waters which are influenced by tidal action (in the landward side) up to 500m from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) & High Tide Line (HTL) as "Coastal Regulation Zone" (CRZ), as per the provisions of the CRZ Notification 6th January 2011.	The main objectives of the Coastal Regulation Zone Notification, 2011 are: to ensure livelihood security to the fishing communities and other local communities living in the coastal areas; to conserve and protect coastal stretches and; to promote development in a sustainable manner based on Scientific principles, taking into account the dangers of natural hazards in the coastal areas and sea level rise due to global warming.	The proposed phase-1 does not include coastal regulatory zone. For the entire SEZ area EC, CRZ clearance are being applied by APIIC.	The ADB funded subproject development area does not fall or contain any environmentally sensitive areas as specified in CRZ Notification.

[16] The proposed subproject activities (under start-up Area 1) will not attract CRZ regulations.

No.	Legislation	Requirements for the Project	Applicability	Permits / Licenses / NoC / Clearances / permissions
15	Minor Mineral and concession Rules	For opening new quarries. Regulate use of minor minerals like stone, soil, river sand etc.	Applicable	It is obligatory for contractor to obtain the NoC for sand mining in the riverbed.
16	The Mining Act (1952)	The mining act has been notified for safe and sound mining activity. The construction of road subprojects will require aggregates. These will be procured through mining from riverbeds and quarries	Applicable	The crushers and quarry are not proposed in the subproject. However, in case contractor establishes the quarry, permission will be obtained by the contractor.
17	Notification for use of fly ash from thermal power plants within 100km reaches of the project.	The MoEF had issued in 2009 a notification that all brick units within 100km radius of thermal power plants were required to use fly ash for making bricks as well as using it for construction activities like building or roads.	Applicable .	Contractor to follow the requirements.
18	Public Liability and Insurance Act 1991	Protection from hazardous materials and accident.	Applicable	Contractor to follow the requirements.
19	National Environment Appellate Authority Act (NEAA) 1997	Grievances process and how they will be dealt with.	Applicable	APIIC / Contractor to follow the requirements.
20	Explosive Act 1984 - For transporting and storing diesel, bitumen etc.	Safe transportation, storage and use of explosive material.	Applicable	Contractor to follow the requirements.
21	The Factories Act, 1948 - The Andhra Pradesh Factory Rules	The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities.	Applicable	APIIC / Partner units to follow the requirements

No.	Legislation	Requirements for the Project	Applicability	Permits / Licenses / NoC / Clearances / permissions
22	Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.	The Rules provide for mandatory preparation of On-Site Emergency Plans by the industry and Off-Site Plans by the district collector and the constitution of four tier crisis groups at the center, district, and local levels for the management of chemical disaster.	Applicable	Contractor to follow the requirements during construction. APIIC/Partner units to follow the requirements during operations.
23	Permission for extraction of ground water for use in road construction activities from State Ground Water Board.	Extraction of groundwater.	Applicable to rehabilitation and improvement of water supply. To be obtained prior to initiation of any work involving abstraction of groundwater	NOC is obligatory in case of abstraction of ground water. Contractor to follow the requirements.
24	Permission for use of water for construction purpose from irrigation department	Use of surface water for construction	Applicable. To be obtained prior to initiation of any work involving use of surface water for construction	NOC is obligatory in case of abstraction of irrigation canal water. Contractor to follow the requirements.
25	Approval of Start-up area Master Plans for the Industrial cluster	Town planning / Regional area planning department review and approval of the master plans. A phased development approach in line with the prepared master plan shall be adopted	Applicable to start-up area proposed under Rambilli cluster	Clearance is Required prior to Contract Awards

C. Government of India Environmental Assessment Procedures

37. The EIA Notification, 2006, sets out the requirement for environmental assessment in India. This states that prior environmental clearance (EC) is mandatory for the development activities listed in its schedule and must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

(i) Category A projects require EC from MoEF. The proponent is required to provide preliminary details of the project in the prescribed form, after which an Expert Appraisal Committee (EAC) of the MoEF prepares comprehensive terms of reference (ToR) for the

environmental impact assessment (EIA) study within 60 days. On completion of the study and review of the report by the EAC, MoEF considers the recommendation of the EAC and provides the EC if appropriate.

(ii) Category B projects require EC from the State Environment Impact Assessment Authority (SEIAA). The State-level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study) and prepares ToR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the EC based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

38. The development of startup area of Rambilli cluster (160 ha) is a part of the VCIC – Visakhapatnam node and APIIC has applied for Environmental Clearance for the entire SEZ area (1024.66 ha) for category 'A' industry. The expected timeline for obtaining EC is as follows.

	Tentative EC Timelines for Rambill I.P	
S. No	**Timeline**	**Rambilli I.P**
a.	Date of submission of application of ToR	31-Oct-18
b.	Date of ToR[17]	Issued 18 November 2019
c.	Date of Public Consultation and Public Hearing[18]	23 November 2021
d.	Date of submission of Final EIA to MoEF&CC	December 2021
e.	Expected date of EC	March 2023

D. International Environmental Agreements

39. India is a party to the following international convention that may apply to this subproject, especially in selection and screening of subproject locations under restricted/sensitive areas.

[17] TOR attached as Appendix – 15
[18] Minutes of Public Hearing attached as Appendix - 16

Table 4: International Agreements and Applicability to start up area development at Rambilli Cluster of VCIC – Visakhapatnam node.

No.	Agreement	Requirements for the Project
1	Ramsar Convention on Wetlands of International Importance, 1971. The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. According to the Ramsar list of Wetlands of International Importance, there are 25 designated wetlands in India which are required to be protected.	There is one Ramsar Site[19] in Andhra Pradesh however it is not located within or adjacent to the proposed Rambilli start up area. (The Ramsar Convention Handbooks for the wise use of wetlands, 4th ed. (2010), (http://www.ramsar.org/cda/en/ramsar-pubshandbooks/main/ramsar/1-30-33_4000_0__)
2	Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal, 1989 To protect human health and the environment against the adverse effects of hazardous wastes. This aims at (i) reduction of hazardous waste generation, promotion of environmentally sound management (ii) restriction of transboundary movements, and (iii) a regulatory system for transboundary movements.	Sludge/rejects generated from tertiary treatment process likely to have heavy metals and may fall in hazardous waste category. The sludge/rejects will be disposed within the country, and therefore will not attract this convention.
3	Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972)	This Convention defines and provides for the conservation of the world`s heritage by listing the natural and cultural sites whose value should be preserved. Not applicable for this subproject.
4	Convention on International Trade in Endangered Species of Wild Fauna and Flora (Washington 1973) – also known as CITES was signed on 20 November 1981.	This Convention provides a framework for addressing the overharvesting and exploitation patterns that threaten species of flora and fauna. Under the Convention, the governments agree to restrict or regulate trade in species that are threatened by unsustainable patterns. Not applicable for the subproject. APIIC to ensure that the subproject activities will not cause any harvesting and exploitation of wild flora and fauna during construction and operation.
5	Convention on Biological Diversity (1992)	This provides for a framework for biodiversity and requires signatories to develop a National Biodiversity Strategy and Action Plan. Not applicable for the subproject. The subproject activities will refer to the applicable National Biodiversity Strategy and Action Plan and that any replacement to cleared vegetation resulting from the subproject will be

[19] Kolleru Lake

No.	Agreement	Requirements for the Project
		consistent with the objectives and priorities of the Action Plan.
6	Convention on the Conservation of Migratory Species of Wild Animals (Bonn 1979)	This sets the framework for agreements between countries important to the migration of 8 threatened species. Not applicable for the subproject. There are no areas known to be habitat of migratory species of wild animals.
7	United Nations Framework Convention on Climate Change (UNFCCC), 1993	The UNFCC is an international environmental treaty with the main objective to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. India signed the UNFCC on 10 June 1992 and ratified it on 1 November 1993. The project will ensure that all construction activities will not significantly increase the GHG emissions and ensure that design of all infrastructure are resilient climate change impacts

40. **Government Regulatory Body.** The Andhra Pradesh Pollution Control Board (APPCB) is the main state-level regulatory agency that is responsible environment protection and pollution control. APPCB through its Regional Offices (RO) in Visakhapatnam region will regulate environmental protection related activities. Regional Officer's at these locations will monitor the subprojects operation and compliance with the standards.

41. APPCB monitors the environmental parameters to check whether or not it meets the standards stipulated in its consent order. Surveillance monitoring by APPCB staff, at least once a year, by visiting the project sites and collecting the sample and testing at APPCB laboratory, and specific monitoring in case of public complaints.

E. ADB's Safeguard Requirement

42. The Asian Development Bank has defined its Safeguard requirements under its "Safeguard Policy Statement" (SPS, 2009). Project categorization has been done using REA checklist and the project is categorized as category B. As per SPS 2009, category B projects warrants preparation of an IEE.

F. Grievance Redress Mechanism

43. People that are affected by the impacts of this subproject will have a channel to register their grievance. This report and the EMP describe a Grievance Redress Mechanism (GRM) to document and resolve complaints from affected people. The proposed GRM was explained to the attendees of the public forum. The GRM will be accessible to diverse members of the community, including more vulnerable groups such as women and youth. Multiple points of entry and modes of access, including face-to-face meetings, written complaints, telephone conversations, or e-

mail, will be available. Opportunities for confidentiality and privacy for complainants will be honored where this is seen as important.

G. EHS guidelines of World Bank and Good International Industry Practice (GIIP)

44. World Bank and IFC formulate the general EHS guidelines will be applicable and implemented through EMP and Environmental Monitoring Plan. The general EHS guidelines are available online and can be accessed at website address:

https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

45. Compliance to the specific EHS guidelines is given below.

Table 5: World Bank EHS guidelines

World Bank EHS Requirements	Compliance and Action Plan
Emissions from point sources should be avoided and controlled according to good international industry practice (GIIP) applicable to the relevant industry sector, depending on ambient conditions	Industries shall adopt APPCB/CPCB regulation and air pollution control measures
The stack height for all point sources of emissions, whether 'significant' or not, should be designed according to GIIP to avoid excessive ground level concentrations	Industries shall adopt APPCB/CPCB regulation in maintaining the stack heights
Monitoring of air quality	Air quality monitoring stations shall be established
The quality of treated process wastewater from industries having their own ETP units, wastewater from utility operations or stormwater discharged on land, including wetlands, should be established based on local regulatory requirements	In case of STP treated water from individual industries having their own STP units, be eb used for land application, it shall meet the STP discharge standards stipulated by MoEF&CC/CPCB
Wastewater and water quality monitoring program with adequate resources and management oversight should be developed	Monitoring program shall be carried out
Water conservation programs should be implemented	Water reuse/recycle techniques shall be adopted to the extent possible
Hazardous material management	Hazard assessment should be performed by specialized professionals using internationally accepted methodologies and mitigation measures suggested shall be followed
Occupational Health and Safety	OHS guidelines shall be followed
Waste Management; Hazardous wastes should always be segregated from non-hazardous wastes. Hazardous waste should be stored so as to prevent or control accidental releases to air, soil, and water resources in area location	Industries shall follow the APPCB/CPCB guidelines and hazardous waste shall eb segregated and sent to nearby TSDF for treatment and disposal
Noise prevention and mitigation measures should be applied where predicted or measured noise impacts from a project facility or operations exceed the applicable noise level guideline at the most sensitive point of reception	Industries shall adopt noise control techniques.

World Bank EHS Requirements	Compliance and Action Plan
Noise monitoring may be carried out for the purposes of establishing the existing ambient noise levels in the area of the proposed or existing facility, or for verifying operational. phase noise levels	Noise monitoring programme shall be taken place
Contamination of land should be avoided by preventing or controlling the release of hazardous materials, hazardous wastes, or oil to the environment	Industries shall avoid such land contamination and shall adopt immediate recovery methods in case of any accidents

III. DESCRIPTION OF THE PROJECT

A. Project Location and Area

46. Proposed project site is located in Rambilli and Atchutapuram mandals in the district of Visakhapatnam in Andhra Pradesh. Rambilli is north to Nakkapalli site at a distance of 25 km. The proposed subproject is development of internal infrastructure in start-up area of Rambilli industrial Cluster comes under the proposed Vizag – Chennai Industrial Corridor Development Programme (VCICDP). It covers an area of 396.27 acres to be developed under ADB assistance. The total land earmarked under Achuthapuram – Rambill Cluster is 2532.00 acres. The development of the cluster was suggested in two phases. (i) PHASE I- 787.25 acre (Start - up area), and (ii) PHASE II- 1744.75 Ac

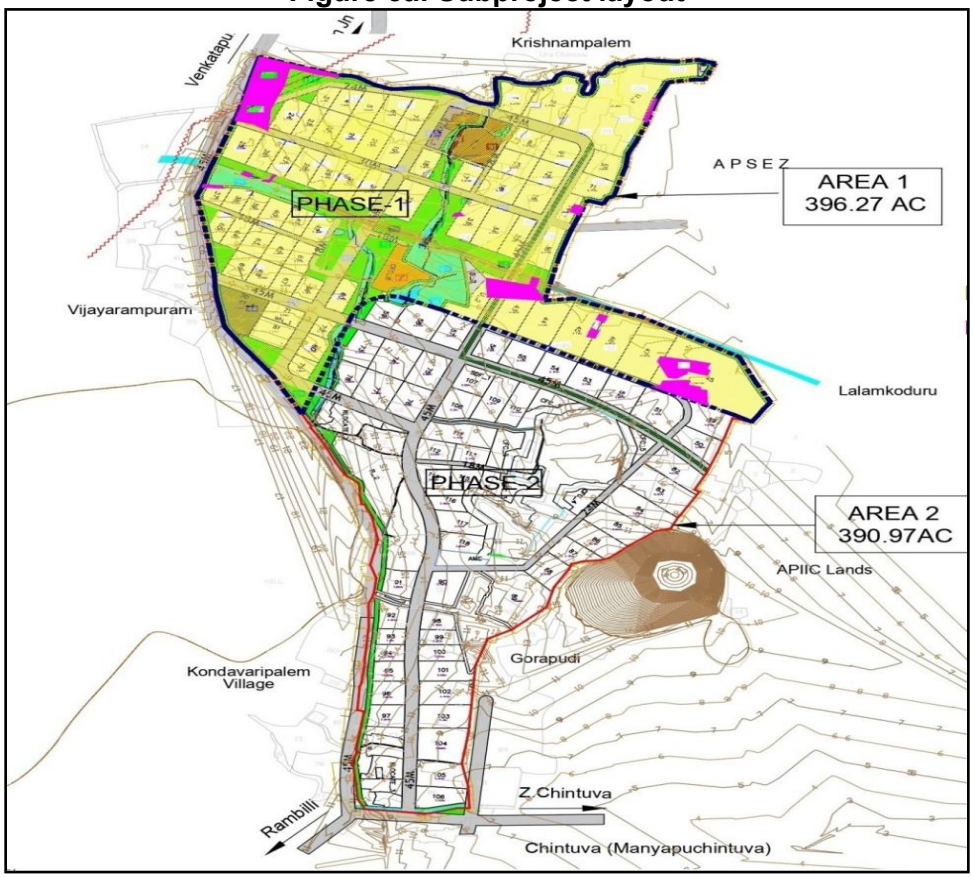
47. APIIC appointed consultant to prepare the DPR for the entire Phase I area, however based on land availability and also on the envisaged demand, APIIC intended to develop the infrastructure with modular approach. Hence the Startup area was further subdivided into Area-I (396.27 acres) and Area-2 (390.98 acres). This IEE covers internal infrastructure development in Area 1, 396.27 acres as presented in Figure 5.

Table 6: Details of Project Components[20]

Sl. No.	Particulars	Total Area in Acres	Start Up Area (phase 1)		
			Area-1	Area-2	Total
1	Area (Acres)	2532	396.27	390.98	787.25
2.	Raw Water Demand (MLD)		1.75	1.75	3.50
3.	Power Demand (MW)		20.19	24.48	44.67
4.	Road Network (Kms)		6.53	6.21	12.74
5.	Storm Water Drains (Kms)		14.50	10.70	25.20
6.	No. of plots		63	55	118
7.	No. of Utility Plots		2	0	2
8.	No. of Amenity Plot		-	1	1
9.	No. of Common Facility Centers (CFC) Plots		1	5	6

[20] The land use break-up (Table 6) and Subproject layout plan (Figure 5a) are prepared for startup area of 396.27 acres or 160 ha. This will be updated if there is any further change in the areas under the ADB subproject.

Figure 5a: Subproject layout



Source: Detailed Project Report, August 2020

B. Zoning of industrial Area

48. Presently, APIIC does not have any guidelines at organizational level for zoning industrial areas. APIIC will develop industrial areas and allocate plots to the industrial activities based on size of the plot and cost. However, while developing industrial areas, the APIIC will approach regulatory agencies/APPCB/MOEFCC as per EIA notification for obtaining necessary statutory clearances. All the industries should adhere to the conditions imposed by the statutory bodies during implementation of the projects. Sometimes, if there is any change in the conditions recommended in the clearance or change in capacity/size and location of the project, the respective industry will have to get the necessary separate approvals from the regulatory authority. The proposed zoning of industries will follow as per the EIA[21] study to minimize the pollution that may arise from the industries, which are as follows:

(i) 50m of green area around the settlement
(ii) Orange, Green and White category of industries are proposed within 50m to 250m from the settlement
(iii) Red category of industries (non-chemical, non-pharma etc., as mentioned in below table) are proposed within 250m to 500m from the settlement
(iv) Pharmaceuticals, Chemical and Petrochemical, tiles, ceramics.

[21] EIA prepared for obtaining Environmental Clearance for the complete Industrial Cluster

49. The layout map showing the proposed zoning of industries shown in Figure 6.

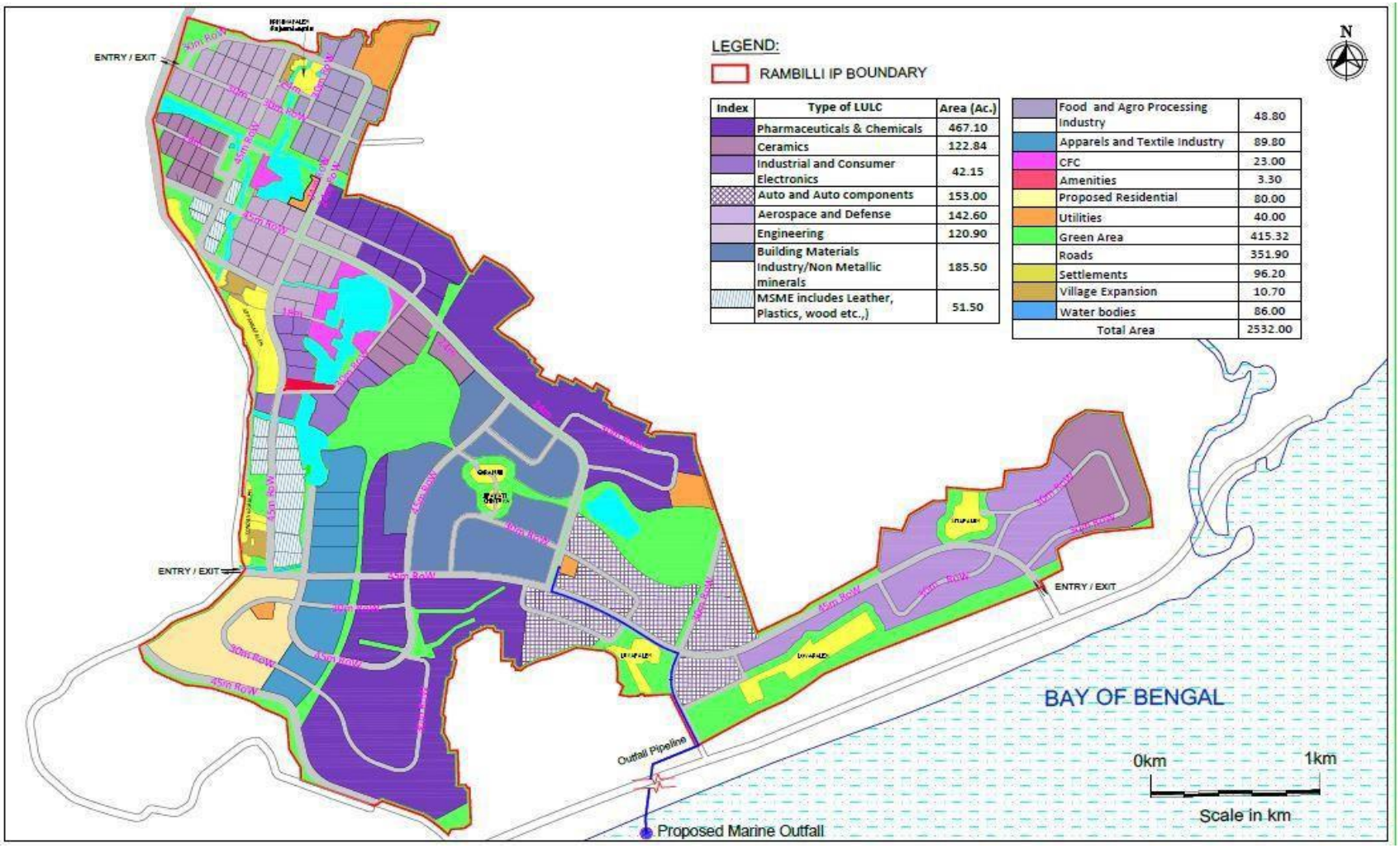
1. Surrounding Activity Profile

50. The Rambilli Industrial site of approximately 2,532 acres is located approximately 40km from Visakhapatnam City and 30km from Visakhapatnam airport and seaport. It is approximately 40km apart from the proposed Nakkapalle Industrial Site. The existing Venkatapuram road connects the site from National Highway — NH 5 and State Highway — SH 97. The site is situated adjacent to an existing multi-product Special Economic Zone (APSEZ) and is surrounded by existing settlements, roads and sea front. The configuration of the site is dependent upon the land ownership and ease of acquisition. This accounts for the irregular shape of the industrial park. The following are the details of distances to the key nodes.

(i) Strategically located near to four states Andhra Pradesh, Telangana, Chhattisgarh and Odisha.
(ii) The major factor is that it is adjacent to existing Multi-Product SEZ (APSEZ).
(iii) The catchment area of the Site is already witnessing considerable activity in Pharmaceuticals, Control equipment, Medical Instruments, Solar panels and modules and Defence electronics manufacturing.
(iv) The site is located around 40 km from City of Visakhapatnam with well-endowed Social and educational infrastructure.
(v) The site has good access to logistic facilities. The site is well connected to the Road network in the region from Chennai - Kolkata National Highway 16 which is at adistance of ~10 km on Northwest side of the site. State Highway, SH-97 is at adistance of 3 km towards North of project site.
(vi) The nearest Railway station to the project site is at Elamanchili located at 10.4 km towards NW.
(vii) The distance of Pothukunda Rambilli Reserve Forest and Kaluvapalli Reserve Forest [22] from the boundary of the Industrial cluster is 500m and 1400m respectively

[22] Refer Map in Fig 2, Appendix 13

Figure 6: Zoning of Industries (Proposed)

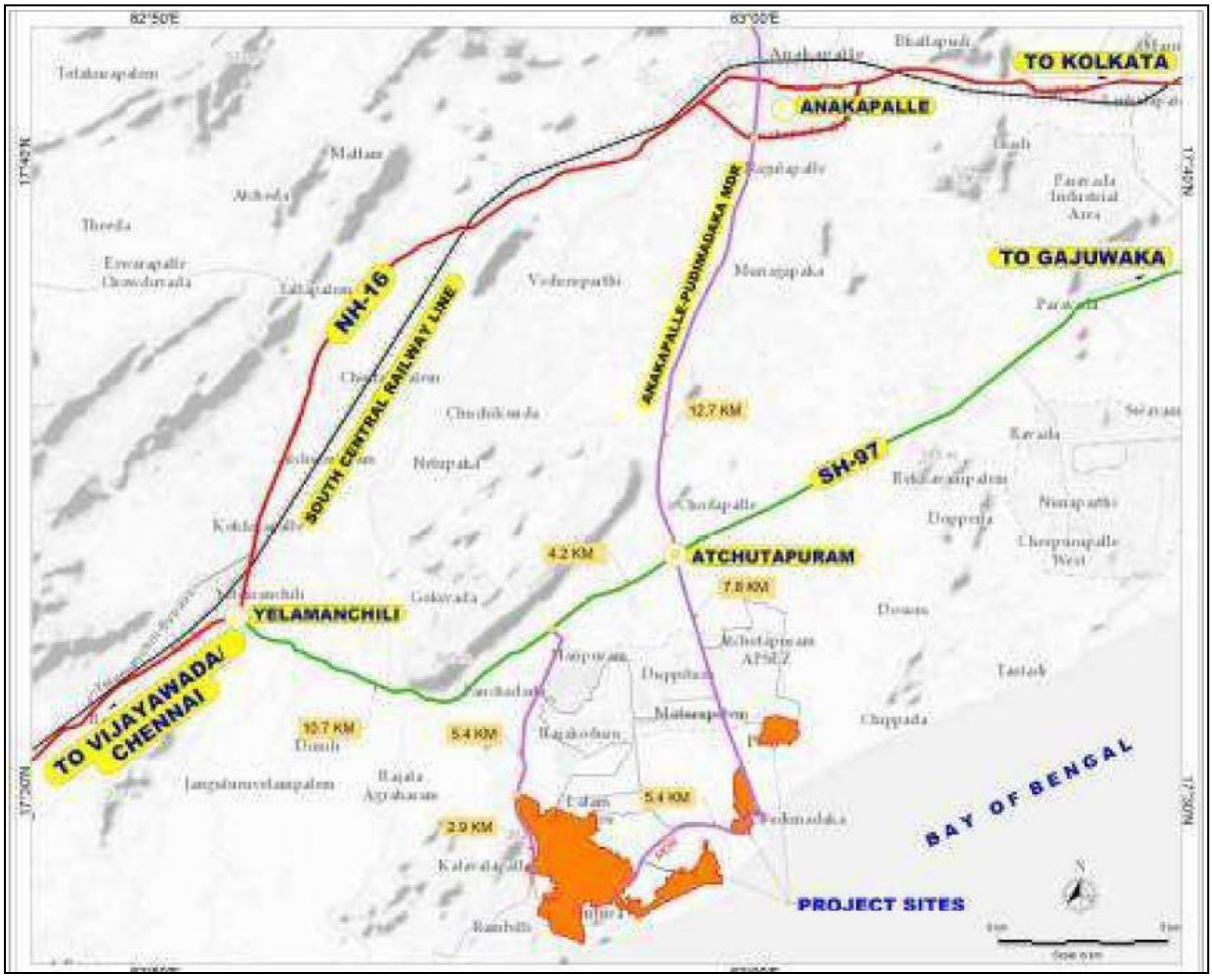


Index	Type of LULC	Area (Ac.)
	Pharmaceuticals & Chemicals	467.10
	Ceramics	122.84
	Industrial and Consumer Electronics	42.15
	Auto and Auto components	153.00
	Aerospace and Defense	142.60
	Engineering	120.90
	Building Materials Industry/Non Metallic minerals	185.50
	MSME includes Leather, Plastics, wood etc.,)	51.50

	Food and Agro Processing Industry	48.80
	Apparels and Textile Industry	89.80
	CFC	23.00
	Amenities	3.30
	Proposed Residential	80.00
	Utilities	40.00
	Green Area	415.32
	Roads	351.90
	Settlements	96.20
	Village Expansion	10.70
	Water bodies	86.00
	Total Area	2532.00

Source: Obtaining Environmental Clearance and CFE for Rambilli Industrial Park, EIA/EMP Report, 2019

Figure 7: Railroad Connectivity



C. Proposed Subproject Components in Project 2 VCICDP (funded by ADB)

51. The project components to be covered under the IEE are for Area I (396.27 acres). The proposed subproject includes construction of the following components in the start-up area of Rambilli industrial cluster (**Table 6a**). The entire works shall be procured through a single works contract package. Further details of proposed infrastructure are presented in the following subsections.

Table 6a: Subproject Components Proposed under ADB funded Project 2

1	**Roads and drains**
(i)	• 6.53 km roads which include 5.4 km of 4 lane divided road with 2 box culverts • Utility ducts, street lighting, road furniture, priority at grade junctions and pathways included for the entire length of the internal road network • Flexible pavements consisting of BC, DBM, WMM and GSB is designed as per IRC 37 – 2012 for the pavement life period of 15 years
(ii)	• storm drain cross structures and 2 minor bridges • 14.50 km storm water drains
2	**Water supply**

(i)	3850 m Clear Water Transmission Mains of 250, 300and 450 mm DI K9 pipes
(ii)	One Ground level reservoir of 1200 KL capacity
(iii)	3.5 MLD water treatment plant with 2 years O&M
(iv)	750 KL sump at WTP
(v)	9774 m water distribution pipeline of 150mm Diameter DI K7 pipe
3	**Power distribution**
(i)	• Electrical works with 2 numbers 33 KV bay extension in existing 132/33 KV substation, • 33KV overhead line on 12.5 m spun poles for a length of 4 km. 9131 m • 33 KV UG cables. • 15968 m 11 KV UG cables, • 33X11 KV substation, • RCC ducts for cabling and 287 poles for street lighting.
4	**Green areas / land scaping**
(i)	Site grading of land for industrial plots.

1. Internal Roads Network

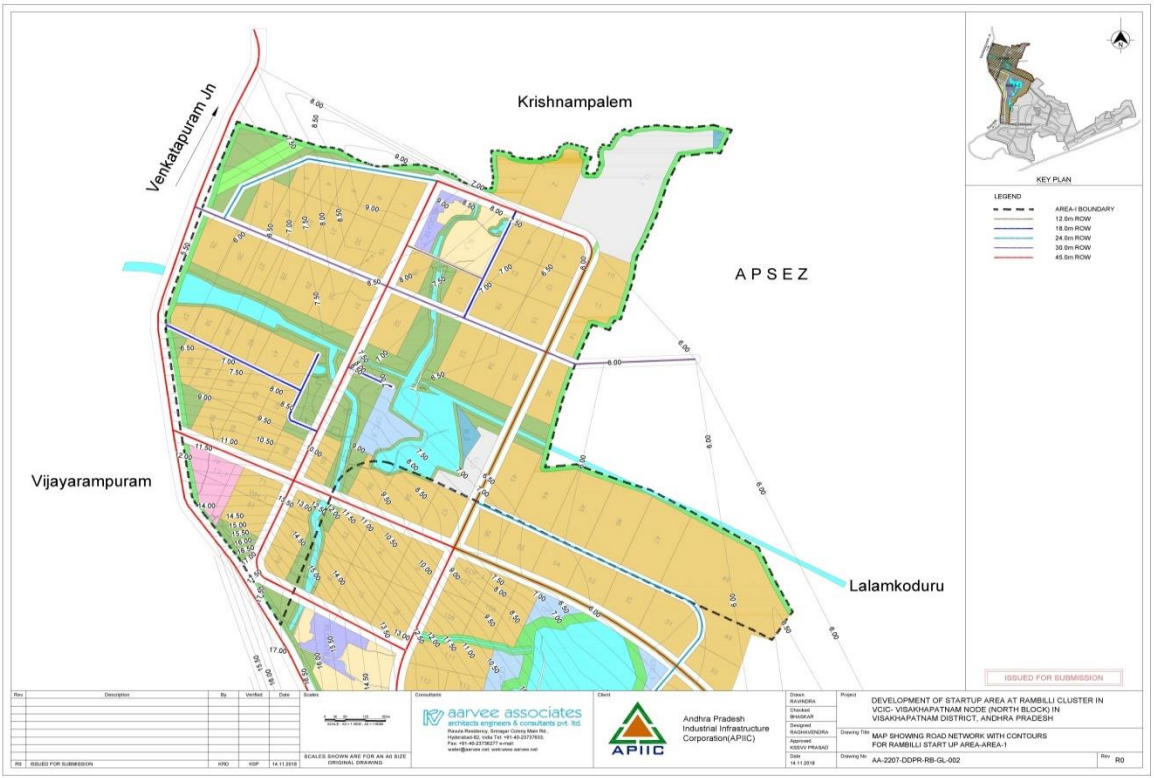
52. The preliminary design of road network of Rambilli Industrial Area Phase I scheme have included design of alignment and profile of the proposed road network as per the draft typical cross sections along with other elements of the project scheme. The design proposal is ensuring the following:

(i) The road network is safe for the road users
(ii) Operation of the road network is smooth and efficient
(iii) Construction is least disruptive
(iv) Constraints of site are got over by proven technological solutions

53. Within the given constraints, the solutions are sound, economical, constructible, and manageable. The Client have provided topographic information such as contour survey to the Consultants. Same contour plan is used after eliminating some erratic contour levels to develop ground model for preliminary design of network roads in the master plan. Based on ground model, the proposed development area falls in rolling terrain and elevations are varying from 8.0 to 28.0m. Later on, consultants have re-evaluated ground and collected topographical details on site and re-model ground for preliminary design. Elevations are varying from 3.0 to 17.0 m.

54. A re-model map with varying elevation of the project area is shown in the following Figure 8.

Figure 8: Contour Plan



55. Based on land-use master plan and site reconnaissance survey, it is found that there are 2 hillocks (but outside the phase I area) and some existing ponds/water bodies in proposed phase I area. The land-use master plan includes these existing hillocks and ponds/water bodies, A colour banded terrain is shown below to understand the topography of the project area.

56. Proposed road network length as per preliminary engineering design is given in following Table 7.

Table 7: Proposed Road Network- Lengths

S. No	Road ROW	Road No.	Design Road Lengths (m)
1	45 m with power corridor (4 Lane Road)		Road no .11 (From Ch.2+060 to 3+050) =990 Road No. 12 (From 0+920 to 1+850) = 930 Total = 1920
2	45 m (4 Lane Road)	11 12 Total	5380 – 990 = 4390 1850 – 930 = 920 5310
3	30 m (4 Lane Road)	21	1210
4	24 m (2 Lane Road)	22 25 Total	680 1930 2618

5	18 m (2 Lane Road)	23 24 31 32 34 Total	320 270 428 122 304 1444
6	12 m (2 Lane Road)	33	212
7	TOTAL		12714

57. Design speeds for all roads are given in the following table.

S. No	Road ROW	Design Speed (Km/h)
1	45 m with power corridor	**60**
2	45 m	**60**
3	30 m	**50**
4	24 m	**30**
5	18 m	**30**

58. Typical cross section based on master plan report and requirements given in IRC standards were developed. Finalized typical cross sections are shown below for 45m with power corridor, 45m, 30m, 24m, 18m and 12m ROW roads are shown in below figures from 9 to 13:

Figure 9: Typical Cross Section Of 45 M ROW with High Tension Lines

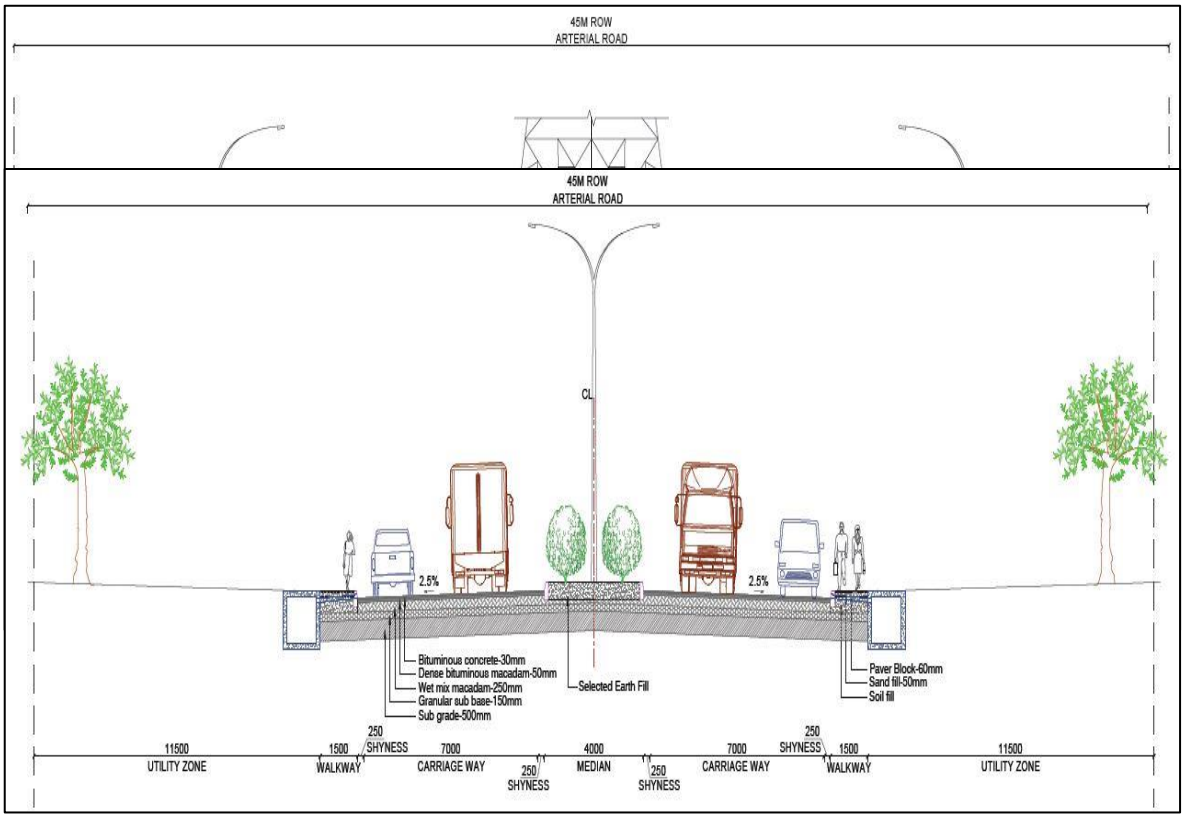


Figure 10: Typical Cross Section of 30 M ROW

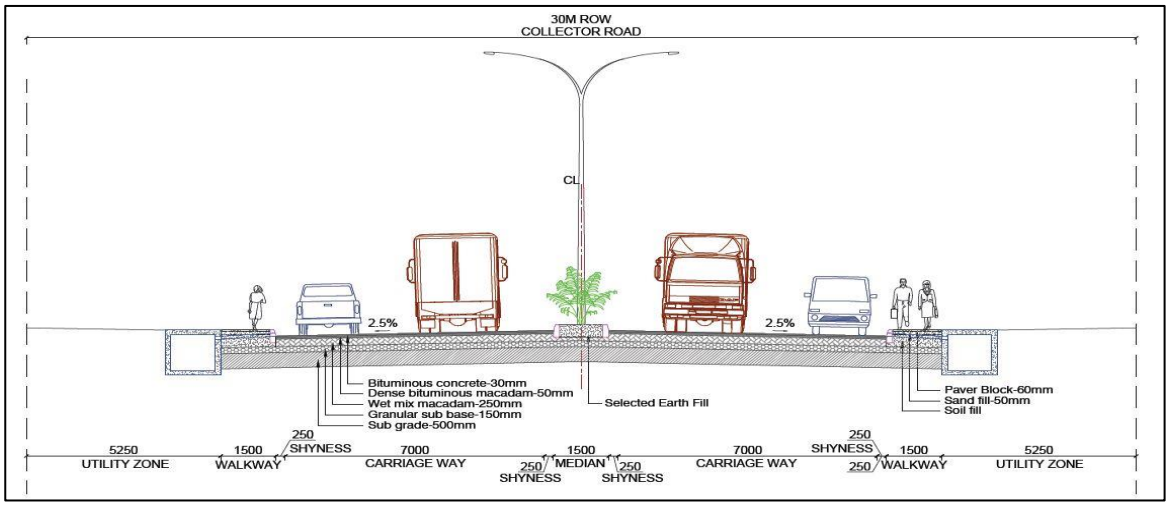


Figure 11: Typical Cross Section of 24 M ROW

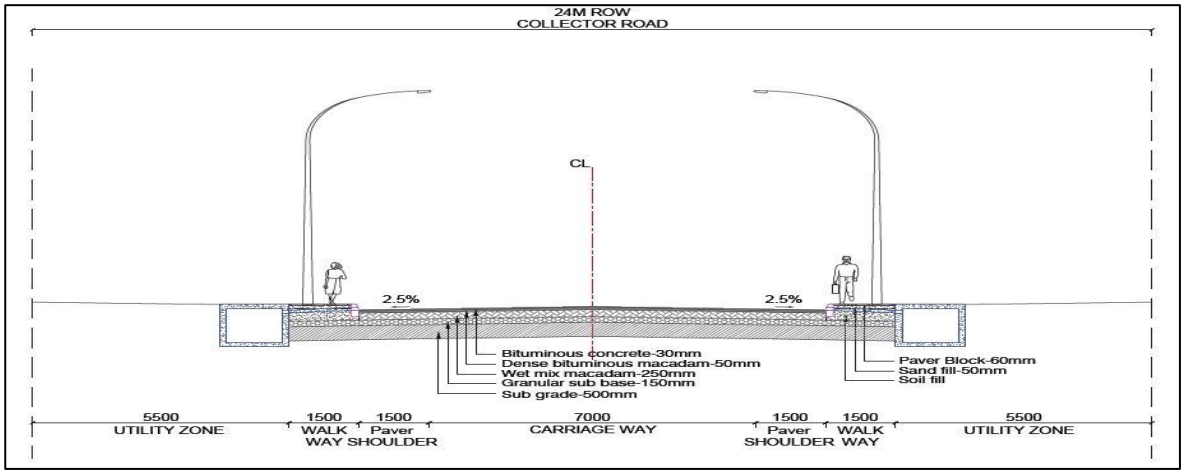


Figure 12: Typical Cross Section of 18 M ROW

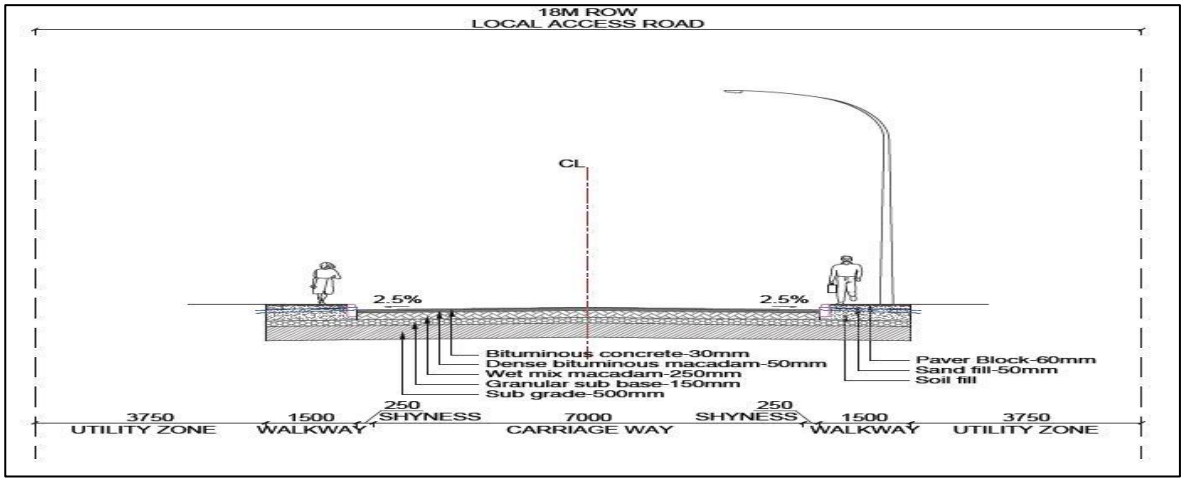


Figure 13: Typical Cross Section of 12 M ROW

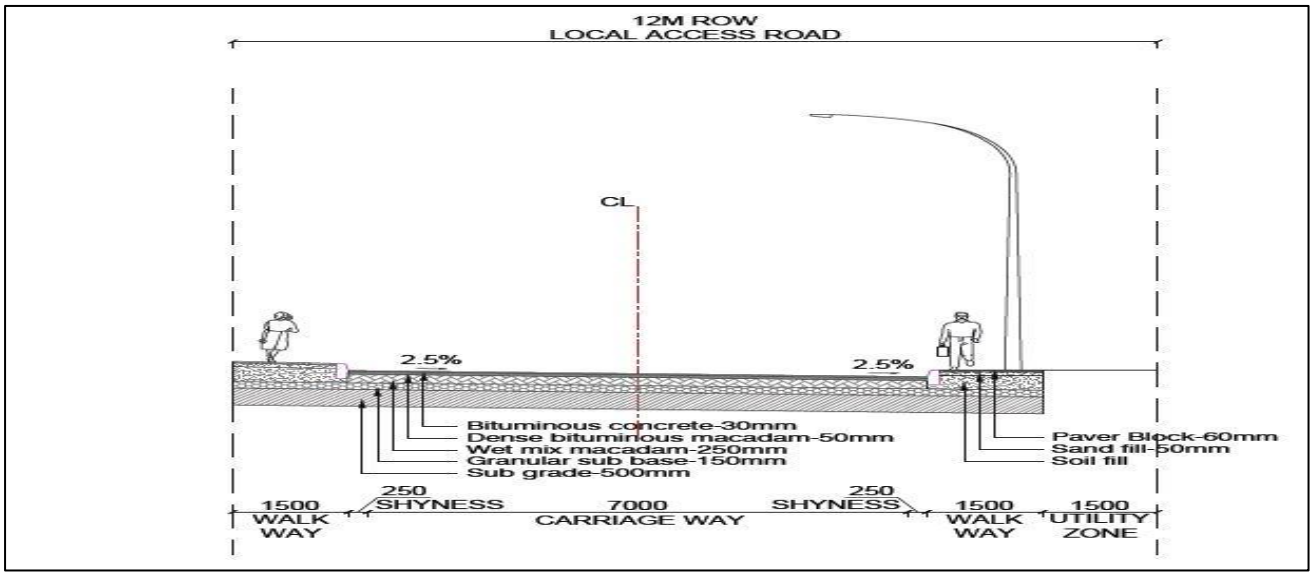


Figure 9-13 sources: EIA Report of Rambilli Industrial Park**, APIIC**

59. Major Roads (45 m ROW). Major road number 11 and 12 to cater for high capacity of industrial traffic. This road feed the traffic within the industrial area to and from highways, bypasses and roads connecting the Visakhapatnam industrial node. Based on traffic forecast it was reported that, 4 lane carriage way with 4.0m median, will be adequate for next 20 years.

60. Major roads with power corridor (45 m ROW). These major roads are subset of Major Road with 45 RoW with propose with power corridor in the center for road number 11 (from 2+060 to 3+050) and road number 12 (From 0+920-1+850) to cater for high capacity of industrial traffic. These roads are designed with two lane dual carriageways with 12m service corridor for power in the centre. Based on traffic forecast it was reported that, 4 lane dual carriageway will be adequate for next 20 years.

61. Collector roads with power corridor (30 m ROW). These Roads with 30m ROW to collect traffic from Major roads and feed arterial roads. Few roads directly feed the traffic to Major/arterial roads. The roads are designed for four lane carriageways with 1.5m median width.

62. Collector roads with power corridor (24 m ROW). These Roads with 24m ROW to collect traffic from Major roads and feed arterial roads. Few roads directly feed the traffic to Major/arterial roads. These roads are designed for two lane carriageways.

63. Local roads (12-18 m ROW). Collector roads are the roads from which the traffic originates. These roads, which are the end roads that feed directly into the proposed land use area, are designed for two-lane carriageways with 18 m and 12 m RoW. These roads may feed traffic to Sub arterial roads or may even directly feed to Arterial roads based on land use purposes.

64. Embankments and cuttings. Roadside slopes have proposed to be kept not steeper than 2:1 (horizontal: vertical).

65. Median. The divider between the two-way traffic lanes is termed as median. In urban areas median is often used as a pedestrian refuge. Pedestrians can use medians as narrow as 1.2 m

however the preferable widthis2.0mwhere space permits. Median is not meant for pedestrian movement parallel to roads however this would be used as refuge lane while crossing the divided 4/6 lanes roads.

66. Junctions. At-grade junctions have been designed at intersection of roads as per IRC guidelines i.e. IRC:SP:41 - 1994, IRC: 92- 1985,IRC: 65-1976.

67. Road Junctions in proposed development were planned at development plan stage and have been designed in such a way that vehicular traffic plying in various directions are channelized as per vehicular movement and traffic requirement. All the Junctions proposed have been designed on the basis of traffic projections and intersection proposal.

68. Pedestrian facilities. Provision of foot path for pedestrian movement have been kept in proposed road network plan on both sides. The minimum width of the footpath has been kept as 1.5 m. The footpath has also termed as multipurpose corridor as when width of footpath is more than the minimum required width it could be utilized for plantation, lighting etc. Moreover, underground utilities are also being utilizing space adjacent for running utility lines parallel to the roadways.

69. Being the most vulnerable road user, priority crossing to be given to pedestrian to legally claim the right to cross the road. Pedestrian crossings are provided where they will be well used. At-grade pedestrian crossings are classified as:

70. **Pedestrian crossings at intersections -**These can be controlled or un-controlled crossings. Uncontrolled crossings are those which are marked by studs or paint line but not controlled by any system of signals or a zebra form of a crossing.

71. **At-grade pedestrian crossing away from intersection -**Such crossings are to be provided only when the distance between two consecutive intersections is more than 300 m and simultaneously, there is a genuine demand for such a facility (e.g., Shopping or commercial area being located within this area).

72. Transit network. As the proposed development plan is above 1.2 km wide and 3 km length, there is no MRTS/BRTS is planned in current phase I of development. Hence there is no transit network within current development area.

73. However, a provision for foundation in median is left with sufficient width for any future requirement for MRTS on all Major Roads.

74. **Safety Barriers.**

(i) **Pedestrian Guard Rails –** Pedestrian guardrails are an important design element to prevent indiscriminate crossing and spilling over of pedestrians on to the carriageway. Design of the guard rails have been adopted in accordance to the IRC:103-2012.Use of pedestrian guardrail shall be considered as per IRC: 103-2012.

(ii) **Speed Breakers –** Speed breakers are used as speed control measure in residential areas and minor roads. Design and placement of speed breakers are proposed as per IRC: 99-1988.

(iii) **Median barriers –** as per IRC codal practice, where width of median is less than 4.5m, median safety barrier is required to avoid secondary incident on

another carriageway. Also recommended to provide antiglare screens to avoid the glare from the opposing vehicle. As the width of median is less than 4.5m.

75. Roadside Furniture

76. Traffic signage. In this road network road signs have been provided as per IRC: 67 - 2012. There are corresponding road markings with stop signs, give way signs, merging or diverging traffic signs, lane closed signs, road narrowing signs, slip roads/ diversion signs, compulsory keep left/right signs, or any other signs as perIRC:67 - 2012.

77. Wherever road alignment is on a curve, there shall be an advance cautionary sign for sharp curves (depending whether it is on left or right) and chevron signs (rectangular in dimension with yellow background and black arrow) at the outer edge of the curve. The sign for the curve ahead particularly in mountainous and steep terrain shall always be accompanied with chevron signs at the outer edge of the curve and appropriate delineation.

78. Road marking. Road markings on proposed road network have been proposed in accordance with IRC:35-1997. These markings have been applied to road center line, carriageway lane line, edge line, continuity line, stop line, give way lines, diagonal/chevron markings, zebra crossing and at parking are as by mean of an approved self-propelled machine which has a satisfactory cut off value capable of applying broken line automatically.

79. Road markings shall be of hot applied thermoplastic paints with reflectorizing glass beads as per relevant clauses of Section 803 of MOST specifications.

80. Landscaping. IRC:SP:21-1979 "Manual on Landscaping ”have been referred for planning and design guideline for the plantation of rows of trees with staggered pitch on either side of the road wherever land is available in the ROW. The choice of the trees has also been made as per the same code. Local, indigenous species that grow in the project area micro-climate are proposed to be planted. A spacing of 10-15m c/c is recommended for spacing of trees parallel to the roads. Setback distance of trees needed in different situations are as per the IRC:SP: 21-1979 and the IRC: 66-1976.

81. Shrubs in medians are not normally exceeded1-1.5min height and proposed to be asper IRC: SP:21-1979. To ensure survival from herbivorous animals, shrubs/ plants containing latex are recommended.

82. Bus stops and bus bays. Design and provision of bus bays are as per IRC 70:1977. Bus bays are not proposed too close to intersections. It is desirable that they are located 75mfrom the intersection on either side preferably on the further side of the intersection.

83. Bus bays have been provided with recessing the kerb to avoid conflict with moving traffic. The length of the reces should be 15 m for single bus stop with increased of 15 m for each extra bus for multiple bus stops.

84. The depth of the recess should be 3.5 m. However due to space limitations available width of ROW after providing standard feature of road i.e., carriageway, median, footpath etc., balance available width shall be used for bus bays.

85. Truck layby. Truck layby has not been envisaged on any of the network road. However, separate truck terminal in proposed project area.

86. Bus route network for are designed to provide the accessibility to the whole development area by covering routes from 30m ROW. Pedestrian walk ways are proposed all along the road networks.

87. Utility lines. Provision of underground utility corridors is made for the proposed roads. There should be advanced planning to earmark the position of each utility line expected along the road and provide space therefore in such a manner that it does not interfere with other services or safe operation of the road.

88. Bridges and culvers. It has been observed that there are some locations where the roads are crossing some water bodies and three minor bridge sand six box culverts are proposed. Here a total of 9 bridges/ Box Culverts have been observed to cross over various streams & water bodies.

89. Interface with existing Rambilli Road. The traffic from the proposed road network within the project area is fed to the Rambilli road at five locations. The existing Rambilli road is proposed to be widened under a separate project. Junction designs are proposed at major intersecting locations (which were decided in consultations with client) where the Rambilli road is connecting to the project area.

90. The junctions are designed as per IRC: SP:41-1994 "Guidelines for the Design of At-Grade Intersection in Rural and Urban Areas" and MOSRTH – Type designs for Intersection on National Highways, 1992 also referred where required to develop suitable layout and design.

91. **Design Methodology of Flexible Pavement.** The pavement design is based on various design parameters such as design traffic and Soil California Bearing Ration (CBR) value. For the design of flexible pavement all the required design considerations are stipulated in the following mentioned IRC Code. Design of the Road pavement has been carried out in the conformance with guidelines provided in, IRC: 37-2012 and Specifications for Road and Bridge works, MoRT&H 2013. Following factors considered for design of flexible Pavements

Traffic factors

92. Traffic is the most important factor in the pavement design. The key factors include contact pressure, wheel load, axle configuration, moving loads, load, and load repetitions. For present work, the design traffic assumed as 5 million standard axle loads.

Design Life

93. As per IRC: 37-2012, clause 4.3 the present project relevant to other categories of roads and design life of the pavement is considered as 15 years.

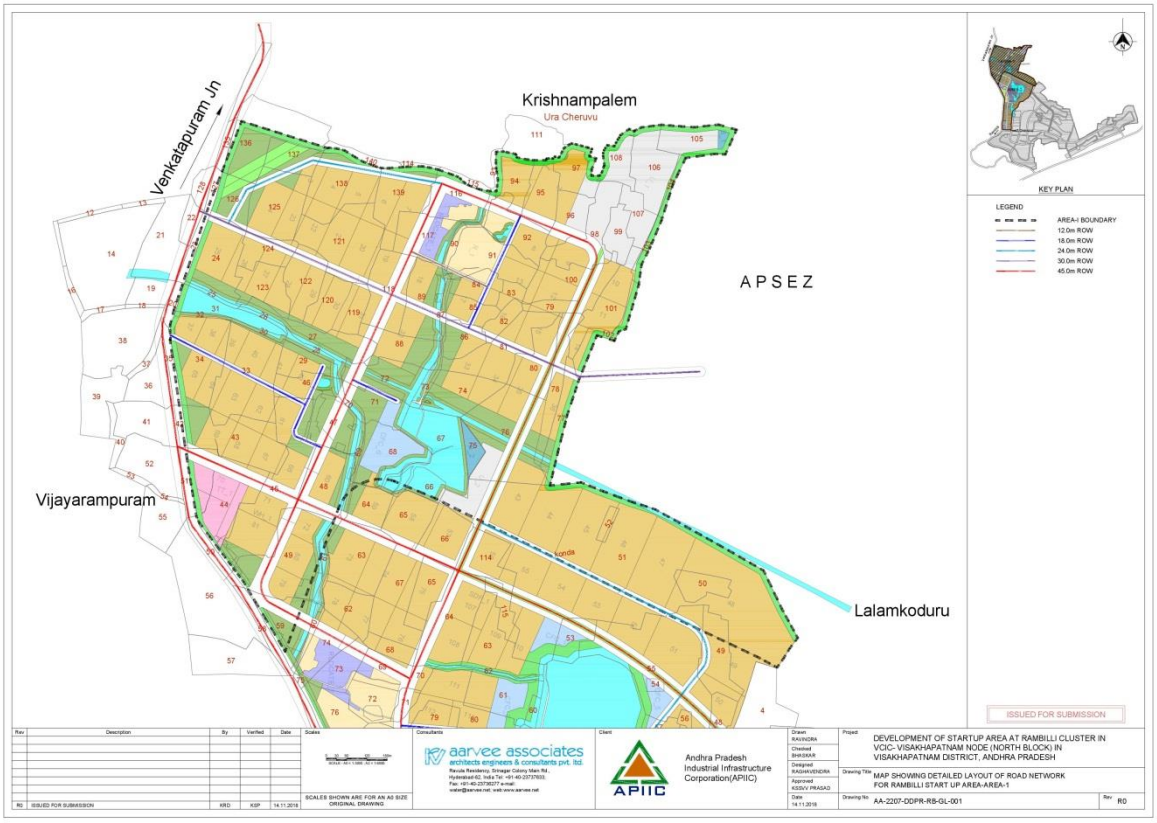
Pavement Composition

94. In order to design the pavement, specific repetition of traffic during design life without having failures in rutting and/or cracking is considered, and design of pavement has been done according to IRC:37-2012. For different combinations of traffic and material properties pavement composition has been suggested in the form of design charts in IRC:37-2012.

95. A total of 6.53 km or internal roads were proposed to be constructed within the development of the startup area of Rambilli cluster. It was also proposed that different width roads i.e., 12m, 18m, 24m, 30m and, 45 m width internal roads were planned in the startup area.

96. The amount of Rs. 21.94 crores cost was estimated for the proposed road network of the startup area of Rambilli cluster. Map showing the road network of the proposed development of startup area of Rambilli cluster – VCIC – Visakhpatnam node is placed as Figure 14.

Figure 14: Proposed Road network for the Start-up area of Rambilli cluster



2. Water supply

97. **Planning Criteria.** The objectives for water supply system are to cater for the anticipated peak water demand requirements and to transform the Rambilli industrial development into an efficient and reliable water supply system. The estimation of the water demand is based on the type of industries, population land use distribution.

98. In general, the water requirements for industrial and domestic use are based on previous project experience. In addition, the following parameters are adopted for the scheming of water supply and distribution network for Rambilli site.

- Minimum residual pressure 1.0 bar
- Minimum diameter 150 mm DI
- Service water tank storage capacity 8 hours capacity

99. In the case of high-rise buildings where their pressure requirement is more than 1.0 bar, it is recommended to have their own booster pumping system to enhance the distribution pressure for raw/potable water consumption. Both potable water and recycle water shall be used for Rambilli industrial development.

100. To meet these requirements, one set of Ground Level water tanks are proposed for each type of water distribution system – Potable Water System and Recycle Water System. The potable water is pumped to Ground Level water tank (with storage capacity of 8 hours). The water is distributed to tenants from Ground Level Water tank by gravity.

101. **Design Standards.** Safe and 24x7 water supply is a public good as it has very large positive externalities. Access to water supply is important for all the urban residents and lack of safe water supply can keep the mortality rates high in general and among the poor in particular. Smart cities should therefore have an availability of 24x7 piped water supply that also meets benchmarks of water quality, pressure, etc. across the city.

102. Adoption of new methods especially smart metering for reducing loss and energy consumption in water networks needs to be ensured. This is possible by installing sensors in the supply system that measure water consumption, water levels, and water flow rates on a real time basis. These models will help in not only identifying and localize leaks; it would also assist to optimize energy consumption in the network. In addition, smart water meters may be installed for measuring water consumption more efficiently and providing water customers with data to help them monitor their water usage and reduce costs.

103. The key to sustainability of any water supply system depends majorly on two factors - availability of water and effective O&M. In regard to the parameters such as per capita water supply, it is a much-localized requirement and depends on the local habits and lifestyle. Thus, for water supply the above-mentioned parameters are sufficient to be adopted based on International Benchmarks.

104. The Indian standards or guidelines referred to for design of water supply system are enlisted below.

(i) Manual on Water Supply and Treatment by CPHEEO, MoUD, 1999
(ii) IS 10500 – For Water Quality
(iii) IS 8329-2000 – For DI Pipes
(iv) IS 9523-20000 – For DI fittings
(v) IS 14846-2000 – For CI Sluice valves
(vi) IS 14845-2000 – For CI Air Valves
(vii) IS 779 and IS 2372 - For water meters

105. The international standards referred to for design of water supply system are as follows:

(i) WHO Standards on Drinking Water Quality
(ii) European Standards on Drinking Water Quality - BS EN 850
(iii) ISO 37120 - Sustainable development of communities -- Indicators for city services and quality of life
(iv) ISO 15389 - For Online sensors/ Analyzer Equipment
(v) ISO/TC 224 - Service activities relating to drinking water supply systems and wastewater systems - Quality criteria of the service and performance indicators

(vi) ISO 24510:2007 - Activities relating to drinking water and wastewater services - Guidelines for the assessment and for the improvement of the service to users
(vii) ISO 24512:2007 - Activities relating to drinking water and wastewater services - Guidelines for the management of drinking water utilities and for the assessment of drinking water services
(viii) ISO/CD 24516-1 - Guidelines for Management of Assets of water supply and wastewater systems - Part 1: Drinking water distribution networks
(ix) Public parks and private gardens: 20 to 30 liters per 100 sq. meters

106. **Raw Water Source.** No new water source will be developed for the subproject. Bulk Water Supply Scheme of 95 MLD to APSEZ and its Expansion areas (i.e., Atchutapuram Cluster) by tapping water from Yeleru Left Main Canal (YLMC) which includes construction of head works at the source, laying of about 30 km pumping main from head works to summer storage tank (SST), upgradation of existing Krishnampalem tank near APSEZ as summer storage tank. Water from SST is the source for WTP of the Rambilli area. This project, including SST, under currently in implementation by APIIC under the VCICDP Project 1 for "Providing Bulk Water Facility and SST/WTP at Naidupeta IP (package numb APIIC 04)".

107. Water demand. **B**ased on the above parameters, the water demands for different land uses developed as described hereunder.

Table 8: Demand Details for Rambilli Industrial Cluster

Rambilli Industrial Cluster Total Demand			
Gross Development Area (Ha)	**Clear Water Demand Including UFW@15%(MLD)**	**Demand Including Transmission Losses@5%(MLD)**	**Raw water Demand Including Transmission& Treatment Losses@ (5% +3%) (MLD)**
1158.973	10.84	11.38	12.29

Table 9: Demand Details for Rambilli Phase - I Area

Rambilli Start Up Area Demand			
Gross Development area	**Clear Water Demand Including UFW@15%(MLD)**	**Clear Water Demand Including Transmission Losses@5%(MLD)**	**Raw water Demand Including Transmission& Treatment Losses@ (5% +3%) (MLD)**
317.2	3.12	3.28	3.54

108. The water demand for fire-fighting comes out as 350 KLD for Startup Area.

109. *Peak Factor. Clause 10.3.1 of CPHEEO Manual on Water Supply & Treatment* recommends following peak factors for design of water supply distribution network:

- For population less than 50,000 - 3.0
- For a population range of 50,000 to 2, 00,000 - 2.5
- For population above 2, 00, 000 - 2.0

110. However, the water supply is being done to a mixed land use which comprises of industrial and commercial developments. Due to uncertainty of the level of all these developments, a weighted peak factor has been computed for the design of potable water supply distribution network.

111. **Water Treatment Plant.** The basic Philosophy in designing water Treatment plant is to ensure highest water quality standards and best industry practices comparable to those available in the smart cities in the world. The water treatment plants are designed for continuous operation to produce treated water to specified water specified water quality standards. The plants are designed to automate all the treatment plant operations with continuous operation, control and monitoring of the state- of-art SCADA, control system and instrumentation at each and every stage/unit location.

112. WTP is proposed in the defined utility Land use in the startup area.

113. The WTP has to treat 3.54 MLD of raw water in order to get 3.28 MLD of clear water for the startup area.

114. Water Quality Standards. The objective of water works management is to ensure that the water supplied to the consumers is free from pathogenic organisms, clear, palatable and free from undesirable taste and odour, of reasonable temperature, neither corrosive nor scale forming and free from minerals which will produce undesirable physiological effects. Towards this objective, World Health Organization has provided guidelines (W.H.O guidelines for Drinking Water Quality - 1993). CPHEEO has adopted the same guidelines as standards of treated water quality. At the unit process levels of the plant, required output standards can be further enhanced, which will provide superior water quality, besides achieving high process efficiency. Therefore, besides compliance with the WHO Guidelines, the plants are designed to comply with the following water quality standards.

Table 10: Treated Water Quality Standards

S. No	Water Quality Parameters	Required Output Standard
1	Turbidity (NTU) at the Clarifier outlet before the Filtration Plant	< 5.0 NTU
2	Turbidity (NTU) at the outlet of the Filter Plant, before the Chlorination Chamber	< 1.0 NTU
3	Colour (Units on Platinum Cobalt Scale) TCU	< 5.0
4	Taste and Odour	Unobjectionable
5	pH	6.5 - 8.5
6	Faecal coliforms number/100ml Coliform organisms' number/100ml	Not detectable in any 100-ml sample for required output and permissible standards of faecal coliforms number/100 ml and Coliform organisms' number/100ml
7	Residual Aluminium (mg/l, Al)	< 0.1
8	Residual Chlorine	0.8 to 1.0 ppm

115. Treatment process. **B**asic processes in a water treatment plant are well documented in textbooks and manuals. In a nutshell, these processes and functions are presented below:

Table 11: BASIC TREATMENT PROCESS

PROCESS		FUNCTION
Aeration		Removal of dissolved gases and addition of oxygen
Measurement	Clarification	Parshall flume
Addition of flocculent chemical		Alum dosing
Rapid Mixing		Initiation for Floc formation
Flocculation/sedimentation		Floc formation & settlement of turbidity causing material
Filtration		Straining of finer particles to reduce the influent turbidity to filters.
Disinfection/Chlorination		Removal of pathogenic bacteria and maintaining residual chlorine

116. Filtration is age-old tested and much practiced technology in water treatment processes. They are classified depending upon:

- Bed depth : shallow or deep bed
- Slow or rapid
- Type of filtering medium used : mono-, dual-, multi-medium
- Driving force : gravity or pressure filters.
- Flow rate through filters : Constant - rate of filtration with fixed head,
- Constant - rate of filtration with variable head,
- Variable - declining-rate filtration.

117. Preferred uses of different types of filtration techniques are given below:

Table 12: Filtration Techniques

S. No.	Filtration Technology	Filter Media	Preferred Uses
1	Granular Media Filter		In most municipal water treatment facilities
	Single media	Sand or anthracite	
	Dual Media	Sand + anthracite	
	Multimedia	Garnet + sand + anthracite	
2	Active Carbon Filter	Wood or coal-based charcoal	Home water filters, landfill leachate, industrial wastewater, pre-treatment to RO, occasionally, in municipal water treatment facilities.
3	Membrane Filter	Thin layer of semi-permeable polymer films with specific pore ratings.	Wastewater treatment for reuse, Desalination plant, pre-treatment to RO.

118. However, depending on the raw water quality and treated water quality standards, cost, ease of operation and maintenance, etc. a trade-off has to be struck to adopt a particular choice of filtration class.

119. **Water Treatment Processes Adopted.** The plant shall be designed, constructed and installed considering site ambient conditions, local conditions and location. For these, the Agency shall make do allowances in his design for the increased temperatures which may be experienced by Plate Settler clarifiers and filter plant exposed to direct sunlight.

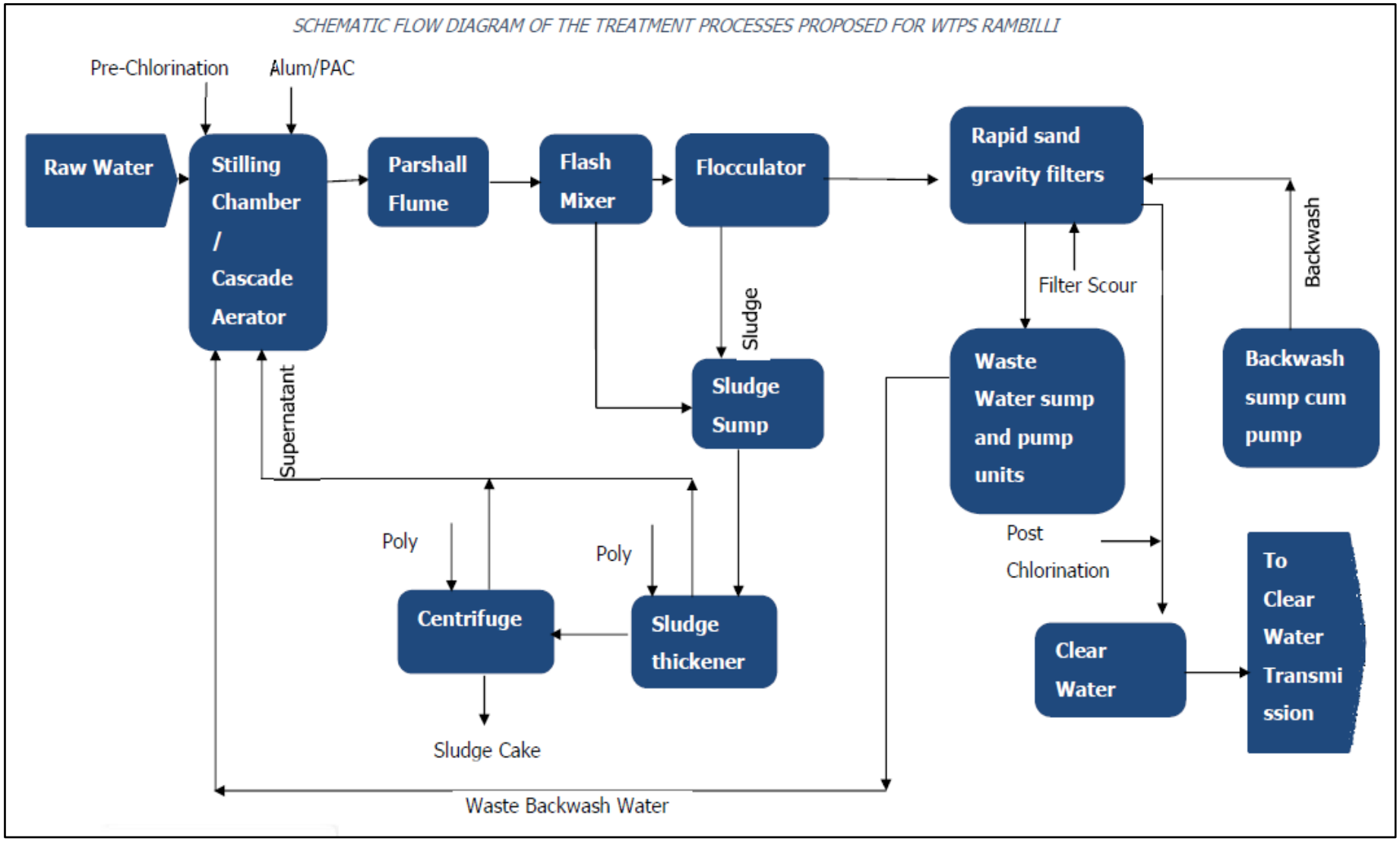
120. The WTP shall be hydraulically designed to produce 3.28 MLD of treated water to specified quality standards. The loss of water in terms of sludge bleed from the clarifiers and filter backwash shall be kept to the minimum and not exceeding 3% of the raw water input.

121. In compliance with the project requirements of high standard of treated water quality using modern treatment technologies and considering water quality at source, following treatment processes are proposed:

(i) Stilling Chamber
(ii) Alum Dosing
(iii) Flash Mixing
(iv) Clarification using Flocculators
(v) Filtration using Rapid Sand Gravity Filters
(vi) Disinfection using Chlorination

122. A Schematic flow diagram of the treatment processes is presented in Figure 15.

Figure 15: Schematic flow diagram of the treatment processes proposed for WTPS Rambilli



123. Components of WTP. **T**he WTP consists of following major components/units:

(i) Raw water Inlet pipe
(ii) Stilling chamber and Parshall flume with ultrasonic flow measuring device
(iii) Pre-chlorination with Alum/PAC
(iv) Chemical dozing with thorough mixing of raw water
(v) Flash mixers
(vi) Flocculator
(vii) Sedimentation
(viii) Rapid sand gravity filters with modern under drainage system.
(ix) Backwash arrangement with backwash sump cum pump house
(x) Sludge drainage, sludge pump house
(xi) Sludge thickener
(xii) Centrifuge
(xiii) All pumps, motors, compressors, air blowers & other electro-mechanical equipment related to water treatment process
(xiv) Storage of disinfectant
(xv) Collecting & conveying channels of raw and filter water along with bypass channel
(xvi) Chlorination
(xvii) Chemical house
(xviii) Recirculation sump cum pump house
(xix) Filter house annex building
(xx) Well-equipped laboratory
(xxi) Clear water pump house
(xxii) Transformer yard
(xxiii) MCC room
(xxiv) Staff quarter building

3. Proposed Water Supply Network – Phase I

124. Potable water shall serve the Rambilli (Atchutapuram) industrial Development Cluster. As there is no potable water source near the site, raw water treatment plant (WTP) has been proposed within the development. Yeleru Left Main Canal located north to site is the main source of raw water.

125. The Atchutapuram SEZ is presently using the surplus bulk water from the adjacent apparel SEZ, Brandix, which is yet to expand to its full capacity. To be self-reliant for bulk water, APSEZ has been allocated 95 MLD water from Yeluru left bank main canal, which is 26 km away from the APSEZ area. It is planned to construct intake structure with pumps, collection, transmission and summer storage facilities under the project 1. This project, including SST, under currently in implementation by APIIC under the VCICDP Project 1 for “Providing Bulk Water Facility and SST/WTP at Naidupeta IP (package numb APIIC 04)”. This water treatment plant located within the development for treatment.

126. The Yeleru Left Main Canal will be shut down for about 30 to 40 days in a year for annual maintenance. To achieve uninterrupted water supply to the proposed industries during canal maintenance, a storage tank/pond is necessary. The storage tank/pond shall have a capacity to store water to cater for 30 to 40 days of projected water demand including losses due to evaporation and seepage. The area required for this pond works out to about 35 Ha. The

availability of industrial land within Rambilli site is limited, hence it is proposed to develop/augment existing ponds surrounding/nearby the site for water storage.

127. The location of the proposed WTP is proposed within the designated utility location of the land use map of the phase I area of the Rambilli cluster. The potable water will initially be stored in the ground water tank (located within WTP) which has 24 hours storage capacity and subsequently pumped to phase – I and phase – II catchments respectively, each of which is served by its own GLSRs. The Ground level water storage tank is proposed to have the minimum storage capacity of 8 hours.

128. In supplying water to the proposed Rambilli industrial development, gravity system of water supply & distribution systems has been considered. Generally, a gravity system comprises the ground storage facilities, pumps, elevated storage facilities, pipes and appurtenances. In a gravity system, water will be pumped from ground storage facilities to the elevated storage facilities, which will then distribute potable water to end users by gravity. Pressure is put on the system by the height of the water in the storage facilities. When water demand causes the water level in the storage facilities to drop, the booster pump will be activated, and excess water will be supplied to topping up to the appropriate water level. When the water level in the elevated water storage facilities reaches the cut-off limit, the pump will be cut off.

129. For the water supply to the start-up area of Rambilli cluster, a network of pipelines planned along with the GLSRs etc., This entire water supply network will be placed along the roadside to reduce the problem and for easy accessibility. So, along the internal road network, the water supply network is planned to serve the start-up area. A total of 11.56 crores cost was estimated for the water supply network.

130. The proposed water supply network in Area – 1, Rambilli is covered for a length of 12.623 km. The details of Pipe network is given below.

Water Supply		
S. No.	Diameter of Pipe	Length (m)
1	150DI K7	9773.73
2	250 DI K9	565
3	450 DI K9	2285
	Total	12623.73

131. Map showing the proposed water supply network for the start-up area of Rambilli cluster is placed as Figure 16(a) and Rambilli Area-1 detail network is given as Figure 16(b).

Figure 16(a): Proposed water supply network for the startup area of Rambilli cluster

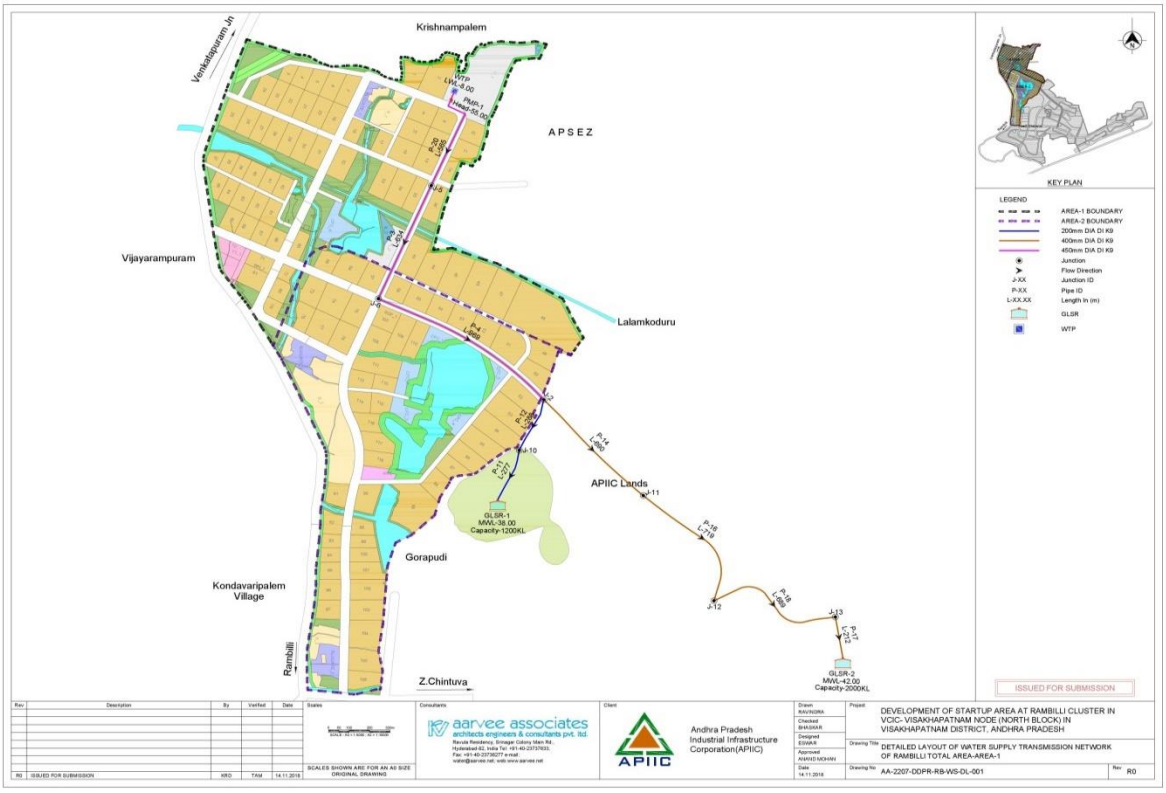
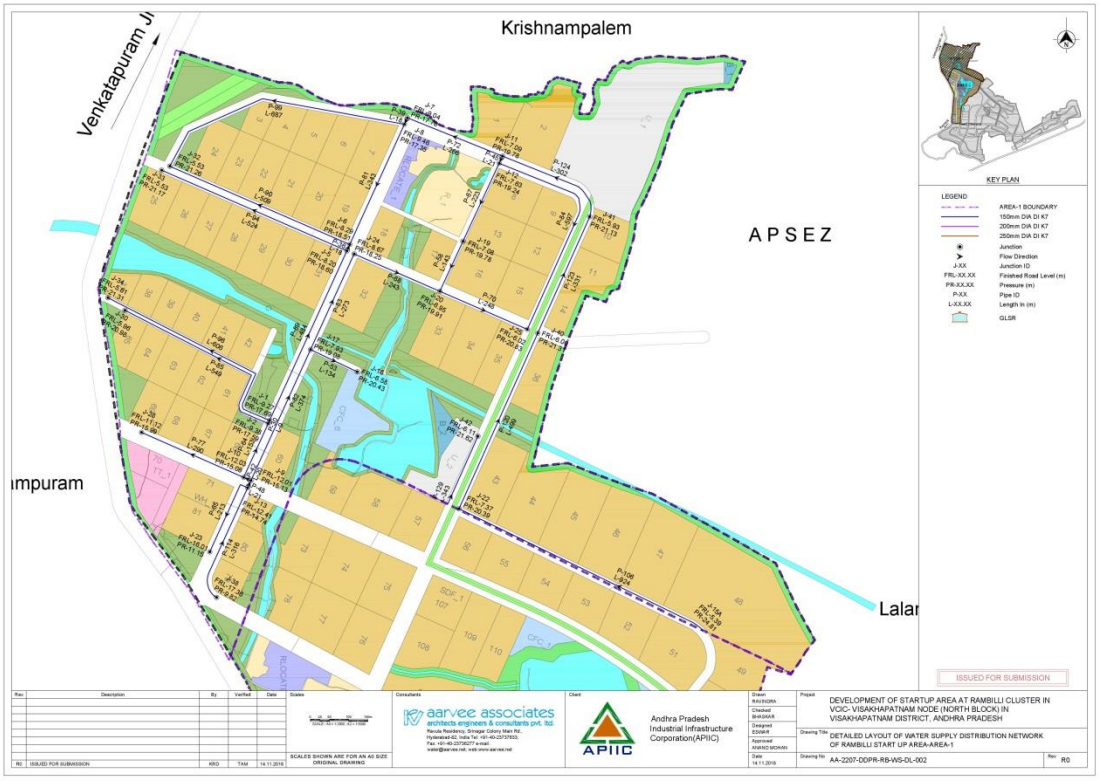


Figure 16(b): Proposed water supply network for the start up area of Rambilli Area - 1



4. Storm water drains network

132. The project site has tropical wet and dry climate (Köppen Aw). It receives rainfall from the South-west and North-east monsoons with the average annual rainfall of 1118mm. The driest month is December, with 6 mm of rainfall. In October, the precipitation reaches its peak, with an average rainfall of 259 mm.

133. Storm water drainage system helps to relieve and dispose surface water from the developed site. For Atchutapuram, the planning strategies for drainage system have taken into the following considerations:

(i) Develop an effective drainage control plan to manage surface runoff disposal.
(ii) Achieve a fully gravitational storm water drainage system whenever possible.
(iii) Integrate with rain water harvesting facilities to achieve sustainability

134. The drainage system shall only be designed to cater for the runoff within the development.

135. **Existing storm water drainage pattern.** Generally, the existing terrain of the entire project site is relatively flat and gentle. Existing ground elevation ranging from 0m to 55m. There are two hillocks present within the site. Generally, the fall direction of the site is from the hillock slopes towards the lower area radially. There is an existing water body straddles the northeast of the project site. The fall direction of the site falls from the hillock towards the lower area such as the water body.

136. Generally, the site is gentle, 94.3% of land with slope less than 4% which is suitable for industrial development. Hillock area shall be excluded from developable land due to its steep slope. Existing ground level may be largely retained, and no major earthwork is needed as there is no flooding recorded at the time of this planning task.

137. **Estimation of Rainfall and Runoff.** In order to compute storm water runoff, it is essential to analyze the rainfall data in the contributory catchment. Many of the precipitation records collected give only the total amount of rainfall day by day. Such records are of less value in the study of storm water runoff. It is the maximum rate of precipitation lasting for a sufficient time to produce maximum runoff conditions, which is of importance in the storm water quantity computations.

138. Basically, two types of rain gauges are available namely, non-recording and recording. The non-recording type is used to determine the total rainfall in a particular period without reference to rate at which it fell. The recording type or pluviograph on the other hand records the rainfall intensity either continuously or in short separate time intervals.

139. Rates of precipitation can only be obtained from the records of recording rain-gauges. Usage of such gauges is generally limited to larger cities of greater importance or by weather system stations or specific places where studies are proposed to be made. At most of the places such gauge information is not available. The data that normally collected is the daily/monthly rainfall data.

140. Historically at most of the places in India, the rain gauges of non-recording type were installed and are at taluk level offices (Tahsildar office or Mandal office). The accuracy of rainfall prediction increases as the density of rain-gauge station network increases.

141. Hence available rainfall records were analyzed to arrive at appropriate intensities for the design of a cost-effective and reliable storm water drainage system for Rambilli Start-up Area (Phase – I). The predicted design storms were used to model storm water runoff and perform hydraulic analysis of the storm water drainage system.

142. Daily rainfall data of Anakapalli which is located nearer to the Rambilli Start-up Area from Andhra Pradesh State Development Planning Society, Vijayawada. Data is also collected for 38 years (1981 to 2018) for rain gauge station located at Anakapalli near Rambilli area catchments and rainfall analysis is carried out for developing the IDF curves.

143. In general, the intensity of precipitation varies inversely with the duration of the downpour, i.e., heavy showers do not last as long as rains of lesser intensity. Intensity is expressed in terms of millimeters per hour, but this rate changes continuously throughout the storm period. It may rain 100 mm say in particular one-hour duration, giving an average rainfall rate of 100 mm/hr during that particular hour. However, during this particular hour, sometimes, the rainfall rate will exceed 50 mm/hr and sometimes, it may be less than 50 mm/hr.

144. From the rainfall records, the rates of precipitation i.e., intensity of rainfall during storm can be ascertained. The duration is the time (minutes) for which it falls with that given intensity and the frequency is the number of times (once a year, twice a year, etc.), it falls. If such records are available for a considerable period of years, they will indicate the intensities which may be expected on the average during a term of years equal to the period of record. However, they may not indicate the extreme conditions likely to occur, but it may include a great storm due to occur once on the average in a much longer period.

145. **Insity duration and frequency curves.** Basic data for rainfall intensity duration frequency are derived from gauge measurement of rainfall. Processing of data for runoff estimation involves statistical procedures yielding time-intensity curves for different frequencies. There are several methods available for the preparation of point rainfall data for intensity-duration-frequency analysis. Out of which there are two approaches, the annual-duration and partial-duration series.

146. In the annual-duration series, for each duration selected, the heaviest rainfall that occurred in each year is listed, with no tabulation of lesser intensities during that same calendar year, even though some of them might be greater than rainfall intensities that occurred in other years of record. In the partial-duration series, all rainfall intensities above a practical minimum for each duration for the entire period of record are included.

147. The first of these methods gives the probability of occurrence that the maximum rainfall in any one year for a specified duration will equal or exceed a given intensity. The second method gives the frequency on the number of occurrences in a given period of time that a rainfall of a given intensity and duration will be equaled or exceeded.

148. Rainfall Intensity–Duration–Frequency (IDF) curves are graphical representations of the amount of water that falls within a given period of time in catchment areas. The IDF curves allow for the estimation of the return period of an observed rainfall event or conversely of the rainfall amount corresponding to a given return period for different aggregation times. IDF curves are used in conjunction with runoff estimation formulae e.g., the Rational Method, to predict the peak runoff amounts from a particular watershed. The information from the curves is then used in hydraulic design to size culverts, open drains, and pipes.

149. Especially in urban areas, due to increase in imperviousness of the surfaces, there is a possibility of occurrence of flash floods. To reduce the amount of flooding, proper drainage facilities are to be constructed with adequate capacities. Hence, one must have an adequate knowledge of occurrence of maximum intensity rainfall depending on the importance of the hydraulic structure to be constructed. Hence, the IDF Curves are constructed to serve this purpose.

150. For the preparation of IDF Curves, considerable amount of rainfall data is to be present for the region in consideration. With a minimum of 30 years of rainfall data from the stations in and around the catchment area, IDF Curves can be constructed. The longer the data available, the more dependable is the forecast.

151. **Stormwater Drainage Basins and System Design.** A detailed storm water drainage system and related structures for collecting and discharging the storm water within the site to primary drains are developed during the Draft DPR stage based on the best practices.

152. The design runoff reaching storm water drains depend on intensity of precipitation, duration of precipitation, tributary area of contribution and time required for such flow to reach the drain. The designs shall conform to the Central Public Health and Environmental Engineering Organization (CPHEEO) Manual.

153. The frequency of storm for which the drainage systems are to be designed depends on the importance of the area to be drained. Commercial and Industrial areas shall not be subject to frequent flooding. The suggested frequency of flooding in the different areas is as follows (as per CPHEEO manual on sewerage, 2013 version):

a) Residential areas
   (i) Peripheral Areas – Twice a year
   (ii) Central and comparatively high prices areas – Once a year

b) Commercial and high-priced areas – Once in 2 years

154. As per the CPHEEO sewerage manual, the recommendation of design event is for once in 2-year event. Hence, the components of proposed storm water drainage system was designed for the following design standards:

- Once in 2-year event flows for storm water drains;

155. **Planning and Design of Drain Network.** Sewer GEMs was used to develop the hydraulic designs, ensuring that the drainage channels running through the site will have enough capacity to transport design flows without flooding.

156. The hydraulic analysis includes the various types of transverse drainage structures, i.e., longitudinal drains and culverts. Storm water drainage (SWD) network for each runoff zone was designed using Sewer GEMS to arrive at size, capacity, nodes/ junction points, and outfall points etc. The following SWD network is proposed:

(i) The Storm Water Drainage from the upstream hilly catchments is discharged to the existing channels;
(ii) Road drainage was via a open drain covered with the slab within the ROW of the roads.

(iii) The site controlled/volume restricted storm water from the developed industrial plots was let in through kerb inlets into these drains. Topographic survey and road alignments was utilised for hydraulic gradient of storm drains, for fixing invert levels.

157. Layout Plan for Storm Water Network. The optimized design of storm water network includes the drain wise invert level, cover level and slope of drain. Layout plan of the SWD system, alignment and position of storm water drainage along the road is shown in drawings.

158. The road run off is planned to be collected through road gully pits placed at 20 m c/c interval. The industrial lot storm water drainage is proposed to be connected direct into the concrete drains on either side of the roads.

159. The cost estimate of the storm water drainage works for the proposed design and details are given in the Cost Estimates annexure.

160. To avoid the urban flooding and for effective rain water management, the Storm Water Drain network was planned. This network of drains also planned along with the road network on the roadside. For total road network the estimated cost for provision of Storm Water Drain network is 17.00 crores having storm water drain length of 14.51 km.

161. Contour map pertaining to the start-up area of Rambilli cluster – VCIC – Visakhapatnam node is depicted as Figure 17(a) and Storm Water Drainage Network Map for the Start-up area of Rambilli Area-1 is depicted as Figure 17(b).

Figure 17(a): Contour map for the Start-up area of Rambilli cluster

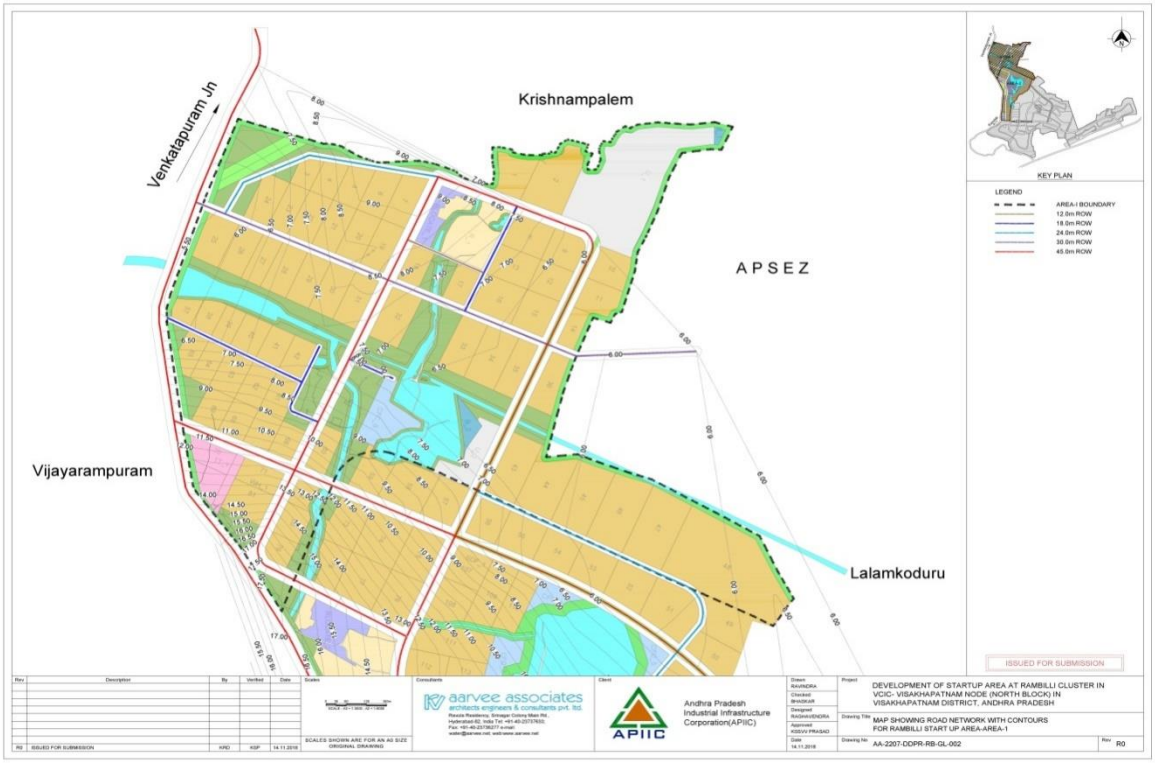
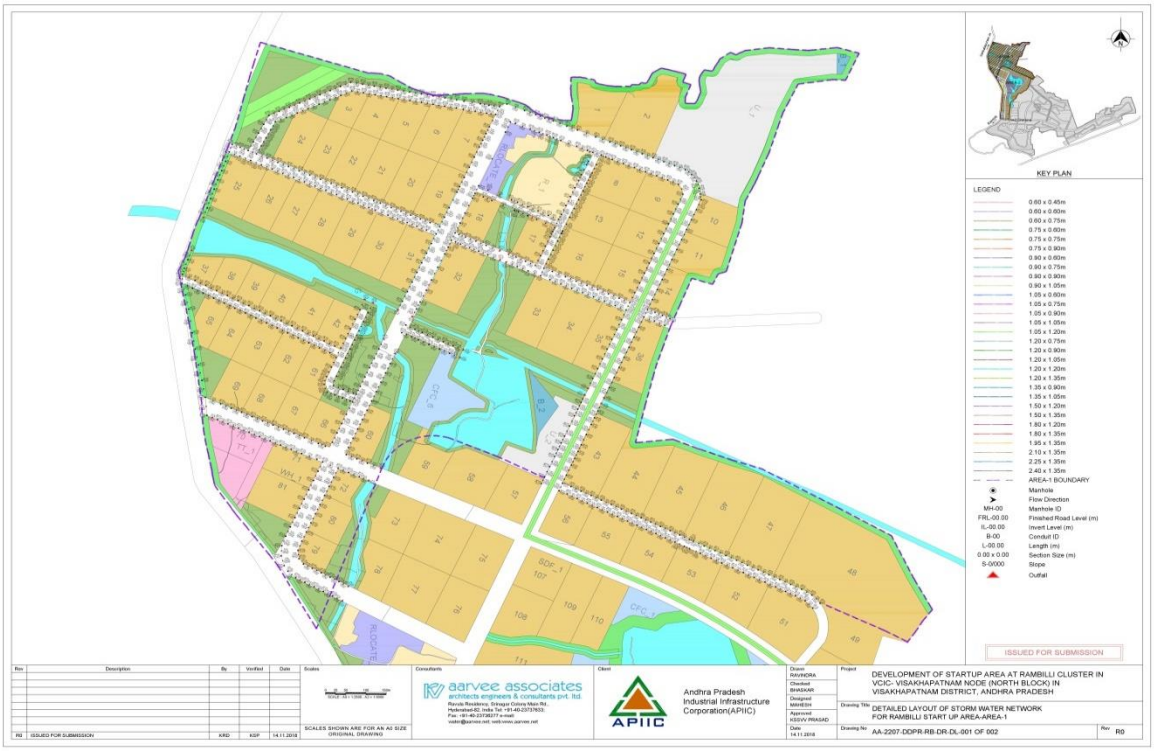


Figure 17(b): Storm Water Drainage Network Map for the Start-up area of Rambilli Area-1



5. Power distribution network

162. As reported in Facility Administration Manual for Visakhapatnam–Chennai Industrial Corridor Development Program, APTransco has identified the need for power transmission investments in the VCIC nodes of Visakhapatnam, Naidupeta, and Yerpedu-Srikalahasti and the requirement for installation of substations at 10 locations and associated transmission lines. Four of these substations are at voltage levels of 220/132/33 kilo volts (kV), one substation is at 220/132 kV, four substations are at 132/33 kV and one substation is of 400/220 kV along with associated transmission infrastructure. APTransco has proposed gas-insulated substations (GIS) at three locations (i.e., Ozone valley, Kappuluppada and Atchutapuram) owning to constraint in availability of land and air-insulated substations in other locations, namely Nakkapalle/Chandanada, Pydibhimavaram, Yerpedu, Rachagunneri, Naidupeta, Kakinada and Mangalgiri. The project proposals are optimized based on load flow studies detailed field studies conducted by APTransco in partnership with APIIC to arrive at the least-cost option. In addition, there will be an improvement in the voltage profile within the VCIC region and the schemes would result in reduction of losses. For better evacuation and transmission of power with system reliability and stability, alternatives were examined at various stages of planning to arrive at the optimal solution based on technical and cost considerations. Estimated timelines for completing the scheme is as follows:

Estimated Timelines

Category	Estimated Timeline
132 kV SS and lines	9 months from award of contract
220/400 kV SS and lines	12 months from award of contract

GIS SS and cabling	18 months from award of contract

GIS = gas-insulated substations, kV = kilovolt

163. APTransco has assessed the following benefits due to implementation of VCIC project:

(i) voltage variation within the acceptable range specified under Indian Electricity Rules; (ii) ability to cater to load growth of about 1,078 megawatts (MW) in the clusters; (iii) reduction of system losses of about 35.5 MW; and (iv) enhanced security of supply for sub-stations to meet the peak load even with an outage event on the single largest transformer. The designs of proposed transmission lines and substations are based on standard designs and drawings complying with statutory requirements of safety and quality standards. The substations and associated transmission lines are divided into three packages. Package 1 and 3 will be taken up under Tranche 1 while Package 2 will be taken up under Tranche 2.

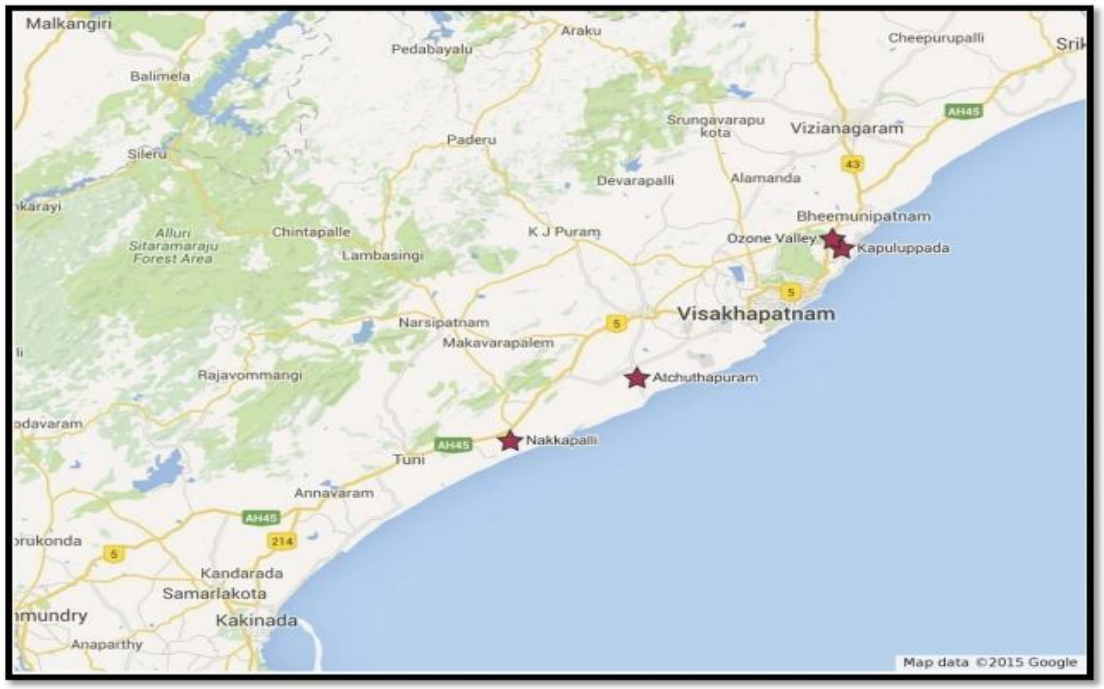
Table 13: Proposed Subproject Components Under VCICDP Tranche 1 Package APTransco

Subproject Components	Location	Component Description
132kV Kapuluppada Substation	Kapuluppada, Visakhapatnam District	132Kv GIS Substation (2X80 MVA)
220kV Achutapuram Substation	Achutapuram,	220kV GIS Substation (2x100+2x80+1x50 MVA)
220 Nakkapalle Substation	Nakkapalle, (DL-Puram),	220kV Substation (3X100+2x80 MVA)
16 km Transmission line	Parwada, Kakinada to Nakkapalli SS, Visakhapatnam Dist	Laying of 220kV Multi Ckt LILO of Parwada - Samalkota and VSS-Kakinada Line to proposed SS at Nakkapalle/Chandanada (16 KM)
8 km Transmission line	Brandix to Achutapuram SS, Visakhapatnam Dist	Laying of 220 kV Multi Ckt OH Line from 220kV Brandix SS to proposed GIS at Achutapuram (8 KM)
14 km underground cable	Dairy Farm to proposed GIS at Kapuluppada, Visakhapatnam District	Laying of 132kV Double Ckt XLPE Cable from 220 kV SS Diary Farm to proposed GIS at Kapuluppada (14 KM)
12 km underground cable	Dairy Farm to Ozone Valley, Visakhapatnam District	Laying of 132kV Double Ckt XLPE Cable from 220 kV SS Diary Farm to proposed GIS at Ozone Valley (12 KM)

164. The Energy Department in Andhra Pradesh is also monitoring the performance of distribution feeders. Data on number of outages and duration of outages along with number of interrupted consumers is being recorded on a daily basis. The Energy Department is reviewing this information and will be taking further initiatives to support 24-hour supply of power to industrial cluster loads along the VCIC while also identifying international standard benchmarks for improving reliability of supply including outage levels. So, Main source of power to Rambilli Phase-I shall be at 132KV level from 220KV/132KV, Atchutapuram Substation of APTRANSCO, which is under construction and shall be commissioned in next six months' time. Achutapuram Substation is situated approximately 3.0 km from proposed Rambilli Industrial complex.

165. But for phase1 & Phase 2 combined, requirement of Power will be above 200MVA. In th at case, Incoming 132KV Transmission line to be replaced with 220KV Transmission line and presently proposed 132kv/33kv Substation shall be upgraded to 220KV/132KV/33KV with 4x80 MVA Power Transformers.

Figure 18: Key Plan depicting Proposed Substation Locations proposed by APTRANSCO for Visakhapatnam Chennai Industrial Corridor Development Project



166. Alternatively, APTRANSCO may be requested to lay 220KV Incoming Transmission line and charge at 132kv level to the proposed 132KV/33KV Substation. Later on, same Transmission line can be charged at 220KV level and utilised for phase-2 also, by adding 220KV/132KV Transformers whenever the Power demand crosses 50 MVA. Space for 220KV Bay & 220/132 kv Transformers and for required Switchgear shall be provided in the layout of presently proposed 132KV/33KV Substation. With this proposal, additional expenditure can be avoided for laying 220KV Transmission line at later stage for Phase-2.

167. Proposed scheme. **T**o meet the Power demand of Phase-I, 132KV/33kv Receiving Substation is proposed at Rambilli Industrial complex in Block nos. 105, 106 &107, which shall be constructed by APTRANSCO. The location of Main Substation is shown in the drawing. This main 132KV substation shall receive power supply at 132KV level from Achutapuram substation.

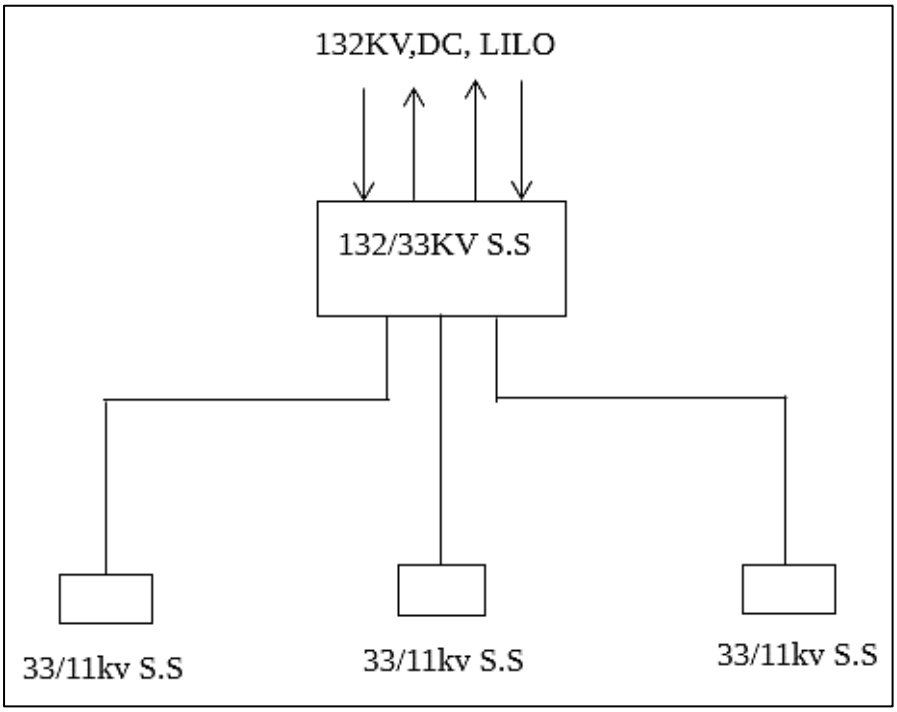
168. Double circuit 132KV overhead Transmission line to be installed From Brandix substation, which is 6.0 km away from the proposed Achutapuram 220kv/132kv substation. Out of two 132kV circuits, one will be working & another will be standby.

169. The scope of work starts from Tapping the power at 132 KV level from 220KV/132KV Substation by means of Double circuit overhead Transmission line to 132/33 kV Switch yard. Incoming 132KV line is connected to 132KV bus with Line – In- Line out arrangement.

170. Incoming Power at 132 kv level shall be further step down to 33 kV at Receiving Substation.

171. Power at 33kv level is Transmitted to 3 no's 33kv/11kv Substations.

Figure 19: Block Diagram Indicating Power Supply Network to Rambilli Industrial Complex



172. Power thus received at 33kv level shall be further stepped down to 11 kV voltage at 33/11kv substation. Power at 33 kV and 11 kV levels shall be provided to various consumers from three (3) no's 33/11KV substation.

173. Each 33KV/11KV Substation shall be receiving power from132KV/33kV Main Receiving Substation (MRSS) through 33KV, Double Circuit Overhead lines.

174. 33/11kV AIS substations shall be provided nearer to the load centers. Each substation shall be provided with necessary 33kV, 11kV Indoor switch gears and Outdoor LiLO arrangement with Power Transformers.

175. Number of Substations required to transmit energy to all Industrial Consumers at various voltage levels:

132KV/33KV Substation: 1no.
33KV/11KV Substations: 3 nos.

176. To maintain the redundancy and reliability in the power supply distribution network, far end terminals of 11 kV and 33kV Feeders are interlinked through Outdoor Isolators.

177. **Identification Of Location of Substation & Power Transmission Route. Considering** the power system described as above, 220/132/33kV Main receiving substation is planned to be

in plot no 105,106 &107 as per Development plan of Rambilli Industrial Complex (Phase-1). The location is selected in such a way that substation is to facilitate ROW without any problem 220kv incoming lines.

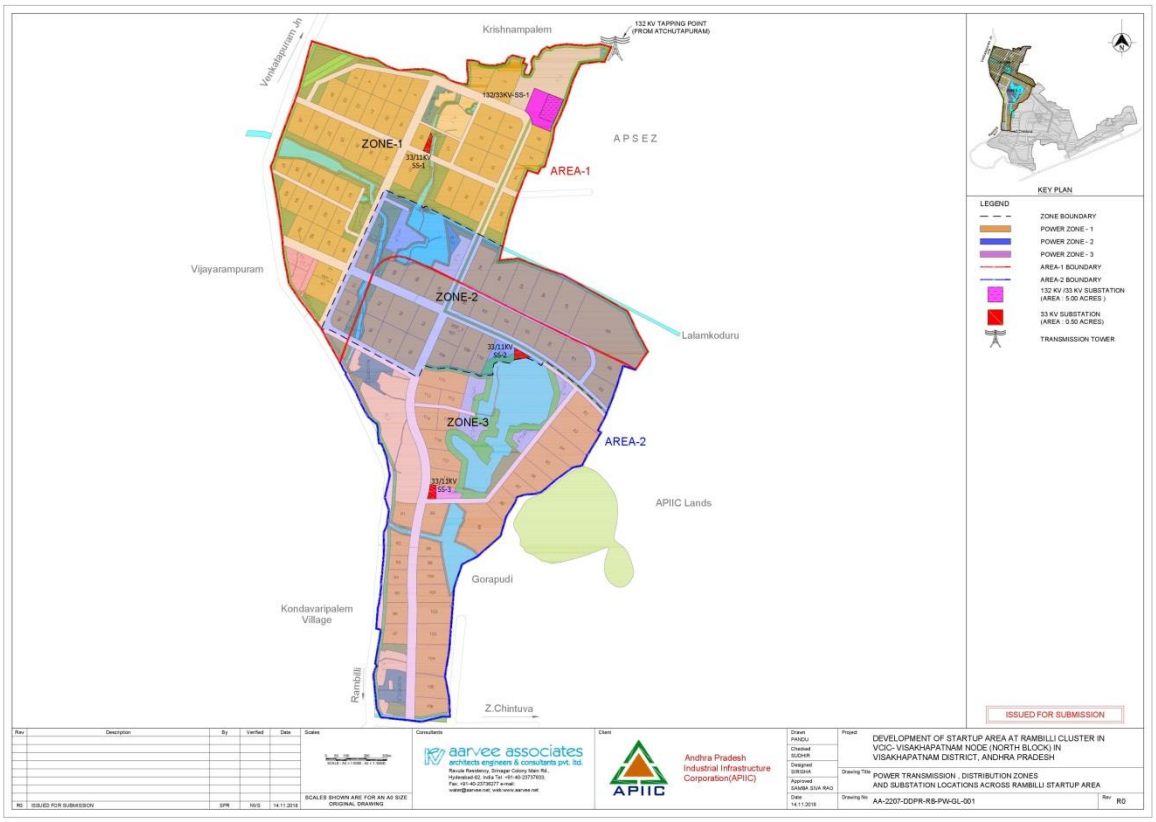
178. The distribution of power will be through 33kV/11KV SS. Keeping in view the optimum utilization of substation and power requirement of different Premises / consumers at different supply voltages 33kV, 11kV and 415V, load centres have been identified and the total 3 (Three) locations of 33/11kV Substations have been planned near the load centres. The location of these 33/11KV substation is shown in the layout drawing the power to consumer requiring 11KV, 33KV supply shall be fed from respective overhead lines. However, consumer requiring 132KV supply shall be directly fed from 132/33KV substation.

179. All 33kV/11KV Substations are interlinked. Two 11KV Feeders are interlinked at end points to form a ring and shall be fed from two different circuit breakers to form a Ring in distribution network. For service, areas such as ICT and streetlights additional 11/0.433kV transformers shall be installed.

180. Power distribution network was effectively planned for the start up area. At present there is one proposed power source i.e., 220 kv substation at Achutapuram. Whereas additional power sources were proposed. The total estimated cost for power distribution network is 24.26 crores. This network is planned along the road network and roadside only.

181. A map showing the Rambilli cluster – start up area with the proposed power supply distribution network is depicted in Figure 20.

Figure 20: Proposed Power supply network for the Start up area of Rambilli cluster



D. Proposed Components to be funded by Government of Andhra Pradesh (GOAP)

182. The infrastructure related to wastewater collection, conveyance and treatment, recycled water reuse, administrative buildings, ready built factory sheds etc., in the start-up area will be constructed by implementing agency APIIC with government or other funds. Per APIIC, these works will be taken up after the works funded under VCICIDP Project 2 are completed. List of components proposed to be funded by GOAP is given in the table below.

Table 14: Components proposed under GOAP / Other funding

Components	Description
Wastewater Conveyance system	Sewerage system with 150 mm DWC HDPE pipes of 5681 m length and 203 manholes for collecting sewage with 146 plot connection chambers. Intermediate and main pumping stations with 3600 m DI K9 100 mm pumping main and pump sets for pumping sewage; (p) 300 KLD STP for treatment of sewage with 2 years O&M
Administrative Building	administration building
Ready Built Factories	standard flatted factory buildings
Common Effluent Treatment Plant (CETP)	APIIC shall be constructing CETP using the DBOFT mode (Refer Appendix) after construction of the internal infrastructure in accordance with the MOEFCC Environmental Clearance requirements.

Other common facilities	As required to operationalize the industrial park

183. **Establishment of industrial, commercial, logistics and services:** APIIC on its part develops industrial parks, in this case Rambilli industrial cluster Phase 1 Area 1, for establishment of industrial units to manufacture a product or service units. The industrial parks will have basic infrastructure like developed open plots, internal roads, water distribution facilities sewage, power distribution, common effluent treatment facilities, communication facilities such other facilities as may be required.

184. Subsequent to development of basic infrastructure and amenities, APIIC allots vacant developed plots and factory sheds for establishment of industries, allied facilities, services, commercial establishments etc., These allotments will be made as per the regulations enforce (APIIC Industrial Parks Allotment Regulations, 2020). As per the regulations, these plots/industrial premises are allotted, based on the application made in the prescribed format, to an individual or group of individuals under Indian Partnership Act, 1932 or a company registered under Indian Companies Act, 1956 or Limited Liability Partnership Act, 2008 or cooperative institution or a body incorporated under any Act of Indian law, established for the purpose of industrial activity/service.

185. Industrial area management. APIIC is responsible for establishment and operation and maintenance of industrial park and establishes an Industrial Area Local Authority (IALA) for each industrial area/park for this purpose. APIIC is organized in the form head office, headed by managing director, and zonal offices, one for each zone, headed by Zonal Managers. For management of industrial parks, under each Zone, APIIC establishes IALA, headed by a commissioner or executive officer, who is the Industrial Park Manager (IPM). IPM works under the supervision of Zonal Manager and is responsible for all aspects of industrial park development and operation. Industrial Park management team shall have staff for asset management, infrastructure management, revenue collection etc.,

186. Member industries and service agencies are responsible for the establishment and operations of respective units in compliance with the applicable regulations, including EIA Notification 2006, and other regulations related to air, water, noise, hazardous waste, solid waste, health and safety, labour welfare etc. APIIC has conducted an EIA study for the overall industrial area and is in the process of obtaining environmental clearance from the MOEFCC. APIIC will ensure that industrial development is as per the environmental clearance issued. APIIC will also prepare and implement disaster management plan in coordination with other government agencies and industries. APIIC will also prepare and implement disaster management plan in coordination with other government agencies and industries. Individual industries, depending on the type and scale of operation, will conduct EIA study if required and obtain EC for their individual operations, and will obtain consent to establish (CTE) and consent to operate (CFE) from APPCB. Industries will also obtain other necessary permissions and licenses and will be responsible for compliance. Member industries shall monitor all environmental parameters such as emissions, air quality, noise levels, treated wastewater, water quality, etc., within their industry premises as per the stipulations laid by APPCB and/or MOEFCC in their respective Environmental Clearance, CFE and CTO.

E. Existing waste management facilities to be utilized by industrial area

187. **Waste Management (Hazardous and Municipal) System**. The proposed industrial cluster will utilize existing waste management facilities approved by Central Pollution Control

Board (CPCB) and operating in the state of Andhra Pradesh. Municipal waste in the form of canteen waste, commercial wastes from operations will be generated. Disposal of these wastes will be carried out as per prevailing norms. For non-hazardous and biodegradable wastes generated during the industries operations, APIIC will mandate each industry to have its waste management arrangements either through authorized recyclers or their own internal arrangements for recycling or other means such as composting facilities etc. Hazardous waste generated by industries and facilities like treatment plants, etc. will be sent to the existing hazardous waste management facility for treatment, storage and disposal set up and operated with the consent of pollution control boards. These are known as “Treatment, Storage, and Disposal Facility (TSDF). The nearest TSDF (JN Pharma City hazardous waste management facility at Parawada) to the proposed industrial cluster is at 21 km northeast of project site. APIIC will obtain consent of TSDF for accepting hazardous waste from member industries of the industrial cluster. Industries shall follow Hazardous and Other Waste (Management and Transboundary Movement) and amendment thereof, 2016.

F. Proposed Implementation Schedule

188. The subproject is currently at the bidding stage. The bidding process is likely to be completed and contracted awarded by May-June 2023. Construction is likely to start in July-August 2023 and will take 36 months to complete (July-Aug 2026).

189. Per APIIC, works related to the infrastructure to be funded by GOAP will be initiated after this. APIIC will schedule the works such that necessary infrastructure is made operational before the member industries start operation. APIIC will allot the developed plots for individuals or companies for establishment of industries, services etc., after the development industrial park with all necessary facilities and amenities.

IV. DESCRIPTION OF THE ENVIRONMENT

190. A brief description about the existing environment, including its physical and ecological resources, economic development of the region, and issues relating to quality of life are presented in this section. Broad aspects on various environmental parameters (geology, soil, topography, climate, land use, water resources, water quality, air quality, noise quality, tourism, cultural resources etc.) which are likely to be affected (direct or indirect) by the proposed road widening project are covered. These aspects are covered in broader geographic extent to present the entire project region.

191. Visakhapatnam district is considered as the Project Influenced Area (PIA) District /General Study Area. As a primary requirement of the environmental and social screening process, the Core Study Area (CSA) will be start up area of Rambilli cluster of VCIC-Visakhapatnam node.

A. District Profile

192. **Visakhapatnam District** is one of the North Eastern Coastal districts of Andhra Pradesh and it lies betweenCoordinates:17°42′15″North latitude83°17′52″ Eastern longitude. It is bounded on the North partly by the Orissa State and partly by Vizianagaram District, on the South by East Godavari District, on the West by Orissa State and on the East by Bay of Bengal.

193. The District presents two distinct Geographic divisions. The strip of the land along the coast and the interior called the plains division and hilly area of the Eastern Ghats flanking it on

the North and West called the Agency Division. The Agency Division consists of the hilly regions covered by the Eastern Ghats with an altitutde of about 900 metres dotted by several peaks exceeding 1200 metres. Sankaram Forest block topping with 1615 metres embraces the Mandals of Paderu, G. Madugula, Pedabayalu, Munchingput, Hukumpeta, Dumbriguda, Araku Valley, Ananthagiri, Chinthapalli, G.K. Veedhi, and Koyyuru erstwhile Paderu, Araku Valley and Chinthapalli taluks in entirety. Machkhand River which on reflow becomes Sileru, drains and waters the area in its flow and reflow and is tapped for Power Generation.

194. The other division is the plains division with altitude nowhere exceeding 75 metres watered and drained by Sarada, Varaha and Thandava Rivers and rivulets Meghadrigedda and Gambheeramgedda. Since no major Irrigation system exists significant sub regional agronomic variations exist in this division. Along the shore lies a series of salt and sandy swamps. The coastline is broken by a number of bald head lands, the important of them being the Dolphin's Nose which had afforded the establishment of Natural harbour at Visakhapatnam, Rushikonda (v), Polavaram Rock and the big Narasimha Hill at Bheemunipatnam. Administratively the District is divided into 43 mandals.

195. The district has a work force of 16.03 lakhs constituting about 41.83 of the population besides the marginal workers to a tune of 2.97 lakhs as per 2001 Census. The cultivators constitute 36.31% Agricultural Labourers 23.60% and the balance of 40.09% engage in Primary, Secondary and Territory sectors as per 1991 census.

B. Geological Profile

196. The district is underlain by variety of geological formations from the oldest Archaeans to Recent Alluvium. The Archaean group of rocks includes Khondalites and Charnockites of Eastern Ghat super group and Granitic gneisses of Migmatite group. The Gondwana rocks which are represented by sandstones are in very limited aerial extent. The recent alluvium is prevalent along the rivers.

C. Hydrogeology

197. Ground water occurs in almost all geological formations. From the ground water point of view, the aquifers in the district can be broadly classified into hard formations (khondalites, charnockites, granitic gneisses etc.) and soft formations (sand stones and alluvium). Ground water occurs under unconfined to semi-confined conditions in the hard formations, while it occurs under unconfined to confined conditions in soft formations. The yields in the weathered zones of hard formations range from 25 to 100 m/day. The bore wells drilled in the hard formations, generally tap the fractured and fissured zones. The yields of the bore wells in these formations range between 5 to 25m/hr. Sand stones are exposed in the small, isolated places around Nakkavanipalem and Elamanchili. In these formations, ground water occurs under both unconfined and confined conditions. The depth of dug wells in alluvium formations ranges from 2 to 10 mbgl and the yields generally ranges from 40 to 250 m/day. The depth of filter points/tubewells varies from 9 to 35 m with discharges ranging from 15 to 30 m/hour.

1. Soils

198. 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% villages 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.

2. Land Use/Land Cover

199. The total geographical area of the district is 11.16 lakh hectares of this 36.45% alone is arable area while 39.53% is forest area. The rest is distributed among "Barren and uncultivable land" about 11.7% and "Land put to non-agricultural uses" about 9.0%. Out of the arable area, the net area sowed form 27.2% while cultivable waste and fallow (current and old) lands constitute about 9.2% during 2006-2007.

D. Meteorology

1. General Meteorological Conditions

200. The climatological table for Visakhapatnam (17^0 43' N and 83^0 14' E), published by Indian Meteorological Department (IMD) based on daily observations at 08:30 and 17:30 hrs IST for a 30-year period from 1951 to 1980 forms the basis of the meteorological conditions of the project area falling in the region.

201. The monthly variations of the relevant meteorological parameters are presented in the following Table.

Month	Temperature (°C)		Rainfall (mm)		Relative Humidity (%)		Cloud Amount All Clouds (oktas)		Mean Wind Speed (kmph)	Predominant Wind Directions (From)	
	Daily Max.	Daily Min.	Total	Number of days	0830	1730	0830	1730		0830	1730
January	29.2	18.2	7.4	0.7	76	65	2.1	2.0	6.4	W,NW	E,SE
February	31.2	20.6	13.8	0.9	75	65	2.2	2.2	7.0	W,NW	E,S
March	33.8	23.4	6.6	0.4	71	66	2.1	2.5	8.5	SW,W	S,SW
April	35.1	26.1	24.2	1.8	68	70	2.9	4.0	12.0	SW,W	S,SW
May	36.1	27.6	45.3	2.9	68	69	4.1	4.7	12.2	SW,W	S,SW
June	35.2	27.6	117.7	6.6	72	69	5.9	6.1	11.8	SW,W	S,SW
July	33.1	26.4	128.2	8.1	78	73	6.3	6.4	11.8	SW,W	SW,W
August	32.8	26.2	161.4	8.9	78	74	6.2	6.5	10.6	SW,W	SW,W
September	32.7	25.9	171.9	9.4	79	77	5.6	6.1	7.1	SW,W	S,SW
October	32.1	24.6	194.7	8.7	75	73	4.2	4.8	6.0	NE,NW	E,SE
November	30.6	22.1	73.5	3.5	69	68	3.5	3.8	7.4	N,NE	NE,E
December	29.2	18.8	6.0	0.7	69	64	2.6	2.8	7.2	NE,NW	E,SE

Source: Climatological tables (1971-2000) by Indian Meteorological Department (IMD), GoI

2. Observations:

202. Based on the above table, the following are the observations drawn for the post monsoon season/ study period.

- Daily mean maximum temperature of 32.6^0C and daily mean minimum temperature of

24^0C was recorded.

- Maximum and minimum relative humidity of 79% and 68% were recorded at 08:30 hours in the month of September and April & May. Maximum and minimum relative humidity of 78% and 65 % were recorded at 17:30 hours in the month of September and December.
- Maximum and minimum rainfall of 194.7 mm and 6.0 mm was recorded in the month of October and December. Annual rainfall was 950.8mm.
- Mean wind speed during this season was 9.0 kilometre perhour.
- The predominant wind direction is observed from Southwest.

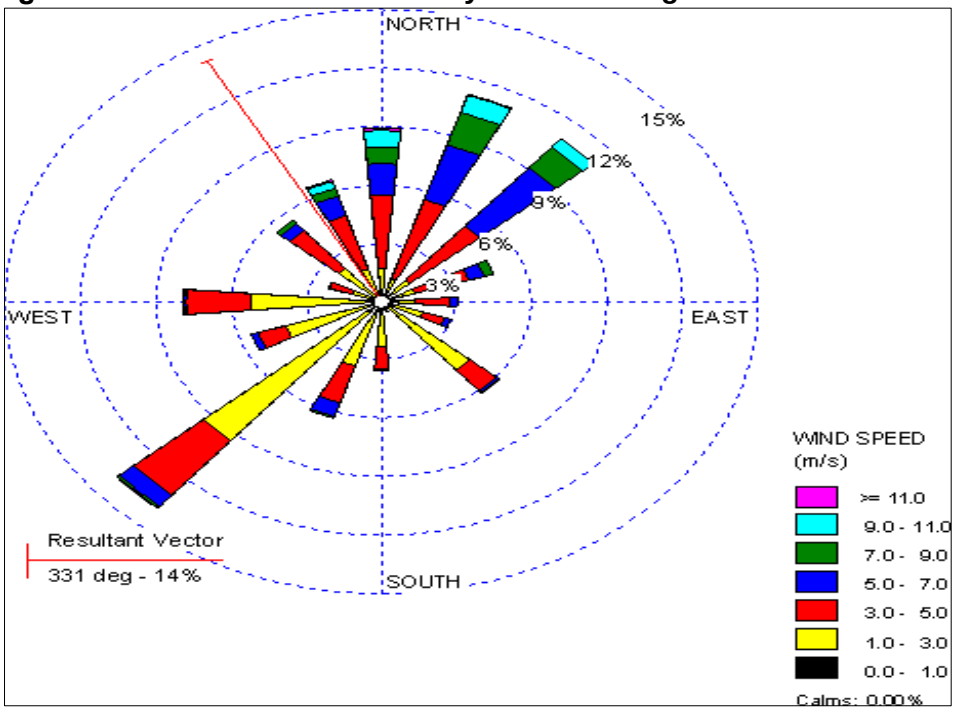
3. Wind Speed and Wind Direction

203. The daily-recorded meteorological data was processed, and wind roses were drawn on a sixteen-point compass (N, NNE, NE, ENE; E, ESE, SE, SSE; S, SSW, SW, WSW; W, WNW, NW, and NNW).

204. Wind pattern representing 00-23 hours for the entire study period is discussed below. The frequency occurrence of wind at various speeds was calculated on the basis of total number of observations recorded in the respective wind speed category.

205. The overall wind pattern recorded for 0.00 – 23.00 hours during the study period is given in Figure 21**.** The predominant wind directions observed were from SW (13.9%), NNE (11.3%), and NE (11.1%). Calm conditions prevailed for 0% of the total time. The wind speed varied between 1.0 to 3.0 m/s for most of the time during this period.

Figure 21: Wind Rose for the Study Period during 0:00 to 23:00Hrs



Source: APIIC

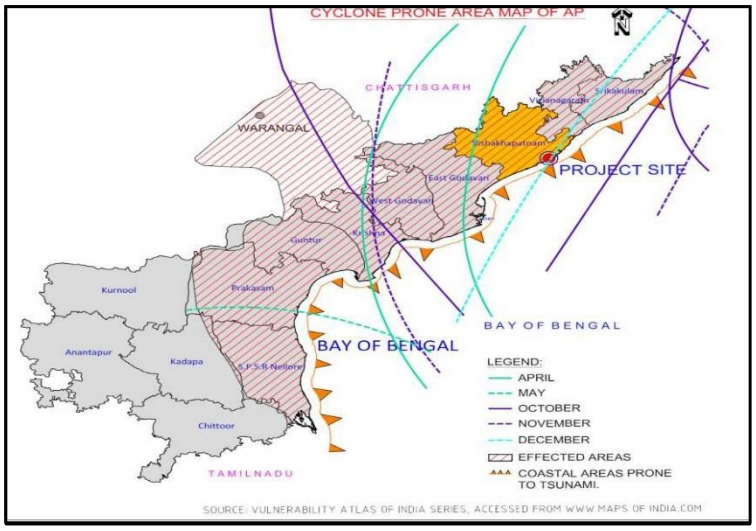
4. Natural Hazards

206. The potential natural hazards such as cyclones and depressions, Tsunami and seismicity of the project area are provided.

5. Cyclones and depressions

207. Cyclones are rare in Bay of Bengal from January to March. Isolated cyclones forming in south Bay of Bengal move towards west-north-west and hit Tamil Nadu and Sri Lanka coasts. In April and May, these form in south and adjoining central Bay of Bengal and move initially towards north-west and north; and then re-curve towards north-east striking Andhra- Orissa-West Bengal-Bangladesh coasts in May. Most of the monsoonal (June – September) storms develop in central and north of Bay of Bengal and move towards west-north-west affecting Andhra-Orissa-West Bengal coasts. Post monsoon (October – December) storms form mostly in south and central Bay of Bengal, re-curve between 15^0 and 18^0N affecting Tamil Nadu-Andhra-Orissa-West Bengal-Bangladesh coasts. Cyclone prone areas of Andhra Pradesh are shown in Figure 22.

Figure 22: Cyclone Prone Areas in relation to project site



Source: Vulnerability atlas of India series, accessed from www.mapsofindia.com

208. Frequency of cyclones in NIO Basin is bi-modal. Cyclones occur in the months of May-June and October-November with a primary peak in November and secondary peak in May. Tropical cyclones generally originate in eastern side of NIO basin.

209. Coastal areas of both Atchuthapuram and Rambilli mandals are prone to cyclones out of ten (10) declared cyclone prone mandals in Visakhapatnam district. The number of occurrences of severe cyclonic storms in the Visakhapatnam region over the past 70 years is 28 (Source: Polavaram Project Report, Vol.1). The frequency of the cyclonic storms based on the averaged value for past 70 years is given in Table 15.

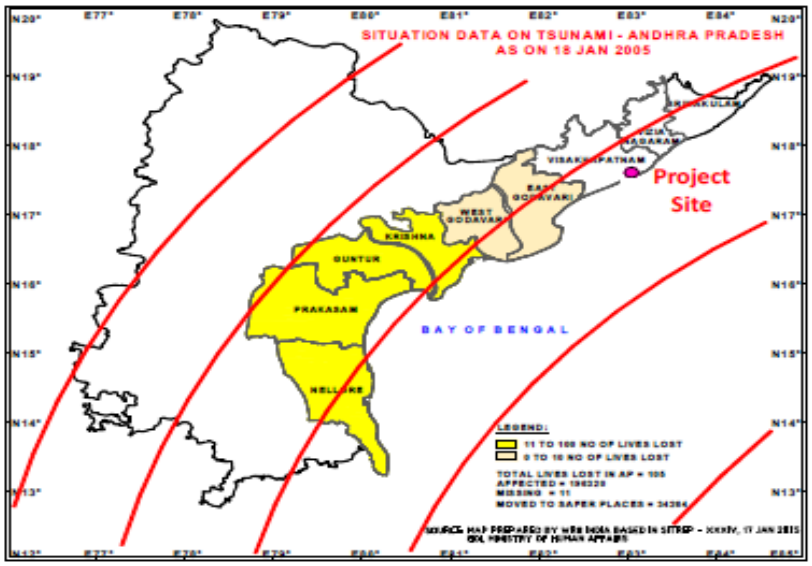
Table 15: Cyclonic Storm Occurrences in past 70 years near Visakhapatnam

Month	Occurrences
May	4
June	1
September	2
October	13
November	8

6. Tsunami

210. The Tsunami that affected the Indian coast in December 2004 was not reported in Visakhapatnam district since the water level rose by less than 0.5 m, in the coastal areas. Visakhapatnam fishing harbour and port experienced amplification of tide due to coning effect from outer harbour to entrance channel and unusual current speed in the order of 5 to 10 m/s. Tsunami (2004) affected areas in Andhra Pradesh is shown in Figure 23.

Figure 23: Tsunami (2004) Affected Areas

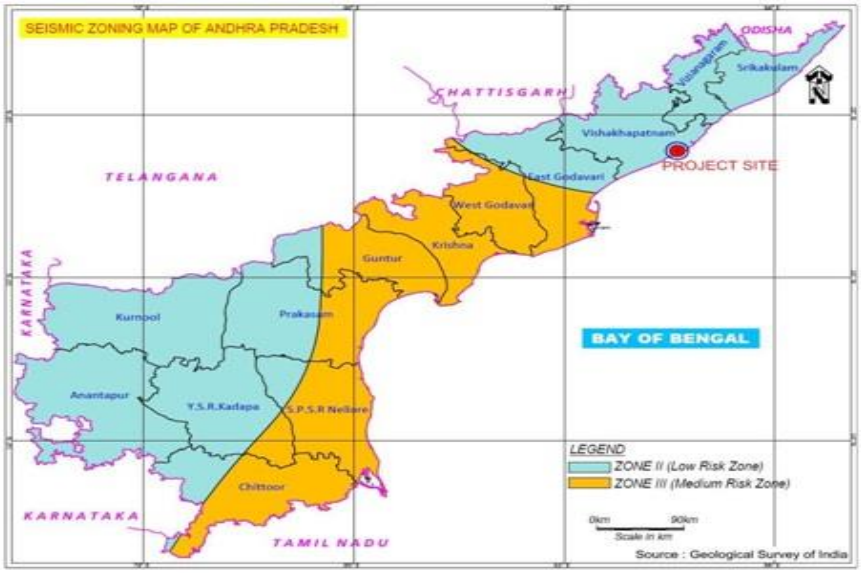


Source: Ministry of Home affairs

7. Seismicity

211. Seismic zone map of Andhra Pradesh is shown in Figure 24.

Figure 24: Seismic Zoning Map of Andhra Pradesh

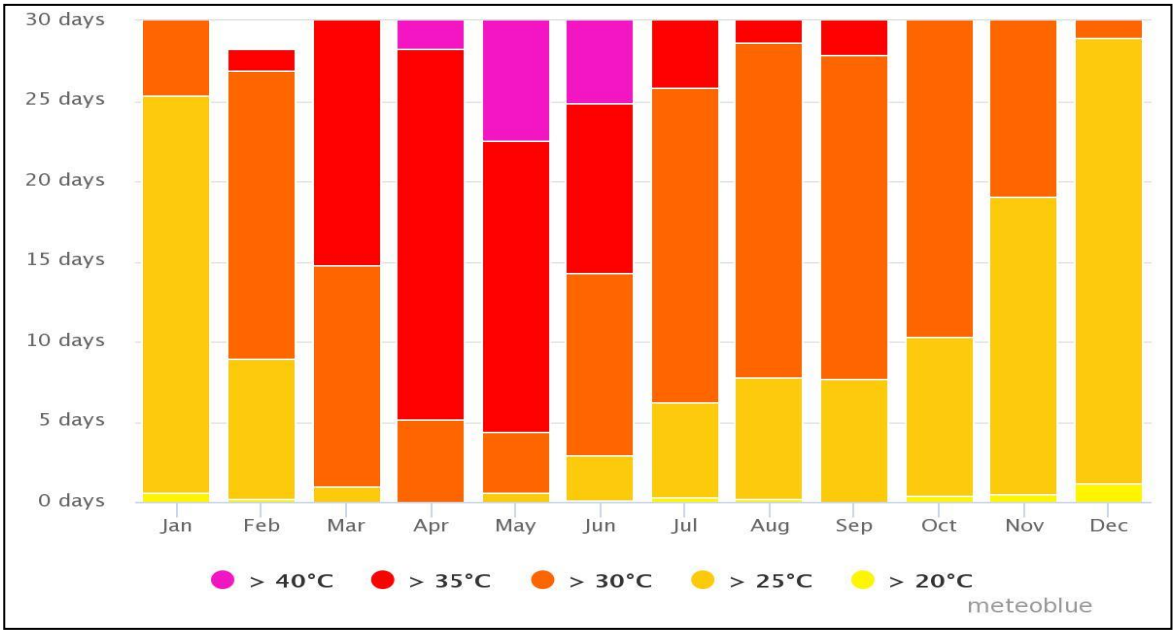


Source: Geological survey of India

212. It can be inferred from above figure that the project site falls in Zone-II (Low Risk Zone) "Seismic Disturbance up to 4.9 Zone".

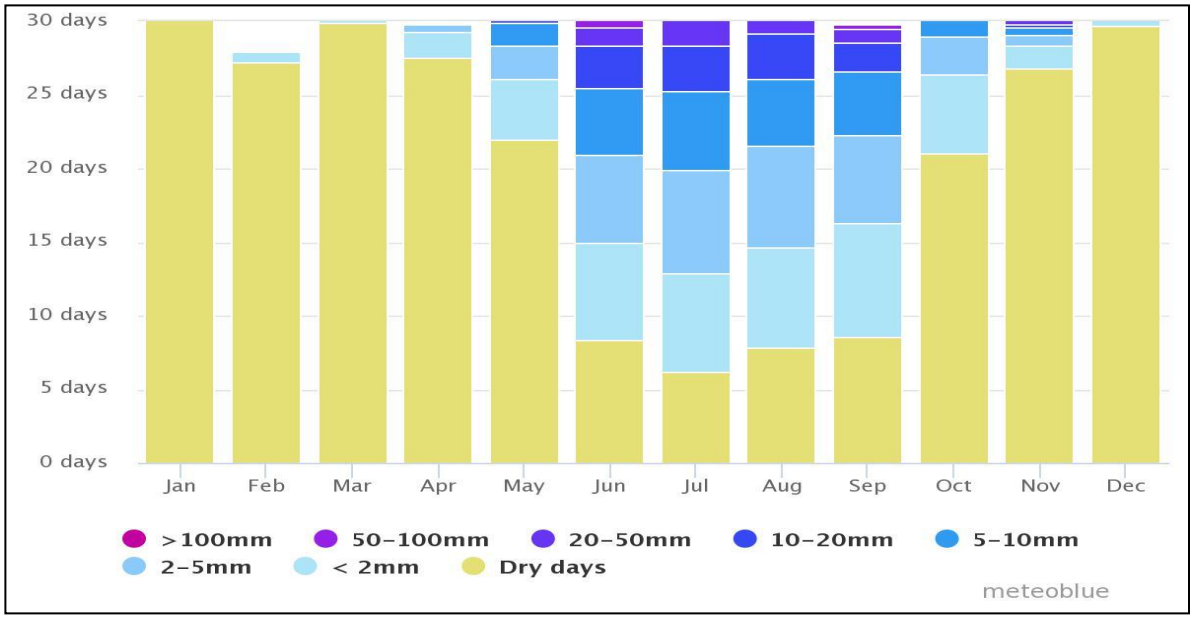
213. The observed meteorological data for temperature, rainfall, relative humidity and mean wind speed from **www.meteoblue.com** website are presented in Figure 25 to 27.

Figure 25: Variations in Temperature



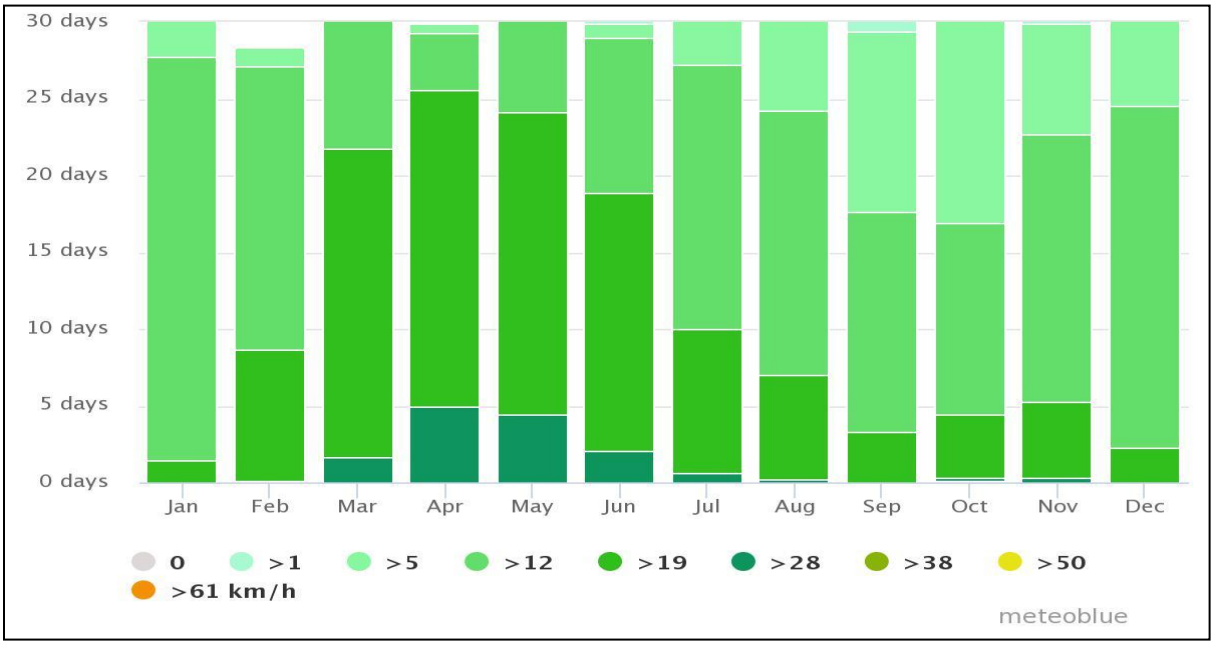
214. Hottest month is May and average daily temperature is 39˚. Temperature gradually increases from January; with onset of the southwest monsoon the temperature gradually decreases.

Figure 26: Annual Rainfall



215. The district lies in an area of precarious and uncertain rainfall. As such, the climate of the district is generally dry and salubrious. The average normal rainfall is 1,000 mm. Both the southwest and northeast monsoons contribute to the rainfall in the district. The rain from former monsoon is received between June and September.

Figure 27: Variations in Mean Wind Speed



216. The diagram for Visakhapatnam shows the days per month, during which the wind reaches a certain speed.

8. Reserved Forests

217. From discussions with the officials from APIIC, we understand that the Rambilli Cluster abuts the Rambilli Pothukonda, Kaluvalapalli and Pudimadaka Reserve Forests. As per the information from Forest Department officials, these forests are territorial in nature and do not have any endangered species or animals of concern. Further the Industrial cluster is away from the RF block. Proposed project activity i.e., development of Start-up area of Rambilli cluster – VCIC – Visakhapatnam node is not going to have any impact on the reserve forests. However, the preliminary study of the available flora and fauna of these reserve forests was done and updated in the Bio-diversity report which is enclosed as Annexure 15.

E. Socio-economic Profile of Visakhapatnam Rambilli cluster[23]

218. Visakhapatnam, the subproject district, is one of the Northeastern Coastal districts of the newly carved state of Andhra Pradesh. The district is bounded by the state of Odisha and Vizianagaram district (Andhra Pradesh) to the north, Bay of Bengal to the east, East Godavari district to the south and Odisha on its west.

219. The population of the district is 42.88 lakhs as per 2011 census which constitutes 5.0% of the state population. The district is spread over 11161 square km which is 4.1% of the area of the state. The sex ratio in the district is 1003 females per 1000 males while population density is 384 per square km. scheduled castes and scheduled tribes constitute 7.7% and 14.55%respectively of the district population. As per census 2011, district literacy level is 67.7% which among the males and females have been reported as 75.47% and 60% percent respectively.

220. Visakhapatnam is constituted of 43 sub districts and 39 community development blocks which in turn is constituted of 3265 villages. There are 15 towns in the district. Average land holding size is 2.23 hectares per household which for a marginal farmer is reported to be 0.96 hectare. About 35.9% of land in the district is cultivable area while 39.52% is forest area. “Barren and uncultivable land” is 11.7% and “Land under non-agricultural uses” is about 9.6%. Agriculture is the main occupation for nearly 70% of households. Animal husbandry is an important subsidiary economic activity. Fishing is another important economic activity. Fishermen population lives in about 59 fishery villages and hamlets on coastline stretching to a length of 132 kms. Industrial development in the district is marked by presence of number of large-scale industries like Hindustan Shipyard, Hindustan Petroleum Corporation, Coromandal Fertilizers etc.

221. Special Economic Zone (SEZ): The Andhra Pradesh Industrial Infrastructure Corporation of Government of Andhra Pradesh has established Andhra Pradesh Special Economic Zone in Rambilli and Atchutapuram Mandals in Visakhapatnam district. The APSEZ was notified in Government of India gazette by Ministry of Commerce on 12 April 2007. The SEZ initially was set up in an area of 5595 acres (from 17 villages). Major companies that are already present in this industrial cluster include Brandix Apparel India SEZ, Ramky Pharma City (India) Pvt Ltd SEZ, Divis Laboratories Ltd SEZ, Hetero Infrastructure Pvt Ltd SEZ, White Field Paper Mills Ltd SEZ, Parry Infrastructure Company Pvt Ltd SEZ, Anrak Aluminium Ltd SEZ, Baba Atomic Research Centre, NTPC have already been set up in the allotted locations and some industries are yet to be established in this cluster.

[23] Refer Resettlement Plan (RP) prepared for the subproject.

222. With the objective of further expansion, land acquisition was carried out in areas adjacent to the existing SEZ. A section of proposed acquisition for SEZ expansion (falling in Krishnampalem and Godapudi villages), has been allocated to this subproject i.e., 'area 1' under the start-up area.

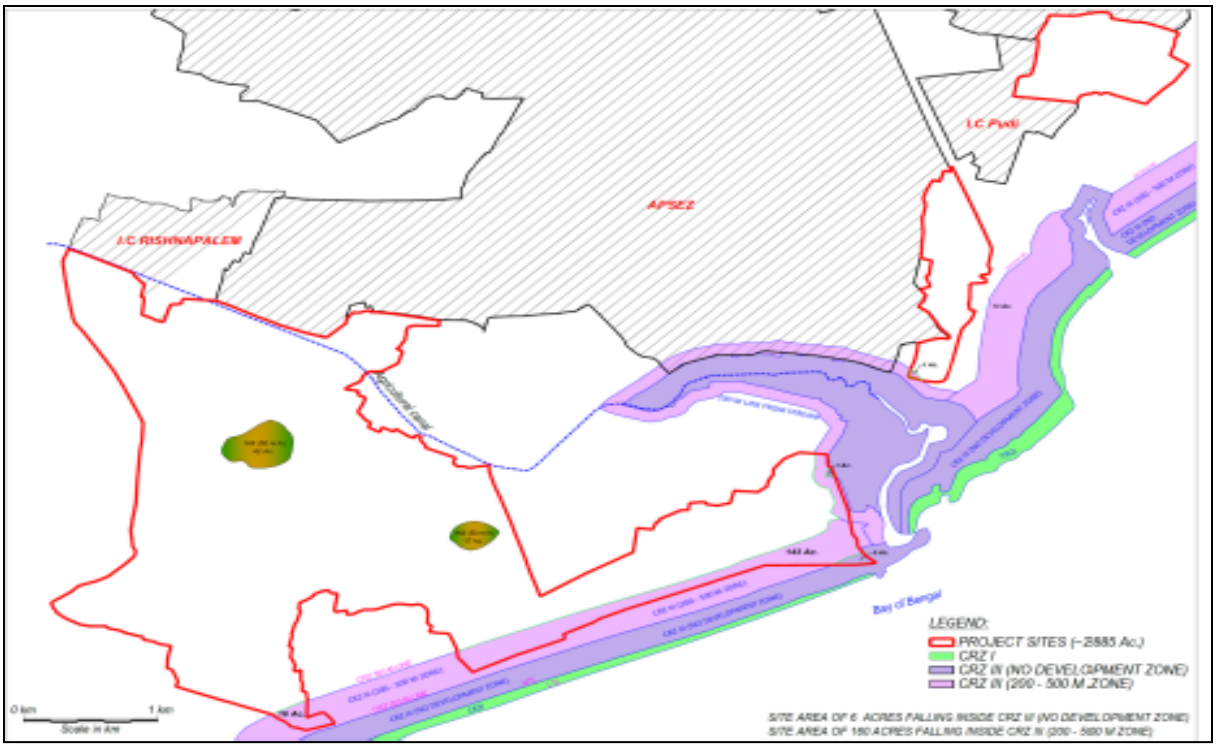
223. Krishnampalem village has a geographical area of 4 square km that houses a population of 1056. There are 289 households in the village. The sex-ratio of the village is 952 which is significantly lower than state average of 993 females per 1000 males. The literacy rate is 53.88% which amongst males and females are 67% and 51% females, respectively.

224. Godapudi village has a population is 1025 persons with 279 households. and number of houses are 279. Sex ratio in Godapudi, as per census 2011, is 994 per 100 males. The village literacy rate is 64.8% while female literacy rate has been recorded as 30.5%.

F. CRZ Area

225. CRZ maps were obtained from Visakhapatnam Urban Development Authority (VUDA)through Joint Collector office. The ADB funded subproject activities will not be falling under the CRZ area, however, the overall Project site is falling in CRZ I, CRZ III (No Development Zone) and CRZ III (200-500 m zone) categories. The total area falling under CRZ III (Nondevelopment zone) is 6 acres and CRZ III (200-500 m zone) is 160 acres. The following Figure 28 shows the area which falls in CRZ area. No subproject activities will be conducted in the CRZ areas.

Figure 28: Showing the area falling in CRZ area



Source: APIIC

226. For the entire APSEZ area APIIC has already obtained CRZ clearance and is expected to secure Environmental Clearance by March 2023.

G. Baseline Environmental Conditions[24]

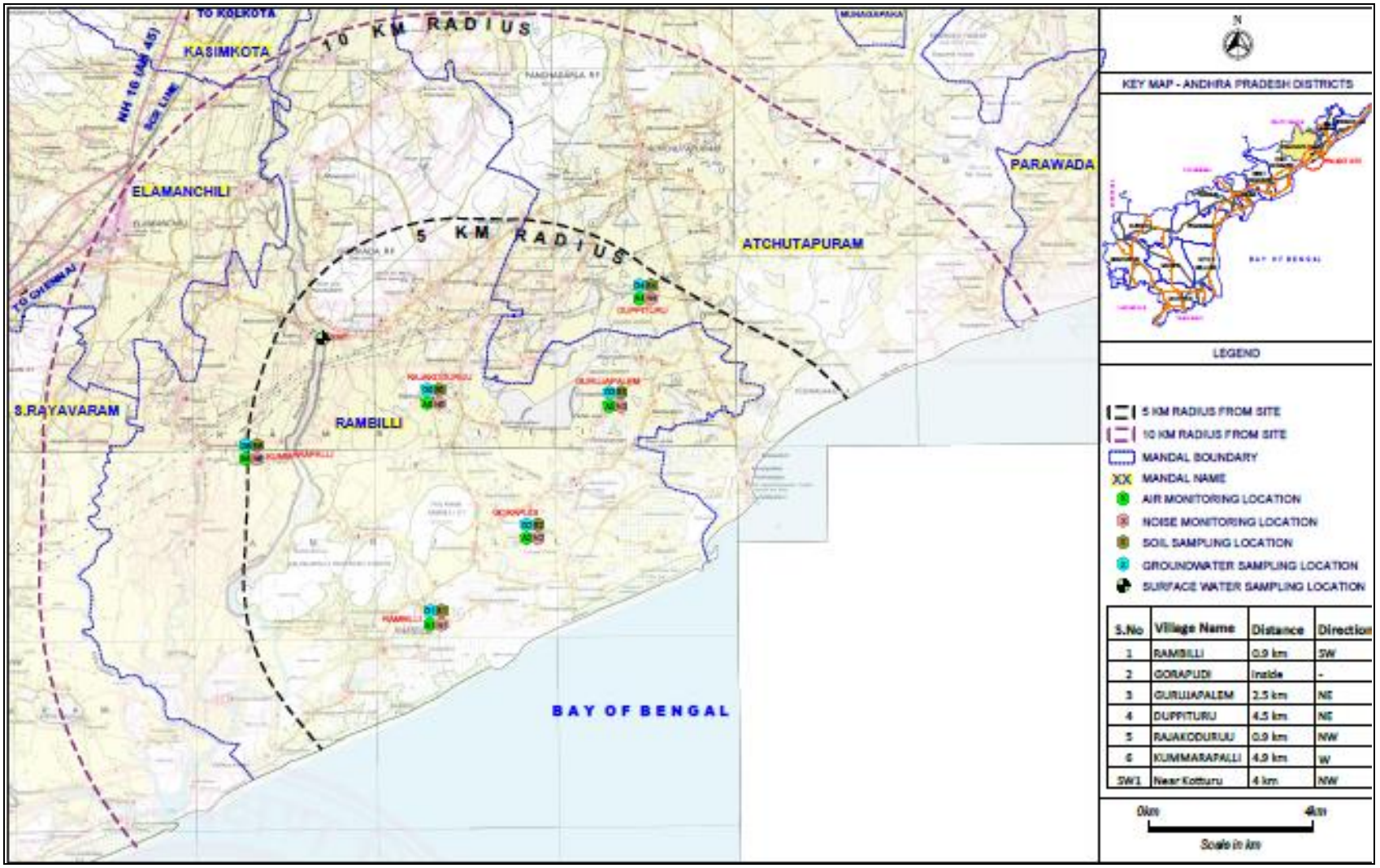
227. For purpose of this Initial Environment Examination report, available baseline environmental data from APIIC has been used.

228. The baseline environmental data was generated for Summer 2018 season. A map showing the monitoring locations is shown as **Figure 29**. Details of the monitoring/sampling locations are provided in Table 16**.**

View of the site

[24] The Baseline data was gathered in summer of 2018 during the EIA study conducted by APIIC for obtaining Environmental Clearance for Rambilli Industrial Park.

Figure 29: Map showing monitoring locations of the project area



S.No	Village Name	Distance	Direction
1	RAMBILLI	0.9 km	SW
2	GORAPUDI	Inside	-
3	GURLUAPALEM	2.5 km	NE
4	DUPPITURU	4.5 km	NE
5	RAJAKODURUU	0.9 km	NW
6	KUMMARAPALLI	4.9 km	W
SW1	Near Kotturu	4 km	NW

Table 16: Details of the Monitoring Locations

Location	Name of the Station	W.R.T. site		Latitude (North)	Longitude (East)
		Direction	Distance (Km)		
1	Rambilli	SW	-	17^0 27' 48.82"	82^0 55' 58.33"
2	Gorapudi	NE	1.17 km	17^0 27' 52.512"	82^0 56' 40.48"
3	Gurujapalem	NE	3.81 km	17^0 29' 56.56"	82^0 55' 58.33"
4	Duppituru	NE	7.78 km	17^0 31' 34.76"	82^0 57' 59.09"
5	Rajakoduru	NW	4.55 km	17^0 30' 14.57"	82^0 54' 54.70"
6	Kummarapalli	NW	5.70 km	17^0 29' 56.96"	82^0 53' 20.54"

1. Ambient Air Quality

229. Based on the primary data collected, the values of PM_{10}, $PM_{2.5}$, SO2, NOx and CO are placed in the following Table 17. and the variations in ambient air quality of the project area are presented in Figure 30 to Figure 33**.** Statistical parameters like Minimum, Maximum values of observed raw data were compared against the NAAQ standards of Central Pollution Control Board.

Table 17: Monitoring station wise recorded values of parameters

S. No.	Location	PM 10 (µg/m3)		PM 2.5 (µg/m3)		SO2 (µg/m3)		NOX (µg/m3)		CO (mg/m3)	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
AAQ-1	Kummarapalli	38.9	50.7	19.5	23.4	11.6	16.8	17.3	22.5	<0.1	<0.1
AAQ-2	Rambilli	45.2	53.5	21.1	27.4	12.6	19.1	18.5	23.7	<0.1	<0.1
AAQ-3	Gurjapalem	41.3	50.3	21.9	29.3	11.6	14.9	18.1	23.8	<0.1	<0.1
AAQ-4	Rajakoduru	44.3	48.1	20.9	27.1	10.6	14.9	18.1	23.4	<0.1	<0.1
AAQ-5	Garapudi	38.7	49.7	16.8	25.6	9.2	12.7	16.4	22.4	<0.1	<0.1
AAQ-6	Upputuru	41.3	51.8	18.6	26.4	10.1	14	15.6	22.6	<0.1	<0.1

230. Baseline data when compared to existing National Ambient Air Quality Standards (NAAQS); were found to be within the applicable limits of the NAAQS.

Figure 30: Ambient $PM_{2.5}$ Levels

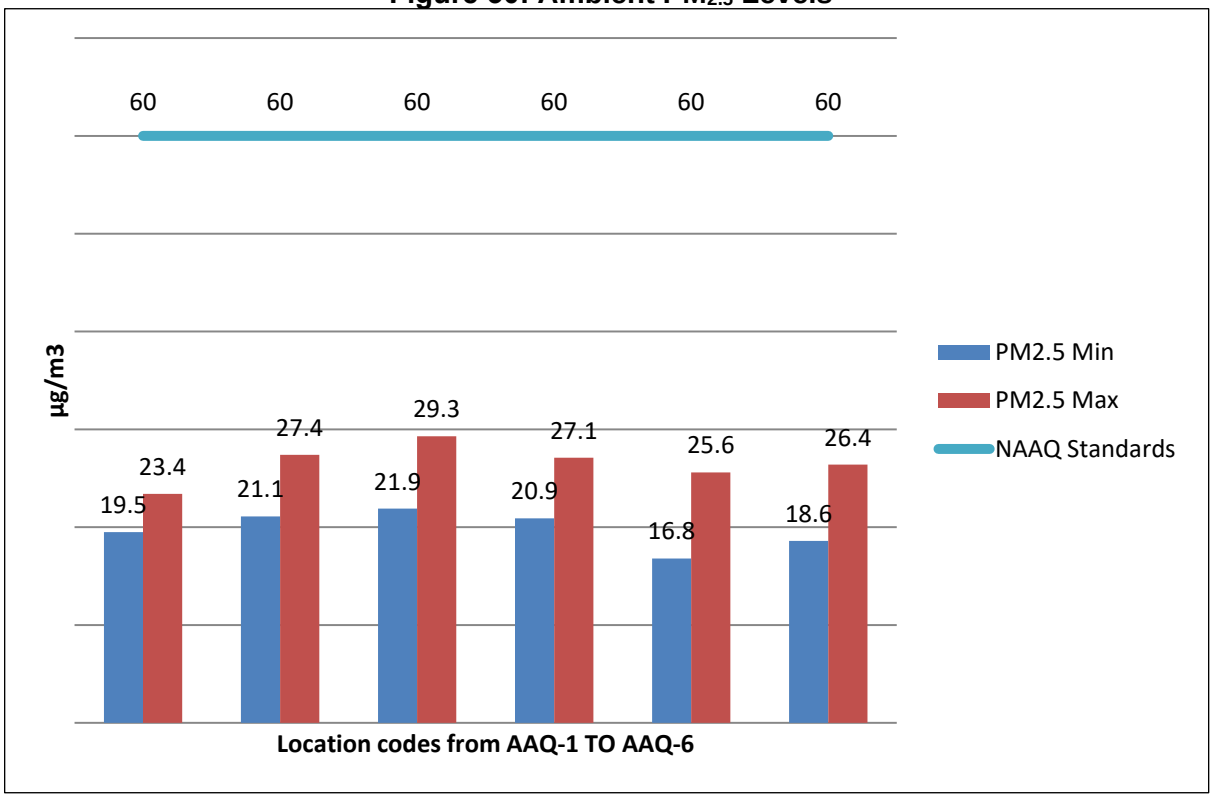


Figure 31: Ambient PM_{10} Levels

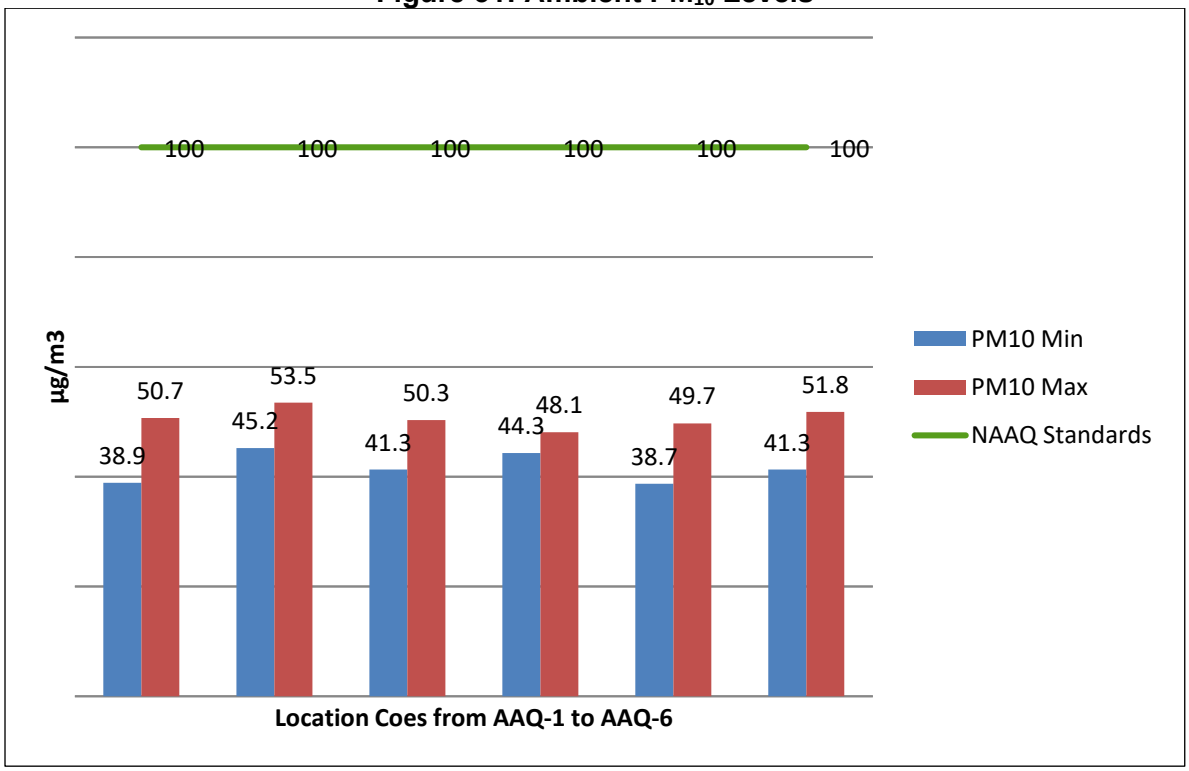


Figure 32: Ambient SO_2 Levels

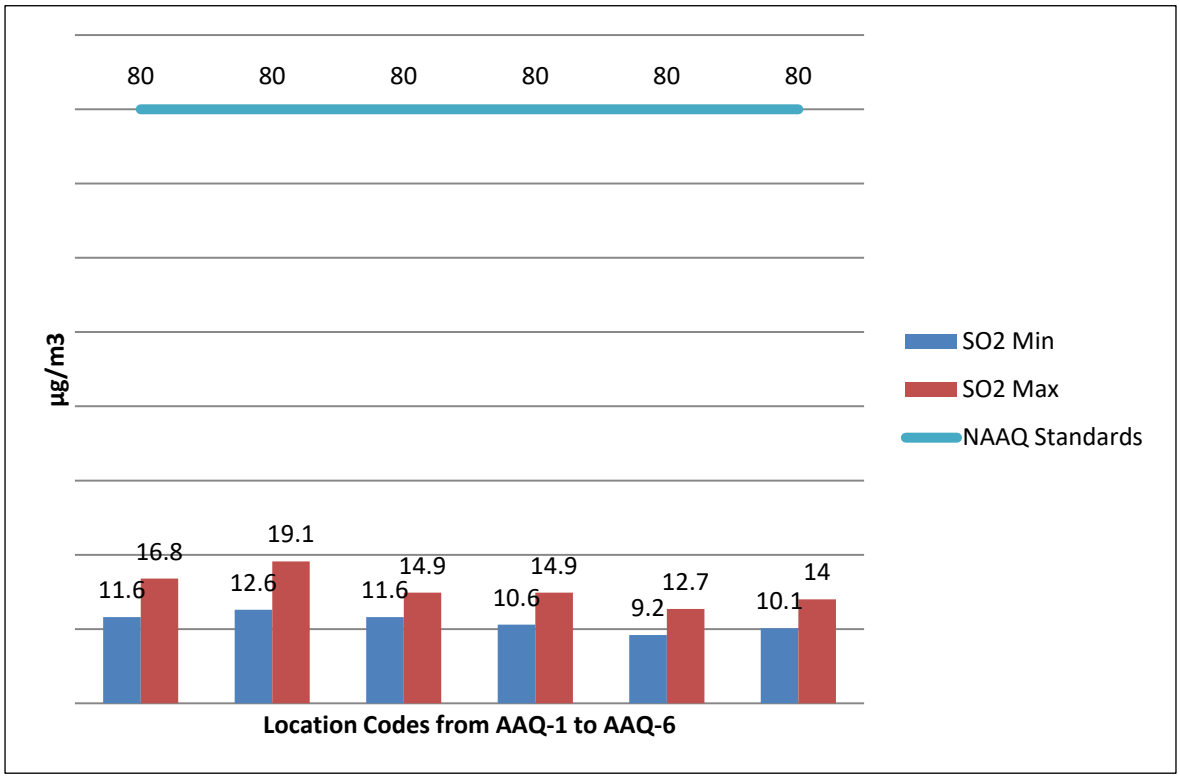
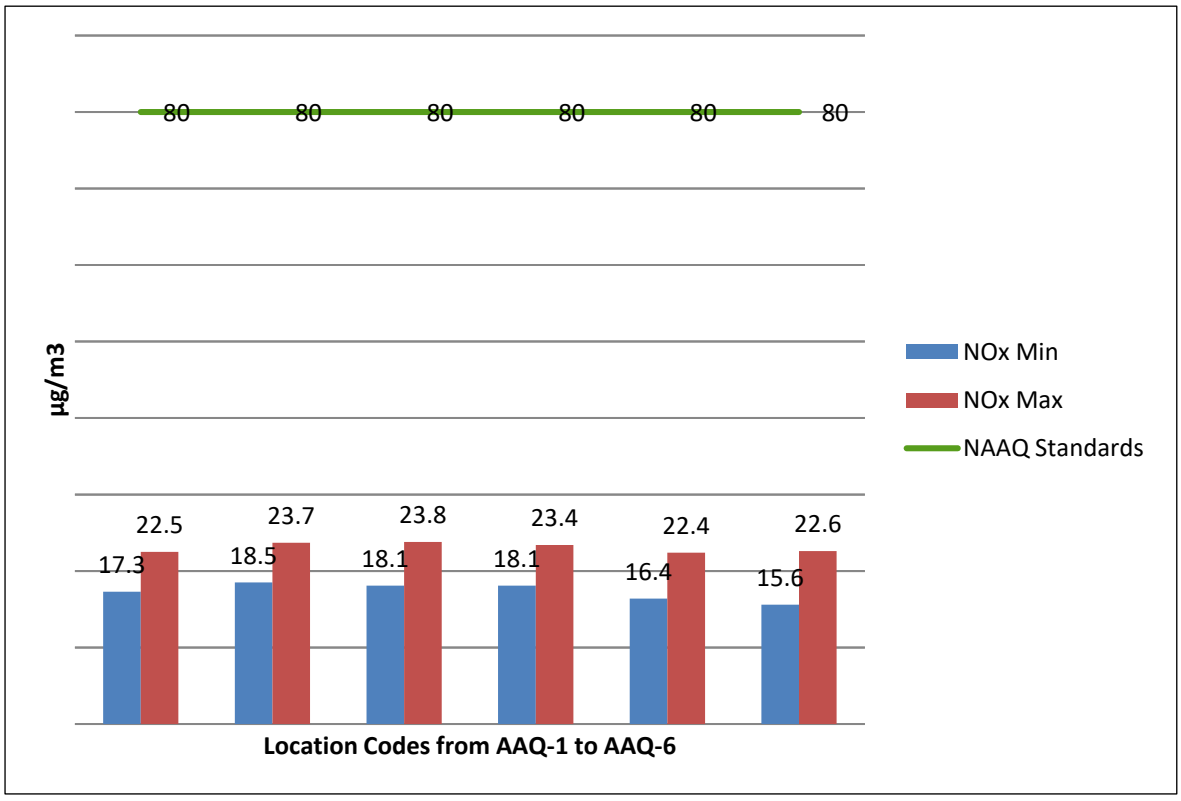


Figure 33: Ambient NO_x Levels



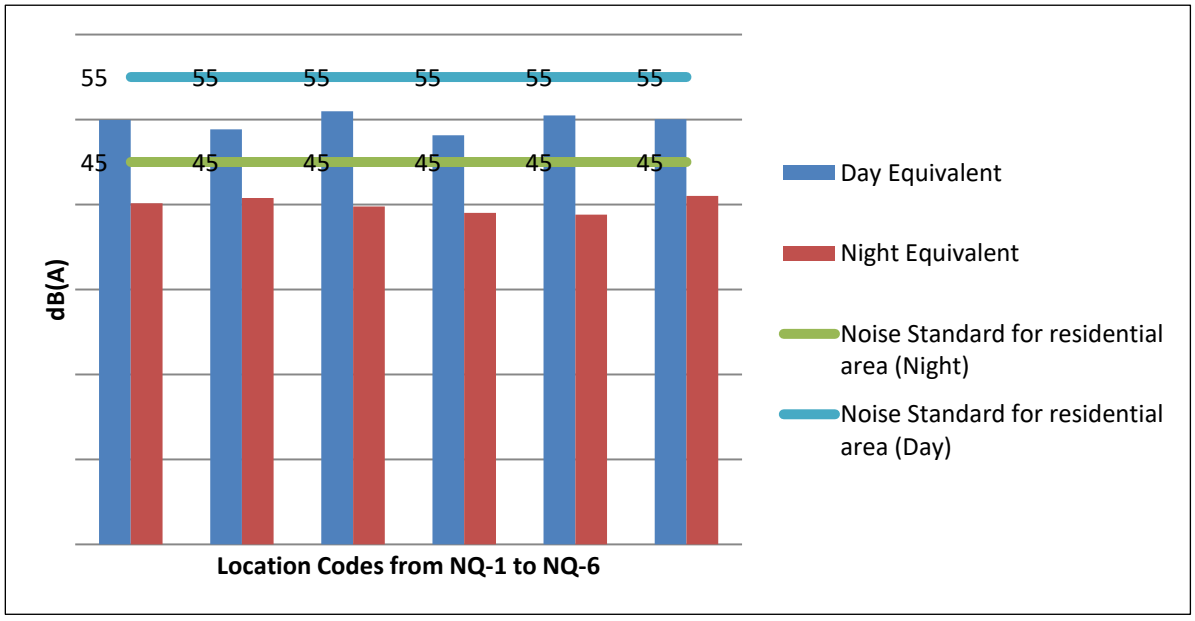
2. Noise Environment

231. The baseline data reported that minimum and maximum noise levels for day equivalents (Ld) during study period ranged between 48.14 (at Location Rajakoduru) and 50.97 (at Location Gurjapalem) dB(A), respectively. Minimum and maximum noise levels recorded at Project Site was 38.81 (At location Garapudi) and 41.01(At location Upputuru) dB(A) respectively. The summary of the results are presented in **Table 18** and Figure 34.

Table 18: Detail of Noise Quality monitoring locations and recorded values

Location Code	Code	$L_{d\ dB(A)}$	CPCB Standards dB (A)	L_N dB (A)	CPCB Standards dB (A)
Kummarapalli	NQ-1	49.95	55	40.14	45
Rambilli	NQ-2	48.84	55	40.77	45
Gurjapalem	NQ-3	50.97	55	39.76	45
Rajakoduru	NQ-4	48.14	55	39.01	45
Garapudi	NQ-5	50.49	55	38.81	45
Upputuru	NQ-6	50.03	55	41.01	45

Figure 34: Noise monitoring results



Source: Baseline data provided by APIIC.

232. The recorded noise levels when compared to the prescribed standards (AAQ Standards in respect of Noise SO 123 (E), dated 14 February 2000) was noted that all recorded noise levels were within the prescribed standards for Commercial Zones. The noise levels were also predominantly within standards for Residential Zones, barring few locations where the recorded levels were slightly exceeding the standards.

3. Soil Quality

233. A total of 6 soil samples were collected from the project affected areas and the same have been analyzed and the results were placed in Table 19.

Table 19: Detail of Soil quality parameters recorded values

Parameters	Units	Kummara palli	Rambilli	Gujapalem	Rajakodu ru	Garapudi	Uppturu
pH@26.2oC	-	7.23	7.47	7.94	7.02	7.44	7.61
Electrical Conductivity (1:5)	µMohs/Cm	381	312	472	391	517	297
Bulk Density	gm/cc	1.47	1.28	1.56	1.74	1.82	1.07
Potassium as K	mg/100gm	11.19	12.70	9.20	10.29	11.34	9.69
Chromium as Cr	mg/kg	3.69	4.12	3.44	5.22	3.62	2.27
Copper as Cu	mg/kg	2.38	5.65	3.12	4.11	5.2	4.9
Zinc as Zn	mg/kg	19.7	26.7	27.4	21.9	18.2	20.6
Manganese as Mn	mg/kg	187.4	237.2	164.8	131.1	184.4	215.7
Cadmium as Cd	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Lead as Pb	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Iron as Fe	mg/kg	10472.77	11470.17	9475.36	13714.34	11968.88	16207.85
Nickel as Ni	mg/kg	6.8	4.2	7.1	6.2	4.1	3.9
Texture							
a) Sand	%	46.23	48.77	52.17	38.76	38.23	32.17
b) Slit	%	18.36	22.69	23.28	29.98	27.74	32.69
c) Clay	%	35.41	28.54	24.55	31.26	33.03	35.14
Soil Type	-	Sandy Clay	Sandy Clay Loam	Sandy Clay Loam	Clay Loam	Clay Loam	Clay Loam
Color	-	Brown	Light Brown	Light Black	Light Red	Light Brown	Light Red
Sodium Absorption Ratio(SAR)	----	0.78	0.63	1.04	1.11	0.94	0.86
Cation Exchange Capacity	meq/100gm	7.35	9.35	4.55	5.35	7.43	6.27
Phosphates as P	mg/100gm	4.29	4.09	3.79	6.39	5.79	5.99
Nitrogen as N	mg/100gm	4.2	3.6	4.9	6.1	5.5	3.9
Water Holding Capacity	%	22.48	23.44	37.12	28.54	24.38	34.19
Porosity	%	44.53	51.70	41.13	34.34	31.32	59.62
Alkali Metals	mg/kg	170.22	184.90	157.74	214.87	194.54	177.61
Permeability	Cm/s	$2.03x10^{-3}$	$3.69x10^{-3}$	$5.47x10^{-3}$	$7.14x10^{-4}$	$2.57x10^{-3}$	$6.79x10^{-4}$

(i) pH was reported to be varying from 7.02 to 7.94 indicating that the soils are falling in normal saline class

(ii) The Electrical Conductivity varied from 297 to 517 µmhos/cm indicating that the soils are falling in the normal category

(iii) Soil type varied from Sandy clay to Clay loam.

4. Water Quality

234. There are few natural drains existing in Eastern and Western sectors and are flowing towards south and southeast of the site and finally joins the sea. Major water bodies in the study area are Sarada River, Bay of Bengal, and agricultural canal towards north side of project boundary. Currently, based on the initial screening, there does not appear to be a concern for water pollution at this moment. Summary of the results of water quality analysis is presented below:

5. Ground Water quality results

(i) pH was varying for ground water from 7.25 to 7.88 indicating the results are within the limits for drinking water samples (i.e., 6.5 to 8.5).
(ii) Total Dissolved Solids are varying from 925 mg/l to 1545 mg /l; results indicated that TDS levels are mostly above the acceptable limits (500 mg/l) but within permissible limits (2 000 mg/l).
(iii) Chloride levels were ranging from 325 mg/l to a maximum of 539 mg/l; results indicate that Chloride level s are mostly above the acceptable limits (250 mg/l) but within the permissible limits (1000 mg/l).
(iv) Hardness is varying from 250 mg/l to 390 mg/l; results indicate that Hardness in 2 samples were below the acceptable limit (300 mg/l), 4 sample is having value above the acceptable limit but within the permissible limit (600 mg/l)
(v) Fluoride values were in the range of 0.2 mg/l to 0.27 mg/l; results show that the Fluoride levels in all samples were within the acceptable limit (1 mg/l).

6. Surface Water quality results

(i) pH was varying between 7.68 to 7.82 which are meeting the IS: 2296-1982 standard for inland surface water
(ii) Total Dissolved Solids were in the range of 1090 mg/l to 1145 mg/l which were within the Class 'A' Standard of the inland surface water as per IS: 2296-1982
(iii) Chlorides were in the range of 274 mg/l to 340 mg/l, which are meeting the Class 'A' Standards of the IS: 2296-1982 for inland surface water
(iv) Hardness is varying between 310 mg/l to 340 mg/l which are meeting Class 'A' Standards as per IS: 2296-1982.
(v) Fluoride content is in the range of 0.24 mg/l to 0.25 mg/l, which were meeting the Class 'A' norms as per IS: 2296-1982.

7. Ecology

235. The initial reconnaissance survey[25] suggests that the proposed location for development of the Rambilli Cluster is predominantly covered with moderate vegetation and mainly consists of species like *Ficus religiosa,Tamarindus indica, Tectona grandis, Anacardium occidentale, Eucalyptus,Prosopis juliflora, Pongamia pinnata,Casuarina equisifoliata* and *Cocos nucifera* and many more shrubs and herbs like *Calotropis, Cactus, Opuntia, Carissa etc.,* fruit bearing trees like *Manilkara japota, Annona squamosa etc.,* are also found. Agricultural fields are also observed in the surrounding areas of the project site. As per the information from department, no rare or sensitive / endangered flora or fauna or species of conservation status are reported in the project region. No records were found of rare or sensitive flora and fauna species in the study area. A separate biodiversity report prepared based on primary survey and secondary information is enclosed as Annexure (Appendix7).

8. Project Area Fisheries Profile

236. As per the secondary census data of Marine Fisheries Census 2010 for Andhra Pradesh published by Central Marine Fisheries Research Institute (CMFRI), Cochin, there are 03marine fishing villages are falling within the project area in Rambilli District. They are Gajjireddipalem, Lovapalem and Venkayyapalem.

[25] The survey was conducted during the EIA study for the Rambilli Industrial Park in 2018.

9. Air Quality

237. The ambient air quality in the state is quite pure compared to other neighbouring states. Particulate emissions from industrial activities are major concern in the state. Dust arising from unpaved surfaces, forest fire, smoke created by burning of firewoods for producing charcoal and domestic heating, and vehicular pollution are other possible secondary sources of pollution in the state. Firewood burning is major contributor in the ambient pollution load. Industrial & vehicular pollution is mainly concentrated in the major commercial areas in the State. Lack of technology and state of the art equipment are some of the factors responsible for industrial pollution.

238. Pollution from vehicles is mainly due to use of low-grade fuel, low maintenance of vehicles, and also the poor conditions of the roads. The level of pollution in rural areas is much lower than that of the urban areas. The air quality is reported within permissible limits in these areas.

239. ADB SPS requires that the subproject applies pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as World Bank Group's EHS Guidelines. Following table provides the WHO ambient air quality guidelines.

Table 20: WHO Ambient Air Quality Guidelines

Table 1.1.1: WHO Ambient Air Quality Guidelines[7,8]		
	Averaging Period	Guideline value in µg/m³
Sulfur dioxide (SO_2)	24-hour 10 minute	125 (Interim target-1) 50 (Interim target-2) 20 (guideline) 500 (guideline)
Nitrogen dioxide (NO_2)	1-year 1-hour	40 (guideline) 200 (guideline)
Particulate Matter PM_{10}	1-year 24-hour	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) 150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter $PM_{2.5}$	1-year 24-hour	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

10. Noise Quality

240. Noise pollution is not a problem in the state. Also, in future there will not be any rise in the noise levels due to proposed activities. At busy junction small contribution to the noise levels are expected, but still the ambient noise quality is expected to be well within the permissible limits.

241. During the construction period, temporary increase in the noise levels are expected due to movement of construction machineries and construction activities associated with proposed road development. Suitable barriers in the form of noise barriers and timely scheduling of construction activities will minimize these affects to the greater extent.

242. ADB SPS requires that the subproject applies pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as World Bank Group's EHS Guidelines. Following table provides the noise level guidelines.

Table 21: World Bank Group's EHS Noise Level Guideline

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND ITS MITIGATION MEASURES

243. Augmentation of Industrial Infrastructure projects are likely to bring changes in the local environment both beneficial and adverse. There were no potentially significant impacts requiring further assessment identified for the subproject. Detailed assessment for the subprojects has already been conducted as a part of the studies for the development of Start up area of Rambilli cluster (area-1 covering 396.28 acres).

244. This section of IEE identifies nature, extent, and magnitude of likely changes vis-a-vis project activities for all stage of project cycle i.e., preconstruction, construction, and operation. Beneficial impacts are mostly long -term and permanent whereas adverse impacts are localized and temporary in nature and are likely to occur mostly during construction stage.

A. Pre-Construction Phase Impacts and Mitigation Measures

245. **Location impacts** include impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site. The proposed Rambilli Industrial Park will be developed in an area of 2532 acres (~1025 ha). APIIC is in the possession of 1329.4 acres out of which private land is 771.18 acres and government land are 558.22 acres and requisition for land acquisition has been filed for remaining government land of 223.03 acres and private land of 979.55 acres. Compensation for land and structure are paid as per G.O MS. No. 160 by Industries and Commerce (INFRA) Department, GoAP dated November 13, 2017. As such no R&R is proposed for the settlements existing in the project boundary.

246. **Land acquisition and involuntary resettlement impacts.** The subproject has a land requirement of 396.27 acres which is spread across two villages namely Krishnampalem (337.49 acres) and Gorapudi (58.78 acres). As mentioned in the preceding section, the allocated subproject area (Area 1) is part of the SEZ expansion exercise (to develop industrial cluster) for which land acquisition was initiated in 2006. Out of total 396.27 acres (includes 306.10 acres of private land and 90.17 acres government land), 379.36 acres have already been handed over to APIIC[26] and 16.91 acres remain to be acquired and handed over.

247. The involuntaty resettlemtn impacts are assessed through a parallel process of resettlement planning. The resettlement plan of this subproject comprrehsenively assessed all the potential social impacts. Recognizing that the past land acquisition was not carried out in anticipation of ADB financing to the subproject, this resettlement plan is prepared to cover all land parcels (and associated resettlement impacts) for which acquisition process remains incomplete or yet to be initiated. With this perspective, the plan is prepared for loss of private land admeasuring 16.91 acres (11.52 acres in Krishnampalem village and 5.38 acres in Gorapudi village) affecting 63 families[27] (6 families in Krishnampalem village and 57 families in Gorapudi village).

[26] Refer Appendix 1 for land acquisition timeline and land possession/handover status. Self-certification by PIU on land possession status is provided in Appendix 2.

[27] Refer list of Affected Families against Land Survey Numbers in Appendix 3. This draft resettlement plan presents socioeconomic profile, impact assessment and vulnerability assessment based on details obtained from families that willingly participated in the survey. In Krishnampalem village, the affected families (1 land parcel admeasuring 11.52 acres) have filed a writ petition (WP.No.7102 of 2008) with Hon'ble High Court of Andhra Pradesh for enhancement of compensation and R&R assistance. Land acquisition process for the land parcel under litigation is suspended,

248. Of the affected families, 15 families have been found to be vulnerable. None of the affected families belong to scheduled tribe community. Summary of subproject impact is provided below. Following table shows the summary of impacts:

Summary of Involuntary Resettlement Impacts

	Impact	Extent/Number
1	Loss of Land*	16.91 acres
1.1	Involuntary Land Acquisition of Private Land Parcels	16.91 acres
1.2	Number of Affected Villages	2
1.3	Number of Affected Land Parcels	7
2	Loss of Structure and other assets (private and common property)	Nil
3	Loss of Trees	849 trees**
4	Project Affected Families	63 families (173 persons)
4.1	Involuntary Acquisition of Private Land	63 families (173 persons)
5	Physically Displaced Families	Nil
6	Economic Impacts (loss of agriculture land; permanent and significant impact)	63 families
7	Vulnerability Status***	
7.1	Vulnerable families (to total affected families)	24% (15)
7.1.a	Women headed households	8% (5)
7.1.b	Scheduled Tribe households	Nil
7.1.c	Scheduled Caste households	6% (4)
7.1.d	Below Poverty Line (BPL) households-	19% (12)

* in two villages namely Krishnampalem (11.52 acres, 2 land parcels/land survey numbers, 6 families) and Gorapudi (5.39 acres, 5 land parcels/land survey numbers and 57 families)
** loss of tree estimate is based on survey carried out earlier for the entire start up area. Information specific to 16.91 acres not available at this stage and will be included in the updated plan.
***Vulnerable families may have multiple vulnerabilities. Categories of vulnerability presented above are not mutually exclusive.

249. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Project site is mostly comprising of barren and agricultural lands, and it is most certain that construction camps will be set up within the project area. Residential areas will not be considered for setting up construction camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust and noise and to prevent social conflicts, shortages of amenities and crime). No construction facility, activities or camp site shall be located in the CRZ areas.

250. **Design impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughout, waste production, discharge specifications, pollution sources and ancillary services. Design of the Proposed Components: Technical design of all the elements of water supply (WTP, reservoirs, and distribution system etc.), roads and drains, and power distribution, etc., follows the relevant national planning and design guidelines such as Central Public Health and Environmental Engineering Organization (CPHEEO) manuals, Indian Road Congress (IRC) standards, and applicable power distribution system planning, security and operating standards.

pending final court order on the case. Households involved in the court case did not wish to participate in the socioeconomic survey and were not forced to do so. This resettlement plan will be updated to incorporate findings from the census survey.

251. **Impacts on Existing Water Resources.** During construction phase, the water requirement during the construction phase is 1 MLD and will be partly sourced water supply scheme of YLMC and partly from local Municipality/panchayat. Total water demand for the proposed Rambilli IP is ~18.31 MLD for different purposes specifically industrial, commercial, institutional, residential, district cooling, fire-fighting and green area maintenance. The net fresh water demand is ~17.62 MLD and 900 KL of fire water demand and will be sourced from Yeleru Left Main Canal. Water will be sourced from Bulk Water Supply Scheme of 95 MLD of APSEZ and surrounding industrial areas. Water supply approval for Rambilli I.P as a apart of Atchuthapuram Industrial areas has already been obtained from Visakhapatnam Industrial Water Supply Company Limited (VIWSCO), GoAP and is provided as Appendix.

252. **Mitigation Measures**. Though the withdrawal of groundwater is not envisaged as a part of proposed development, the following measures are proposed as a part of development to improve the ground water
scenario.

- Strategic plans such as implementing following structures for rainwater harvesting and ground water recharging purposes in Project site
- Roof-top rain water harvesting, Rainwater storage ponds/tanks
- To step up the present level of rain water harvesting and conservation in the study area, the measures such as renovation/revamping of existing rain water harvesting structure
- Proposed to create awareness among farmers in the study area on advanced management methods in utilizing the ground water for irrigation and other purposes
- Monitoring of water quality and ground water level variations in and around the Project site

253. All licenses or permits required for the proposed subproject will be obtained prior to their construction in accordance with the existing GoAP and GoI laws. Depending on the design, required licenses may include environmental clearance, consents under air and water act hazardous waste management requirement, and permits for water and power, building permits etc.

254. **Socio cultural resources.** Project areas are not known to be archeologically or historically sensitive, the risk of uncovering archaeological remains during the excavations is very low. Nevertheless, accidental discovery of cultural property sites, if any, will be managed according to government guidelines. If archaeological or cultural artifacts are discovered on the campuses during construction, the finds will be handled by the contractor in accordance with government standards and procedures set forth concerning cultural conservation. Following measures will be implemented:

(i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work

(ii) Stop work immediately to allow further investigation if any finds are suspected; and

(iii) Inform local Archaeological Department office if a find is suspected and take any action, they require to ensure its removal or protection in situ.

B. Construction Phase Impacts and Mitigation Measures:

255. **Construction impacts** include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production.

256. Component wise possible adverse impacts. The proposed project 'development of start-up area (Infrastructure services) for Rambilli Cluster' comes under the proposed Vizag – Chennai Industrial Corridor Development Programme (VCICDP). The following sub project components are to be constructed in the project area

a) Roads
b) Water supply
c) Storm Water Drains
d) Power distribution

257. Construction of **Roads and development road network** needs excavation works which will create air, noise and land disturbances. The fugitive dust due to the excavation works, the noise that machines / vehicles make in the area and a permanent conversion of land by placing black topping on to the roads etc., will be the possible impacts on the surroundings. Incase the excavation works were not properly managed, the runoff (rain water) from the excavated soils can lead to disturbing the local water bodies. During operational phase the maintenance of the roads creates several impacts on the surroundings.

258. Provision of Water Supply network is planned along the roadside. Even this development activity will have impacts like the excavation works for placing the pipes leads to emission of fugitive dust and the transportation of the pipes, joining the pipes and shifting of construction material to the site will lead to noise and dust pollution. Improper water pipe connections, leakages lead to contamination of water. During operation phase, the maintenance of these pipes will create impact on the surrounding environment.

259. Construction phase of Storm Water Drain will have excavation and construction of drain works which will generate dust pollution. The Storm Water Drains are also planned roadside only. During operation phase, the Storm water drain should work properly without any clogging or obstructions. Again, the dumping of solid waste will lead to overflow of storm water drain which will create problems to the surroundings. Availability of water and sunlight and other favorable conditions will increase the fly menace. Crisscrossing of sewerage lines may cause odour problems in the Storm Water Drains during the operation phase.

260. Provision of Power supply distribution involves excavation work and placement of the electric poles which needs to be transported from other place. Both these works will create dust pollution and also noise pollution. The trees which come in the right of the way needs to be removed. During operation phase, not much impacts are anticipated.

261. For construction phase of all the above components the excavation sites get disturbed with the dust pollution and the trees which come in the right of the way of the construction needs to be removed which needs to be compensated with Plantation programme. The labour camps used for the construction works also leads to several kind of impacts on water, soil and air in the surroundings. The vehicle movement for transporting the workers and materials will also create lot of dust pollution. These vehicles should be properly maintained otherwise, they will cause air

pollution through their exhausts. The construction works should have necessary safety precautions otherwise will also create impact on the public who move in the vicinity.

262. **Borrow Areas and Quarries:** Need for opening new borrows areas and quarries are not anticipated. If additional quarries will be required, contractor shall obtain all necessary permits and licenses, including environmental clearance, if required. Contractor will identify sources of water for construction purposes and obtain necessary permissions as required and will obtain approval of APIIC before the use. Contractor is required to submit a borrow area management plan including the details on topsoil conservation, procedures for opening/closing and restoration of borrow area etc. The plan is required to be approved by the site engineer PIU. Following measures needs to be implemented:

(i) Borrow areas if required, shall not be located near forest areas. The edges of borrow sites shall be no closer than 3 m from any fence line or boundary.
(ii) Adequate clearance shall be provided for the construction of catch drains.
(iii) Borrow sites shall have adequate drainage outlets unless the relevant landowner has agreed that the borrow area is to create a permanent tank or dam. Cut batter slopes shall not be steeper than 3 to 1 and shall be left by the Contractor in a tidy and safe condition to the satisfaction of the Engineer. Written clearance from the landowner/village head shall be obtained before leaving a site.
(iv) Obtain statutory approval from competent authorities
(v) Borrow pits shall be selected from barren land/wasteland to the extent possible.
(vi) Borrow areas should not be located on cultivable lands except in the situations where landowners' desires to level the land. The topsoil shall be preserved, and depth shall be restricted to the desired level.
(vii) Borrow areas should be excavated as per the intended end use by the owner.
(viii) The Indian Road Congress (IRC):10-1961 guideline should be used for selection of borrow pits and amount that can be borrowed.
(ix) The dredged material from the riverbank shall be tested for presence of heavy metals and other pollutants before its reuse.
(x) The depths in borrow pits to be regulated so that the sides shall not be steeper than 25%, to the extent possible, borrow areas shall be sited away from habited areas. Borrow areas shall be levelled with salvaged material or other filling materials which do not pose contamination of soil.
(xi) Monitoring of rehabilitation plan of borrow areas.

263. **Impact due to Site Grading/Levelling.** The existing terrain of the entire project site is relatively flat and gentle. Existing ground elevation is ranging from 0 m to 55 m. Generally, the fall direction of the site is towards the lower area radially. During the construction phase, site levelling would be required which involves site preparation work, soil and rock debris etc., achieved as cut material from the higher gradient shall be utilized to elevate the low-level areas within project premises. Excess material if required will be sourced from an approved quarry in the nearby areas or excess rock debris generated from site levelling may also be utilized in the region for other developmental activities. The land disposal of solid wastes such as construction rubble, camp site garbage and discarded topsoil may impact soil quality. There might be a temporary phase of dumping the construction materials and wastes in the project site marring the aesthetics of the site. The landscape changes are expected with the changed land use. Apart from the localized construction impacts confined to the site, the impact is likely to be insignificant and no long-term adverse impacts on topography are envisaged.

264. Mitigation Measures

- The earth material will be balanced as much as possible by cut and fill quantities within the individual industrial plot. Hence the reduction in transportation/conveyance of earth material to and from the site is envisaged.
- Cut and fill quantities shall be minimized by adopting appropriate engineering design of facilities based on the elevation requirements.
- Proper disposal of construction waste has to be planned with temporary dump storage near to the site.

265. **Transportation of Construction Material:** Transportation of huge quantities of construction material (quarry material, gravel, stone, aggregate, sand, bricks, cement, steel bitumen, paint bricks, etc.) during construction phase of the project results in use of public infrastructure like roads, railways, drainage, water and power supply which in turn results in extra burden on the existing infrastructure.

266. **Construction Workers Camp:** During the construction phase of the project there will be large-scale short-term employment generation in the form of skilled and semi-skilled labors. It is expected to generate employment of about 1200-1500 persons in the region. The daily wage unskilled labors employed locally will get job only for less than half of the construction period. Also, majority of the works will be sub-contracted. Temporary workers camps are planned to be set up for semi-skilled laborers in the project area during the construction period. This level of short-term employment opportunities would have a positive impact on the local economy and on regional unemployment.

267. **Mitigation Measures**. Existing roads will be strengthened wherever necessary, to reduce the impact from transportation of construction material.

268. Construction material shall be sourced from nearby approved and licensed quarries

(i) Temporary approach roads may be developed/strengthened with prior permission from competent authority.

(ii) Trucks with construction material susceptible for fugitive suspension will be covered with tarpaulin covers during transport of construction materials.

(iii) Transportation management will be adopted for movement of dumpers transporting quarry stones and construction materials and traffic will be regulated.

(iv) Vehicles deployed will confirm to emit norms of CPCB and have valid Pollution Under Control (PUC) certificates.

(v) Dumpers and trucks will comply with standards for exhaust emissions and noise levels.

(vi) To avoid/minimize impact/strain on the existing infrastructure, the worker camps will be self-sufficient and would not rely on any local resource. This would help to avoid any conflict with the local population. To mitigate impacts from health hazards, sanitation facilities will be provided. Further, the worker camp siting will be planned away from habitations.

(vii) The camps will be adequately equipped with all the necessary facilities such as water supply, LPG supply, power supply, wastewater collection, solid waste collection and sanitation.

(viii) The domestic wastes generated from the camps will be disposed at approved disposal sites.

(ix) Periodic health check-ups will be undertaken for early detection and control of

(x) communicable diseases.
(xi) Medical facilities including first aid will be available in the workers camps for injured
(xii) workers.

269. **Impact on Air Quality.** The proposed subprojects will require construction during the development phase. Air quality in the immediate vicinity is likely to be marginally affected due to movement of vehicles and earth movement works that will be undertaken as part of subproject works. In most instances the primary concern during construction phase are emissions of dust and particulate matter that arise from the movement and storage of materials and other construction activities. The emissions from vehicles and construction machinery are also considered.

270. For all developments, best practicable means should be adopted to control and reduce emissions. Some examples that may be used are as follows:

(i) Use of enclosures – use of screens and sheeting to contain dust;
(ii) Use of paved / surfaced and cleaned haul routes and hard-standings;
(iii) Use of water suppression and wheel washing;
(iv) Choice of location and facilities for site storage where required (aggregates, sand, soil, cement etc.);
(v) Location of dust generating activities e.g., stone / flag cutting;
(vi) Transport route selection and location; and
(vii) No burning of waste or wood or logs on site.
(viii) Plan the work sites properly, and demarcate the sites for stockpiling of, soils, gravel, and other construction materials away from the traffic, vehicle, general worker movement to avoid disturbance of loose materials;
(ix) Use tarpaulins to cover sand and other loose material when transported by trucks;
(x) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
(xi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly; contractor's vehicles and equipment should compulsorily have pollution under control (PUC) certificate and submit to PIU before deployment at site
(xii) Obtain consent to establish (CTE) and consent to operate (CTO) for batching plant, hot mix plant, crushers and DG set etc. if specifically established for this project;
(xiii) If contractor procures any material (such as ready mix concrete, asphalt/macadam, aggregates etc.), from third party agencies, contractor shall ensure that such agencies have all necessary clearances/permissions as required under the law; these include CTE/CTO from APPCB, environmental clearance, etc.; contractor shall collect the copy of these certificates and submit to PIU; PIU will approve the source only after all the certificates are submitted; and
(xiv) Conduct air quality monitoring according to the EMP.

271. **Potential Impact on Water.** During the construction phase water will be used for varies construction activities. To fulfill the water requirement, water is to be supplied from the nearest surface water bodies from the water reserves in the area. The subproject will not use groundwater for construction purposes. Hence there are no impacts related with water abstraction anticipated from the subproject. Subproject does not involve development of water source. Subproject will meet the water demand from a bulk water supply subproject being implemented under Project 1 of VCICDP, the net water demand will be sourced from Yeleru Left Main Canal. Water will be

sourced from Bulk Water Supply Scheme of 95 MLD of APSEZ and surrounding industrial areas. Water supply approval for Rambilli I.P as a apart of Atchuthapuram Industrial areas has already been obtained from Visakhapatnam Industrial Water Supply Company Limited (VIWSCO), GoAP and is provided as Appendix. Suitable arrangement for drinking water in the campsite will be managed by contractor without affecting availability to local community

272. Mitigation Measures. During the pre and post construction, the following measures has to be followed to maintain the quality of ground and surface water:

(i) Preventing the run-off water beyond the Industrial cluster premises so that it will recharge the ground water in the same area; and Storm water drainage system should be provided inside the project area.

(i) Ground water extraction for construction activities will not be done and water or surface water wastage should be avoided. Construction works near waterways/water bodies shall not be undertaken during the monsoon season.

(ii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies.

(iii) No construction camp within 500 m of any water body.

(iv) Locate all parking, repair, and fuel and hazardous material storage area away from any water body. Vehicle parking and maintenance areas shall have waterproof floors from which drainage is collected and treated to legal standards.

(v) Refuel vehicles only in dedicated areas with waterproof floors from which drainage flows to an oil/water separator before discharge.

(vi) Collect all waste oil, store in sealed damage-proof containers and dispose it to recyclers.

(vii) All equipment operators, drivers, and warehouse personnel will be trained in immediate response for spill containment and eventual clean up.

(viii) Temporary retention ponds, interception drains, and silt traps are installed to prevent silt laden water from entering adjacent water bodies/waterways; and

(ii) The slopes of embankments leading to water bodies should be modified and re-channelized to prevent entry of contaminants.

273. Impact on noise levels. Sources of noise pollution during the construction of the subprojects is from machinery comprising of mainly bull dozers, front end loaders, standby generators, fabrication workshop and other heavy earth machinery used in construction in addition to the vehicular movement within the project boundary. The industrial cluster of Rambilli is far from the main city population and as such impact of noise on the surrounding areas will be minimal. During the construction period, noise will be generated from the operation of heavy machinery, the haulage of construction materials to the construction yard and the general activities at the yard itself. Excavation, Concrete mixing and material movements will be primary noise generating activities and, most likely, will be uniformly distributed over the entire construction period. These construction activities are expected to produce noise levels in the range of 80 – 95 dB(A). Noise and vibration from construction and operation phase will be unavoidable but the impact will only be temporary and minimal and will only impact locations close to the work sites. Regular maintenance of construction vehicles and machinery must also be undertaken to reduce noise.

Mitigation Measures

(i) Construction facilities should be located away from surrounding settlements; no facility should be located within the nearby CRZ areas.
(ii) Careful planning of machinery operation and the scheduling of such operations can reduce noise levels. The use of equipment emitting noise not greater than 90 dB (A) for eight-hour operations shift and, when possible, the siting of construction yards at least 500 metres from residential areas should be adhered to.
(iii) Contractors should be required to fit noise shields on construction machinery and to provide earplugs to the operators of heavy machines.
(iv) Further to minimize noise impacts near sensitive receptors (nearby community), operation of excavator and other heavy machineries will be carried out mostly during off-hours (7 am to 9 am and 3.30 pm to 7 pm) and on holidays (Saturday and Sundays). Baseline noise will be established for all sensitive areas prior to construction and follow up noise monitoring will be carried out during the construction.

274. **Impact on the existing traffic system.** The proposed subproject will involve minimal and temporary increase in traffic for transportation of the construction material. Project area is mostly inhabited and works within the site unlikely to have any impacts on traffic or access. However, the movement of construction vehicles on existing roads, will add to the traffic. Increased movement of trucks and heavy vehicles for transportation may cause road safety issues. Construction traffic will interact with the existing traffic on Rabillli Road.Following measures neds to be implemented:

(i) The contractor will submit a Traffic Management Plan to the Project Engineer at least two weeks before the construction starts. This Plan will recommend for approval of PIU, the safe and convenient construction traffic movement, schedules, and road safety measures and information dissemination;
(ii) Transportation of quarry and other construction material to the construction sites through heavy vehicles shall be done through existing major roads to the extent possible. This will restrict wear and tear to the interior village/minor roads. Small vehicles/un-motorized vehicle can also be used for its further transportation to the construction sites from temporary storage areas.

275. **Impact on Topography and land use.** The industrial estates are located on barren land and the subproject implementation will have no or minimal impact on present topography as well as land use.

276. **Impact on soil quality.** Land disturbance from the proposed construction activities will be confined to the immediate work area. It is anticipated that major civil and mechanical works would be undertaken in setting up the subprojects. Overall, the impact of this on the site environment will be temporary.

277. **Impact on ecology.** The proposed subprojects are a part of Rambilli Cluster that is though covered with vegetation there are no rare or sensitive flora and fauna species in site or in the region, it is predicted that the impacts on existing flora and fauna will be negligible. In case of tree removal (which occurs in the right of the way of road, storm water drain and power line laying etc.,) compensatory plantation will be take up and three saplings will be planted for each tree removed. Further, development of green belt around the subproject area would enhance the

situation by planting local fast-growing species which are present in the surrounding areas Development of green belt around the subproject area would enhance the situation by planting local fast-growing species which are present in the surrounding areas.

(i) Minimize removal of trees by adopting to site condition, remove tree only where it is necessary

(ii) Obtain prior permission for tree cutting

(iii) Plant and maintain 2 trees for each tree that is removed.

(iv) Prior to removal of trees, conduct a confirmatory survey of trees for any birds and nests to confirm there are no protected species of birds; if any protected species are noticed, inform ADB, and update the IEE and EMP, and work should commence only after ADB clearance of IEE and EMP

278. **Impact on Landscape, aesthetics:** The construction works will produce excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. These impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to: The construction contractor will be required to:

(i) Prepare and implement spoils management plan;

(ii) Avoid stockpiling of excess excavated soils;

(iii) Coordinate with for beneficial uses of excess excavated soils or immediately dispose to designated areas;

(iv) Recover used oil and lubricants and reuse or remove from the sites;

(v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;

(vi) Remove all wreckage, rubbish, or temporary structures which are no longer required;

(vii) Request PMU/ to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

279. **Impact on historical monuments / religious structures:** There are no adverse impacts expected on historical places/monuments. Some available historical places like temples are far from the project site thus no impact is anticipated.

280. **Solid waste management:** The various types of solid wastes generated during the construction phase will be segregated into two main categories, viz., non-hazardous and hazardous.

Mitigation Measures

(i) The excavated soil will be used for refilling.

(ii) General refuse generated on-site will be collected in waste skips and separated from construction and chemical waste.

(iii) A local authorized waste handler will be employed to remove general refuse from the site, separately from construction waste and hazardous wastes, on regular basis to minimize odor, pest and litter impacts.

(iv) Burning of refuse on construction sites will be prohibited.

281. **Accessibility:** Hauling of construction materials and equipment can cause traffic problems. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

Mitigation Measures

(i) Prepare and implement a Traffic Management Plan

(ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;

(iii) Schedule transport and hauling activities during non-peak hours;

(iv) Locate entry and exit points in areas where there is low potential for traffic congestion;

(v) Keep the site free from all unnecessary obstructions;

(vi) Drive vehicles in a considerate manner;

(vii) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and

(viii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

282. **Work Camps:** Operation of work camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Consult with PMU/ before locating project offices, sheds, and construction plants;

(ii) Minimize removal of vegetation and disallow cutting of trees;

(iii) Provide drinking water, water for other uses, and sanitation facilities for employees;

(iv) Ensure conditions of livability at work camps are maintained at the highest standards possible at all times;

(v) Prohibit employees from poaching wildlife and cutting of trees for firewood;

(vi) Train employees in the storage and handling of materials which can potentially cause soil contamination;

(vii) Recover used oil and lubricants and reuse or remove from the site;

(viii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;

(ix) Remove all wreckage, rubbish, or temporary structures which are no longer required; and

(x) Request PMU/ to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

283. **Social and Cultural Resources:** For this subproject, excavation of land will occur at locations known not to have archaeological values, so it could be that there is a low risk of such impacts. Nevertheless, the construction contractor will be required to:

(xi) Follow the protocol for chance finds in any excavation work;

(xii) Stop work immediately to allow further investigation if any finds are suspected; and Inform PMU/ if a find is suspected and take any action they require ensuring its removal or protection in situ.

284. **Occupational Health and Safety:** Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to:

(i) Comply with all national, state and local labor laws;

(ii) Following best practice health and safety guidelines such as IFC's General EHS Guidelines[28]

(iii) Develop and implement site-specific occupational health and safety (OHS) plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training[29] for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;

(iv) Conduct work in confine spaces, trenches, and at height with suitable precautions and using standards and safe construction methods; do not adopt adhoc methods; all trenches deeper than 1.5 m shall be provided with safety shoring/braces;

(v) Ensure that qualified first aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;

(vi) Provide medical insurance coverage for workers;

(vii) Secure all installations from unauthorized intrusion and accident risks; and

(viii) Provide supplies of potable drinking water;

(ix) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;

[28] https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

[29] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence, but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective, and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

(x) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;

(xi) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;

(xii) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;

(xiii) Ensure moving equipment is outfitted with audible back-up alarms;

(xiv) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate;

(xv) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively;

(xvi) Conduct regular health check-ups for workers;

(xvii) Provide periodical awareness camps and special trainings for workers for health issues and risks in construction sites

(xviii) An emergency plan shall be prepared duly approved by engineer in charge to respond to any instance of safety hazard.

285. VCICDP Health and safety plan in response to COVID-19 is an integral part of the environmental management plan (EMP).

(i) The COVID 19 H&S plan may be updated as and when new guidelines are issued by the governments, and international organizations such as WHO and ADB.

(ii) All the contractors be advised to prepare site-specific plan compliant with government circulars, guidelines and public health advisories, elaborating the arrangements and measures for implementation of the H&S plan.

286. **Post-construction clean-up:** Damage to existing land due to debris, spoils, excess construction materials, etc. Mitigation may include following actions;

(i) remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and,

(ii) all excavated areas shall be reinstated to the original condition, all disrupted utilities restored, the area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up, all hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and regressed using the prescribed guidelines set out in the contract specifications.

C. Potential Impacts during operation phase

287. The operational phase impacts are related to the operation and maintenance of established infrastructure facilities in the start-up area under this subproject that include water supply treatment and distribution, roads and drains, power supply and green areas. During its design life (~30 years), infrastructure shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the equipment in working order. Operation of facilities will be gradual and is as per the establishment and operation of industries. Fully capacity utilization is anticipated only after entire start up area is occupied by industries and operationalized.

288. During the operation phase, the stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts. Therefore, this will not cause significant impacts. The industry establishment and commencement of their operations in the industrial cluster will be after this subproject funded under VCICDP Project 2 is implemented and the impacts during that period are not considered here.

289. Given the adaption of standard design, construction, and operation procedures as per the prevailing standards in respective infrastructure sector, no notable impacts envisaged during the operation of the infrastructure. Water treatment and disinfection in the WTP is one of the main operation activities of the water supply system. This activity produces wastewater, solid waste, and poses safety risk due to handling of chlorine. Backwash water/wastewater from the process is recovered and recirculated in the WTP, no wastewater will be generated from water treatment process. Water treatment process will generate sludge. WTP will include facilities to collect, and dry sludge, and dried sludge will be used as manure in green areas. No negative impacts envisaged. Chlorine facility will include necessary safety features and equipment, and staff will be provided personnel protection equipment.

290. Pumps will generate noise. Pumps will be installed in pumping stations, which are enclosed buildings with restricted access and provided with adequate buffer around. Project area is mostly barren, vacant and agriculture lands, which will be converted into industrial plots. Therefore, no notable adverse impacts due to noise envisaged. Operation of diesel generator sets will also generate noise and emissions. Procurement of CPCB approved generators and standard operation and maintenance will ensure that emissions and noise are minimal. Prior permission for operation of generator from APPCB shall be ensured.

291. The operation of the power distribution lines near community areas may expose the locals to electrocution hazards. Given that project area to be developed as industrial cluster, and there will the safe horizontal or vertical clearances to the power infrastructure, no notable impacts envisaged. Nevertheless, distribution components poses risk but not significant. The probability of an incident resulting in fatality will be higher if appropriate health and safety measures are not enforced by the operator. Used oils from transformers will be disposed through the agencies authorized by APPCB.

Traffic on internal roads after construction will cause air and noise pollution in the vicinity of the sub project area. Vehicular emission and vehicular noise will be the principal source of pollution during operation stage of roads. Proposed provision of green belt around the industrial area, trees along the roads will minimize the impact. Enforcement of pollution under control (PUC) certificate for all vehicles by Road Transport Authority will ensure that the

vehicular emissions are minimal. Roads are built to IRC standards, and chance of accidents will be minimal if traffic and road safety measures are strictly enforced. APIIC will ensure that traffic safety measures are strictly enforced in the industrial cluster.

292. The proposed stormwater drainage system will cater to storm runoff and is not designed to carry industrial or domestic wastewater. Separate wastewater management system is proposed in the industrial clusters, which will be implemented by APIIC with GOAP funding. Any discharge of wastewater from industries or any other establishments will pollute the storm water and will degrade the receiving water bodies. APIIC shall ensure that proper wastewater management system is provided prior to start of operation of any industrial activity in the start-up area. APIIC shall ensure that no wastewater is discharged into storm water drains. Siltation due to poor or lack of maintenance of drains and accumulation of solid wastes may clog the drains. This may result is accumulation of putrescible organic materials causing odour nuisance and pollution to the receiving water bodies. This may also attract vectors of communicable diseases that could affect public health.

293. Following measures are suggested for implementation/compliance during the operation phase:

(i) Ensure that standard operating procedures are adapted for all infrastructure, and ensure preventive, periodic, and emergency maintenance activities as needed; provide adequately trained operators and maintenance staff

(ii) Provide necessary personnel protection equipment, use appropriate maintenance equipment and tools

(iii) Recirculate backwash/process wastewater in the WTP, and ensure that no wastewater discharge

(iv) Ensure that sludge is dried properly prior to its disposal or reuse

(v) Operate chlorination facility with all safety features and trained staff, ensure emergency procedures

(vi) Diesel generator sets shall maintain stack height as per CPCB regulation

(vii) Dust suppression measures such as water sprinkling shall be carried out during infrastructure repair and maintenance activities.

(viii) Construction safety measures shall be adapted during the repair and maintenance works; adequate PPE’s shall be provided workers.

(ix) Implement health and safety measures in power infrastructure operation and maintenance as per applicable standards and guidelines

(x) Dispose waste oil or any other hazardous material via agencies authorized by APPCB

(xi) Enforce road and traffic safety rules in the industrial cluster strictly

(xii) Ensure that wastewater management system is developed prior to establishment and operation of any industry in the start up area

(xiii) Ensure that wastewater is not discharged into stormwater drains

(xiv) Ensure regular cleaning and maintenance of drains

294. **Cumulative Impacts:** For the ADB subproject of start-up area development, no cumulative impacts are anticipated as the proposed site is mostly comprised of barren land and no existing major industrial activity is happening in the vicinity of the site. The components to be developed and implemented by GoAP funding will be constructed only after the start-up area works are completed.

295. As such, the proposed industrial estate works during start-up area construction will not generate cumulative impacts of significance in terms of dust, noise, water resources contamination, soil contamination, traffic, blocking of accesses, health and safety hazards and disruption to social services and economic activities.

296. **Indirect and Development induced impacts:** While the proposed subproject is located close to urban and semi-urban areas, better and available employment opportunities and transport operations may lead to rapid urbanization in future. For the start-up area development, no induced impacts are anticipated.

297. **Beneficial Impacts:** The influx of industrial sectors such as Pharma Industry, electronic and information technology, textiles, engineering etc., will help in overall economic development of the state, resulting in attracting skilled workforce and enable improvement of quality of life of people. Providing Common infrastructure at the Industrial Park such as Water Supply, etc., will help in attracting different sectors of industries due to availability of adequate infrastructure to better manage the industrial waste and wastewater ensuring environmental compliance.

298. The long-term effects of these developed industrial estates on poverty reduction are, consequently, expected to be significantly positive. During operation stage, economic activities supporting ancillary industries, trade, transport, etc. will increase due to increase in industrial activities is also expected to improve development of urban centres with amenities like housing, educational institutions, hospitals, etc.

299. **Adverse Impacts:** Any developmental activity in its wake will bring about some adverse impacts associated with its activities. For an Industrial Cluster based on the possible worst-case emissions and waste generation scenario, prediction of impacts helps in the preparation of a sound environmental management plan which has to be executed during the on-going activities for the proposed project to minimize the adverse impacts on the environmental quality. Provision of effective connectivity through internal transport, efficient management of industrial cluster operations, adoption pollution control technologies by the industries and efficient management of hazardous waste/ operations will be important to manage any adverse impacts due to sub-project operations. APIIC has conducted an EIA study, and developed environmental management plan, and monitoring plan, and is in the process of obtaining environmental clearance from the MOEFCC (Appendix xx). Further, individual industrial units /member industries, depending on the type and capacity, will conduct EIA studies if it falls under the ambit of EIA Notification, 2006. All industries will obtain consent to establish (CTE) prior to establishment and consent to operate (CTO) prior to start of operation from APPCB. During the operation, member industries will monitor all environmental parameters such as emissions, air quality, noise levels, treated wastewater, water quality, etc., within their industry premises as per the stipulations laid by MOEFCC and APPCB in their respective Environmental Clearance, CTE and CFO. APPCB will monitor the compliance and validate the CTOs periodically, and in case of non-compliances actions will be taken as per the rules, including cancellation of CTO.

300. **Adaption to Climate Change.** A separate climate risk assessment has been conducted for the overall VCICDP project considering climate risks to project subcomponents located in

areas prone to potential cyclones, heavy rains and flooding. The subproject components may face climate risks due to cyclones natural events, suitable mitigation measures highlighted in the climate risk study will be considered for implementation.

301. **Greenhouse Gas Emissions.** Greenhouse gas (GHG) emissions that will be generated from the construction of the subproject facilities are expected to be minimal. Emissions during construction will derive from the use of energy, including gasoline, diesel and electricity, by construction machinery and vehicles and by consumption of construction materials, traffic congestion for short durations, etc. Loss of tree cover will also contribute towards reduction of carbon sink. After construction is completed, twice the number of trees will be planted as per the regulatory norms. GHG emissions are expected to be reduced due to increased tree plantations, reduced traffic congestion and implementation of measures such as solar lights along the road sections and near junction areas.

302. GHG emissions during the operation phase of the industrial estate are expected to increase based on the types of industries located in the estate. In cases where the emissions are significant, APIIC will quantify direct emissions from the facilities within the project boundary and indirect emissions associated with the off-site production of power used by the facility. APIIC / facilities in the industrial estate will conduct quantification and monitoring of greenhouse gas emissions annually in accordance with internationally recognized methodologies. Technical and financially feasible options to offset such GHG emissions will be evaluated and implemented.

303. **Unanticipated Impacts during Construction and Operation:** In the event, unanticipated impacts become apparent during project implementation, the borrower will: (i) inform and seek ADB's advice; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) update the IEE including EMP. ADB will help the borrower mobilize the resources required to mitigate any adverse unanticipated impacts or damage.

VI. ANALYSIS OF ALTERNATIVES:

A. With- and Without-Project Alternatives

304. 'Without-project' or 'do-nothing' Alternative': Availability of government barren land and potential of industrial development in the vicinity is an advantage for development of this subproject. Many employable youths are lack of employment. Without project alternative, it will be difficult to boost the industrial development and improve the socio-economic conditions of people.

305. With Project Alternative: Government of Andhra Pradesh (GoAP) has embarked on major initiative of creating industrial clusters with state-of-the-art infrastructure to accommodate diverse sectors of industries and position Andhra Pradesh as the industrial hub for various industrial sectors in an endeavour to attract investments from National and International Players across the globe. Barren land availability and proximity to the seaports is one of most important advantage for this area. APIIC has identified land parcel in Visakhapatnam node at Rambilli and Nakkapalli. At Rambilli, about 1025 ha (2532 Acres) of land was identified falling in Jirayati Chintuva, Gorapudi, Krishnampalem, Lalamkoduru villages in Rambilli Mandal of Visakhapatnam District for development of Industrial Park.

306. The 'with project' alternative will contribute to the realization of improved socio-economic conditions, employment generation, and increase in economy.

1.	**Project Need – No Project Alternative**
Type of alternative	'No project' alternative
Description of alternatives	Availability of government barren land and potential of industrial development in the vicinity is an advantage for development of this subproject. Many employable youths are lack of employment. Without project alternative, it will be difficult to boost the industrial development and improve the socio-economic conditions of people.
Selected Alternative	Government of Andhra Pradesh (GoAP) has embarked on major initiative of developing Rambilli area as one of the future industrial hubs in the region. land availability and proximity to the sea ports is one of most important advantage for this industrial area. Given the large-scale benefits to the population and environment, 'no project' alternative is considered inappropriate
2	**Site Alternatives & Criteria**
Type of alternative	**Location alternative**
Site at Rambilli	• The site proposed for the development of Rambilli IP has been earmarked based on the major dynamic factors such as the following: • Availability of land • Suitability of land in terms of topographical and geological aspects. • Land shall be free from habitation, forest land, least agricultural activity and • archaeological/historical monuments • No or Minimum Rehabilitation and Resettlement (R&R) • Scope for future development • Suitability for phased and integrated development • Proximity and accessibility to state/National highway/railway line • Sustainability and viability of such a development with minimal environmental impacts • Evaluation in accordance with project objectives and compliance with country laws,

	• policies and legal requirements
Other sites	• Rambilli site is assessed to be suitable for industrial park and therefore no other site evaluated as alternative site.
Selected Alternative	Rambilli site selected for the following reasons • Strategically located near to four states Andhra Pradesh, Telangana, Chhattisgarh and • Odisha. • The major factor is that it is adjacent to existing Multi-Product SEZ (APSEZ). • The catchment area of the Site is already witnessing considerable activity in • Pharmaceuticals, Control equipment, Medical Instruments, Solar panels and modules and Defence electronics manufacturing. • The site is located around 30 km from City of Visakhapatnam with well-endowed Social and educational infrastructure. • The site has good access to logistic facilities. The site is well connected to the Road network in the region from Chennai - Kolkata National Highway 16 which is at a distance of ~10 km on Northwest side of the site. State Highway, SH-97 is at a distance of 3 kmtowards North of project site. • The nearest Railway station to the project site is at Elamanchili located at 10.4 km towards NW. • Visakhapatnam Airport is located at a distance of 35.5 km towards NE. The Airport has direct flight connectivity to international destinations such as Kuala Lumpur, Singapore, Colombo, Dubai, National destinations such as Bangalore, Kolkata, Delhi,–, Hyderabad, Mumbai, Port Blair, Jagdalpur, Tirupati, Vijayawada, Ahmedabad, Bhubaneswar, Chennai, & Coimbatore. • Gangavaram Port is located at distance of 30 km NE. • Water requirement for the proposed IP will be met from the Yeleru Left Main Canal (YLMC) in line with the existing industrial water supply policy of the state. • The site meets the requirement of all critical factors that are important for success of development of Industrial Park

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Public Consultation and Information Disclosure

307. Meaningful stakeholder consultation and participation is part of the project preparation and implementation strategy. A consultation and participation strategy is being designed and also implemented with the assistance of consultant. By addressing stakeholder needs, there is greater awareness of the benefits and "ownership" of the project among stakeholders, which in turn contribute to sustainability. The consultation process during the project preparation has solicited inputs from a wide range of stakeholders, including government officials, NGOs, residents near the subproject locations and towns, marginalized/vulnerable beneficiary groups, and project-affected persons (APs).

308. Consultation, participation, and disclosure will ensure that information is provided and feedback on proposed subproject design is sought early, right from the subproject preparation phase, so that the views/preferences of stakeholders including potential beneficiaries and affected people can be adequately considered, and continue at each stage of the subproject preparation, processing, and implementation.

309. APs were consulted in the preliminary stage and subsequently to ensure: (i) incorporation of their views/concerns on compensation/resettlement assistance and environmental impacts and mitigation measures; (ii) inclusion of vulnerable groups in project benefits; (iii) identification of help required by APs during rehabilitation, if any; and (iv) avoidance of potential conflicts for smooth project implementation. It also provides adequate opportunities for consultation and participation to all stakeholders and inclusion of the poor, vulnerable, marginalized, and APs in the project process.

310. Relevant information about any major changes to project scope is shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

311. A variety of approaches were adopted such as stakeholder consultations regarding the scope of the environmental and social impact studies before work commences, and they were informed of the likely impacts of the project and proposed mitigation once the draft IEE and resettlement plan reports were prepared. The views of different stakeholders were recorded and documented and indicate how these have been taken into account in project development.

312. The key stakeholders consulted during project preparation included:

(i) Project beneficiaries;
(ii) Andhra Pradesh Industrial Association (s)
(iii) Elected representatives, community leaders, religious leaders, and representatives of community-based organizations;
(iv) local NGOs;
(v) Andhra Pradesh Pollution Control Board
(vi) local government and relevant government agency representatives, including local authorities responsible for land acquisition, protection, and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments;
(vii) residents, shopkeepers, and business people who live and work alongside the industrial estates where facilities will be built;

(viii) Custodians, and users of socially and culturally important buildings;
(ix) VCICDP PMU and consultants; and
(x) ADB, Government of Andhra Pradesh and the Government of India

313. Detailed consultations were conducted as per the Environmental Clearance requirements. The issues raised by public and stakeholders during consultation is placed in Table 22.

314. Details of the attendants and photographs of the consultation are enclosed to this IEE report of Rambilli cluster as Appendix 10.

Table 22: Details of Public and Stakeholder Consultation Meeting held on 03.09.2018 for Rambilli Cluster

Sl. No.	Name	Representative Section	Issue discussed	Date
1.	R. Paradesemma	R/O Rajanapalem	Waste Water Discharge and water pollution due to industries operating in the region.	03-09-2018
2.	K. Sanyasi naidu	R/O Rajanapalem	Provision of employment in surrounding companies	03-09-2018
3.	P. Parvathi	R/O Rajanapalem	Provision of drinking water after industries established in the region as they may pollute the drinking water sources.	03-09-2018
4.	R. Rajeswari	R/o Rajanapalem	Weekly or monthly twice health camps in the project affected areas	03-09-2018
5.	S. Srinivasa Rao	R/O Rajanapalem	Effective pollution control measures for preventing health risks such as asthma, etc.	03-09-2018
6.	R. Venkateswara Rao	R/O Rajanapalem	Implementation of proper R & R package	03-09-2018
7.	R. Shankar	R/o Rajanapalem	Try to avoid tree cutting and improve the green belt	03-09-2018

Table 23: Details of Public and Stakeholder Consultation Meeting held on 07.04.2021

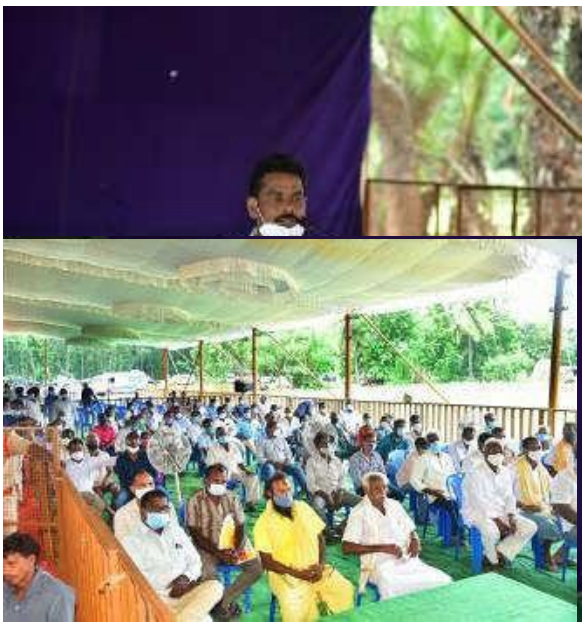
SNo	Date	Location	No. of Participants	Key Discussion Points	Response to Key Discussion Points
1	07th April 2021	Gorapudi	12	• Most of the affected families were boycotted census survey and not interested so far given incomplete information for land acquisition or negotiations purchases and	APIIC will take appropriate decision and measures in view of opinion

SNo	Date	Location	No. of Participants	Key Discussion Points	Response to Key Discussion Points
				demanded for rehabilitation and resettlement assistance especially for annuity amount • Demanding compensation more than INR 30 lakhs with R&R assistance as per New Land Acquisition Act, RFCTLARR 2013. • Villagers suggested that R&R package should be provided compulsorily to them. It should be implemented before APIIC asks them to vacate the village. • Socio-economic information shared in informal way like affected family, type and scale of losses, ownership details. In addition to these, family members details. • General information was also provided by villagers about Paddy, vegetables, fruit bearing trees, pulses, timber are the major crops cultivated in the village. Women are engaged in cultivation in their own lands as well as in agriculture labor.	shared by participants

315. **Public Hearing**: Public hearing for the proposed Industrial cluster (including Rambilli Mandal) was conducted on 23.09.2021. Details of the same are attached as Appendix 7.

SNo	Date	Location	No. of Participants	Summary of Key Points raised during the Public Hearing	Response to Key Discussion Points
1	23.09 2021	Public Hearing conducted at proposed Project Site	Total - 131 participants	Most of the stakeholders welcomed project development and are expecting due compensation and direct and indirect job creation due to the project. Some of the environmental related issues that were highlighted during the public hearing are as below: • There is air and water pollution due to 2-3 companies near Krishnampalem and wastewater is contaminating the wells. • Monitoring of polluting industries to be done and provision of safe drinking water to be ensured. • Environmental pollution may result in impacting health of the people in the area and suitable preventive measures may be adopted during the project implementation. • Impact of air and noise pollution during nighttime and early morning to be monitored and managed. Defaulting industries in such cases to be penalized.	APIIC will take appropriate decision and measures in view of opinion shared by participants. Response on public hearing comments and proposed mitigation measures will also be shared with all stakeholders and communicated with the concerned authorities as needed.

Photographs Taken During the Environmental Public Consultation Held on 23.09.2021






B. Future Consultation

316. This process shall be extended during implementation. Appointed PMSC (Project Management and Supervision Consultant) agency and APIIC Environment and Social Safeguards officer shall develop public consultation and disclosure program which is likely to include (i) Public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and (ii) smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation.

C. Information Disclosure

317. The IEE report for the development of Start-up area of Rambilli cluster – VCIC – Visakhapatnam node will be disclosed after obtaining Environmental Clearance from the Ministry of Environment and Forests (as EC is being applied for the entire SEZ area of approximately 2352 acres). IEE draft report including the sub project components will be submitted to ADB shortly. Information will be disclosed through public consultation and making relevant documents available in public locations. The following documents will be submitted to ADB for disclosure on its website once they are finalized:

(i) final IEE;
(ii) a new or updated IEE and corrective action plan prepared during project implementation, if any; and
(iii) environmental monitoring reports.

318. VCICDP PMU will send written endorsement to ADB for disclosing these documents on ADB's website. VCICDP PMU will also provide relevant safeguards information in a timely manner, in an accessible place and in a form and languages understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.

D. Grievance Redress Mechanism

319. **Project grievance redress mechanism**. A project-specific, three-tier GRM covers both environment and social issues. The GRM has been established to receive, evaluate, and facilitate the resolution of affected persons' concerns, complaints, and grievances about the social and environmental performance at project level. The GRM aims to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns related to the project. Assessment of the GRM designed and implemented for Project 1 shows that the system was effective in timely resolution of grievances in a transparent manner.[30] The GRM will be disclosed to the affected communities and households prior to the mobilization of contractors in any subproject areas. The project GRC, supported by the PMSC consultants as well as the PMU and PIU safeguard officers will be responsible for timely grievance redress on environmental and social safeguards issues and responsible for registration of grievances, related disclosure, and communication with the aggrieved party. A complaint register will be maintained at field unit, PIU, and PMU levels with details of complaint lodged, date of personal hearing, action taken and date of communication sent to complainant. Contact details, procedures and complaint mechanism will be disclosed to the project affected communities at accessible locations and through various media (i.e., leaflets, newspapers, etc.). Samples of draft project leaflets, grievance registration forms and monitoring templates are in the resettlement framework.

(i) **1st Level grievance.** The phone number of the PIU office should be made available at the construction site signboards. The contractors and field unit staff can immediately resolve onsite, seek the advice of the PIU safeguard manager (social safeguards and communications/environment safeguards) as required, within seven days of receipt of a complaint/grievance.

(ii) **2nd level grievance.** All grievances that cannot be redressed within 7 days at field/ward level will be reviewed by the GRC at district level headed by Joint Collector. GRC will attempt to resolve them within 15 days. The PIU safeguard manager (social safeguards and communications/ environment safeguards) will be responsible to see through the process of redressal of each grievance.

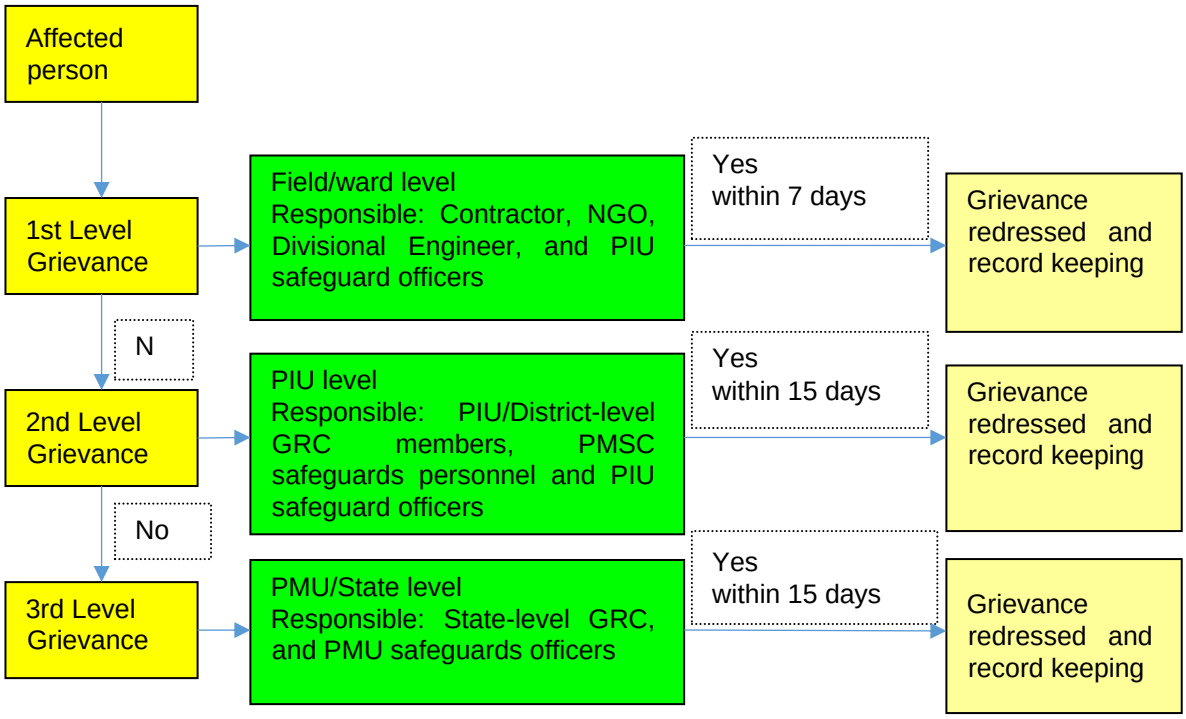
(iii) **3rd Level Grievance.** All grievances that cannot be redressed within 15 days at district level will be reviewed by the GRC at state level headed by the project director, PMU with support from district GRC, PMU officer - social safeguard and communications/officer-environmental safeguards, and PMC environment and social safeguards specialists. GRC will attempt to resolve them within 15 days. The PMU officer - social safeguard and communications will be responsible to see through the process of redressal of each grievance pertaining to social safeguards.

320. The multi-tier GRM for the project is outlined below (Figure 35), each tier having time-bound schedules and with responsible persons identified to address grievances and seek

[30] Regular recording and resolution of grievances at field level indicates that the GRM structure is working effectively. No major grievance was received for project 1 and the GRM helped smoothen the process of project implementation. Hence the proposed architecture for the project 2 of VCICDP GRM remains similar, with some refinement and strengthening for the industrial startup areas, through (a) provision of help desks at each startup area which would serve as accessible platforms for grievance registration for local communities and (b) ensuring indigenous peoples' representation in the GRM structure at district level, for Chittoor–South startup area.

appropriate persons' advice at each stage, as required. The GRC will continue to function throughout the project duration.

Figure 35: Grievance Redress Mechanism – Visakhapatnam–Chennai Industrial Corridor Development Program



GRC = grievance redressal committee, PIU = project implementation unit, PMU = project management unit, PMSC = project management and supervision consultant.

E. Grievance Redressal Committee

321. GRC consists of two-levels, one at district level and another at state/PMU level, to receive, evaluate and facilitate the resolution of displaced persons concerns, complaints and grievances. GRC at district level will receive, evaluate, and facilitate the resolution of displaced persons concerns, complaints, and grievances. The GRC will provide an opportunity to the affected persons to have their grievances redressed prior to approaching the State level LARR Authority, constituted by GOAP in accordance with Section 51(1) of the RFCTLARR Act, 2013. The GRC is aimed to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address displaced person's concerns without allowing it to escalate resulting in delays in project implementation. In case of any indigenous peoples impacts in subprojects, the GRC (at district level) must have representation of the affected indigenous people community, the chief of the tribe or a member of the tribal council as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) or an independent indigenous peoples expert or an NGO working with indigenous people groups. GRC will also ensure that grievance mechanism established is gender inclusive in receiving and facilitating resolution of the IPs' concerns.

322. The GRC will continue to function, for the benefit of the displaced persons, during the entire life of the project including the defects liability period. The entire resettlement component of the project has to be completed before the construction starts, and pending grievances resolved. Other than disputes relating to ownership rights and apportionment issues on which the LARR Authority has jurisdiction, GRC will review grievances involving all resettlement benefits, relocation, and payment of assistances. The GRCs will function out of each district where the subprojects are being implemented. The existing setup for coordination, monitoring, and grievance redress at district level which meets once a month, will be used for Project 2 of VCICDP. The GRC chaired by Joint Collector, will comprise of the Divisional/Project Engineer acting as its member secretary and the following members: (i) Revenue Divisional Officer/Sub- Collector of the division; (ii) project director, District Rural Development Agency; (iii) Chief Executive Officer, Zilla Parishad; (iv) District Panchayat Officer; (v) District Education Officer; (vi) District Medical and Health Officer; (vii) District Level representative of power distribution companies; and (viii) Superintendent, Rural Water Supply Panchayat Raj Department, three members from affected persons (with at least one being a woman affected person), team leader of the implementing consulting agency/NGO. The contact details of the GRC, PIUs safeguards manager, and the resettlement plan implementation NGO/agency will be included in the brochures to be circulated among all affected people as a first step in resettlement plan implementation.

323. The project director, PMU will be the appellate authority who will be supported by the PMSC and Safeguard Officer (social safeguards and communications/ environment safeguards) of PMU and concerned PIUs to make final decisions on the unresolved issues. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

324. **Accountability Mechanism.** In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters or the ADB India Resident Mission. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[31]

325. **Record-keeping.** Each of the PIUs of each town/city will keep records of grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions, and the date these were affected and final outcome. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PMU office, PIU offices, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis. The sample grievance registration format is attached as Appendix 16.

326. **Periodic review and documentation of lessons learned.** The PMU Officer (social safeguard and communications/environmental safeguards) will periodically review the functioning

[31] ADB. Accountability Mechanism.

of the GRM in each nodes and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

327. **Costs.** Costs involved in resolving the complaints (meetings, consultations, communication, and reporting/information dissemination) will be borne by the concerned PIU at town level while costs related to escalated grievances will be met by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates.

328. **Capacity building.** Regular capacity building activities on social safeguards are proposed, including quarterly training for safeguards officers of PIUs in year 1, followed by semiannual training in years 2 and 3 of project implementation, and semiannual training for at least 40 staff of PMU, PIUs, and resettlement NGO in the first 3 years of project implementation. Capacity building training will be undertaken by PMSC social safeguards coordinator on safeguards issues of the projects, resettlement framework of VCICDP and ADB Safeguards Policy. The PIU safeguards managers will be further supported by the PMSC experts through on the job training for resettlement plan updating, implementation, complaint resolution and report writing on safeguards.

329. **Civil works contracts.** The PIUs will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all (i) applicable labor laws and core labor standards on prohibition of child labor as defined in national legislation for construction and maintenance activities, on equal pay for equal work of equal value regardless of gender, ethnicity or caste, on elimination of forced or bonded labor; and (ii) the requirement to disseminate information on infectious diseases such as coronavirus disease and sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. Relevant provisions of the GESI AP will be shared with the contractors' responsibilities by the PMU and PIUs. Contractors will carry out all environmental and social mitigation and monitoring measures outlined in their contract and will maintain grievance registers and place GRM signboards at work sites. PMSC specialists will assist the PMU and PIUs in monitoring contractor's compliance activities.

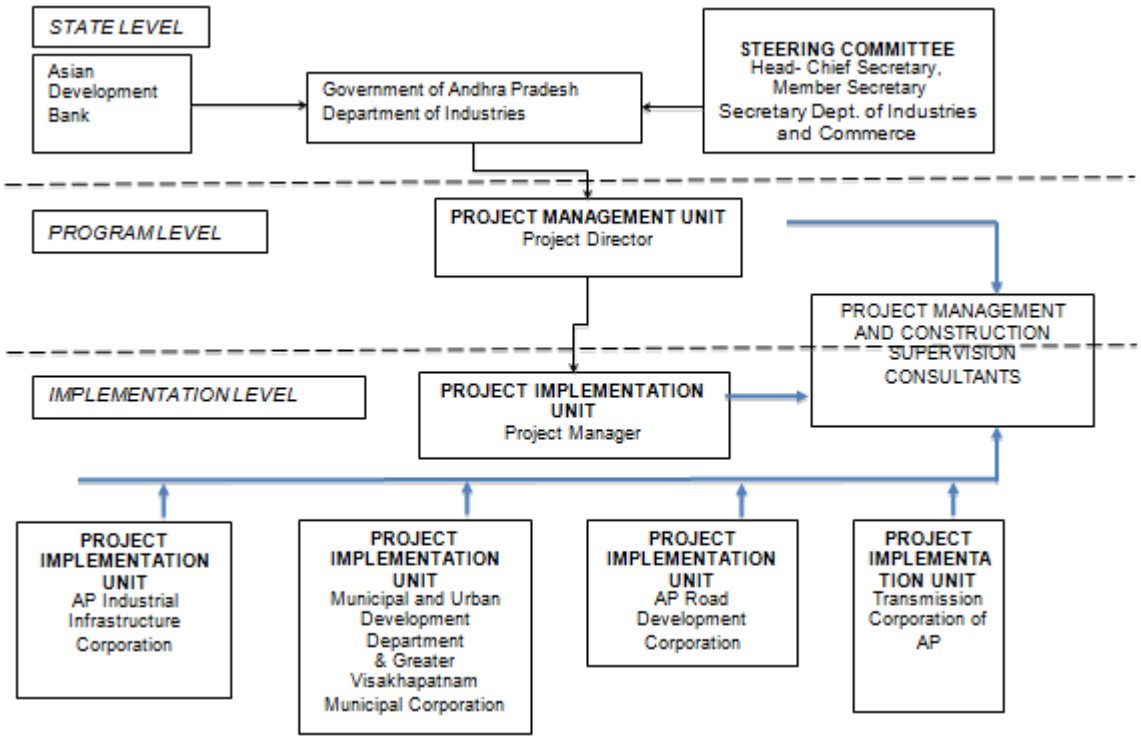
330. **Prohibited investment activities.** Pursuant to ADB's Safeguard Policy Statement (2009), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009).

VIII. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES

331. The effective implementation and close supervision of the environmental management to mitigate the environmental impacts, which are likely to arise due to the construction and operational phases of the Industrial area could be achieved through a suitable institutional mechanism. A proper institutional mechanism to understand and implement appropriate environmental management measures during various stages of the project is a pre- requisite and has a strong bearing for the overall success of the project management. Implementation of the Environmental Management measures shall become easy once an environmentally responsible Team with institutional arrangement and responsibilities are in place.

332. DOI is the executing agency. A PMU is established within the Directorate of Industries, which is under the DOI, for planning, implementation, monitoring and supervision, and coordination for both the PBL and MFF. PIUs, established in APIIC, APRDC, GVMC, and APTransco, will be responsible for implementing the MFF. PMU has recruited PMSC to provide support in implementation of VCICDP.

333. PMU will support PIUs in implementation, management and monitoring of the project. PMU and PIUs will be assisted by PMSC respectively. PIUs will appoint construction contractors to build infrastructure. Once the infrastructure is built and commissioned, the PIUs will operate and maintain the infrastructure. At state-level a Project Steering Committee (PSC) will be established to provide overall policy direction for the implementation of VCICDP.



334. The GOAP will ensure that all the requirements prescribed in Schedule 5 of the framework financing agreement, and the following frameworks that have been prepared with respect to the Facility are complied with during the processing and implementation of VCICDP: (i) environmental

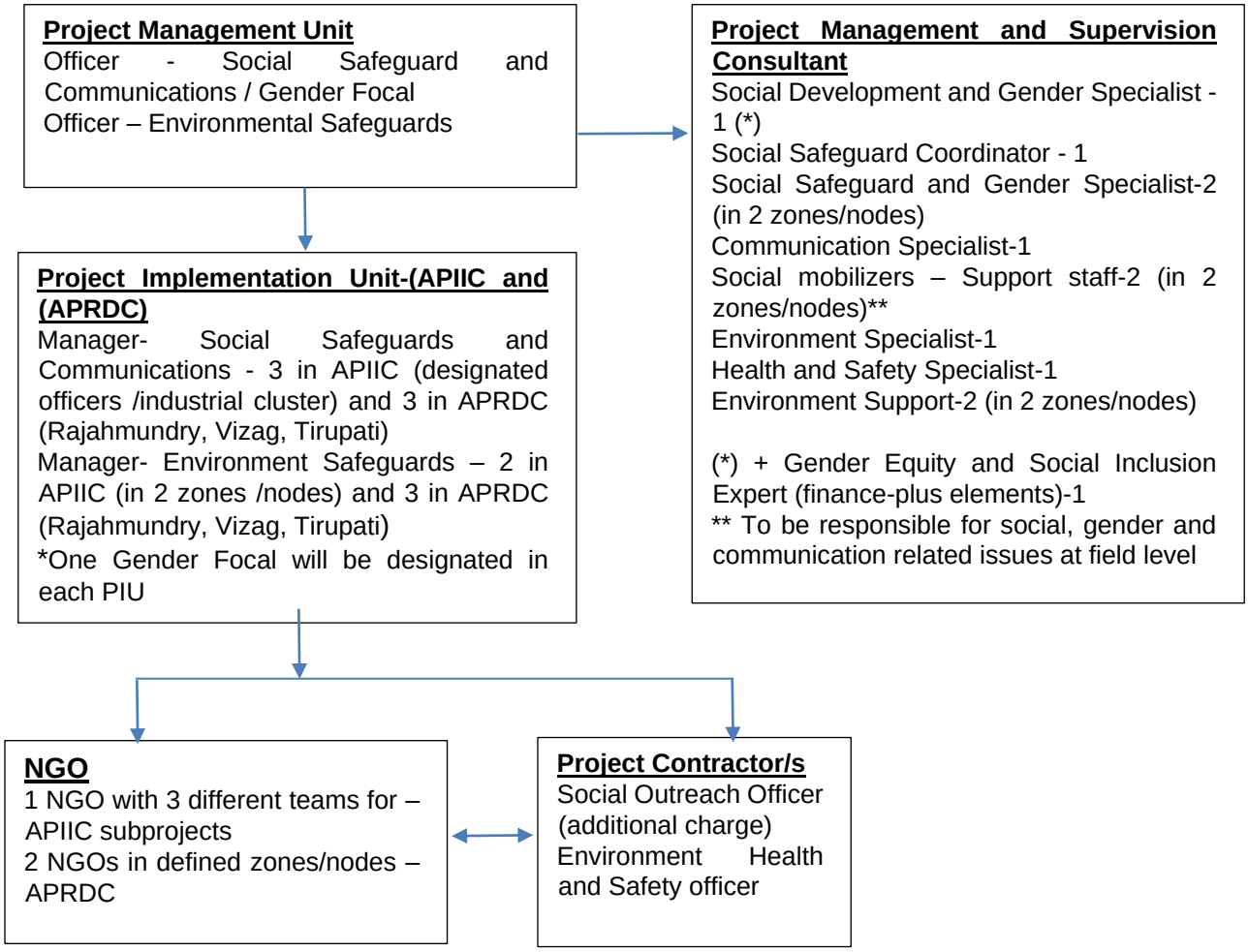
assessment and review framework (EARF), (ii) resettlement framework, and (iii) indigenous peoples planning framework (IPPF).

335. The safeguard frameworks cover the Facility specific information and requirements in accordance with ADB's Safeguard Policy Statement, 2009: (i) the general anticipated impacts of subprojects likely to be financed under the Facility on the environment, involuntary resettlement, and indigenous peoples; (ii) the safeguard criteria that are to be used in selecting projects; (iii) the requirements and procedure that will be followed for screening and categorization, impact assessments, development of management plans, public consultation and information disclosure , and monitoring and reporting; (iv) the institutional arrangements (including budget and capacity requirements) and government's and ADB's responsibilities and authorities for the preparation, review and clearance of safeguard documents.

336. The applicability and relevance of each safeguard framework for Tranche 2 has been reviewed and updated to ensure relevance and consistency with all applicable laws and regulations in India and Safeguard Policy Statement, 2009 as amended from time to time. In the event that there is a discrepancy between the laws and regulations of India and ADB safeguard policies, the ADB safeguard policies will prevail. In addition, Government of India will carry out due diligence works on ongoing projects to assess the status of compliance with the safeguards-related plans and frameworks. For each project, GOAP is required to submit safeguard monitoring reports semiannually covering all the aspects and issues from perspectives of environment, land acquisition, and resettlement and indigenous people.

337. All executing and implementing agencies will ensure that VCICDP is implemented with active participation of all stakeholders, using participatory practices, and consultation will continue throughout implementation of the Investment Program. Disclosure of relevant information to these stakeholders will continue throughout implementation of the Investment Program. Safeguards will be the responsibility of the PMU and the respective PIUs. The PMU and PIUs will be supported by experts as part of the PMSC and resettlement plan implementation nongovernment organizations (NGOs). The safeguards implementation organogram is provided in Figure 36.

Figure 36: Safeguards Organogram – Visakhapatnam–Chennai Industrial Corridor Development Program



APIIC = Andhra Pradesh Industrial Infrastructure Corporation, APRDC = Andhra Pradesh Road Development Corporation, NGO = nongovernment organization.

A. Safeguard Implementation Arrangement

338. **Safeguards Implementation Arrangements**. The implementation arrangements put in place for the MFF, and Project 1 will continue for Project 2. Program management unit (PMU) established within Directorate of Industries by DOIC (EA), is responsible for planning, implementation, monitoring and supervision, and coordination of MFF. PMU is supported by Project implementation units (PIUs) established in Andhra Pradesh Industrial Infrastructure Corporation (APIIC) and Andhra Pradesh Road Development Corporation (APRDC), which will respectively implement industrial infrastructure and road sector subprojects under Project 2. PMU and PIUs are supported by a Project Management and Supervision Consultant (PMSC). Described below are the institutional roles and responsibilities of PMU and PIUs /APIIC to ensure environmental safeguards are implemented and complied with during design, construction, and operation phases. PMU is staffed with an environmental safeguards officer to oversee and ensure environmental safeguards compliance. APIIC has environmental safeguards managers (one in each zone/node) to oversee the day-to- day implementation of SEMPs by the contractors and

ensure safeguards compliance. PMSC team with an environment specialist and a health and safety specialist based in PMU and supported by two field-based environmental engineers one in each Nodes [32] will assist APIIC and PMU in implementation, monitoring and reporting on environmental safeguards. Contractors will be responsible for implementing the mitigating measures during the design/construction phase, and APIIC and PMU will be responsible for monitoring.

339. **Program Management Unit (PMU). K**ey tasks and responsibilities of the PMU environmental safeguards officer with the support of PMSC are asfollows:

(i) confirm existing IEEs/EMPs are updated based on detailed designs and that new IEEs/EMPs are prepared in accordance with the EARF and subproject selection criteria related to safeguards;
(ii) confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
(iii) provide oversight on environmental management aspects of subprojects;
(iv) ensure SEMPs prepared by contractors are cleared by PIUs prior to commencement of civil works;
(v) establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the SEMPs;
(vi) facilitate and confirm overall compliance with all Government rules andregulations regarding site and environmental clearances as well as any other environmental requirements, as relevant;
(vii) Oversee and ensure compliance with labour regulations and ADB SPS prohibited list by contractors and their subcontractors and suppliers etc.
(viii) supervise and provide guidance to the PIUs to properly carry out theenvironmental monitoring and assessments as per the EARF;
(ix) review, monitor and evaluate the effectiveness with which the SEMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
(x) consolidate monthly environmental monitoring reports from PIUs and submit semi-annual monitoring reports to ADB;
(xi) ensure timely disclosure of final IEEs/SEMPs in locations and in a form and language accessible to the public and local communities; and
(xii) address any grievances brought about through the Grievance Redress Mechanism (GRM) in a timely manner.

340. **Project Implementation Units.** In APRDC Head Office, the safeguards managers of APRDC currently working on a World Bank Project will coordinate all environmental and social aspects of the projects. In APTransco, given the isolated locations of the proposed sub projects, the subprojects are under different Superintending Engineers and will implement thesubprojects through respective circle offices and a special projects cell. The respective Senior Engineers will be deputed/designated as safeguard compliance officers covering bothenvironment and social safeguards. In APIIC, the Senior Engineer will be deputed/designatedas safeguard compliance managers in addition to the environmental engineer. In GVMC, the Deputy Engineer will be deputed/designated as safeguard compliance officer in addition to the environmental engineer.

[32] The environmental engineers may be based at Vizag and Chittore /Vijaywada supporting the subprojects in two ends of the VCIC corridor.

Table 24: PIU Environmental Safeguard Manager Tasks and Responsibilities

PIU Environmental Safeguard Manager	Tasks and Responsibilities
Environmental Safeguards –APRDC	(i) include IEEs/EMPs in bidding documents and civil works contracts; (ii) review and approve SEMPs prepared by contractors; (iii) oversee day-to-day implementation of SEMPs by contractors including compliance with all government rules and regulations; (iv) take necessary action for obtaining rights of way; (v) oversee environmental monitoring by contractors; Ensure that workers are paid and treated according to the labour legislations and ADB's SPS prohibited list requirements (vii) take corrective actions when necessary;

PIU Environmental Safeguard Manager	Tasks and Responsibilities
	(vii) submit monthly environmental monitoring reports to PMU; (viii) conduct continuous public outreach and awareness building related to environmental management; (ix) address grievances brought about through the GRM in a timelymanner; and (x) organize an induction course for the training of contractors in environmental management to be delivered by PMSC consultants
Senior Engineer Cum Compliance Officer (DE Level) – APTransco	(i) Ensure complete payment and other resettlement assistants provided to the affected people prior to displacements (physical and economical) and starts of civil works in the affected areas; (ii) Coordinate with Safeguard Manager of PMU and ensure all social/environmental requirements if any are met.
Senior Engineer Cum Compliance Officer – APIIC	(iii) Coordinate with Safeguard Manager and ensure all social/environmental requirements are met.
Environmental Engineer - APIIC (not exclusive to this project)	(i) include IEEs/EMPs in bidding documents and civil works contracts; (ii) review and approve SEMPs prepared by contractors; (iii) oversee day-to-day implementation of SEMPs by contractors including compliance with all government rules and regulations; (iv) take necessary action for obtaining rights of way; (v) oversee environmental monitoring by contractors; (vi) Ensure that workers are paid and treated according to the labour legislations and ADB's SPS prohibited list requirements (vii) take corrective actions when necessary; (viii) submit monthly environmental monitoring reports to PMU; (ix) conduct continuous public outreach and awareness building related to environmental management; (x) address grievances brought about through the GRM in a timelymanner; and (xi) organize an induction course for the training of contractors in environmental management to be delivered by PMSC consultants.
Deputy Engineer Cum Compliance Officer - GVMC	(i) Coordinate with Safeguard Manager and ensure all social/environmental requirements are met.

Environmental Engineer - GVMC	(i) include IEEs/EMPs in bidding documents and civil works contracts; (ii) review and approve SEMPs prepared by contractors; (iii) oversee day-to-day implementation of SEMPs by contractors including compliance with all government rules and regulations; (iv) take necessary action for obtaining rights of way; (v) oversee environmental monitoring by contractors; (vi) take corrective actions when necessary; (vii) submit monthly environmental monitoring reports to PMU; (viii) conduct continuous public outreach and awareness building related to environmental management; (ix) address grievances brought about through the GRM in a timelymanner; and (x) organize an induction course for the training of contractors in environmental management to be delivered by PMSC consultants

341. **Project Management and Supervision Consultants.** The PMU and PIUs will be assisted by PMSC which will be staffed with environmental, health and safety and social safeguard specialists to provide required assistance and regular progress report on safeguards implementation. The environmental specialist will have overall responsibility in implementation of environmental safeguards, including appropriate monitoring and reporting responsibilities. The PMSC environment specialist will provide support for both Project 1 and Project 2 subprojects. Key tasks and responsibilities of the PSMC environmental specialist is as follows:

(i) Update the EARF as required;
(ii) Update the IEEs including site- and subproject-specific EMPs for VCICDP subprojects; Prepare the IEEs and EMPs for subproject components;
(iii) Supervise EMP implementation;
(iv) Prepare a monitoring report of final site- and subproject-specific EMPs and communicate with the stakeholders, including ADB on the progress, of the subprojects including environmental safeguards compliance;
(v) Prepare semi-annual environmental safeguards compliance reports; and
(vi) Support the implementing agencies in preparing periodic financing requests and necessary environmental safeguard reports for subsequent tranches.
(vii) Establish a system to monitor environmental safeguards of the Project; prepare indicators for monitoring important parameters of safeguards;
(viii) Ensure all requisite approvals and no objection certificates are in place to allow implementation, and that these are renewed in a timely manner where required;
(ix) Ensure that provisions and conditions of all necessary permits, consents, NOCs, etc., are incorporated in the IEEs;
(x) Take proactive action to anticipate the potential environmental impacts of the Project to avoid delays in implementation;
(xi) Assist PIUs in the establishment of GRC for IEE implementation;
(xii) Support the PIUs and PMU in the GRM implementation to address any grievances submitted in a timely manner and establish record keeping system forcomplaint and redressal status of the project;
(xiii) Assist the PIUs and PMU in the project GRM mechanism and complaint solution;
(xiv) Assist the PIUs and PMU for GRM record keeping for first tier complaint and redressed actions;
(xv) Ensure that the relevant environmental mitigation measures specified in the updated EMP will be incorporated into bidding documents and approved by the ADB prior to the issuance of the invitation for bidding;

(xvi) Closely monitor and supervise to ensure that all mitigation measures and monitoring requirements set out in the EMP are implemented and complied with throughout the project implementation, and when required, prepare or recommend necessary corrective actions to be taken and monitor its implementation;
(xvii) Conduct regular monitoring and ensure that contractors and their subcontractors comply with labour legislations and ADB SPS Prohibited list requirements; ensure that workers are paid and treated according to the labor legislations
(xviii) Provide on-the-job training programs to PIU staff involved in Project implementation for strengthening their capacity in managing and monitoring environmental safeguards; and
(xix) Assist the PIUs' safeguards officer to sensitize the turnkey contractors on ADB SPS, EARF, and GRM during detailed design and civil works implementation.

342. **Civil works contracts and contractors.** IEEs including EMPs are to be included in bidding and contract documents and verified by the PIUs and PMU. The PMU and PIUs will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable laws and regulations relating to environment, health and safety; (ii) reinstate pathways, other local infrastructure, and agricultural land to at least to their pre-project condition upon the completion of construction; (iii) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation, international treaties for construction and maintenance activities;(b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; (c) no discrimination in respect of employment and occupation; (d) allow freedom of association and effectively recognize the right to collective bargaining, and (e) elimination of forced labor; and (iv) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

343. The contractor will be required to appoint a full-time Environment, Health and Safety (EHS) supervisor on-site to implement the EMP. Prior to start of construction, Contractor will be required to prepare and submit to PIU, for review and approval. a Site-specific EMP (SEMP). No works can commence until SEMP is approved by PIUPMU. Contractors will carry out all environmental mitigation and monitoring measures outlined in EMP, approved SEMP and their contracts. The contractor will be required to undertake day-to-day monitoring of the SEMP implementation and submit reports to the PIU on a monthly basis. A copy of the EMP/approved SEMP will always be kept on-site during the construction period. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective actions. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. Key responsibilities of the EHS supervisor are:

(i) Prepare SEMP and submit to PMU/PIU for approval prior to start of construction;
(ii) Ensure implementation of SEMP and report to PIU/PMSC on any new or unanticipated impacts; seek guidance from the PMU/PIU/PMSC to address the new or unanticipated impact in accordance with the EARF, and ADB SPS;
(iii) Ensure that necessary pre-construction and construction permits are obtained;
(iv) Conduct orientation and daily briefing sessions to workers on environment, health and safety;
(v) Ensure that appropriate worker facilities are provided at the workplace and labor camps as per the contractual provisions;
(vi) Carry out site inspections on a regular basis and prepare site-inspection checklists/reports;
(vii) Record EHS incidents and undertake remedial actions;

(viii) Conduct environmental monitoring (air, noise, etc.,) as per the monitoring plan
(ix) Prepare monthly EMP monitoring reports and submit to PIU;
(x) Comply with labour legislations, and ensure that subcontractors also implement labor legislations requirements, through cascading of requirements to subcontractors—HR policy, labor management requirements, any worksite specific grievance redress mechanism.
(xi) Work closely with PIU Safeguards Officer and PMDSC Environmental Engineer to ensure communities are aware of project-related impacts, mitigation measures, and GRM; and
(xii) Coordinate with the PIU and PMDSC on any grievances received and ensure that those are addressed in an effective and timely manner.

Table 25: Institutional Roles & Responsibility: Environmental Safeguards

Phase	PMU / PIUs	PMSC	ADB
Appraisal stage of all Subprojects under the investment program	PMU / PIUs to review the REA checklists and draft EIA/IEE. PMU / PIUs to submit draft EIA/IEE to ADB for review and approval. PMU / PIUs to disclose on its website the approved EIA/IEE. PMU / PIUs to ensure disclosure of information throughout the duration of the subproject.	PMSC to conduct REA for each subproject using checklists and to prepare EIA/IEE	ADB to review the REA checklists and reconfirm the categorization. ADB will review and approve EIA reports (Category A) and IEE reports (Category B) subprojects. ADB to disclose on its website the submitted EIA/IEE report.
Detailed Design Phase of all Subprojects under the investment program	PMU / PIUs with the assistance of PMSC to incorporate the EMP, environmental mitigation and monitoring measures into contract documents. PMU / PIUs to obtain all applicable consents/permits/clearances PMU to submit to ADB final IEE for approval and disclosure at ADB website.	PMSC to revise the IEE and EMP in accordance with detailed design changes if warranted. PMSC to ensure incorporation of EMP in bid documents and contracts. PMSC to prepare inventory of utilities to be affected by the subproject.	ADB will review and approve updated EIA reports (Category A) and IEE reports (Category B) subprojects. ADB to disclose on its website updated EIA/IEE report.

Phase	PMU / PIUs	PMSC	ADB
Pre-construction Phase of all Subprojects under the investment program	PMU / PIUs to conduct public consultation and disclosure during IEE process and comments will be reflected in the IEE report. PMU / PIU to monitor the disclosure and public consultation. PIU and PMSC to approve contractor's proposed locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes. PMU to submit to ADB in prescribed format semi-annual Environment Monitoring Report 6 months after Loan effective date.	PMSC to ensure statutory clearances and permits from government agencies/other entities are obtained prior to start of civil works. PMSC to ensure disclosure of information prior to start of civil works and throughout the duration of the construction period. PMSC to approve contractor's site-specific environmental plan (such as traffic management plan, waste management plan, locations for camp sites, storage areas, lay down areas, and other sites/plans specified in the EMP). PMSC to conduct	

Phase	PMU / PIUs	PMSC	ADB
		baseline environmental conditions and inventory of affected trees	

Construction Phase of all Subprojects under the investment program	PMU / PIUs will review 6-monthly monitoring and EMP implementation report including the status of Project compliance with statutory clearances and with relevant loan covenants and submit the 6-monthly report to ADB and seek permission to disclose the same in the investment program web site.	PMSC to monitor the implementation of mitigation measures by Contractor. PMSC to prepare monthly progress reports including a section on implementation of the mitigation measures (application of EMP and monitoring plan) PMSC (as per EMP) will conduct environmental quality monitoring during construction stage (ambient air and noise, and water quality). PMSC to prepare the six-monthly monitoring report on environment by focusing on the progress in implementation of the EMP and issues encountered and measures adopted, follow-up actions required, if any.	ADB to review the 6 monthly report, provide necessary advice if needed to the PMU and approve the same. ADB to disclose on its website environmental monitoring reports.
Pre-operation Phase (Commissioning and Defect Liability Period)	PMU / PIUs to review monitoring report of PMSC on post-construction activities by the contractors as specified in the EMP PMU / PIU to review applicable consents requirements submit 6-monthly environmental monitoring report until project completion	PMSC to apply for the CTOs prior to commissioning. PMSC to monitor and approve post-construction activities by the contractors as specified in the EMP. prepare 6-monthly environmental monitoring report until project completion	ADB to review the environmental monitoring reports and provide necessary advice if needed to the PMU and approve the same. ADB to disclose on its website environmental monitoring reports.
Operation Phase of all Subprojects under the investment program	PIUs to conduct monitoring, as specified in the environmental monitoring plan. APPCB to monitor the compliance of the standards regarding drinking water quality, ground water, ambient air, effluent quality from treatment plant, noise, as applicable. submit 6-monthly environmental monitoring report until project completion	PMSC to support PMU and PIUs for environmental monitoring and compliance management during O&M of the developed infrastructure in the start-up area.	ADB to review the environmental monitoring reports and provide necessary advice if needed to the PMU and approve the same. ADB to disclose on its website environmental monitoring reports.

Notes: APPCB = Andhra Pradesh State Pollution Control Board, PMSC = Project Management Consultants, CTE = Consent to Establish, CTO = Consent to Operate, PMSC = Design and Supervision Consultant, EIA = Environmental Impact Assessment, EMP = Environmental Management Plan, IEE = Initial Environmental Examination, PMU = Project Management Unit; PIU = Project Implementation Unit; REA = Rapid Environmental Assessment

344. APIIC proposed setup for Environmental Management of the Industrial Park (IP) – Operations Phase. Qualified and experienced persons in the field of Environmental Management of industrial estates shall be considered for overall Environmental management. Well qualified personnel with minimum qualification of graduation in the respective discipline and minimum of seven (7) years of experience in relevant field shall be considered for the third level positions. The member industries shall appoint experienced persons for the position of Manager (Environment) for management of environmental aspects within the individual industrial plant premises and coordination with IP Environmental Management Cell (EMC). The responsibilities of the Environmental Management Cell shall be as follows:

(i) Identify environmental aspects, normal, abnormal and emergency conditions.
(ii) Ensure implementation of standard operating procedures as updated from time to time.
(iii) Evaluate any non-conformity to the environmental standards, as stipulated by different regulatory agencies
(iv) Ensure and implement necessary corrective actions
(v) Establish procedures for reporting, document and record control
(vi) Establish and implement procedures for incident and near miss reporting, investigation and root cause analysis and prescribe corrective action.

345. The roles and responsibilities of Developer/IP authority and Member Industry coming up in the IP are brought out in Table below. These roles and responsibilities can be shared by IP developer as a part of agreement with member industry and shall have clear terms on environmental management responsibilities.

Roles and Responsibilities of APIIC and Member Industry

S NO	COMPONENT	RESPONSIBILITY OF APIIC	RESPONSIBILITY OF MEMBER
1	General Agreement	Evolve very specific plot allotment guidelines with proper Environmental impact mitigation clauses. Any violations need proper penal clauses with adequate notice. Multiple violations need to be taken seriously and need to be reported to concerned administrative authority.	Strictly adhere to the plot allotment guidelines and agreement. No pollutant shall be released to Natural water systems that affect the common people of the region.
2	Water Supply	Required water for the member industries for process, cooling and domestic usage shall be supplied by developer. Groundwater shall not be withdrawn during operation stage of the project. Groundwater shall not be contaminated by discharge of pollutants in to streams, ponds and other surface water bodies.	Water requirement shall be met from IP water supply scheme. Groundwater shall not be withdrawn during operation stage of the Project. Groundwater shall not be contaminated by discharge of pollutants in to streams, ponds and other surface water bodies.
3	Rainwater harvesting	Rainwater harvesting pits/recharge wells shall be	Rainwater harvesting in industry premises shall be adopted.

S NO	COMPONENT	RESPONSIBILITY OF APIIC	RESPONSIBILITY OF MEMBER
		provided at identified locations as per development plan.	
4	Waste management	Sludge generated from STP shall be composted and will be used as manure for greenbelt/ green areas development.	Member industry shall have their independent Hazardous/Non-hazardous waste collection and segregation system.
5	Post project environmental monitoring	EMC shall conduct post project environmental monitoring as per the environmental monitoring programme suggested for construction and operation phases. Specific requirement of monitoring shall be carried out as a part of compliance to EC/CFE/CFO.	Industry specific critical pollutants shall be monitored at industry level. Specific requirement of monitoring shall be carried out as a part of compliance to CFE/CFO.
6	Stack monitoring	Developer need to ensure that all regulator measures are properly incorporated and all institutional arrangements by developer as well as member industries are in place.	Stack monitoring shall be carried out by member industry.
7	Greenbelt development	Greenbelt development along IP boundary and green areas in common areas and open spaces shall be developed.	Greenbelt and green areas shall be developed in the industry level as per APPCB norms.

IX. INSTITUTIONAL CAPACITY AND DEVELOPMENT

346. The PMSC environmental safeguards specialist will be responsible for training PMU and APIIC on environmental awareness and management in accordance with both ADB and government requirements. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project, along with the frequency of sessions, is presented in Table 26.

Table 26: Training Program for Environmental Management

Description	Contents	Schedule	Participants
Pre-construction stage			
Orientation workshop	Module 1 – Orientation ADB Safeguard Policy Statement Government of India Environmental Laws and Regulations	1/2 day (at Visakhapatnam) (50 persons)	PMU, and APIIC's officials involved in project implementation
Description	**Contents**	**Schedule**	**Participants**
	Module 2 – Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements - Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts	1/2 day (at Visakhapatnam) (50 persons)	PMU, and APIIC's officials involved in project implementation.
Construction stage			
Orientation program/ workshop for contractors and supervisory staff	- Roles and responsibilities of officials/contractors/consultants towards protection of environment - Environmental issues during construction Implementation of EMP - Monitoring of EMP implementation Reporting requirements	1 day (at Subproject locations) (15 persons)	PMU APIICs Contractors
Experiences and best practices sharing	Experiences on EMP implementation – issues and challenges Best practices followed	1 day on a regular period to be determined by PMU, APIICs, and PMSC (at Visakhapatnam / Rambilli) (50 persons)	PMU APIICs Contractors

ADB = Asian Development Bank; EMP = Environmental Management Plan; APIIC = Project Implementation Unit; PMU = Project Management Unit; PMSC = Design and Supervision Consultant.

X. ENVIRONMENTAL MANAGEMENT PLAN, MONTORING PLAN

A. Environment Management Plan

347. Environmental Management Plan (EMP) is intended to set out clearly and unambiguously the likely negative impacts of construction and/or operation of the project, the action that is required to avoid or mitigate each impact and the responsibility for taking each action. Responsibility is made legally binding when actions are subsequently specified in contracts.

348. The EMP also ensures that the positive impacts are conserved and enhanced. It addition, it provides measures for institutional strengthening and effectiveness assessment through defined monitoring plan, reporting and corrective & preventive action planning. More specifically the objectives of the EMP are:

(i) To ensure compliance with Asian Development Bank's applicable safeguard policies, and regulatory requirements of Andhra Pradesh and the Government of India;
(ii) To formulate avoidance, mitigation and compensation measures for anticipated adverse environmental impacts during construction and maintenance and ensure that environmentally sound, sustainable and good practices are adopted;
(iii) To stipulate monitoring and institutional requirements for ensuring safeguard compliance; and
(iv) The subprojects should be environmentally sustainable.

349. Detailed Environment Management Plan is enclosed in the following table:

Table 27: Environmental Management Plan (EMP) for the Pre-Construction, Construction and Post Construction Phases

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
Pre-Construction Phase							
Necessary Statutory approvals (environment clearance, consent to establish, etc.) for environment management, building construction, water supply, fire safety, tree cutting, etc. Contractor Preparatory Works	Necessary planning and coordination with concerned authorities. Prior notice to and consultation with concerned authority, public to be affected so as to ensure that work does not get affected. The Contractor will complete the following activities no later than 30 days upon issuance of Notice to Proceed 1.) **Submit appointment letter and resume of the Contractor's Environmental Officer (EO) to APIIC** 2.) EO will engage PMSC-Environment Specialist and to a meeting to discuss in detail the EMP, seek clarification and recommend corresponding revisions if necessary 3.) EO will request PMSC-ES copy of monthly monitoring formats and establish deadlines for submission. 4.) EO will submit for PMSC-ES approval an	Documents like permits, licenses and its conditions	All project site	Contractor	Document Checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	action plan to secure all permits and approvals needed to be secured during construction stage of Phase-II development. This will include but not limited to: i) consent to establish; (ii) Agreement with TSDF for transport, storage and disposal of hazardous waste (e.g. sludge, toxic untreated wastewater) if any, iii) temporary storage location, iv) water use, v) emission and fitness compliance of all vehicles to be used for construction and transport, vi) emission compliance of DG sets to be used for construction, vii) permission for groundwater extraction from CGWB The contractor will prepare a site-specific environmental management plan considering the IEE herewith, EIA and EMP prepared for environmental clearance and conditions received therein.						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	Prior to construction, the contractors / APIIC will hire authorized environmental monitoring agency for any baseline monitoring in accordance with the EMP monitoring plan.						
Construction of labour camps, stockpile areas, storage areas, and disposal areas may potentially cause conflicts with the local community; disruption to traffic flow and sensitive receptor.	(i) Prioritize areas within or nearest possible vacant space in the project location; ii. If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in the destruction of property, vegetation, irrigation, and drinking water supply systems; iii. Do not consider residential areas; iv. Take extreme care in selecting sites to avoid direct disposal of excavated earth / demolition waste to a water body which may cause inconvenience to the community. v. For excess spoil disposal, ensure (a) site shall be selected preferably from barren,	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	Quarry sites and borrow areas	Contractor	Document Checking and site visits	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	infertile lands. In case agricultural land needs to be selected, written consent from landowners (not lessees) will be obtained; (b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes or other water bodies.						
Sources of Materials, Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and waterlogging, and water pollution.	Obtain construction materials only from government-approved quarries with prior approval of APIIC ii. APIIC to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval iii. Contractor to submit to APIIC the documentation every month with the details of	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry	Quarry sites and borrow areas	Contractor	Document Checking and site visits	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	the material obtained from each source (quarry/ borrow pit) i. Avoid the creation of new borrow areas, quarries, etc., for the project; if unavoidable, contractor to obtain all clearances and permissions as required under law, including Environmental Clearance (EC) prior to approval by APIIC.	sites if necessary.					
Chance finds / damage or disturbance to any artifacts.	Contractors to follow these measures in conducting any excavation work • Create awareness among the workers, supervisors, and engineers about the chance finds during excavation work • Stop work immediately to allow further investigation if any finds are suspected. • Inform APIIC immediately if a find is suspected, and taking any action required to ensure its removal or protection in situ.	Chance Find Protocol	All project site	Contractor	Document Checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Construction Phase							

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
Impact due to site development Activities like clearing of vegetation, waste/debris disposal, and establishment of temporary labour camps may change the topography and appearance of the landscape.	(i) During the site levelling, excess soil or cut materials should be used for road construction or widening or properly disposed in an environmentally acceptable manner. (ii) Cut slopes should be re-vegetated immediately after widening activities. (iii) Borrow areas, if required should be rehabilitated and brought back as far as possible to their previous appearance. (iv) Cut off material should be used to widen the road or disposed of at proper disposal sites. (v) Provision and allocation of proper waste disposal bins and sites are required; and (vi) Supply of cooking gas should be provided by the contractor to eliminate the use of firewood.	Site conditions, Labor camp locations and associated areas, area redevelopment, etc.	All project site	Contractor	Physical visits, records of housekeeping and site pictures clicked at different duration of development.	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Impacts on air quality Construction dust, exhaust emissions from vehicles, fugitive dust during material transport	To reduce impacts from exhausts, emission control norms will be enforced/adhered.	Air quality parameters like particulate matter, oxides of nitrogen, oxides of Sulphur	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
and unloading, Dust suspension during site preparation, construction and trenching Emissions from DG sets	All the vehicles and construction machinery will be periodically checked to ensure compliance to the emission standards Construction equipment and transport vehicles will be periodically washed to remove accumulated dirt Providing adequately sized yard for storage of construction materials, equipment tools, earthmoving equipment, etc. Provide enclosures on all sides of construction site Movement of material will be mostly during non-peak hours. On-site vehicle speeds will be controlled to reduce excessive dust suspension in air and dispersion by traffic Water sprinkling will be carried as required, to suppress fugitive dust in the project site Environmental awareness program will be provided to the personnel involved in developmental works.						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	Dust generating activities to be avoided in conditions of high wind (particularly during summer season) and covers to be provided for loose construction material at construction site. Vehicle speed to be restricted to 20 km/hr at site to minimize potential for dust generation in the surroundings. Trucks / dumpers to be covered by tarpaulin sheets during off site transportation of construction materials and spoil. Surfaced roads to be cleaned and un-surfaced roads will be stabilized to reduce offsite transport of soils and avoid dust generation.						
Impact on Noise Levels Sources of noise pollution during the construction of the subproject is from machinery comprising of mainly bull dozers, front end loaders, standby generators, fabrication workshop and other heavy earth machinery used in	(i) Construction machinery should be located away from settlements; no facility should be located within 1 km of Shastri yanadi colony. (ii) Careful planning of machinery operation and the scheduling of such operations can reduce noise levels. The use of equipment	Ambient noise and work site noise levels	All work site	Contractor	Noise monitoring with equipment	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
construction in addition to the vehicular movement within the project boundary.	emitting noise not greater than 90 dB (A) for eight-hour operations shift and, when possible, the siting of construction yards at least 500 metres from residential areas should be adhered to. (iii) Contractors should be required to fit noise shields on construction machinery and to provide earplugs to the operators of heavy machines. (iv) Further to minimize noise impacts near sensitive receptors (nearby community), operation of excavator and other heavy machineries will be carried out mostly during off-hours (7 am to 9 am and 3.30 pm to 7 pm) and on holidays (Saturday and Sundays). Baseline noise will be established for all sensitive areas prior to construction and follow up noise monitoring will be carried out during the construction.						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
Impacts to the surface water body	Water Requirement during the construction will be met through local municipal bodies and groundwater. Care should be taken to prevent the contaminated runoff from the construction site to the nearby natural streams, if any. Optimized utilization of the water Wastewater and sewage generated shall be treated at STP or septic tank with soak pits	Physical, chemical and biological parameters	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Impact to natural flow of runoff due to blockage and change of drainage course	Natural drain is observed as seen on the Topographical maps. Adequate storm water drainage system shall be provided. Drainage system will be provided at construction yard. Measures will be taken to prevent silting of natural drainage due to runoff from construction areas	Water logging and items which can cause flooding like boundary wall, blockage of drains	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Impact on Soil Quality. Land disturbance from the proposed construction activities will be confined to the immediate work area	(i) Borrow areas if required, shall not be located near forest areas. The edges of borrow sites shall be no closer than 3 m from any fence line or boundary.	Any New borrow area opened; required licenses and approvals	All work site / internal roads and connecting roads to the NH	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
Borrow Areas and Quarries	(ii) Adequate clearance shall be provided for the construction of catch drains. (iii) Borrow sites shall have adequate drainage outlets unless the relevant landowner has agreed that the borrow area is to create a permanent tank or dam. Cut batter slopes shall not be steeper than 3 to 1 and shall be left by the Contractor in a tidy and safe condition to the satisfaction of the Engineer. Written clearance from the landowner/village head shall be obtained before leaving a site. (iv) Obtain statutory approval from competent authorities. (v) Borrow pits shall be selected from barren land/wasteland to the extent possible. (vi) Borrow areas should not be located on cultivable lands except in the situations where landowners' desires to level the land. The topsoil shall be						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	preserved, and depth shall be restricted to the desired level. (vii) Borrow areas should be excavated as per the intended end use by the owner. (viii) The Indian Road Congress (IRC):10-1961 guideline should be used for selection of borrow pits and amount that can be borrowed. (ix) The dredged material from the riverbank shall be tested for presence of heavy metals and other pollutants before its reuse. (x) The depths in borrow pits to be regulated so that the sides shall not be steeper than 25%, to the extent possible, borrow areas shall be sited away from habited areas. Borrow areas shall be levelled with salvaged material or other filling materials which do not pose contamination of soil. (xi) Monitoring of rehabilitation plan of borrow areas.						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
Impact on Ecology	(i) Minimize removal of trees by adopting to site condition, remove tree only where it is necessary (ii) Obtain prior permission for tree cutting (iii) Plant and maintain 2 trees for each tree that is removed. (iv) Prior to removal of trees, conduct a confirmatory survey of trees for any birds and nests to confirm there are no protected species of birds; if any protected species are noticed, inform ADB, and update the IEE and EMP, and work should commence only after ADB clearance of IEE and EMP		All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Accessibility	(i) Prepare and implement a Traffic Management Plan (ii) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (iii) Schedule transport and hauling	Preparation and implementation of TMP	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	activities during non-peak hours; (iv) Locate entry and exit points in areas where there is low potential for traffic congestion; (v) Keep the site free from all unnecessary obstructions; (vi) Drive vehicles in a considerate manner; (vii) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and (viii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.						
Impact on the Existing Traffic System Increased movement of trucks and heavy vehicles for transportation, may cause road safety issues	The contractor will submit a Traffic Management Plan to the Project Engineer at least two weeks before the construction starts that will result to obstruction. This Plan will	Traffic management plan Implementation of TMP	All work site / internal roads and connecting roads to the NH	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	recommend for approval of PIU, the safe and convenient temporary diversion of construction traffic movement, schedules, and road safety measures and information dissemination. Transportation of quarry and other construction material to the construction sites through heavy vehicles shall be done through existing major roads to the extent possible. This will restrict wear and tear to the interior village/minor roads. Small vehicles/un-motorized vehicle can also be used for its further transportation to the construction sites from temporary storage areas.						
Impacts due to disposal of solid waste on ground	Construction waste shall be used within project site for filling of low-lying areas. Excavated soil shall be stockpiled in a corner of the site in bunded area to avoid run off with storm water. General refuse generated on-site shall be collected in waste skips and	Solid waste generated volume of soil excavated; area of land excavated	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	separated from construction waste. Local authorized waste recycler shall be employed to remove general refuse from the site, separately from construction waste and hazardous wastes Recyclable wastes will be disposed through APPCB approved vendors Burning of refuse at construction sites shall be prohibited.						
Occupational Health and Safety Occupational hazards which can arise during construction works	Follow all national, state and local labour laws. Develop and implement site-specific occupational health and safety (OH and S) Plan which shall include measures such as (a) safe and documented construction procedures to be followed for all site activities; (b) ensuring all workers are provided with and use personal protective equipment; (c) OH and S, training for all site personnel, (d) excluding public from the work sites; and (e) documentation of work-related accidents; Follow International Standards such as the		All work sites	Contractor	Physical checks, inspection reports	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	World Bank Group's Environment, Health, and Safety Guidelines. Ensure that qualified first-aid specialist is provided at all times in the project area. Equipped first-aid stations shall be easily accessible throughout the sites.						
COVID 19 response Spread of infection which causes serious symptoms like difficulty in breathing, chest pain and loss of speech or movement. If not treated it will lead to death	Taking cognizance of situation at time of mobilisation, the Contractor shall undertake a COVID risk assessment of project area and prepare a COVID Response and Management Plan and submit to APIIC for approval. The preparation of the plan shall consider guidance of Government of India and GoAP and be in accordance with the H&S plan of VCICDP (Refer Annex 20) The contractor shall submit a weekly monitoring and progress report to APIIC during implementation.	Preparation and implementation of COVID Response and manegement plant	All work sites	Contractor	Physical checks, inspection reports	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Fire accidents due to hazardous material handling Health Issues	Adequate safety measures as per OSHA standards will be adopted	Number of accidents,	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	Construction site will be secured by fencing with controlled/limited entry points. Hazardous materials such as lubricants, paints, compressed gases, and varnishes etc., will be stored as per the prescribed/approved safety norms. Construction site will be secured by fencing with controlled/ limited entry points Medical facilities including first aid will be made available for attending to injured workers. Handling and storage as per statutory guidelines. Positive isolation procedures will be adhered Handling and storage as per MSIHC rules, MoEF guidelines with Fire protection system. Hazardous wastes, if any, shall be disposed through APPCB/CPCB approved vendors	Number of near miss reported					APIIC to inspect monthly PMSC/ PMU to inspect quarterly
Work Camps and worksites	Consult APIIC before locating project offices, sheds, and construction plants, select a campsite	Location of camps; establishment	All work sites	Contractor	Physical checks, inspection reports	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants Unsanitary and poor living conditions for workers	away from residential areas, avoid tree cutting for setting up camp facilities, provide a proper fencing/compound wall for campsites, campsite shall not be located near (100 m) water bodies, , separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit, ensure conditions of livability at work camps are maintained at the highest standards including COVID19 protocols, camps shall be provided with proper drainage, there shall not be any water accumulation, provide safe and clean drinking water, water for other uses, and sanitation facilities for employees, wastewater from the camps shall be disposed of properly through on-site sanitation facilities (mobile or with a septic tank and soak pit arrangements), recover used oil and lubricants and reuse or remove from the site and manage solid waste according to the	and operation practices					PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	following preference hierarchy: reuse, recycling, and disposal to designated areas.						
Solid waste	(i) General refuse generated on-site will be collected in waste skips and separated from construction and chemical waste. (ii) A local authorized waste handler will be employed to remove general refuse from the site, separately from construction waste and hazardous wastes, on regular basis to minimize odor, pest and litter impacts. (iii) Burning of refuse on construction sites will be prohibited.	Solid waste generation, storage and dispisal practices	All work site / internal roads and connecting roads to the NH	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	
Landscape and Aesthetics	(i) Prepare and implement spoils management plan; (v) Avoid stockpiling of excess excavated soils; (vi) Coordinate with for beneficial uses of excess excavated soils or immediately dispose to designated areas;	Site cleanliness and upkeep	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor regularly APIIC to inspect monthly PMSC/ PMU to inspect quarterly

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	(vii) Recover used oil and lubricants and reuse or remove from the sites; (viii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (ix) Remove all wreckage, rubbish, or temporary structures which are no longer required; (x) Request PMU/ to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.						
Post-construction clean-up	Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and all excavated areas shall be reinstated to the original condition, all disrupted utilities restored, the area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall	Site clearance / work completion certificate	All work site	Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor and APIIC to inspect and confirm.

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	be cleaned up, all hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and regressed using the prescribed guidelines set out in the contract specifications.						
Operation Phase							
Operation of infrastructure	(i) Ensure that standard operating procedures are adapted for all infrastructure, and ensure preventive, periodic, and emergency maintenance activities as needed; provide adequately trained operators and maintenance staff (ii) Provide necessary personnel protection equipment, use appropriate maintenance equipment and tools (iii) Recirculate backwash/process wastewater in the WTP, and ensure that no wastewater discharge (iv) Ensure that sludge is dried properly prior to its disposal or reuse	Air, Water, Noise, Land monitoring through periodic testing and physical observations / audits.	All developed work site and infrastructure facilities	Operations / Maintenance Contractor	Site inspection and documents checking	Contractor / APIIC / PMU/PMSC	Contractor to Monitor and APIIC to inspect and confirm.

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	(v) Operate chlorination facility with all safety features and trained staff, ensure emergency procedures (vi) Diesel generator sets shall maintain stack height as per CPCB regulation (vii) Dust suppression measures such as water sprinkling shall be carried out during infrastructure repair and maintenance activities. (viii) Construction safety measures shall be adapted during the repair and maintenance works; adequate PPE's shall be provided workers. (ix) Implement health and safety measures in power infrastructure operation and maintenance as per applicable standards and guidelines (x) Dispose waste oil or any other hazardous material via agencies authorized by APPCB (xi) Enforce road and traffic safety rules in the industrial cluster strictly						

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters to be Monitored	Location	Responsible for mitigation	Monitoring Method	Responsible for Monitoring	Frequency of Monitoring
	(xii) Ensure that wastewater management system is developed prior to establishment and operation of any industry in the start up area (xiii) Ensure that wastewater is not discharged into stormwater drains (xiv) Ensure regular cleaning and maintenance of drains						

B. Environment Monitoring Program

350. The monitoring and evaluation are critical activities in implementation of the Project. Monitoring involves periodic checking to ascertain whether activities are going according to plan or not. It provides the necessary feedback for project management to ensure project objectives are met and on schedule. The reporting system is based on accountability to ensure that the environmental mitigation measures are implemented. Environmental monitoring program has the underlying objective to ensure that the intended environmental mitigations are realized and these results in desired benefits to the target population causing minimal deterioration to the environmental parameters. Such program targets proper implementation of the EMP. The broad objectives are:

(i) To evaluate the performance of mitigation measures proposed in the EMP.
(ii) To evaluate the adequacy of environmental assessment.
(iii) To suggest ongoing improvements in management plan based on the monitoring and to devise fresh monitoring on the basis of the improved EMP.
(iv) To enhance environmental quality through proper implementation of suggested mitigation measures.
(v) To meet the requirements of the existing environmental regulatory framework and community obligations.

C. Performance Indicators

351. The significant physical, biological and social components affecting the environment at critical locations serve as wider/overall Performance Indicators. However, the following specific environmental parameters can be quantitatively measured and compared over a period of time and are, therefore, selected as specific Performance Indicators (PIs) for monitoring because of their regulatory importance and the availability of standardized procedures and relevant expertise.

352. The following programme as detailed in the environmental monitoring programme for construction as well as operation phases shall be implemented by the APIIC. Besides the monitoring, the compliances to all environmental clearance conditions and regular permits from APPCB/SEIAA, AP shall be monitored and reported periodically. The environmental attributes to be monitored during construction and operational phases of the project, specific description along with technical details of environmental monitoring including the environmental attributes, monitoring parameters, frequency of monitoring and compliance are presented in Section below.

353. The environmental monitoring programme proposed to be followed by APIIC has been formulated in this Section.

Table 28: Environmental Monitoring Program

Component	Project Stage		MONITORING				RESPONSIBILITY	
		Parameters	**Measurement Method**	**Standards**	**Location**	**Frequency**	**Implementation**	**Supervision**
Air	Construction Stage	PM 2.5 PM 10 SO2 NO_x CO	Methods of Measurement as prescribed in National Ambient Air Quality Standard	National Ambient Quality Standards (Appendix 1)	Next to construction area	Once a quarter	Contractor through approved monitoring agency	APIIC
Noise levels	Construction stage	Noise levels on dB (A) scale	Equivalent noise levels using an integrated noise level meter kept at a distance of 10-15 m from edge of pavement	Noise standards by CPCB (Appendix 3)	Around the construction activity areas	Once a quarter	APIIC through approved monitoring agency	APIIC
Water Quality	Construction stage (surface water& Ground water)	pH, temperature, turbidity, DO, BOD, COD, TDS, TSS, Oil & Grease	Grab sample collected from source and analyzed as per IS : 2488 (Part 1-5) methods for sampling and	Water quality standards by CPCB (Appendix 2)	Locations around the construction site	Once in a Quarter for 3 years	Contractor through approved monitoring agency	APIIC
Soil Quality	Construction stage	pH, conductivity, N, P, K , Organic matter,	Grab sample collected from source and analyzed as per soil analysis procedure	Soil quality standards	Locations around the construction site	Once in a Quarter	Contractor through approved monitoring agency	APIIC

Component	Project Stage		MONITORING				RESPONSIBILITY	
		Parameters	Measurement Method	Standards	Location	Frequency	Implementation	Supervision
Drinking Water Supply in worker camps	Construction stage	Physical, Chemical and Biological	IS10500:2012 drinking water standards and given as **Appendix 13**	Contractor/APIIC through approved monitoring agency	APIIC	Monthly	Contractor through approved monitoring agency	APIIC
Treated Water Quality	Operation stage	Physical, Chemical and Biological	IS10500:2012 drinking water standards and given as **Appendix 13**	Contractor/APIIC through approved monitoring agency	APIIC	Monthly	APIIC through approved monitoring agency	APIIC
WTP sludge quality	Operation stage	pH and heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc)	Laboratory testing of sludge with standard methods of analysis	Standards for Composting, Schedule II A, Solid Waste Management Rules, 2016, FCO = Fertilizer Control Order, 1985, amendments in 2009 and 2013.	APIIC through approved monitoring agency	Once a year or as required priot to reuse/ disposal of dried sludge	APIIC through approved monitoring agency	APIIC

D. Environment Management Budget

354. An environmental management budget of **INR 2,585,300** has been estimated for implementation of the environmental management plan. This budget includes cost of environmental monitoring and associated trainings which will be a part of contractor's budget. A detail of environmental management budget is given in the following table.

Table 29: Environment Management Budget

S.no	Quantity	Unit	Item	Unit	Unit rate/ Lump sum cost (INR)	Amount
Costs during Construction Activity						
1	200	Trip	Sprinkling of water twice in a day all along the excavation works, (300 days x 2 times x 1-year x 1 vehicles/road x Rs. 1000/trip)	Trip	1000	200000
2	3575	Cum	Muck/Debris and C&D WasteDisposal from site (approximately)	Cum	84	300300
Tree Plantation						
3	200	Nos	Tree plantation and maintenance for three years (Rs. 1000/ tree) (Approximately 300 saplings)	Nos	1000	200000
Monitoring Cost during Construction Phase						
4	40	Nos.	Air Quality Monitoring once every season other than monsoon seasonduring the construction period.	Nos.	5000	200000
5	30	Nos.	Noise level Monitoring once every season other than monsoon		1500	45000

			seasonduring the construction period.			
6	40	Nos.	Water Quality Monitoring once in a season other than monsoon seasonduring the construction period.		4000	160000
7	30	Nos.	Soil Quality Monitoring once every season other than monsoon season during the construction.		4000	120000
8		LS	Awareness programs (Lumpsum)			100000
9		LS	Labour camps, health and otherservices			400000
10		LS	Solid waste management			120000
11		**LS**	**Provision of Oil & Grease Removal Mechanism**			**100000**
Monitoring Cost during Operation Phase						0
12	4	Nos.	Monitoring of treated water and sludge		15000	60000

XI. CONCLUSION AND RECOMMENDATION

355. The proposed development of internal infrastructure in the Start-up area at Rambilli cluster of VCIC – Visakhapatnam node have been categorized as Category 'B'. This IEE report, prepared according to ADB SPS, assessed various existing environmental parameters in and around the project and the actions planned to minimize any significant negative impact. The project site is not located in a sensitive ecosystem and is not significant from the historical and cultural perspective. The Checklist for Rapid Environmental Assessment (REA) is filled and given as Appendix 5. The project will not cause any significant adverse environmental and social impacts during construction, repair or renovation phase of the project. Rather, the project activity will have a positive impact as indicated earlier.

356. Subproject site mostly comprises vacant lands and agricultural lands, and there are no environmentally sensitive areas such as forests or protected areas in or close to project site. There are also no archeologically, culturally or historically sensitive areas. Although site is located on the coast, no activities are proposed close to the coast, and no activities will be located within the coastal regulation zone area.

357. The construction phase impacts are expected to be limited to the construction site and will therefore be temporary in nature. Operation phase impacts can be mitigated by adequate mitigation actions which will be undertaken in line with management and monitoring of the set of recommended mitigation measures. Regular monitoring of the recommended mitigation measures shall also be carried out during the implementation phase of the project.

358. However, as per GoI requirements, the proposed subproject at Rambilli Chittoor Node South Zone Start-up Industrial area requires an Environmental Clearance (EC) and necessary environmental impact assessment reports have been prepared by APIIC according to EIA Notification, 2006 and its General and Specific Conditions. The EIA is submitted to MOEFCC and APIIC is expacting environmental clearance soon. EC, as stipulated by MOEFCC, will be complied with during implementation.

359. This IEE includes a comprehensive program for monitoring the effectiveness of mitigation measures. An EMP is prepared identifying mitigation measures and specifying administrative arrangements to ensure that mitigation measures are implemented, and their effectiveness is monitored. A budget for the EMP should also be provided.

360. It is pertinent to mention that the Executing Agency and APIIC shall ensure that this IEE and EMP are included in bid documents and forms part of bid document and civil works contract. The same shall be revised if necessary, during project implementation or if there is any change in the project design and with approval of ADB.

361. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

362. The project's grievance redressal mechanism will provide the citizens with a platform for redressal of their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

363. The EMP will assist the DOI and contractors in mitigating the environmental impacts and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between the implementing agency, project management unit, and contractors. The project will benefit the general public through the socio-economic development that will be brought about by the growth of the manufacturing sector in the APSEZ. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practice.

364. This subproject proposed under the ADB funded VCICDP Project 2 is limited to development of internal infrastructure such as internal roads, drains, water supply, power distribution and development of green belt in the start-up area of industrial cluster. APIIC will take development of remaining infrastructure and amenities, including wastewater management systems, after completion of works under this subproject. Subsequently, APIIC will allot vacant developed plots and factory sheds to entrepreneurs / companies for establishment of industries, allied facilities, services, commercial establishments etc., as per prevailing regulations. Industrial area local authority (IALA) established by APIIC will manage the industrial park. Member industries and service agencies will be responsible for the establishment and operations of respective units in compliance with the applicable regulations, including EIA Notification 2006, and other regulations related to air, water, noise, hazardous waste, solid waste, health and safety, labour welfare etc. APIIC has conducted an EIA study for the overall industrial area and is in the process of obtaining environmental clearance from the MOEFCC. Individual industries, depending on the type and scale of operation, will conduct EIA study if required and obtain EC for their individual operations, and will obtain consent to establish (CTE) and consent to operate (CFE) from APPCB. Industries will also obtain other necessary permissions and licenses and will be responsible for compliance.

365. PMU and APIIC will ensure that necessary wastewater management facilities including CETP are established prior to start of industrial operations. APIIC has planned that these will be established on Design-Build-Finance-Operate-Transfer (DBFOT) mode after completion of internal infrastructure in start-up areas funded by ADB.

366. The subproject is therefore unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

367. The IEE / EMP shall be updated as needed to include any changes in the proposed designs / activities during the detailed design stage and activities undertaken by the member industries during the operational phase and monitored by APIIC. The updated IEE during the implementation phase to reflect any changes, amendments will be reviewed and approved by ADB.

Appendix 1: National Ambient Air Quality Standards

Pollutant	Time weighted average	Sensitive area	Industrial area	Residential, rural & other areas	Method of measurement
Sulphur Dioxide (SO2)	Annual* 24 hours**	15 µg/m³ 30 µg/m³	80 µg/m³ 120 µg/m³	60 µg/m³ 80 µg/m³	Improved West and Gaeke Method Ultraviolet Fluorescence
Oxides of Nitrogen as NOx	Annual* 24 hours**	15 µg/m³ 30 µg/m³	80 µg/m³ 120 µg/m³	60 µg/m³ 80 µg/m³	Jacab & Hochheiser Modified (Na-Arsenite) method Gas phase Chemiluminescence
Suspended Particulate Matter (SPM)	Annual* 24 hours**	70 µg/m³ 100 µg/m³	360 µg/m³ 500 µg/m³	140 µg/m³ 200 µg/m³	High Volume Sampler (Average flow rate not less than 1.1 m³/minute)
Restorable Particulate Matter (RPM) size less than 10 µm	Annual* 24 hours**	50 µg/m³ 75 µg/m³	120 µg/m³ 150 µg/m³	60 µg/m³ 100 µg/m³	Respirable Particulate Matter Sampler
Pollutant	Time weighted average	Sensitive area	Industrial area	Residential, rural & other areas	Method of measurement
Lead (Pb)	Annual* 24 hours**	0.5 µg/m³ 0.75 µg/m³	1.0µg/m³ 1.5 µg/m³	0.75 µg/m³ 1.0 µg/m³	AAS Method after sampling using EPM 2000 or equivalent filter paper
Carbon Monoxide (CO)	8 hours** 1 hour	1.0 mg/m³ 2.0 mg/m³	5.0 mg/m³ 10 mg/m³	2.0 mg/m³ 4.0 mg/m³	Non - dispersive infrared Spectroscopy

Appendix 2: Guidelines of CPCB on Primary Water Quality

Designated Best Use	Class of Water	Criteria
Drinking water source (with conventional treatment)	A	Total Coliforms MPN/100ml shall be 50 or less pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/1 or more Biochemical Oxygen Demand (BOD) 5 days 20°C 2 mg/1 or less
Outdoor bathing (organized)	B	Total Coliforms MPN/100ml shall be 500 or less pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/1 or more Biochemical Oxygen Demand (BOD) 5 days 20°C 3 mg/1 or less
Drinking Water Source (Without conventional treatment)	C	Total Coliforms MPN/100 ml shall be 5000 or less pH between 6.5 to 8.5 Dissolved Oxygen 4 mg/l or more Biochemical Oxygen Demand (BOD) 5 days 20°C 3 mg/l or less
Propagation of Wildlife	D	pH between 6.5 to 8.5 for Fisheries Dissolved Oxygen 4 mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C Max 2250µ mhos/cm Sodium absorption ratio Max. 26 Boron, Max. 2 mg/l

Appendix 3: National Ambient Noise Standards

Area Code	Category of Zones	Limits of Leq in dB(A)	
		Day time*	**Night time***
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silence Zone **	50	40

Day time is from 6 am to 9 pm whereas night time is from 9 pm to 6 am

** Silence zone is defined as area up to 100 meters around premises of hospitals, educational institutions and courts. Use of vehicles horns, loud speakers and bursting of cracking are banned in these zones

Appendix 4: Drinking Water Quality Standards (AS PER IS: 10500-1991)

Sl. No.	Parameter and Unit	Desirable Limit	Permissible Limit in Absence ofAlternate Source
1.	Colour (Hazen units)	5	25
2.	Odour	Unobjectionable	-
3.	Taste	Agreeable	-
4.	Turbidity (NTU)	5	10
5.	pH	5-8.5	No relaxation
6.	Total Coliforms (MPN/100 mL)	nil	-
7.	Pathogenic Organisms or Virus	nil	-
8.	TDS (mg/L)	500	2000
9.	Mineral Oil (mg/L)	0.01	0.03
10.	Free Residual Chlorine (mg/L)	0.2	-
11.	Cyanide (mg/L as CN)	0.05	No relaxation
12.	Phenol (mg/L C_6H_5OH)	0.001	0.002
13.	Total Hardness (mg/L as $CaCO_3$)	300	600
14.	Total Alkalinity (mg/L as $CaCO_3$)	200	600
15.	Chloride (mg/L as Cl)	250	1000
16.	Sulphate (mg/L as SO_4)	200	400
17.	Nitrate (mg/L as NO_3)	45	100
18.	Fluoride (mg/L as F)	1	1.5
19.	Calcium (mg/L as Ca)	75	200
20.	Magnesium (mg/L as Mg)	30	100
21.	Copper (mg/L as Cu)	0.05	1.5
22.	Iron (mg/L as Fe)	0.3	1
23.	Manganese (mg/L as Mn)	0.1	0.3
24.	Zinc (mg/L as Zn)	5	15
25.	Boron (mg/L as B)	1	5
26.	Aluminium (mg/L as AL)	0.03	0.2
27.	Arsenic (mg/L as As)	0.05	No relaxation
28.	Mercury (mg/L as Hg)	0.001	No relaxation
29.	Lead (mg/L as Pb)	0.05	No relaxation
30.	Cadmium (mg/L as Cd)	0.01	No relaxation
31.	Chromium (VI) (mg/L as Cr)	0.05	No relaxation
32.	Selenium (mg/L as Se)	0.01	No relaxation
33.	Anionic Detergents (mg/L MBAS)	0.2	1
34.	PAH (mg/L)	nil	-
35.	Pesticides (µg/L)	Absent	0.001
36.	Alpha Emitters (10^{-6}µc/mL)	nil	0.0001
37.	Beta Emitters (10^{-6}µc/mL)	nil	0.001

Appendix 5: REA CHECKLIST

Rapid Environmental Assessment (REA) Checklist

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title:	India - Rambilli cluster Subproject – Development of Startup area of Rambilli cluster of VCIC – Visakhapatnam node
Sector Division:	Asian Development Bank

A. Screening Questions	**Yes**	**No**	**Remarks**
Project Siting Is the project area.			
Densely populated?		√	The industrial estates are far from the urban city and hence population is less.
Heavy with development activities?		√	As and when more industries will come up, the activity in the area will increase
Adjacent to or within any environmentally sensitive areas?		√	
Cultural heritage site		√	There are no environmentally sensitive areas located within the vicinity or 10 km radius of the Special economic zone. Activities will be confined within the already built up/developed and demarcated areas of the economic zones. Though within the 10 km radius the Reserve Forest areas are present however, proposed activity is confined to already developed area, so no impact on these forests.
Protected Area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay			

B. Potential Environmental Impacts Will the Project cause…			
impairment of historical/cultural monuments/areas and loss/damage to these sites?		√	Not anticipated.
interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		√	Not anticipated.
dislocation or involuntary resettlement of people?		√	Not anticipated.
Screening Questions	**Yes**	**No**	**Remarks**
disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	Not anticipated.
impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		√	Not anticipated
noise and vibration due to blasting and other civil works?		√	Not anticipated.
risks and vulnerabilities related to occupational health and safety due to physical, chemical and biological hazards during project construction and operation?		√	Not anticipated. Workers may get exposed to dust and noise during construction activities. However, the exposure levels are likely to be short and insignificant. Workers will be provided requisite PPEs to minimize such exposure and associated harmful occupational health effects. Traffic Safety measures will be adopted during operation phase.
road blocking and temporary flooding due to land excavation during the rainy season?		√	Not anticipated.
noise and dust from construction activities?	√		Ambient noise level is expected to increase in the range of 80-90 dB (Aa) due to various construction activities, maintenance workshops, and earthmoving equipment. However, there are no sensitive receptors in the economic zones. Nevertheless, stationary noisemaking sources equipment like diesel generator sets and compressors will be installed with acoustic enclosures. Workers will be required to wear PPEs and exposure to noise will be limited as per EHS Guidelines.

traffic disturbances due to construction material transport and wastes?		√	Not anticipated. Construction works are within the economic zones. Transportation routes will be through existing roads built for use of the economic zones.
temporary silt runoff due to construction?		√	Not anticipated.
hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		√	Not anticipated. Proper sewerage system is being constructed.
deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		√	Not anticipated.
large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?	√		Temporary increase in the local population in terms of skilled labour. The labour camps will help in combating the problems arising.
social conflicts between construction workers from other areas and community workers?		√	Not Anticipated. Local workers will be employed for regular operations.
risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		√	Adequate measures for transportation, storage and disposal will be implemented. Regular monitoring of the same will be conducted.
community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		√	Not anticipated as the works will be done within the boundary of the SEZ areas where the community movement will be less. However, necessary safeguard measures like barricading, reflecting stickers etc., will be used.

Appendix 6: A Checklist for Preliminary Climate Risk Screening

Country/Project Title: Development of Start up area of Rambilli Cluster – VCIC – Visakhapatnam node
Sector: Development of Start up areawith Roads, Water Supply, Sewerage, Storm Water Drain, Power supply network and Common Effluent Treatment Plan (CETP)
Subsector:
Division/Department: Department of Industries

Screening Questions		Score	Remarks[33]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Material s and Maintenance	Would weather, current and likely future climate conditions (e.g., prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g., construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g., annual power production) of project output(s) (e.g., hydro-power generation facilities) throughout their design life time?	0	

[33] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0

Response	Score
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): __Low_____

Other Comments:

_____ _____

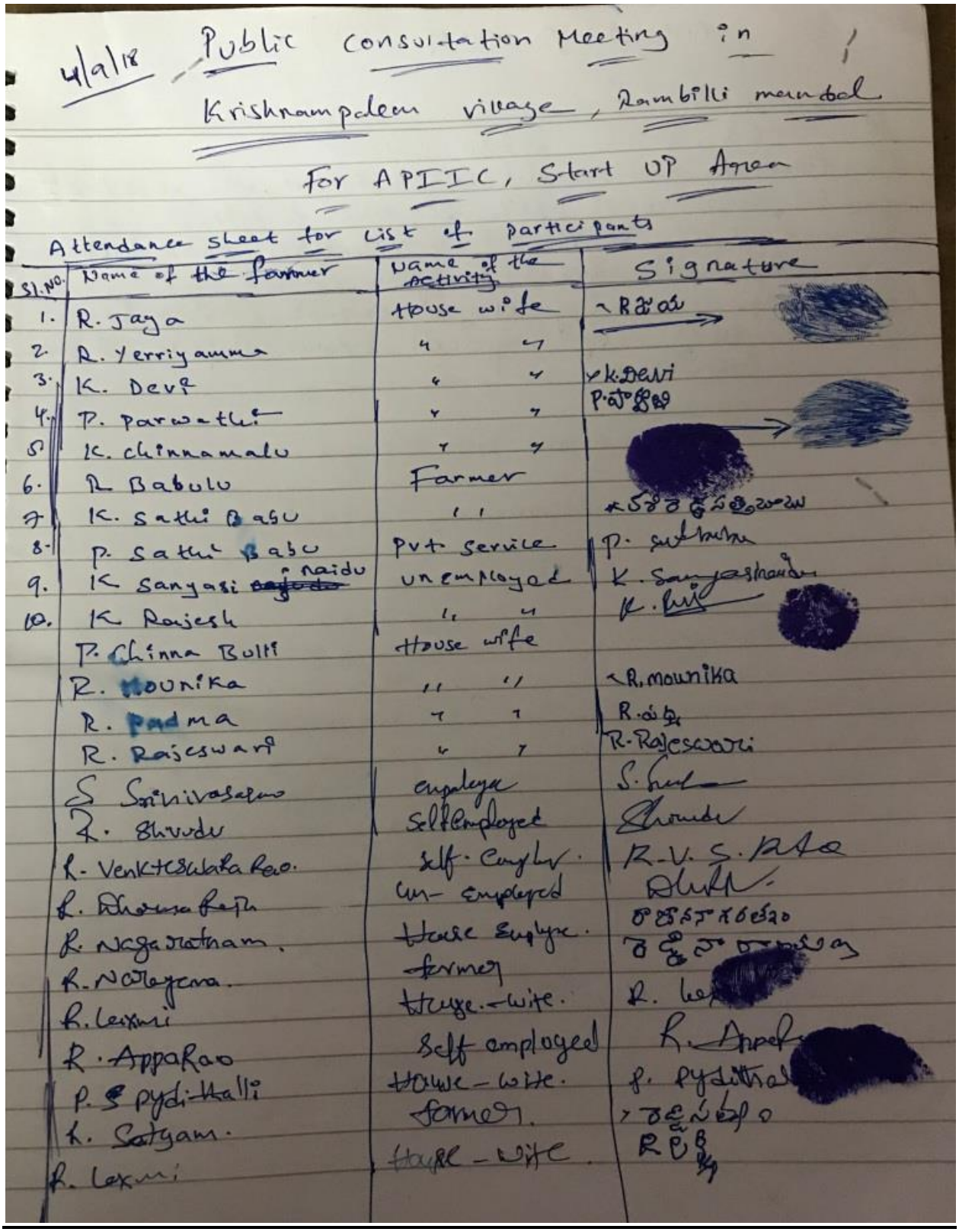
Prepared by: _____

Appendix 7: Records of Public Consultation

The following table is the suggested format for recording the minutes of the public consultations conducted for the project on 03-09-2018.

Date and Venue of Public Consultation	Number of attendees	Issues /concerns raised during the public consultation	Response of the EA/IA on how to address the issues and concerns
03/09/2018, Rajanapalem hamlet of Krishnampalem	45	Topic wise Mentioned below	
Gorapudi	0	Unable to conduct the meeting as all the affected lands owners in the village approached the court for better compensation.	
Z.Chintuva	0	Unable to conduct the meeting as all the affected lands owners in the village approached the court for better compensation.	

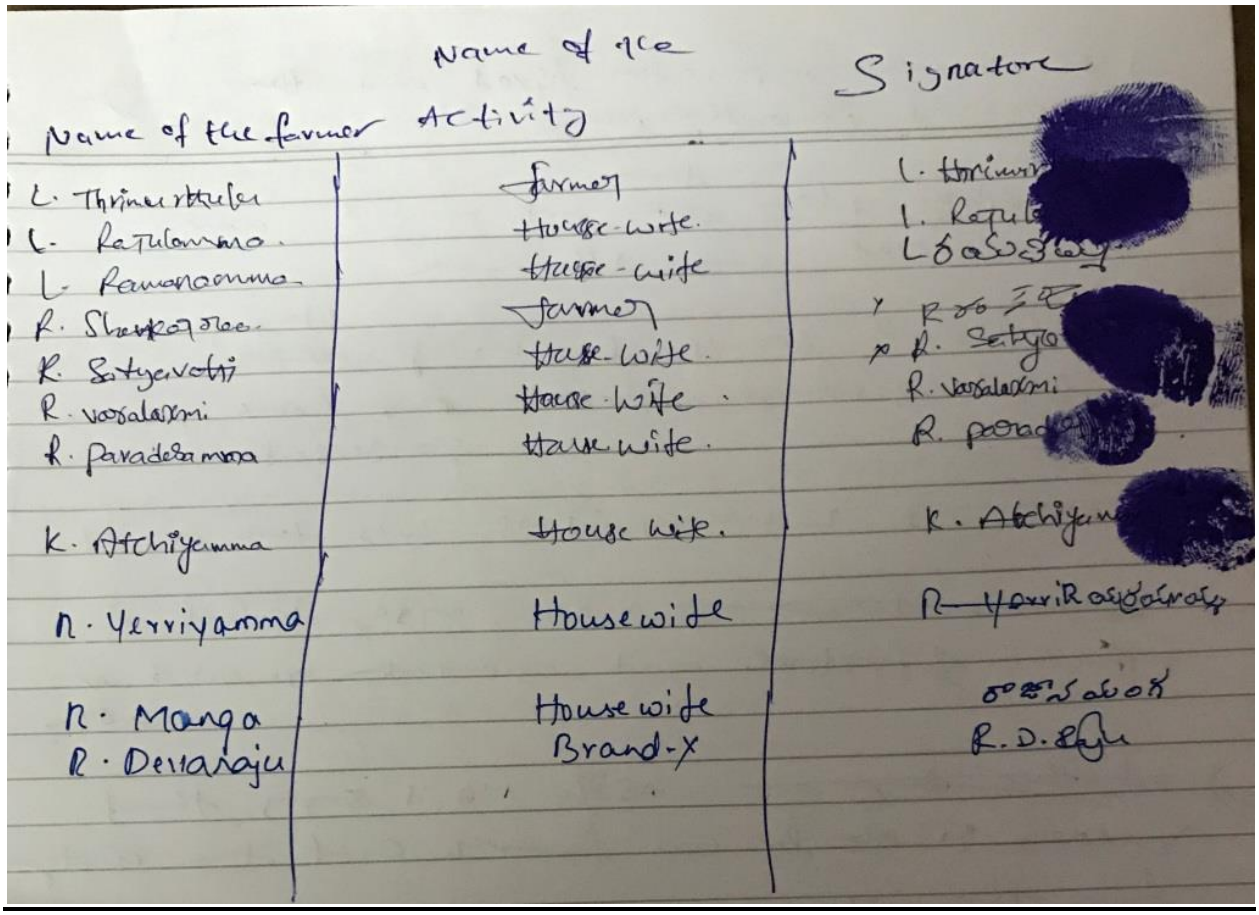
Attendance sheets



4/9/18 Public consultation Meeting in Krishnampalem village, Rambilli mandal for APIIC, Start UP Area

Attendance sheet for list of participants

Sl.No.	Name of the farmer	Name of the activity	Signature
1.	R. Jaya	House wife	
2.	R. Yerriyamma	"	
3.	K. Devi	"	
4.	P. Parvathi	"	
5	K. Chinnamalu	"	
6.	R. Babulu	Farmer	
7	K. Sathi Babu	"	
8.	P. Sathi Babu	Pvt Service	
9.	K Sanyasi ~~Naidu~~	unemployed	
10.	K. Rajesh	"	
	P. Chinna Bulli	House wife	
	R. Mounika	"	
	R. Padma	"	
	R. Rajeswari	"	
	S Srinivasarao	employee	
	R. Bhudu	Self Employed	
	R. Venkateswara Rao.	Self. Employ.	
	R. Dharma Raju	Un-employed	
	R. Nagaratnam.	House Employe.	
	R. Narayana.	farmer	
	R. Laxmi	House-wife.	
	R. AppaRao	Self employed	
	P. Pydithalli	House-wife.	
	K. Satyam.	farmer.	
	R. Laxmi	House-wife.	



Name of the farmer	Activity	Signature
L. Thrimurthulu	~~farmer~~	L. thrimurthulu
L. Ratnamma	House wife.	L. Ratnamma
L. Ramanamma	House wife	L. Ramanamma
R. Shankaraiah	~~farmer~~	R. Shankaraiah
R. Satyavathi	House wife.	R. Satyavathi
R. Vasalakshmi	House wife.	R. Vasalakshmi
R. Paradesamma	House wife.	R. Paradesamma
K. Atchiyamma	~~House wife.~~	K. Atchiyamma
N. Yerriyamma	Housewife	N. Yerriyamma
N. Manga	Housewife	N. Manga
R. Devaraju	Brand-X	R. Devaraju

Photo documentation






Appendix 8: Sample Annual Environmental Monitoring Report Template

I. Introduction

- Overall project description and objectives
- Description of subprojects
- Environmental category of the subprojects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and subproject progress and status

No.	Subproject Name	Status of Subproject				List of Works	Progress of Works
		Design	Pre-construction	Construction	Operational Phase		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

Compliance status with national/state/local statutory environmental requirements

No.	Subproject Name	Statutory Environmental Requirements	Status of Compliance	Action Required

Compliance status with environmental loan covenants

No. (List Schedule and Paragraph Number of Loan Agreement)	Covenant	Status of Compliance	Action Required

II.COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT ANDMONITORING PLAN

a. Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including environmental site inspection reports.

b. There should be reporting on the following items which can be incorporated in the checklist of routine environmental site inspection reports, followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection need to note and record the following:

- what are the dust suppression techniques followed for site, and if any dust was noted to escape the site boundaries;
- if muddy water was escaping site boundaries, or muddy tracks were seen on adjacent roads;
- adequacy of type of erosion and sediment control measures installed on-site, condition of erosion and sediment control measures, including if these were intact following heavy rain;
- are there designated areas for concrete works and refueling;
- are there spill kits on site, and if there are site procedure for handling emergencies;
- is there any chemical stored on site and what is the storage condition;
- are there any dewatering activities, if yes, where is the water being discharged;
- how are the stockpiles being managed;
- how are solid and liquid waste being handled on-site;
- review of the complaint management system; and
- checking if there are any activities being undertaken outside of working hours, and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum, those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with EMP

No.	Subproject Name	EMP Part of Contract Documents (Y/N)	EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

III.APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

Brief description on the approach and methodology used for environmental monitoring of each subproject

IV.MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY, AND NOISE LEVELS)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM_{10} µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM_{10} µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/l	TSS mg/l	TN mg/l	TP mg/l
Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/l	TSS mg/l	TN mg/l	TP mg/l

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/l	TSS mg/l	TN mg/l	TP mg/l

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Daytime	Nighttime

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)	
			Daytime	Nighttime

V SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

Summary of follow up time-bound actions to be taken within a set timeframe.

APPENDIXES

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- Other

Appendix 9: Sample Environmental Site Inspection Report

Project Name

Contract Number

NAME:_____DATE: _____

TITLE: _____ DMA: _____

LOCATION: _____GROUP: _____

WEATHER CONDITION:

_____

INITIAL SITE CONDITION:
_____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____ Resolved _____
Unresolved _____

INCIDENT:
Nature of incident:

_____

Intervention steps:

_____

Incident issues:

Resolution

Project activity stage	Survey	
	Design	
	Implementation	
	Pre-commissioning	
	Guarantee period	

Inspection

Emissions	Waste minimization
Air quality	Reuse and recycling
Noise pollution	Dust and litter control
Hazardous substances	Trees and vegetation

Site restored to original condition Yes ☐ No ☐

Signature

_____

Sign off

_____ _____

Name **Name**

Position **Position**

Appendix 10: Construction Site Checklist for EMP Monitoring

Project Name: **Name of the Contractor:** **Yes (√) No (x)**
Monitoring Details: _____

EHS supervisor appointed by contractor and available on site

Construction site management plan (spoils, safety, material, schedule, equipment etc.,) prepared

Traffic management plan prepared

Dust is under control

Excavated soil properly placed within minimum space Construction area is confined; no traffic/pedestrian entry observed Surplus soil/debris/waste is disposed without delay

Construction material (sand/gravel/aggregate) brought to site as & when required only

Tarpaulins used to cover sand & other loose material when transported by vehicles

After unloading, wheels & undercarriage of vehicles cleaned prior to leaving the site No AC pipes disturbed/removed during excavation

No chance finds encountered during excavation

Work is planned in consultation with traffic police

Work is not being conducted during heavy traffic

Work at a stretch is completed within a day (excavation, pipe laying &backfilling)

Pipe trenches are not kept open unduly

Road is not completely closed; work is conducted on edge; at least one line is kept open

Road is closed; alternative route provided & public is informed, information board provided

Pedestrian access to houses is not blocked due to pipe laying

Spaces left in between trenches for access

Wooden planks/metal sheets provided across trench for pedestrian

No public/unauthorized entry observed in work site

Children safety measures (barricades, security) in place at work sites in residential areas

Prior public information provided about the work, schedule and disturbances

Caution/warning board provided on site

Guards with red flag provided during work at busy roads

Workers using appropriate PPE (boots, masks, gloves, helmets, ear muffs etc.)

Working conditions at SUBPROJECTS are assessed by EHS expert and ensure that there is no risk

Workers conducting or near heavy noise work is provided with ear muffs
Contractor is following standard & safe construction practices

Deep excavation is conducted with land slip/protection measures
First aid facilities are available on site and workers informed
Drinking water provided at the site

Toilet facility provided at the site

Separate toilet facility is provided for women workers
Workers camps are maintained cleanly

Adequate toilet & bath facilities provided

Contractor employed local workers as far as possible
Workers camp set up with the permission of PIU
Adequate housing provided

Sufficient water provided for drinking/washing/bath No noisy work is conductedin the nights

Local people informed of noisy work o blasting activity conducted Pneumatic drills or other equipment creating vibration is not used near old/risky buildings

Appendix 11: Sample Grievance Registration Form
(To be available in Telugu and English)

The _____Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date	**Place of registration**	**Project Town** **Project:**			
Contact information/personal details					
Name	**Gender** * Male **Age** Female				
Home address					
Place					
Phone no.					
E-mail					
Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below:					
If included as attachment/note/letter, please tick here:					

How do you want us to reach you for feedback or update on your comment/grievance?

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)
Mode of communication: Note/letter E-mail Verbal/telephonic
Reviewed by: (Names/positions of officials reviewing grievance)

Action taken:	
Whether action taken disclosed:	Yes No
Means of disclosure:	

Appendix 12: Environment Management Budget

S.no	Quantity	Unit	Item	Unit	Unit rate/ Lump sum cost (INR)	Amount
Costs during Construction Activity						
1	200	Trip	Sprinkling of water twice in a day all along the excavation works, (300 days x 2 times x 1-year x 1 vehicles/road x Rs. 1000/trip)	Trip	1000	200000
2	3575	Cum	Muck/Debris and C&D Waste Disposal from site (approximately)	Cum	84	300300
Tree Plantation						
3	200	Nos	Tree plantation and maintenance for three years (Rs. 1000/tree) (Approximately 300 saplings)	Nos	1000	200000
Monitoring Cost during Construction Phase						
4	40	Nos.	Air Quality Monitoring once every season other than monsoon season during the construction period.	Nos.	5000	200000
5	30	Nos.	Noise level Monitoring once every season other than monsoon season during the construction period.		1500	45000
6	40	Nos.	Water Quality Monitoring once in a season other than monsoon season during the construction period.		4000	160000
7	30	Nos.	Soil Quality Monitoring once every season other than monsoon season during the construction.		4000	120000
8		LS	Awareness programs (Lumpsum)			100000
9		LS	Labour camps, health and other services			400000
10		LS	Solid waste management			120000
11		**LS**	**Provision of Oil & Grease Removal Mechanism**			**100000**
Monitoring Cost during Operation Phase						0
12	20	Nos.	Air Quality Monitoring once every season other than monsoon season during the construction period.		5000	100000

13	20	Nos.	Noise level Monitoring once every season other than monsoon season during the construction period.		1500	30000
14	20	Nos.	Water Quality Monitoring once in a season other than monsoon season during the construction period.		4000	80000
15	20	Nos.	Soil Quality Monitoring once every season other than monsoon season during the construction.		4000	80000
16	4	Nos.	Monitoring of treated water, sludge and lake water at STP location. Regular monitoring		15000	60000
17		LS	Cleaning and maintenance of drainage system		LS	50000
18		LS	Allocation of Budget towards the Corporate Social Responsibility (CSR) activities		LS	300000
Grand Total						26,45,300

Appendix 13: Bio-Diversity Report

for "Development of Startup area of Rambilli Cluster – VCIC – Visakhapatnam Node"

1.0. Background

Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC) a wholly owned undertaking of Government of Andhra Pradesh (GoAP) has a mandate to develop industrial areas across the state. APIIC has developed around 300 Industrial Parks spread over an extent of 121,655 acres and in addition it has also developed sector specific industrial parks and special economic zones at strategic locations across the state. The proposed project is development of start up area (Infrastructure services) for Rambilli Cluster comes under the proposed Vizag – Chennai Industrial Corridor Development Programme (VCICDP).

As part of Environment Impact Assessment study, the preliminary Ecology – Biodiversity studies are conducted and discussed in brief. However, the Asian Development Bank further suggested to carry out the Biodiversity studies in detail for the proposed 'Development of start-up area of Rambilli cluster – VCIC – Visakhapatnam node' as the 10 km stretch of the project area is having patches of reserve forest. In order to carry out the study, three level of approach is adopted i.e., Collection of the secondary data from the Forest Authorities, study of the ADB supplemented Integrated bio-diversity proximity report generated using IBA tool and by preliminary site visit in the project area duly having discussions with the elders & locals in the study area. The Bio-diversity report is compiled based on through synthesis of the collected secondary data and field study. Index map showing the startup area of Rambilli cluster – VCIC – Visakhapatnam node of Andhra Pradesh is given as Figure -1

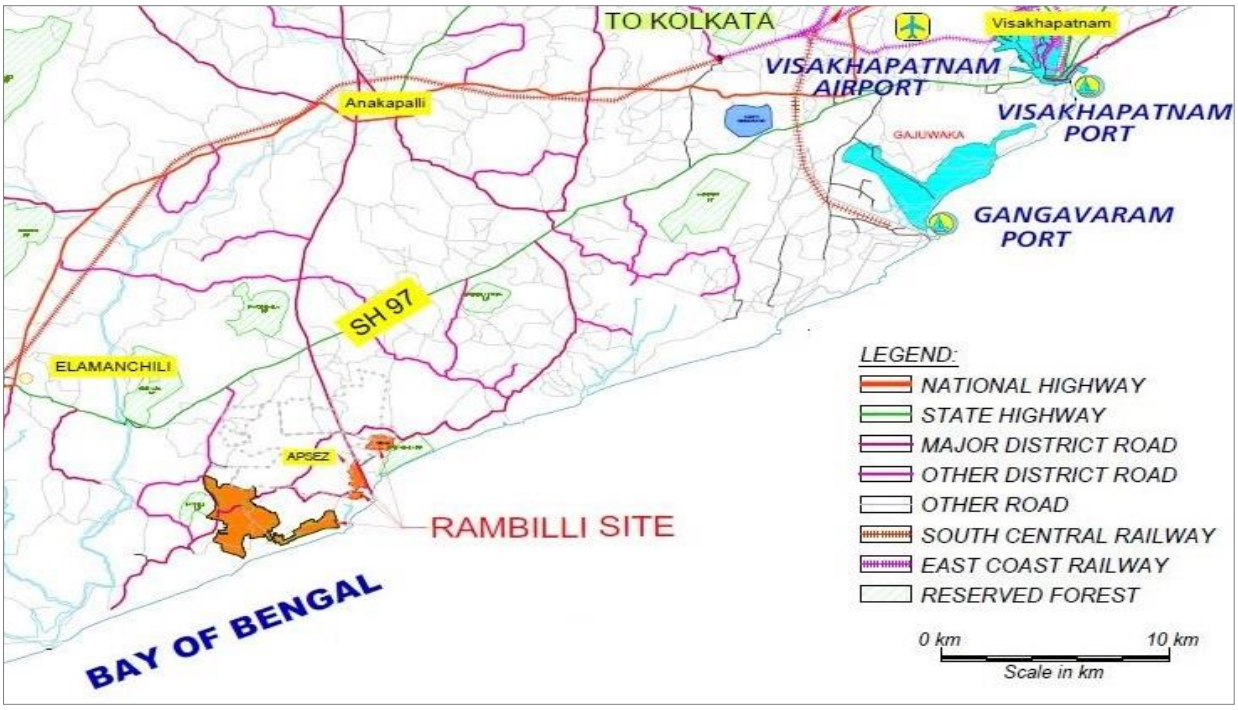


Figure -1: Index Map showing start up area of Rambilli cluster – VCIC – Visakhapatnam node of Andhra Pradesh.

1.0 Introduction to project site

Rambilli cluster is part of the VCIC – Visakhpatnam node and is next to already developed SEZ with major infrastructure in place. The major connectivity details of the Rambilli cluster are placed in the following table.

Major connectivity details of the Rambilli Cluster

ROAD	NH 16 (Old NH 5) SH 97	5-10 km away ~ 5.5 km
RAIL	Visakhapatnam Railway Station	55-60 km
AIRPORT	Visakhapatnam Airport	45-50 km
PORT	Visakhapatnam Port Gangavaram Port Kakinada Port	▪ 60-65 km ▪ 45-50 km ▪ 125-130 km

Under the development of master plan, APIIC has proposed the sub-components like Road, Water supply, Sewerage, Storm Water Drain, Power Supply, Common Effluent Treatment Plant (CETP) for the development of startup area of Rambilli Cluster. A map

showing the Reserve Forests in proximity to the proposed project area of Rambilli is placed as Figure – 2.

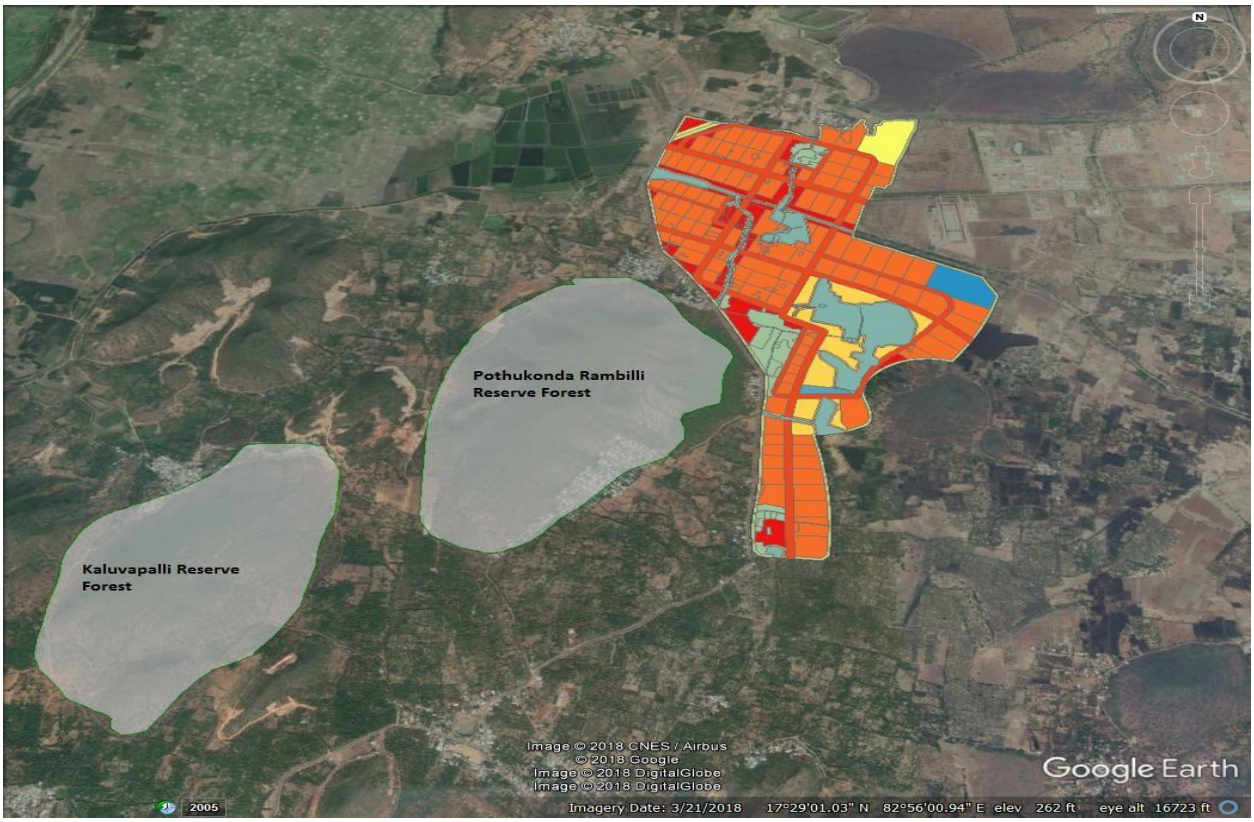


Figure -2: Map showing the reserve forest area near to the start up area of Rambilli cluster

2.0 Methodology adopted for the study

In order to carryout the study, three level of approach is adopted i.e., Collection of the secondary data from the Forest Authority, study of the ADB supplemented Integrated bio-diversity proximity report generated using IBA tool and by preliminary site visits in the Reserve Forest areas duly having discussions with the elders & locals in the study area. The methodology adopted for the preliminary studies for the assessment of flora and fauna are given below:

Flora:

Subject to accessibility, desirability and feasibility, restricted random sampling techniques are used where the number of quadrats in each type of vegetation are proportionate to

the area needs to be applied to the study area. A list of all macroscopic plants needs to be prepared based on preliminary field survey covering the project site. Quantitative data on frequency, density, dominance etc., are noted based on quadrats of 20 x 20 m.

The structure and type of vegetation depends on the climatic conditions and physiography of an area. Climate of the study area suits variety of vegetation based on the average annual rain fall. Because of humus and fertile nature of soil, the big trees will be supported. If silt percentage is less in soil it will support vegetation more. A floral enlistment of trees, shrubs, herbs with scientific names, common names and the family to which they belong are presented in a tabular format. The floral species and their status with reference to IUCN Red data book needs to be placed in table.

Data from field study/secondary data is recorded in the following proforma of the Tables

List of plant species found in the Project area			
Name of plant species	Local name or common name (if any)	Family	Status as per IUCN red list

Frequency, density and dominance of different species of plants			
Name of plant species	Frequency (recorded as + or – only)	Density as number per quadrat	% cover based on line transects

Relative frequency (R.F), relative density (R.D), relative dominance (R.dom) and Importance value indices (IVI) of different species							
Name of plant species	Frequency		Density		Abundance		IVI
	%	R.F	%	R.D	%	R.A	

Based on the IVI values, Shannon –Wiener Indices of Diversity are calculated.

Shannon – Wiener Indices of Diversity are calculated as the sum of p^i value of each species multiplied by ln of p^i using the following equation:

$$H' = -\sum_{i=1}^{S} p_i \ln p_i$$

Where, p^i is calculated by dividing the IVI of a species by the total IVI of all species in the sampled community.

Fauna

With the field survey and local consultation with the villagers a faunal enlisting of reptiles, birds & mammals is done and their scientific names and common names needs to be presented in table. The list of faunal species, the family they belong to and the status of the faunal species with reference to the IUCN red data book and with reference to the Wildlife act 1972 schedules needs to be tabulated. Table should depict the animals and birds found in the study area and its adjoining area.

Data from field study/secondary data is recorded in the following table

List of animal species found in the Project area				
Scientific name of animal species	Local name or common name (if any)	Family	Status as per IUCN red list	Status as per Wildlife Act 1972 (Schedule)

Since the animals with the exception of a few sedentary species and a few residents move from place to place either for feeding or breeding or for shelter etc, it may not be possible to prepare separate lists of fauna for entire project area. The mere absence of a species at the time of sampling does not rule out its presence. In order to overcome such problems, a list based on both primary survey and secondary data is prepared. The primary survey takes in to account both direct evidence and indirect evidence including the circumstantial evidence. All relevant scientific documents such as the scientific publications, documents and reports are a good source of information provided they are site, area and location specific. Further, they have to be recent. In the absence of such data and information, reports of eye witness accounts and information from local non-governmental organizations also considered. Due attention should be paid to rare or endangered or endemic or threatened (REET) species. In order to find out whether a species comes under any of the REET categories, references are made to IUCN Red Data, Indian Wildlife (Protection) Act 1972 and its amendments thereof, Botanical survey of India (BSI) and Zoological Survey of India (ZSI).

Aquatic Flora and Fauna

As the flora and fauna enlisting is done based on the preliminary studies and also secondary data collected from various sources like interaction with stakeholders, authorities, research papers available etc., a list of aquatic flora and fauna needs to be enclosed.

3.0 Collection of data

4.1 Secondary data collection

Forest Authorities: Approached the Andhra Pradesh Forest Department for the flora and fauna details which are available for the Reserve forest areas that are proximity to the proposed project area. The Pothukonda Rambilli Reserve Forest and Kaluvapalli Reserve Forest areas are in proximity to the proposed project area.

IBAT Proximity Report on Proposed project area: This report presented the results of a proximity analysis to identify the biodiversity features and species which are located within 1 km, 5 km and 10 km. This report contains list of mammals, plants, birds, fishes, amphibians, invertebrates, reptiles etc., having with their IUCN Red list category status. The ADB supplemented Integrated bio-diversity proximity report generated using IBA tool is provided by Asian Development Bank and the same is placed as **Annexure -2**.

Research Papers: The research papers are having majority of the information on list of plants and botanical study information etc.

4.2 Preliminary Field study

According to Champion and Seth classification of forests, the forest type in the proximity of the proposed project area falls under Tropical moist and Tropical dry deciduous and there are no Wildlife Sanctuaries in the 10 km stretch. The terrain characterized by hilly slopes, rolling forests hills and low valleys. The Pothukonda Rambilli Reserve Forest and Kaluvapalli Reserve forests are characterized by low hills descending on west and east into plains;.

A preliminary field study on flora and fauna was conducted during the month of September 2018 in the identified areas of the Reserve Forests and other nearby areas carried out by the Expert of AARVEE Associates, Hyderabad. During the study, a quadrat method was used for assessment of floral species in the proposed project area. A total 4 random sampling areas were studied with a size of 20m x 20 m each in the Reserve Forest area and 4 random sampling areas studied with a size of 10m x 10m in other areas. The results were compiled based on collection of preliminary information from the site, having discussions with elder people in the study area and after verifying with the available secondary data collected from various sources. The name of the floral species identified the name of the family and the local name and their status as per IUCN red data book has been tabulated. The map showing the sampling locations in the proximity of the proposed project area are shown in Figure -3.

However, as the animals are not directly visible during the site visit, the available faunal species were compiled after having discussions with the villagers, forest officials etc., duly comparing faunal species from the collected secondary data.

Common Crops in the study region

Common cultivated crop plants in the study area include: Paddy (*Oriza sativa),* Redgram (*Cajanus cajan),*Greengram*(Vigna radiate),*Blackgram *(Vigna mungo),*Groundnut (*Arachis hypogaea),* Sunflower (*Helianthus),*Coriander (*Coriandrum sativum)***,** Bajra (*Pennisetum glaucum)***,** Jowar (*Sorgum bicolour)*, Maize(*Zea mays),* Chillies (*Capsicum sp.).*

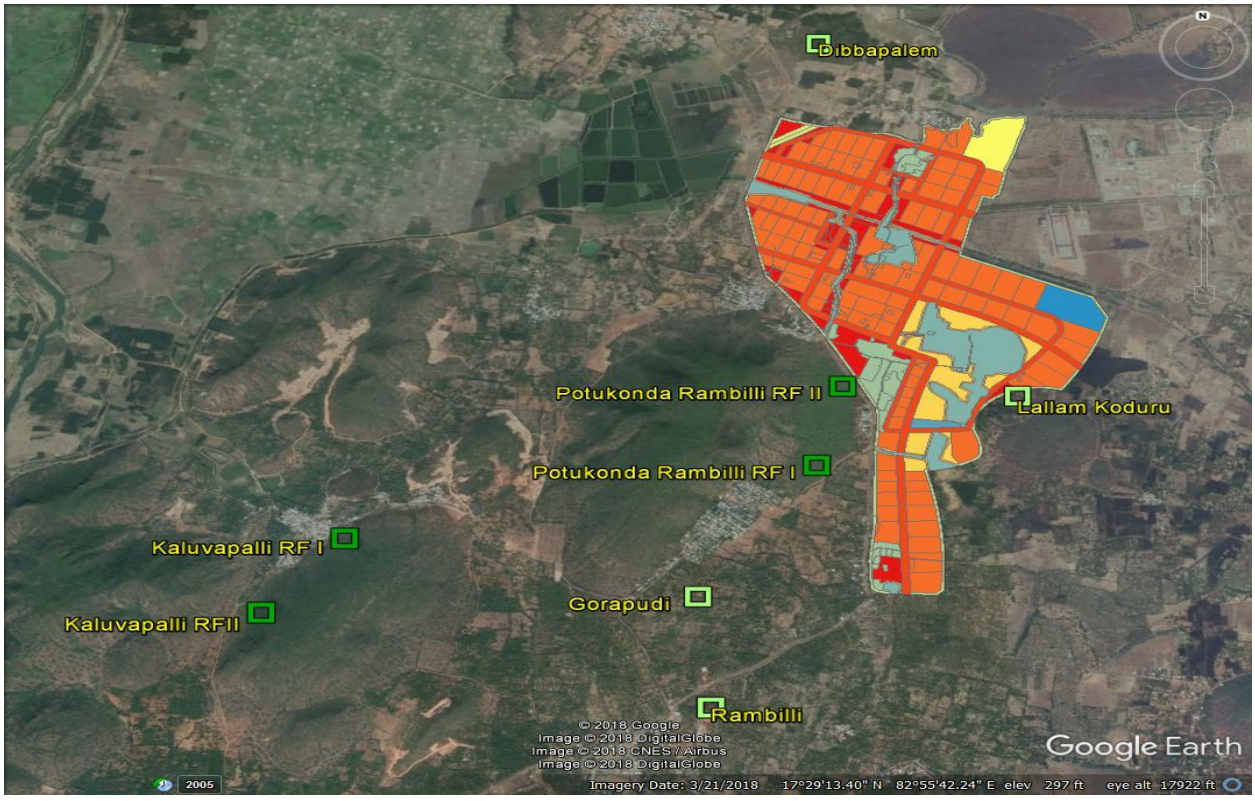


Figure -3: Map showing sampling locations in the proximity of the proposed project area

4.0 Biodiversity Assessment of proposed Project area

The proposed project area is covered with vegetation consisting of herbs and shrubs, the two reserve forests are spreading over an area of approximately 676.12 ha comprising of two large hills consisting of natural vegetation. These Reserve Forests of are comprised of mainly superior dry deciduous types. The most common species occurring are *Acacia planiforns, Glycosmis pentaphylla, Dodonaea viscosa, Canthium parviflorum, Pavetta tomentosa, Ziziphus xylopyrus, Manilkara hexandra, Cissus quandrangularis, Ziziphus oenoplia, , Wrightia tinctoria, Carissa spinarum, Cassia siamea, Borassus flabellifer, Andrographis paniculata, Hemidesmus indicus,*

Aristolochia indica, Artemisia vulgaris, Phoenix sylvestris, Sapindus emarginatus, Aegle marmelos, Syzygium cumini and Cassia auriculata etc.,

The topography of the Reserve Forest area enables the occurrence of varied micro & macro habitats to shelter variety of fauna. The hilly slopes in the centre, numerous hill streams, valley, rock shelters, wood lands, shrubby vegetation contribute to the existence of few varieties of wildlife species. Under the Zoogeographic classification of this area comes under Indo-Malayan region (Cis-Gangetic sub-region)-native to the true Indian fauna like the Black buck (*Antilope cervicapra*) and four horned antelope (*Tetracerus quadricornis*); among the most obvious keystone species are top predators like Wild Dog (*Lycaon pictus*), etc.

5.1 Floral Diversity in the Reserve Forest area

The floral diversity in the Reserve Forest area is tabulated based on secondary data provided by The IBAT proximity report on flora is given in Table -1.

Table -1: List of plant wealth found in Reserve Forest area in proximity to the proposed project area based on iBAT proximity report.

Near *threatened*	Endangered	Vulnerable
1	2	3
Aegialitis rotundifolia	*Nil*	*Anacyclus pyrethrum*
Brownlowia tersa	*Nil*	*Halophila beccarii*
Ceriops decandra	*Nil*	

As per preliminary study conducted by Expert from Aarvee Associates:

As per the preliminary study the following floral species were found in the four areas of the Reserve forests as well as four areas of non forest area are tabulated in Table -2. The list of floral species along with their local name, family and their status as per IUCN red data book is as follows:

Table -2: Floral species in Reserve Forest area and other areas proximity to the proposed project area

S.No	Scientific name of the plant	Local name	Family	IUCN Red book category
1	*Acacia planifrons*	Godugu tumma	Mimosaceae	Not assessed
2	*Acacia leucocephala*	Subabul	Mimosaceae	Not assessed
3	*Trema politoria*	Kuri	Ulmaceae	Not assessed
4	*Glycosmis pentaphylla*	Konda gilugu	Rutaceae	Not assessed
5	*Santalum album*	Tella chandanam	Santalaceae	Vulnerable
6	*Dodonaea viscosa*	Puli vailu	Sapindaceae	Not assessed
7	*Canthium parviflorum*	Chinna balusu	Rubiaceae	Not assessed
8	*Pavetta tomentosa*	Tella papidi	Rubiaceae	Not assessed
9	*Zizyphus xylopyrus*	Gotti	Rhamnaceae	Not assessed
10	*Manilkara hexandra*	Puttapala	Sapotaceae	Not assessed
11	*Cissus quandrangularis*	Nalleru	Vitaceae	Not assessed
12	*Glycosmis maurtiana*	Gilugu	Rutaceae	Not assessed
13	*Ziziphus oenoplia*	Parimi	Rhamnaceae	Not assessed
14	*Desmodium gangeticum*	Kolapanna	Fabaceae	Not assessed
15	*Wrightia tinctoria*	Akupala	Asclepiadaceae	Least Concern
16	*Atalantia monophylla*	Adavi Nimma	Rutaceae	Not assessed
17	*Carissa spinarum*	Vaaka	Apocyanaceae	Not assessed
18	*Borassus flabellifer*	Taati	Palmae	Not assessed
19	*Aganosma caryophyllata*	Mogari	Apocyanaceae	Not assessed

20	*Cassia siamea*	Seema tangedu	Caesalpinaceae	Not assessed
21	*Andrographis paniculata*	Nela vemu	Acanthaceae	Not assessed
22	*Hemidesmus indicus*	Barri sugandi	Periplocaceae	Not assessed
23	*Aristolochia indica*	Dulagovela	Aristolochiaceae	Not assessed
24	*Thysanolaena latifolia*	Konda cheepuru	Cyperaceae	Not assessed
25	*Artemisia vulgaris*	Machapatri	Asteraceae	Not assessed
26	*Phoenix sylvestris*	Eeta	Palmae	Not assessed
27	*Sapindus emarginatus*	Kunkudu	Sapindaceae	Not assessed
28	*Aegle marmelos*	Maredu	Rutaceae	Not assessed
29	*Syzygium cumini*	Neredu	Myrtaceae	Not assessed
30	*Cassia auriculata*	Tangedu	Caesalpinaceae	Not assessed
31	*Ficus benghalensis*	Marri	Moraceae	Not assessed
32	*Cocos nucifera*	Kobbari	Arecaceae	Not assessed
33	*Mangifera indica*	Mamidi	Anacardiaceae	Data Deficient
34	*Melia azadirachata*	Vepa	Meliaceae	Not assessed
35	*Prosopis Juliflora*	Sarcar thumma	Mimosaceae	Not assessed
36	*Pongamia Pinnata*	Ganuga	Fabaceae	Least Concern
37	*Eucolyptus tereticornis*	Neelagiri	Myrtaceae	Not assessed
38	*Tamarindus Indica*	Chinta	Caesalpinaceae	Not assessed
39	*Calotropis gigantea*	Jilledu	Asclepiadaceae	Not assessed
40	*Anona Squamosa*	Seethaphalam	Annonaceae	Not assessed
41	*Bombax ceiba*	Booruga	Bombacaceae	Not assessed
42	*Bauhinia racemosa*	Are	Caesalpinaceae	Not assessed
43	*Butea monosperma*	Moduga	Fabaceae	Not assessed
44	*Pithecellobium dulce*	Guvva chettu	Mimosaceae	Not assessed
45	*Tectona grandis*	Teku	Verbenaceae	Not assessed
46	*Alstonia scholaris*	Edakulapala	Apocyanaceae	Least concern

47	*Delonix regia*	Turaayi	Caesalpinaceae	Least concern
48	*Jatropha curcas`*	Jatropa	Euphorbiaceae	Not assessed
49	*Murraya koenigii*	Karivepa	Rutaceae	Not assessed
50	*Ziziphus mauritiana*	Reni	Rhamnaceae	Not assessed
51	*Ficus religiosa*	Raavi	Moraceae	Not assessed
52	*Anacardium occidentale*	Cashew	Anacardiceae	Not assessed
53	*Nerium oleander*	Ganneru	Apocyanaceae	Not assessed
54	*Casuarina equisetifolia*	Sarugudu	Casuarinaceae	Not assessed
55	*Albizzia lebbek*	Dirisenam	Mimosaceae	Not assessed
56	*Cactus strictus*	Nagajemudu	Cactaceae	Data deficient
57	*Cassia occidentalis*	Kasintha	Caesalpinaceae	Not assessed
58	*Aristida setacea*	Paraka gaddi	Poaceae	Not assessed
59	*Eragrostis tenella*	Garika gaddi	Poaceae	Not assessed
60	Achyranthus aspera	Uttareni	Amaranthaceae	Not assessed
61	*Ocimum sanctum*	Tulasi	Lamiaceae	Not assessed
62	*Cymbopogon caesius*	Grass	Poaceae	Not assessed
63	*Alangium salvifolium*	Ooduga	Alangiaceae	Not assessed
64	*Lantana camara*	Makkadambu	Verbenaceae	Not assessed
65	*Aristida adscensionis*	Grass	Poaceae	Not assessed
66	*Eichhornia crassipes*	Gurrapu dekka	Pontederiaceae	Not assessed
67	*Pistia stratiotes*	Budaga tamara	Araceae	Not assessed
68	*Ipomoea aquatic*	Thooti koora	Convolvulaceae	Least concern
69	*Nelumbo nucifera*	Kamalam	Nelumbonaceae	Not assessed
70	*Nympheaea nouchali*	Kaluva puvvu	Nympheaceae	Not assessed
72	*Euphorbia hirta*	Nanubalu	Euphorbiaceae	Not assessed
73	*Zizyphus jujube*	Regu	Rhamnaceae	Not assessed
74	*Prosopis cineraria*	Jammi	Mimosaceae	Not assessed

75	*Ficus racemosa*	Medi	Moraceae	Not assessed

A total of 4 quadrats of 20 m x 20 m size were placed in the Reserve Forest areas in proximity to the proposed project area. The identified species were tabulated and further calculated the density, frequency and abundance of the floral species. The details are placed in Tables 3 to 6:

Table - 3: Floral species in Reserve Forest area 1- Pothukonda Rambilli Reserve Forest

S.No	Name of the floral species	Local name	Family	Classification as per IUCN redbook
1	*Albizzia lebbek*	Dirisenam	Mimosaceae	Not assessed
2	*Anona Squamosa*	Seethaphalam	Annonaceae	Not assessed
3	*Aegle marmelous*	Maredu	Rutaceae	Not assessed
4	*Prosopis juliflora*	Sarcar tumma	Mimosaceae	Not assessed
5	*Anacardium occidentale*	Cashew	Anacardiceae	Not assessed
6	*Ficus racemosa*	Medi	Moraceae	Not assessed
7	*Syzygium cumini*	Neredu	Myrtaceae	Not assessed
8	*Zizyphus jujube*	Regu	Rhamnaceae	Not assessed
9	*Ficus religiosa*	Raavi	Moraceae	Not assessed
10	*Eucolyptus tereticornis*	Neelagiri	Myrtaceae	Not assessed
11	*Melia azadirachata*	Vepa	Meliaceae	Not assessed
12	*Tectona grandis*	Teku	Lamiaceae	Not assessed
13	*Lantana camara*	Makkadambu	Verbenaceae	Not assessed
14	*Butea monosperma*	Moduga	Fabaceae	Not assessed
15	*Cactus strictus*	Nagajemudu	Cactaceae	Data deficient
16	*Mangifera indica*	Mamidi	Anacardiaceae	Data deficient
17	*Cassia auriculata*	Tangedu	Fabaceae	Not assessed
18	*Cassia siamea*	Seem tangedu	Caesalpinaceae	Not assessed
19	*Pongamia pinnata*	Kanuga	Fabaceae	Not assessed
20	*Prosopis cineraria*	Jammi	Mimosaceae	Not assessed
21	*Ficus racemosa*	Medi	Moraceae	Not assessed
22	*Sapindus emarginatus*	Kunkudu	Sapindaceae	Not assessed
23	*Cassia occidentalis*	Kasintha	Caesalpinaceae	Not assessed
24	*Casuarina equisetifolia*	Sarugudu	Casuarinaceae	Not assessed

S.No	Name of the floral species	Local name	Family	Classification as per IUCN redbook
25	*Alstonia scholaris*	Edakulapala	Apocyanaceae	Not assessed
26	Phoenix sylvestris	Eetha	Palmae	Not assessed

Table - 4: Floral species in Reserve Forest area 2- Pothukonda Rambilli Reserve Forest

S.No	Name of the plant	Local name	Family	Classification as per IUCN redbook
1	*Ficus religiosa*	Raavi	Moraceae	Not assessed
2	*Melia azadirachata*	Vepa	Meliaceae	Not assessed
3	*Prosopis juliflora*	Sarcar tumma	Mimosaceae	Not assessed
4	*Borassus flabellifer*	Taati	Palmae	Not assessed
5	*Bauhinia racemosa*	Are chettu	Caesalpiniaceae	Not assessed
6	Pithecellobium dulce	Cheemachinta	Mimosaceae	Not assessed
7	*Acacia nilotica*	Nalla tumma	Mimosaceae	Not assessed
8	*Casuarina equisetifolia*	Sarugudu	Casuarinaceae	Not assessed
9	*Pongamia pinnata*	Kanuga	Fabaceae	Not assessed
10	*Butea monosperma*	Moduga	Fabaceae	Not assessed
11	Phoenix sylvestris	Eetha	Palmae	Not assessed
12	*Anacardium occidentale*	Cashew	Anacardiceae	Not assessed
13	*Tamarindus Indica*	Chinta	Caesalpinaceae	Not assessed
14	*Cassia auriculata*	Tangedu	Fabaceae	Not assessed
15	*Eucolyptus tereticornis*	Neelagiri	Myrtaceae	Not assessed
16	*Zizyphus jujube*	Regu	Rhamnaceae	Not assessed
17	*Cassia occidentalis*	Kasintha	Caesalpinaceae	Not assessed
18	*Tectona grandis*	Teku	Lamiaceae	Not assessed
19	*Lantana camara*	Makkadambu	Verbenaceae	Not assessed
20	*Albizzia lebbek*	Dirisenam	Mimosaceae	Not assessed
21	*Cassia siamea*	Seem tangedu	Caesalpinaceae	Not assessed

Table - 5: Floral species in Reserve Forest area 1- Kaluvapalli Reserve Forest

S.No	Name of the plant	Local name	Family	Classification as per IUCN redbook
1	*Butea monosperma*	Moduga	Fabaceae	Not assessed
2	Phoenix sylvestris	Eeta	Palmae	Not assessed
3	*Tamarindus Indica*	Chinta	Caesalpinaceae	Not assessed
4	*Alstonia scholaris*	Edakulapala	Apocyanaceae	Not assessed
5	*Acacia nilotica*	Nalla tumma	Mimosaceae	Not assessed
6	*Prosopis juliflora*	Sarcar tumma	Mimosaceae	Not assessed
7	*Bauhinia racemosa*	Are chettu	Caesalpiniaceae	Not assessed
8	*Syzygium cumini*	Neredu	Myrtaceae	Not assessed
9	*Aegle marmelous*	Maredu	Rutaceae	Not assessed
10	*Melia azadirachata*	Vepa	Meliaceae	Not assessed
11	*Pavetta tomentosa*	Tella papidi	Rubiaceae	Not assessed
12	*Ficus religiosa*	Raavi	Moraceae	Not assessed
13	*Albizzia lebbek*	Dirisenam	Mimosaceae	Not assessed
14	*Pongamia pinnata*	Kanuga	Fabaceae	Not assessed
15	*Cassia auriculata*	Tangedu	Fabaceae	Not assessed
16	*Cactus strictus*	Nagajemudu	Cactaceae	Data deficient
17	*Anacardium occidentale*	Cashew	Anacardiceae	Not assessed
18	Pithecellobium dulce	Seemachinta	Mimosaceae	Not assessed
19	*Cassia occidentalis*	Kasintha	Caesalpinaceae	Not assessed
20	*Ficus benghalensis*	Marri	Moraceae	Not assessed
21	*Zizyphus jujube*	Regu	Rhamnaceae	Not assessed
22	*Tectona grandis*	Teku	Lamiaceae	Not assessed
23	*Casuarina equisetifolia*	Sarugudu	Casuarinaceae	Not assessed
24	*Anona Squamosa*	Seethaphalam	Annonaceae	Not assessed
25	*Ficus racemosa*	Medi	Moraceae	Not assessed

Table - 6: Floral species in Reserve Forest area 2- Kaluvapalli Reserve Forest

S.No	Name of the floral species	Local name	Family	Classification as per IUCN redbook
1	*Prosopis cineraria*	Jammi	Mimosaceae	Not assessed

S.No	Name of the floral species	Local name	Family	Classification as per IUCN redbook
2	*Zizyphus jujube*	Regu	Rhamnaceae	Not assessed
3	*Pavetta tomentosa*	Tella papidi	Rubiaceae	Not assessed
4	*Melia azadirachata*	Vepa	Meliaceae	Not assessed
5	*Cassia siamea*	Seem tangedu	Caesalpinaceae	Not assessed
6	*Tectona grandis*	Teku	Lamiaceae	Not assessed
7	*Lantana camara*	Makkadambu	Verbenaceae	Not assessed
8	*Sapindus emarginatus*	Kunkudu	Sapindaceae	Not assessed
9	*Anacardium occidentale*	Cashew	Anacardiceae	Not assessed
10	*Cassia occidentalis*	Kasintha	Caesalpinaceae	Not assessed
11	*Casuarina equisetifolia*	Sarugudu	Casuarinaceae	Not assessed
12	*Pongamia pinnata*	Kanuga	Fabaceae	Not assessed
13	*Cactus strictus*	Nagajemudu	Cactaceae	Data deficient
14	*Prosopis juliflora*	Sarcar tumma	Mimosaceae	Not assessed
15	*Ficus racemosa*	Medi	Moraceae	Not assessed
16	*Ficus religiosa*	Raavi	Moraceae	Not assessed
17	*Eucolyptus tereticornis*	Neelagiri	Myrtaceae	Not assessed
18	*Anona Squamosa*	Seethaphalam	Annonaceae	Not assessed
19	*Butea monosperma*	Moduga	Fabaceae	Not assessed
20	*Mangifera indica*	Mamidi	Anacardiaceae	Data deficient
21	*Albizzia lebbek*	Dirisenam	Mimosaceae	Not assessed

Calculations for indices based on the preliminary study

The Important Value Index of the floral species present in the preliminary study area is calculated based on the Density, Frequency and Abundance of the floral species and are placed in the following table. The IVI values of the floral species are depicted in the graph in Figure -4.

S.No	Name of the tree	F1	F2	F3	F4	Total	Density	Relative density	Frequency	Relative frequency	Abundance	Relative abundance	IVI
1	*Albizzia lebbek*	1	2	2	1	6	1.5	3.53	1.0	4.30	0.67	1.48	**9.31**
2	*Anona Squamosa*	1	0	2	1	4	1	2.35	0.8	3.23	0.75	1.66	**7.24**
3	*Aegle marmelous*	1	0	1	0	2	0.5	1.18	0.5	2.15	1.00	2.21	**5.54**
4	*Prosopis juliflora*	3	2	4	1	10	2.5	5.88	1.0	4.30	0.40	0.89	**11.07**
5	*Ficus racemosa*	1	0	2	1	4	1	2.35	0.8	3.23	0.75	1.66	**7.24**
6	*Syzygium cumini*	1	0	1	0	2	0.5	1.18	0.5	2.15	1.00	2.21	**5.54**
7	*Zizyphus jujube*	2	2	3	2	9	2.25	5.29	1.0	4.30	0.44	0.98	**10.58**
8	*Ficus religiosa*	1	2	1	1	4	1	2.35	1.0	4.30	1.00	2.21	**8.87**
9	*Eucolyptus tereticornis*	4	5	0	6	15	3.75	8.82	0.8	3.23	0.20	0.44	**12.49**
10	*Melia azadirachata*	2	3	2	1	8	2	4.71	1.0	4.30	0.50	1.11	**10.11**
11	*Tectona grandis*	1	1	2	2	6	1.5	3.53	1.0	4.30	0.67	1.48	**9.31**
12	*Lantana camara*	3	2	0	4	9	2.25	5.29	0.8	3.23	0.33	0.74	**9.26**
13	*Butea monosperma*	2	1	1	1	5	1.25	2.94	1.0	4.30	0.80	1.77	**9.01**
14	*Cactus strictus*	1	0	2	1	4	1	2.35	0.8	3.23	0.75	1.66	**7.24**
15	*Mangifera indica*	1	0	0	2	3	0.75	1.76	0.5	2.15	0.67	1.48	**5.39**
16	*Cassia auriculata*	3	2	2	0	7	1.75	4.12	0.8	3.23	0.43	0.95	**8.29**
17	*Cassia siamea*	2	1	0	2	5	1.25	2.94	0.8	3.23	0.60	1.33	**7.50**
18	*Pongamia pinnata*	2	3	2	4	11	2.75	6.47	1.0	4.30	0.36	0.81	**11.58**
19	*Prosopis cineraria*	1	0	0	2	3	0.75	1.76	0.5	2.15	0.67	1.48	**5.39**
20	*Ficus benghalensis*	1	0	1	0	2	0.5	1.18	0.5	2.15	1.00	2.21	**5.54**
21	*Sapindus emarginatus*	1	0	0	1	2	0.5	1.18	0.5	2.15	1.00	2.21	**5.54**
22	*Cassia occidentalis*	3	2	2	2	9	2.25	5.29	1.0	4.30	0.44	0.98	**10.58**
23	*Casuarina equisetifolia*	6	5	5	3	19	4.75	11.18	1.0	4.30	0.21	0.47	**15.94**
24	*Borassus flabellifer*	0	2	0	0	2	0.5	1.18	0.3	1.08	0.50	1.11	**3.36**
25	*Bauhinia racemosa*	0	2	1	0	3	0.75	1.76	0.5	2.15	0.67	1.48	**5.39**
26	*Pithecellobium dulce*	0	1	1	0	2	0.5	1.18	0.5	2.15	1.00	2.21	**5.54**
27	*Acacia nilotica*	0	2	1	0	3	0.75	1.76	0.5	2.15	0.67	1.48	**5.39**
28	*Phoenix sylvestris*	1	2	1	0	3	0.75	1.76	0.8	3.23	1.00	2.21	**7.20**
29	*Tamarindus indica*	0	1	1	0	2	0.5	1.18	0.5	2.15	1.00	2.21	**5.54**
30	*Alstonia scholaris*	1	0	2	0	3	0.75	1.76	0.5	2.15	0.67	1.48	**5.39**
31	*Anacardium occidentale*	2	3	3	2	10	2.5	5.88	1.0	4.30	0.40	0.89	**11.07**
31	*Pavetta tomentosa*	0	0	2	1	3	0.75	1.76	0.5	2.15	0.67	1.48	**5.39**
	Total					**170**			23.25		**45.17**		

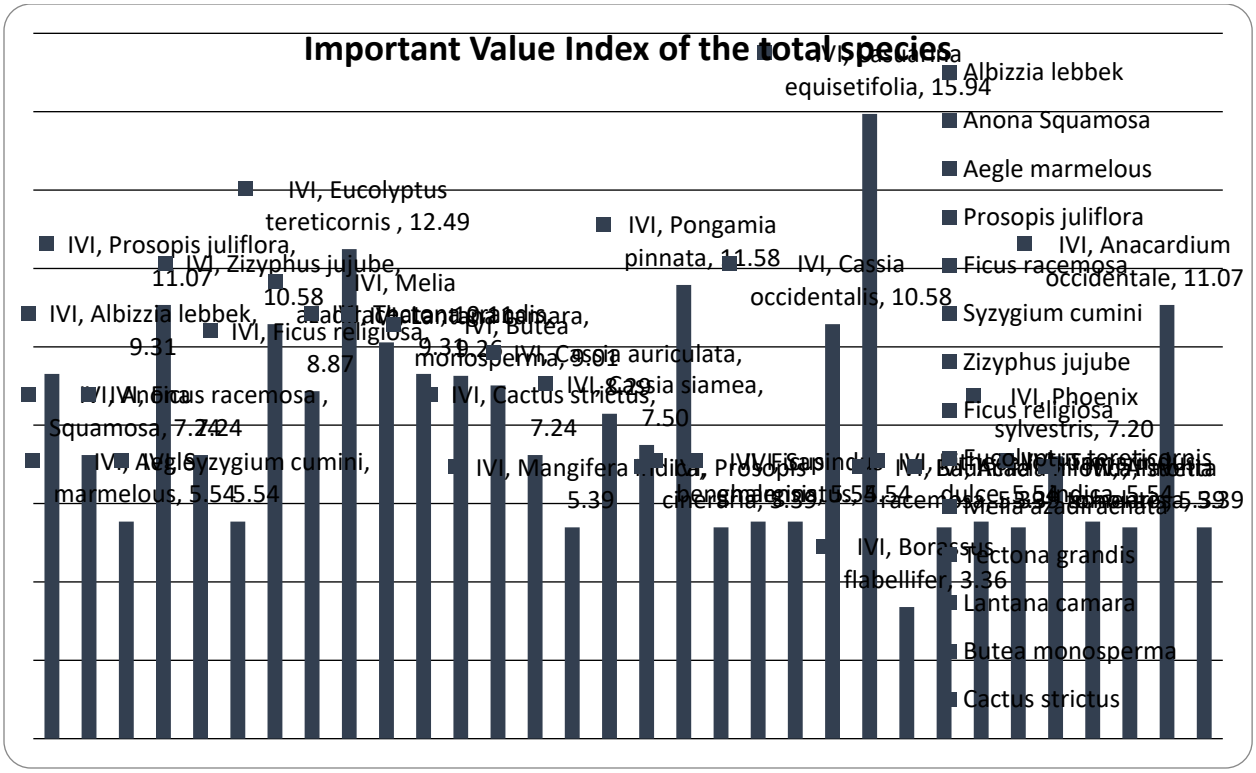


Figure -4: Important Value Index of the floral species in the Reserve Forest area

Based on the analysis conducted on the available data it is noted that *Casuarina equisetifolia and Eucalyptus tereticonis are* dominant in the forest area of the project. Using the formula the Shannon Weiner index value was calculated and it is 3.06 and the evenness of the species is 0.89. These values depict moderately high biodiversity levels at the project site with more species evenness.

The photographs taken during the preliminary study in project area is given in Figure -5

Field survey conducted at Reserve Forest

Monoculture of Eucalyptus

Reserve forest area with vegetation

Vegetation with Cashew nut plants

Fish catch at Pudimadaka beach

Little egret

Figure -5: Photographs taken during the preliminary study in project area

5.2 Faunal Diversity in the Reserve Forest area proximity to the proposed project area

Since the animals with the exception of a few sedentary species and a few residents move from place to place either for feeding or breeding or for shelter etc, it may not be possible to prepare separate lists of fauna. The mere absence of a species at the time of sampling does not rule out its presence. In order to overcome such problems, a list based on both primary survey and secondary data is prepared. The primary survey takes in to account both direct evidence and indirect evidence including the circumstantial evidence. All relevant scientific documents such as the scientific publications, documents and reports are a good source of information provided they are site, area and location specific. The field survey and local consultation with the villagers a faunal enlisting of birds & mammals with their scientific names and common names is presented. The list of faunal species, the family they belong to and the status of the faunal species with reference to the IUCN red data book and with reference to the Wildlife act 1972 schedules are tabulated. The Table depicts the animals and birds found in the study area and its adjoining area. Due attention is paid to rare or endangered or endemic or threatened (REET) species. In order to find out whether a species comes under any of the REET categories, references are made to IUCN Red Data, Indian Wildlife (Protection) Act 1972 and its amendments thereof, Botanical survey of India (BSI) and Zoological Survey of India (ZSI). The list of faunal species present in the project area as per the Secondary data is placed in Table -7.

Table -7: List of faunal species as per secondary data and primary study

Scientific Name of the animal	Local name	Family	Belongs to which schedule as per Wildlife act	Classification as per IUCN Redbook
Mammals				
Axis axis	Spotted deer	Cervidae	III	Least concern
Sus scrofa	Wild Boar	Suidae	III	Least concern
Lepus nigricollis	Hare	Leporidae	IV	Least concern
Bos gaurus	Indian Bison	Bovidae	I	Vulnerable
Cervus unicolour	Sambar	Cervidae	III	Vulnerable
Melursus ursinus	Bear	Ursidae	II	Vulnerable
Hyaena hyaena	Hyenas	Hyaenidae	III	Near threatened
Antilope cervicapra	Black buck	Bovidae	I	Near threatened
Canis aureus	Jackal	Canidae	I	Least concern

Macaca mulatta	Monkey	Cercopithecidae	I	Least concern
Boselapohus tragocamalus	Blue bull	Bovidae	III	Least concern
Felis chaus	Jungle cat	Felidae	II	Least concern
Viverricula indica	Small civet	Viverridae	II	Least concern
Herpestes auropunctatus	Mongoose	Herpestidae	IV	Not assessed
Hystrix indica	Indian porcupine	Hystricidae	III	Least concern
Cuon alpines	Wild dog	Canidae	II	Endangered
Canis lupus pallipes	Wolf	Canidae	I	Not assessed
Muntiacus muntjak	Indian barking deer	Cervidae	III	Least concern
Vulpes benghalensis	Fox	Canidae	II	Least concern
Reptiles				
Varanus bengalensis	Monitor lizard	Varanidae	I	Least concern
Python molurus	Rock python	Pythonidae	I	Near Threatened
Naja naja	Indian cobra	Elapidae	II	
Bungarus coeruleus	Common krait	Elapidae	IV	Not assessed
Ptyas mucosus	Rat snake	Colubridae	II	Not assessed
Natrix stolata	Keel back	Natricidae	II	Not assessed
Calotes versicolor	Garden lizard	Agamidae	-	Not assessed
Birds				
Phalacrocorax niger	Little cormorant	Phalacrocoracidae	IV	Least concern
Pavo cristatus	Peacock	Phasianidae	I	Least concern
Ardea cinerea	Grey heron	Ardeidae	--	Least concern
Bubulcus ibis	Cattle egret	Ardeidae	IV	Least concern
Egretta garzetta	Little egret	Ardeidae	IV	Least concern
Anastomus oscitans	Asian open bill	Ciconiidae		
https://en.wikipedia.org/wiki/Stork*Pterocles indicus*	Painted sand grouse	Pteroclidae	IV	Least concern
Gallinago gallinago	Common snipe	Scolopacidae	IV	Least concern
Tringa hypoleucos	Common sandpiper	Scolopacidae	IV	Least concern
Elanus caeruleus	Blackwinged kite	Accipitridae	--	Not assessed
Vanellus indicus	Red wattled lapwing	Charadiidae	--	Least concern
Corvus splendens	Common crow	Corvidae	V	Least concern
Passer domesticus	Sparrow	Passeridae	--	Least concern
Sterna aurantia	River tern	Laridae	--	Near threatened

Haliastur indus	Brahminy kite	Accipitridae	--	Least concern
Francolinus pondicerianus	Grey patridge	Phasianidae	--	Least concern
Anas crecca	Common teal	Anatidae	IV	Least concern
Dinopium benghalense	Woodpecker	Picidae	IV	Least concern
Coracias benghalensis	Paala pitta	Coraciidae	IV	Least concern
Alcedo atthis	Kingfisher	Alcedinidae	IV	Least concern
Hierococcyx varius	Common hawk	Cuculidae	--	Least concern
Eudynamys scolopaceus	Indian koel	Cuculidae	--	Least concern
Psittacula krameri	Parrot	Psittaculidae		Least concern
Ottus bakkamoena	Owl	Strigidae	IV	Least concern
Columba livia	Indian rock pegion	Columbidae	IV	Least concern
Spilopelia chinensis	Spotted dove	Columbidae	IV	Least concern
Amaurornis phoenicurus	Water hen	Rallidae	--	Least concern
Lanius schach	Longtailed shrike	Laniidae	--	Least concern
Pericrocotus cinnamomeus	Small minivet	Campephagidae	IV	Least concern
Dicrurus macrocercus	Drongo	Dicruridae	IV	Least concern
Tephrodornis pondicerianus	Commonwoodshrike	Tephrodornithidae	--	Not assessed
https://en.wikipedia.org/wiki/Tephrodornithidae*Copsychus fulicatus*	Indian robin	Muscicapidae	--	Not assessed
Astrilda sp.	Munia	Plocidae	IV	Not assessed
Acridotheres fuscus	Jungle myna	Sturnidae	IV	Least concern
Pycnonotus cafer	Red vented bulbul	Pycnonotidae	IV	Least concern
Turdoides caudata	Common babbler	Leiothrichidae	IV	Least concern
Cinnyris asiaticus	Purple sunbird	Nectariniidae	IV	Least concern
Amandava amandava	Red munia	Estrildidae	IV	Not assessed
Upupa epops	Common hoopoe	Upupidae	--	Not assessed
Mycteria leucocephala	Painted stork	Ciconiidae	IV	Near threatened
Fishes (Pisces)				
Ophiocephalus striatus	Korameenu	Channaridae		Least concern
Labeo rohita	Rohu	Cyprinidae	-	Least concern
Barbus sarana	Budda parkalu	Cyprinidae	-	Least concern
Labeo catla	Katla	Cyprinidae	-	Least concern

Marine Fishery Study in Project Area

Marine fishery resources are renewable and limited, therefore management of the harvest of marine fishery resources is necessary for sustained production from the sea. Marine fisheries Study in the Project Area were carried out using the Marine Fisheries Census 2010 for Andhra Pradesh published by Central Marine Fisheries Research Institute (CMFRI), Cochin. The main fish species found in the district and applicable to the Project Area are as follows:

S. No	Name of the species	S.No	Name of the Species
1	*Antennarisdiagopus*	33	*Upeneussulphureus*
2	*Apogonquadrafasciates*	34	*Upeneusmoluccensis*
3	*Apogonpoecilopterus*	35	*Nemipterus japonicas*
4	*Arius jella*	36	*Nemipterusrandalli*
5	*Pseudorhombuselevatus*	37	*Halieutaspicata*
6	*Bregmacerosmaccleliandi*	38	*Ophichthuspolyophthalmus*
7	*Alepesvari*	39	*Ophichthusapicals*
8	*Alectisindicus*	40	*Lactoriadiaphana*
9	*Atule mate*	41	*Platycephalustuberculatus*
10	*Dussumieriaacuta*	42	*Sarsogonatuberculata*
11	*Decapterusmacrosoma*	43	*Pomadasys maculates*
12	*Cynoglossuscynoglossus*	44	*Diagrammapictum*
13	*Cynoglossuspuncticeps*	45	*Priacanthusboops*
14	*Cyanoglossusarel*	46	*Priacanthushamrur*
15	*Elopsmachnata*	47	*Johniuscarutta*
16	*Thryssadussumieri*	48	*Johniusvogleri*
17	*Thryssaengraulids*	49	*Auxisrochi*
18	*Thryssasetirostris*	50	*Rastrelligerkanagurtha*
19	*Fistulariapetimba*	51	*Apolectisniger*
20	*Parachaeturichthyspolynema*	52	*Brachiurs zebra*
21	*Adioryxruber*	53	*Scorpionopsisgibbosa*
22	*Gazzaminuta*	54	*AesopiaCarnuta*
23	*Photopectoralisbindus*	55	*Synapturacommersoniana*
24	*Leiognathusblochii*	56	*Stolephorusbuccaneeri*
25	*Leiognathusequulus*	57	*Pampusargenteus*
26	*Leiognathusdaura*	58	*Sauridatumbil*

27	*Conger conger*	59	*Terapanjarbua*
28	*Conger cineros*	60	*Lagocephalusspadicieus*
29	*Mene maculate*	61	*Lagocephaluslunaris*
30	*Monodactylusargenatus*	62	*Tetrodon leopards*
31	*Upeneusvittatus*	63	*Torpedo fuscomaculata*
32	*Upeneustragula*		

Source: Andhra University: Department of Marine Living Resources

The list of faunal species present in the Reserve forests areaproximity to the proposed project area as per the Secondary data provided by IBAT proximity report is placed in Table -8.

Table -8: List of faunal species as per secondary data provided by IBAT proximity report

Common Name	***Scientific Name***	***Status as per IUCN***
Fishes (Pisces)		
Longhead eagle ray	*Aetobatus flagellum*	Endangered
Spotted Eagle Ray	*Aetobatus ocellatus*	Vulnerable
Mottled Eagle Ray	*Aetomylaeus maculatus*	Endangered
Banded Eagle Ray	*Aetomylaeus nichofil*	Vulnerable
Pelagic Thresher	*Aopias pelagicus*	Vulnerable
Bigeye thresher shark	*Alopias superciliosus*	Vulnerable
Common Thresher Shark	*Alopias vulpinus*	Vulnerable
Narrow saw fish	*Anoxypristis cuspidate*	Endangered
Silvertip shark	*Carcharhinus albimarginatus*	Vulnerable
Silky shark	*Carcharhinus falciformis*	Vulnerable
Pondicherry Shark	*Carcharhinus hemiodon*	Critical
Oceanic whitetip shark	*Carcharhinus longimanus*	Vulnerable
Great white shark	*Carcharodon carcharias*	Vulnerable
Hooktooth shark	*Chaenogaleus macrostoma*	Vulnerable
Giant grouper	*Epinephelus lanceolatus*	Vulnerable
Winghead shark	*Eusphyra blochii*	Endangered
Sharpnose Guitarfish	*Glaucostegus granulatus*	Vulnerable
Widenose Guitarfish	*Glaucostegus obtusus*	Vulnerable
Giant shovelnose Ray	*Gaucostegus typus*	Vulnerable
Ganges shark	*Glyphis gangeticus*	Critical
Zonetail Butterfly Ray	*Gymnura zonura*	Vulnerable
Snaggletooth shark	*Hemipristis elongate*	Vulnerable
Reticulate whipray	*Himantura uarnak*	Vulnerable

Thorny seahorse	*Hippcampus histrix*	Vulnerable
Great seahorse	*Hippocampus kelloggi*	Vulnerable
Three spot seahorse	*Hippocampus trimaculatus*	Vulnerable
Shortfin mako	*Isurus oxyrinchus*	Vulnerable
Longfin mako	*Isurus oxyrinchus*	Vulnerable
Broadfin shark	*Lamiopsis temminckii*	Endangered
Whitespotted whipray	*Maculabatis gerrardi*	Vulnerable
Giant Manta Ray	*Manta birostris*	Vulnerable
Sicklefin devil ray	*Mobula tarapacana*	Vulnerable
Tawny nurse shark	*Nebrius ferrugineus*	Vulnerable
Sharptooth lemon shark	*Negaprion acutiens*	Vulnerable
	Omobranchus smithi	Vulnerable
Jerkin's whipray	*Pateobatis jenkinsii*	Vulnerable
Dwarf sawfish	*Pristis clavata*	Endangered
Largetooth sawfish	*Pristis pristis*	Critical
Green sawfish	*Pristis zijsron*	Critical
Bowmouth Guitarfish	*Rhina ancylostoma*	Vulnerable
Whale shark	*Rhincodon typus*	Endangered
Smoothnose wedgefish	*Rhynchobatus laevis*	Vulnerable
Scalloped hammerhead	*Sphyrna lewini*	Endangered
Great hammerhead	*Sphyrna mokarran*	Endangered
Zebra shark	*Stegostoma fasciatum*	Endangered
Blotched fantail Ray	*Taeniurops meyeni*	Vulnerable
Porcupine Ray	*Urogymnus asperrimus*	Vulnerable
Reptiles (Reptilia)		
Loggerhead turtle	*Caretta caretta*	Vulnerable
Indian narrow headed softshell turtle	*Chitra indica*	Endangered
Mugger	*Crocodylus palustris*	Vulnerable
Leatherback	*Dermochelys coracea*	Vulnerable
Hawksbill turtle	*Eretmochelys imbricate*	Critical
Olive Ridley	*Lepidochelys olivacea*	Vulnerable
King cobra	*Opiophagus Hannah*	Vulnerable
Birds (Aves)		
Common pochard	*Aythya ferina*	Vulnerable
Bristled Grass bird	*Chaetornis striata*	Vulnerable
Nias hill myna	*Gracula robusta*	Critical

Tenggara hill myna	*Gracula venerate*	Endangered
White rumped vulture	*Gyps bengalensis*	Critical
Indian vulture	*Gyps indicus*	Critical
Egyptian vulture	*Neophron percnopterus*	Endangered
Blackbellied tern	*Sterna acuticauda*	Endangered
Lesser florican	*Sypheotides indicus*	Endangered
Mammals (Mammalia)		
Asian small clawed otter	*Aonyx cinereus*	Vulnerable
Blue whale	*Balaenoptera musculus*	Endangered
Dhole	*Cuon alpinus*	Endangered
Smooth coated otter	*Lutragale perspicillata*	Vulnerable
Indian pangolin	*Manis crassicaudata*	Endangered
Indo pacific finless porpoise	*Neophocaena phocaenoides*	Vunerable
Irrawadddy dolphin	*Oracaella brevirostris*	Endangered
Leopard	*Panthera pardus*	Vulnerable
Sperm whale	*Physeter macrocephalus*	Vulnerable
Sambar	*Rusa unicolor*	Vulnerable
Four horned antelope	*Tetracerus quadricornis*	Vulnerable

5.3 Aquatic flora and fauna of the project area

During the site visit the few water bodies are seen. However, based on the secondary data it is noticed that during the monsoon period, the major aquatic flora found at the reservoirs and water bodies includes *Eichornia, Nymphia, Nelumbo etc.,* other planktons like *Microcystis*, *Desmidiu*m, Protozoans like *Arcella*, Rotifers like *Keratella, Brachionus, Bosmina, Polyphemos, Moina, Daphnia, Diaptomus, Cyclops* are present. Few common aquatic birds like Little Egret, Cormarant, Duck, Kingfisher, Grebe, etc., are found in the area. Common fish varieties found in the river area are Carp, *Catlamrigala*, *Labeo rohita, Labeo calbasu* etc.,

6.0 Impacts Due to Proposed development of start up are at Rambilli cluster

The sub-project components of development of start up area at Rambilli cluster are provision of Roads, Water Supply, Sewerage, Storm Water Drain, Power Supply

distribution, Common Effluent Treatment Plant (CETP). The map showing the start up area of Rambilli cluster is given in Figure -6

As per MoEF D.O.No. Z-110125/2012-IA.II (T) dated 02.07.2012 projects falling in eco-sensitive zones, which are not covered under the EIA Notification, 2006 and which do not require Environmental Clearance, would also not require prior approval of the Standing Committee of NBWL, New Delhi. In view of the above, clearance is not envisaged from NBWL for the proposed sub-project components (Roads, Water Supply, Sewerage, Storm Water Drain, Power Supply distribution, Common Effluent Treatment Plant (CETP)) at Rambilli cluster of VCIC – Visakhapatnam, Andhra Pradesh.

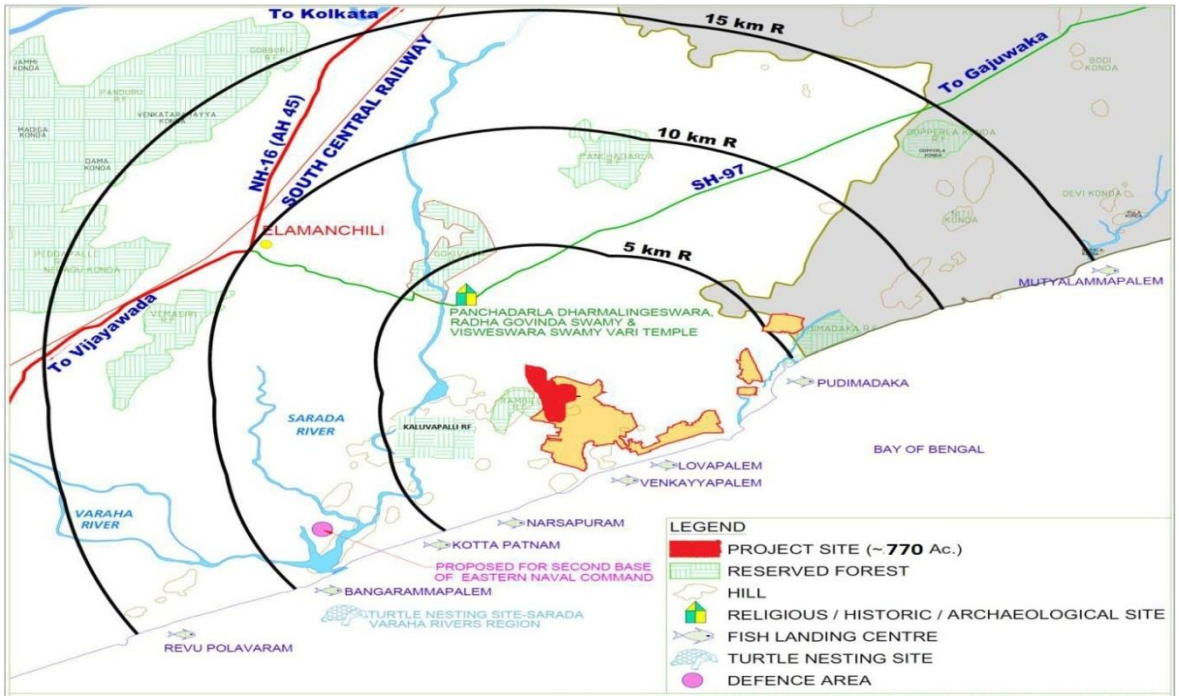


Figure -6: Map showing the Proposed project location with 5, 10 and 15 km radius

6.1 Impact on Flora:

The construction of Roads, Water supply, Sewerage, Storm Water Drain, Power Supply and Common Effluent Treatment Plant (CETP) might require felling of small to medium size trees of about 150 nos falling within the Right of Way. The predominant tree species going to be felled viz.,Neem, Coconut, Palm, Mango, Tamarind, Sarkar Tumma, Thevitia species, etc., and these are all ubiquitous species.

Mitigation Measures:

- Plantation programme shall be promptly adopted to restore and further enrich the loss of vegetation. The impact due to felling of trees will be compensated through the proposed avenue plantation/ landscape development programme. There are 300 nos. of trees proposed to be replanted in the project area along the service roads and landscape near administrative buildings in the ratio of 1:2 against the each tree cut.
- Local plant varieties especially, soil bounding species will be planted near to the constructed areas and also in the surroundings in order to hold the soil tightly.

6.2 Impact on Fauna:

During the construction, no impact on the wildlife is anticipated as the project area. The Roads constructed and, on the roadside, only the water supply and Storm Water Drains will be constructed, so it will not disturb much land. The contractor is suggested to take necessary precautionary measures during the construction activity.

Mitigation Measures:

- Awareness programmes shall be conducted in the study area for the construction labour, engineers etc., in the form of seminars /workshops/ exhibitions. An amount of Rs.1.5 lakhs is made in the EMP for this purpose.
- The construction boundary near project area and shall be provided with hoarding/notice boards/sign boards for the restriction of movement of construction labours/local public.
- Construction camps shall be setup atleast 10 Kms away from the Project boundaries.
- Project Authorities shall make periodic visits to meet Forest authorities to obtain their suggestions during construction and operation of the project when the works are happening close to the forest areas.
- Vehicles under PUC checkup only be used during construction activities to minimize air emissions.
- The required mitigation measures include location of construction equipment at least 250m away from inhabited areas. In addition, construction workers will have to be provided with protection devices like earplugs.

- Other ancillary measures include maintenance of equipment in good condition, proper design of engine enclosures. Project activities shall coincide with periods when people would be least affected. Construction activities shall be strictly prohibited between 10pm. and 6am. inareas near toReserve Forest areas/ residential areas.

7.0 Conclusions and Recommendations

- ➔ The sub-project components of proposed 'Development of Start up area of Rambilli cluster – VCIC – Visakhapatnam node is proposed within the APSEZ area at Rambilli mandal of Visakhapatnam District. Expert from Asian Development Bank (ADB) suggested to prepare the Bio-diversity Report duly covering the impact due to the proposed project activity on the surroundings,accordingly, the Bio-diversity report is prepared.
- ➔ The water demand for the proposed project is met from Yeleru Left main canal. There is no adverse impact on the requirement of water for Flora & Fauna of the project area is envisaged.
- ➔ No forest land is to be acquired for the construction of sub components like water supply, Roads, Sewerage, Storm Water Drain, Power supply and CETP in the project area and no significant impact on Reserve forest area is envisaged due to construction activity as the project sub-components are falling outside these Reserve forest areas.
- ➔ Construction camps shall be setup atleast 10 Kms away from the proposed project boundary.
- ➔ As per the Secondary data and preliminary studies it is evident that there are some endangered, vulnerable, and near threatened category floral and faunal species. But the present project does not disturb these species which are away from the proposed project site.
- ➔ The construction works of sub components of proposed project activity might require felling of small to medium size trees of about 150 nos falling within the Right of Way. The predominant tree species going to be felled viz.,Neem, Coconut, Palm, Mango, Tamarind, Sarkar Tumma, Thevitia species, etc., and these are all ubiquitous species. The impact due to felling of trees will be compensated through the proposed avenue plantation/ landscape development programme. There are 300 nos. of trees proposed to be replanted in the project area along the service roads and landscape near administrative buildings in the ratio of 1:2 against each tree cut.

➔ Awareness programmes shall be conducted in the study area for the construction labour, engineers etc., in the form of seminars /workshops/ exhibitions. An amount of Rs.1.5 lakhs is made in the EMP for this purpose.

REFERENCES

1. Request For Proposal for Development of Start up area of Rambilli cluster – VCIC – Visakhapatnam node – May 2018
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Appendix 14: Health and Safety Plan VCICDP Project 2

SOP-Health and Safety Plan for COVID19 Pandemic

Document Stage: Final

June 2020

Loan 3430-IND and Grant 0495: Visakhapatnam-Chennai Industrial Corridor Development Program, Project 1

Visakhapatnam-Chennai Industrial Corridor Development Program, Tranche 2

Prepared by Government of Andhra Pradesh for the Asian Development Bank.

CONTENTS

1 INTRODUCTION

- This document is intended to supplement formal H&S policies, procedures and plans that the contractor has in place for its employees and staff working on VCICDP projects under loan 3430-IND and Grant 0495 and Visakhapatnam-Chennai Industrial Corridor Development Program Tranche 2. Hence, this document is not intended to replace any formalized procedures currently in place for the Contractor. Where this guideline does not meet or exceed the standards put forth by the Contractor, the Contractor shall abide by the most stringent procedure available.

- This approved project specific Health and Safety Plan (H&SP) shall be modified to require that the COVID-19 Officer (supervised by the contractor's environmental and health and safety officer) at the Contractor's worksite (appointed by Contractor and agreed by PIU) submit a written daily report to the Client's Representative (PIU Head). The COVID-19 Officer shall certify that the Contractor and all subcontractors are in full compliance with these guidelines.

- The COVID-19 officer should be present on site at all times.

- Any issue of non-compliance with these guidelines shall be a basis for the suspension of work. The Contractor will be required to submit a corrective action plan (on the next day or immediately as per the nature of issue) detailing each issue of non-conformance and a plan to rectify the issue(s). The Contractor will not be allowed to resume work until the plan is approved by the Client (PIU). Any additional issues of non-conformance may be subject to action against the Contractor's as health & safety/safeguard clauses of the contract.

- Construction sites operating during the Covid-19 pandemic need to ensure they are protecting their WORKFORCE and minimising the risk of spread of infection.

- This guidance is intended to introduce consistent measures on sites of all sizes in line with the Government's recommendations on social distancing.

- These are exceptional circumstances and the industry must remain abreast of and comply with the latest Government advice on COVID-19at all times.

- The health and safety requirements of any construction activity must also not be compromised at this time. If an activity cannot be undertaken safely due to a lack of suitably qualified personnel being available or social distancing being implemented, it should not take place.

- It is to be noted that emergency services are also under great pressure and may not be in a position to respond as quickly as usual.

- Sites should remind the workforce at every opportunity of the Worksite Procedures which are aimed at protecting them, their colleagues, their families and the Andhra Pradesh population.

If a worksite is not consistently implementing the measures in this document, it may be required to shut down.

2 PRINCIPLES OF WORKER PROTECTION

- Consistently practice social distancing
- Cover coughs and sneezes
- Maintain hand hygiene
- Clean surfaces frequently

3 MAXIMUM PRECAUTION FOR PERSONS/LABOURERS REPORTING TO WORK

- IF SICK, STAY HOME!
- IF SICK, GO HOME!
- IF SOMEONE SICK, SEND THEM HOME!

Contractor to provide face masks (of the type approved by Government for use to protect persons from COVID-19) to all persons working in or visiting the worksite. This along with procedures set out in this document is for maximum precaution to protect all persons/labourers at all times.

4 COVID-19 TYPICAL SYMPTOMS

- Fever
- Cough
- Shortness of Breath
- Sore Throat

All persons at the worksite should have their temperature screened by COVID-19 officer with Infrared Thermometer (handheld non-contact).

5 SELF-ATTESTATION BY PERSONS/LABOUR PRIOR TO WORK

Prior to starting a work (on daily basis), each labour /worker will self-attest to the supervisor:

- no signs of COVID-19 symptoms within the past 24 hours.

- No contact with an individual diagnosed with COVID-19. (contact means living with a positive person, being within 6 ft of positive person OR sharing things of positive person)

- Not undergone quarantine or isolation (in case of any labourer /worker who has been quarantined or isolated previously, the engagement shall be only after obtaining the requisite clearance)

The engagement of workers falling in the high-risk category such as workers over the age of 55 years, with underlying medical conditions or health issues, etc. should be done only after obtaining the requisite clearance from trained and registered medical practitioners.

The self-attestation would be verified in collaboration with trained and registered medical practitioners deployed at site through discussions with laborers /workers and/or preliminary checks such as temperature checks, etc. prior to their engagement at site.

In addition, the Contractor shall mandatorily follow all medical test requirements for the workers prior to their engagement and/or mobilization at site as per the guidelines issued by the Central and State government agencies and WHO from time to time.

Persons/Labourers showing COVID-19 symptoms or not providing self-attestation shall be directed to leave the work site and report to the fever clinic/quarantine centre immediately. Labour not to return to the work site until cleared by fever clinic/quarantine centre.

6 GENERAL DIRECTION

- No handshake, Only Namaste

- Non-essential physical work that requires close contact between workers should not be carried out

- Work requiring physical contact should not be carried out

- Plan all other work to minimise contact between workers

- Wash hands often (every 1-2 hrs or frequently as possible) with soap for at least 20 seconds

- Use hand sanitizer

- No person should enter the work site other than the authorized persons mentioned by supervisor during start of work

- All must implement social distancing by maintaining a minimum distance of 6-feet from others at all times to eliminate the potential of cross contamination.

- Avoid face to face meetings – critical situations requiring in-person discussion must follow social distancing i.e., 6 ft from others.

- Conduct all meetings via conference calls, if possible. Do not convene meetings of more than 10 people. Recommend use of cell phones, texting, web meeting sites and conference calls for project discussion
- All individual work group meetings/ talks should follow social distancing
- At each job briefing/toolbox talk, employees are asked if they are experiencing any symptoms, and are sent home if they are
- Each worksite should have laminated COVID-19 safety guidelines and handwashing instructions
- All restroom/toilet facilities should be cleaned (min twice a day), and handwashing facility must be provided with soap, hand sanitizer and paper towels
- All surfaces should be regularly cleaned, including mobiles, tabletops /surfaces, door handles, laptops, records, etc.
- All common areas and meeting areas are to be regularly cleaned (min twice a day) and disinfected at least twice a day
- All persons to maintain their own water bottle and should not be shared.
- To avoid external contamination, it is recommended everyone bring food from home
- Please maintain Social Distancing separation during breaks and lunch.
- Cover coughing or sneezing with a tissue, then throw the tissue in the trash and wash hands, if no tissue is available then cough /sneeze into your upper sleeves or elbow. Do not cough or sneeze into your hands.
- Clean your hands after coughing or sneezing thoroughly by using soap and water (minimum for 20 seconds). If soap and water are not available, please use a hand sanitizer. The Contractor shall ensure adequate quantities of sanitizer and soap are made available at all locations including site offices, meeting rooms, corridors, washrooms /toilets, etc. as appropriate.
- Avoid touching eyes, nose, and mouth with your hands
- To avoid sharing germs, please clean up after Yourself. DO NOT make others responsible for moving, unpacking and packing up your personal belongings
- If you or a family member is feeling ill, stay home!
- Work schedules are adjusted to provide time for proper cleaning and disinfecting as required.

7 WORK-SITE PREVENTION PRACTICES

- At the start of each shift, confirm with all employees that they are healthy and inform all workers of reusable and disposable PPE.
- Outside person(s) should be strictly prohibited at worksite
- All construction workers will be required to wear cut-resistant gloves or the equivalent.
- Use of eye protection (reusable safety goggles/face shields) is recommended. The supply of eye protection equipment to the workers is considered as a standard part of PPE during construction works.
- In work conditions where required social distancing is impossible to achieve, such employees shall be supplied with standard face mask, gloves, and eye protection.
- All employees shall drive to work site as per the prevailing guidelines of the Government in a single occupant vehicle. Staff shall not ride together in the same vehicle
- When entering a machine or vehicle which you are not sure you were the last person to enter, make sure that you wipe down the interior and door handles with disinfectant (with 1% sodium hypochlorite solution daily) prior to entry. Adequate quantity of the disinfectant shall be provided by the Contractor at all such site-specific locations.
- Workers should maintain separation of 6’ from each other.
- Multi person activities will be limited where feasible (two persons lifting activities)
- Gathering places on the site such as sheds and/or break areas will be eliminated, and instead small break areas will be used with seating limited to ensure social distancing.
- Contact the cleaning person of the worksite and ensure proper COVID-19 sanitation processes. Increase cleaning/disinfection visits to at least 2 times a day. Cleaning person(s) to be provided with gloves, gown and face mask for each cycle of cleaning. The Contractor shall make available adequate supply of PPE and chemicals while the threat of COVID-19 continues.
- Clean all high contact surfaces a minimum of twice a day in order to minimize the spread of germs in areas that people touch frequently. This includes but is not limited to desks, laptops and vehicles
- All employees to maintaining good health by getting adequate sleep; eating a balanced, healthy diet, avoid alcohol; and consume plenty of fluids.

- Continuation of works in construction project with workers available on site and no workers to be brought in from outside

- The site offices shall have adequate ventilation. The air conditioning or ventilation systems installed at the site offices would have high-efficiency air filters to reduce the risk of infection. The frequency of air changes may be increased for areas where close personal proximity cannot be fully prevented such as control rooms, elevators, waiting rooms, etc.

- The Contractor shall carry out contactless temperature checks for the workers prior to site entrance, during working hours and after site works to identify persons showing signs of being unwell with the COVID-19 symptoms

8 WASHING FACILITY

- All worksites should have access to toilet and hand washing facility.

- Providing hand cleaning facilities at entrances and exits. This should be soap and water wherever possible or hand sanitiser if water is not available

- Washing facility with hot water, and soap at fire hydrants or other water sources to be used for frequent handwashing for all onsite employees

- All onsite workers must help to maintain and keep stations clean

- If a worker notices soap or towels are running low or out, immediately notify supervisors. Proactively supervisor should make sure shortage situation never occurs.

- Garbage bins will be placed next to the hand wash facility for discarding of used tissues/towels with regular removal and disposal facility (end of each day)

9 CLEANING PROCEDURES

Increase cleaning/disinfection visits to at least 2 times a day. Cleaning person(s) to be provided with gloves, gown and face mask for each cycle of cleaning.

Each worksite should have enhanced cleaning and disinfection procedures that are posted and shared including sheds, gates, equipment, vehicles, etc. and shall be posted at all entry points to the sites, and throughout the project site. These include common areas and high touch points like

- Taps and washing facilities

- Toilet flush and seats

- Door handles and push plates

- Handrails on staircases and corridors

- Lift and hoist controls
- Machinery and equipment controls
- Food preparation and eating surfaces
- Telephone equipment / mobiles
- Keyboards, photocopiers and other office equipment

Re-usable PPE should be thoroughly cleaned after use and not shared between workers

10 LABOUR CAMP

Contractor shall follow a zero-tolerance policy on wearing of masks.

Masks (homemade can be thought of) to be provided to all the persons/labourers for use at the camp site as well as at the worksite. Increase cleaning/disinfection visits to at least 2 times a day. Cleaning person(s) to be provided with disposable gloves, gown and face mask for each cycle of cleaning.

10.1 Toilet Facility

- Restrict the number of people using toilet facility at any one time e.g. appoint one welfare attendant among the labours.
- Wash hands before and after using the facilities
- Enhance the cleaning regimes for toilet facilities particularly door handles, locks and the toilet flush
- Portable toilets should be avoided wherever possible, but where in use these should be cleaned and emptied more frequently
- Provide suitable and sufficient rubbish bins for hand towels with regular removal and disposal.

10.2 Eating/snacks Arrangements

- With eateries having been closed (restricted) across Andhra Pradesh, providing permanent (till society is safe from COVID-19) on-camp/off-camp cook/helpers can be implemented. Make sure that the “Guidelines for food handling, preparation and distribution during COVID-19” and it regular updates are being followed.
- Whilst there is a requirement for construction camps to provide a means of heating food and making hot water, these are exceptional circumstances and where it is not possible to introduce a means of keeping equipment clean between use, etc. must be removed from use.

- Contractor to arrange all daily need items and grocery at site itself and no worker is allowed to go to shops for daily need items.
- Dedicated eating areas should be identified on camp to reduce food waste and contamination
- Break times should be staggered to reduce congestion and contact at all times
- Hand cleaning facilities or hand sanitiser should be available at the entrance of any room where people eat and should be used by workers when entering and leaving the area
- Workers should sit 2 metres “6 feet” apart from each other whilst eating and avoid all contact
- Where catering is provided on camp, it should provide pre-prepared and wrapped food only
    - Payments should be taken by contactless options wherever possible
    - Crockery, eating utensils, cups etc. should be avoided wherever possible
- Drinking water should be provided with enhanced cleaning measures of the tap mechanism introduced
- Tables should be cleaned between each use
- All rubbish should be put straight in the bin and not left for someone else to clear up; only covered pedal operated bins should be used and the bins should be cleared and cleaned regularly, with strict adherence to safety protocols for disposal and hygiene maintenance (including proper PPE’s such as gloves, mask and apron worn by the waste handler/cleaner and disposal at a designated place);
- All areas used for eating must be thoroughly cleaned at the end of each break and shift, including chairs, door handles, etc.

10.3 Changing Facilities, Showers and Drying Areas

- Introduce staggered start and finish times to reduce congestion and contact at all times
- Introduce enhanced cleaning of all facilities throughout the day and at the end of each day
- Consider increasing the number or size of facilities available on camp if possible
- Based on the size of each facility, determine how many people can use it at any one time to maintain a distance of two metres

- Provide suitable and sufficient garbage bins in these areas with regular removal and disposal.

- Visitor log should be strictly maintained that the labour camp.

COVID-19 officer will ensure compliance with prevention issues at the labour camp(s).

11 UPDATES ON COVID-19

The Contractor shall be in touch with the Department of Health & Family Welfare and Labour Department to identify any potential worksite exposures relating to COVID-19, including:

- Strictly follow the guidelines issues by Ministry of health and OSHA

- Other workers, vendors, inspectors, or visitors to the worksite with close contact to the individual

- Labour Camps / Work areas such as designated workstations or rooms/sheds

- Work tools and equipment

- Common areas such as break rooms, tables and sanitary facilities

Also refer the following websites from time to time for regular updates.

https://www.mohfw.gov.in/

http://hmfw.ap.gov.in/

This document can be updated from time to time based on the advisories or directions of the Government.

12 TRAINING

- RPMU/PIU to ensure all workers get training on above requirements before start of any construction activity

- During construction period frequent visual and verbal reminders to workers can improve compliance with hand hygiene practices and thus reduce rates of infection. Handwashing posters should also be displayed at work site and labour camps

13 EMERGENCY CONTACT

- Provide emergency contact number(s) at work site and labour camp for reporting COVID-19 symptoms

Ensure all staff and personal use the AarogyaSetu App, recommended by GOI for tracking COVID-19 patients.

Appendix 15: Approved TOR

F. No. 21-139/2018-IA.III
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)

Indira Paryavaran Bhawan,
Jor Bagh Road, Aliganj
New Delhi - 110 003
Dated: 18th November, 2019

To

The Chief Engineer (North)
Andhra Pradesh Industrial Infrastructure Corporation Limited
10th Floor, APIIC Towers,
Plot No-I, IT Park, Mangalagiri
Guntur District (Andhra Pradesh) – 522 503

Sub: Development of Industrial Park in Z. Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District (1025 ha) by M/s Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited - Terms of Reference.

Sir,

This has reference to your letter no. Lr.No.GM/EMP/APIIC/IP Rambilli/EC/2017, submitting above mentioned proposal online on 30th November, 2018 and subsequent clarifications on 6th August, 2019 and 9th September, 2019, for seeking Terms of Reference (TOR) as per the provisions of the Environment Impact Assessment (EIA) Notification, 2006 and subsequent amendments under the Environment (Protection) Act, 1986.

2. The above mentioned proposal was considered by the Expert Appraisal Committee (EAC) for Industrial Estate/Area, SEZ and Highways projects in its 204th EAC meeting on 17th December, 2018 and 222nd meeting on 20th August, 2019 in the Ministry of Environment, Forest and Climate Change, New Delhi.

3. The project proponent along with the EIA consultant M/s L&T Infrastructure Engineering Limited, Hyderabad, made a presentation and provided the following information to the Committee:

(i) The proposal is for Development of Industrial Park near Rambilli Village, Rambilli Mandal of Visakhapatnam District in in an area of 1025 ha (2532 acres) by M/s Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC).

(ii) **Location:** Z. Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages in Rambilli Mandal of Visakhapatnam district in Andhra Pradesh.

(iii) **Land use of the site and around the site up to 10 km radius:** The site is mostly comprised of Agriculture plantation and Cropland Scrub lands, water

Bodies, Stream/Canals, and Built up (rural area). Few pockets of settlements are also located within the site.

The surrounding area up to 10.0 km radius land use comprises mostly sea (Bay of Bengal), Agriculture - Crop land, Plantation & Aquaculture /Pisciculture, Fallow land/Barren - Scrub land, Sandy areas & Salt affected areas, Forest – Plantation &dense, water bodies Lakes/Ponds, Reservoir/ Tanks & River/ Stream/Drain. The existing land use of study area i.e., 10 km radius from project site is given below:

S. No.	Classes	Area (Ha)	Area (acres)	% of Area
1	Agriculture Plantation	5789.19	14305.40	10.76%
2	Crop land	14889.36	36792.41	27.67%
3	Aquaculture/Pisciculture	1254.99	3101.16	2.33%
4	Builtup (Rural)	892.74	2206.01	1.66%
5	Mining/Industrial	873.97	2159.64	1.62%
6	Forest Plantation	480.79	1188.06	0.89%
7	Forest-Dense	1669.57	4125.59	3.10%
8	Gullied/Ravenous	81.34	200.99	0.15%
9	Scrub land Open	4214.67	10414.68	7.83%
10	Sandy areas	329.94	815.31	0.61%
11	Salt Affected	0.58	1.44	0.00%
12	Lakes/Ponds	10.13	25.03	0.02%
13	Reservoir/Tanks	855.27	2113.43	1.59%
14	River/Stream/Drain	445.21	1100.14	0.83%
15	Mangrove/Swamp area	94.23	232.85	0.18%
16	Sea (Bay of Bengal)	21930.86	54192.35	40.75%
Total		53812.86	132974.48	100%

(Statistics as generated from LU/LC data of NRSC-Bhuvan: Cycle-2 [2011-12])

The land use breakup of project site is given below

S. No.	Classes	Area (Ha)	Area(acres)	% of Area
1	Agriculture Plantation	616.55	1523.53	60.17%
2	Crop land	285.47	705.41	27.86%
3	Aquaculture/Pisciculture	7.29	18.02	0.71%
4	Builtup (Rural)	22.65	55.96	2.21%
6	Scrub land Open	75.04	185.42	7.32%
7	Reservoir/Tanks	17.67	43.66	1.72%
Total		1025	2532.00	100.00%

(iv) **Justification for selection of the site:** Andhra Pradesh is strategically located on the south eastern coast of India and is regarded as one of the largest producers of marine products in the country. The prominent industries in the state include Agro & Food–based, petroleum products, pharmaceuticals,

textile, basic metals, non–metallic mineral products, etc. Further, the state in the country has pioneered and enacted the concept of industrial single–window clearance. The policy seeks to create an investor–friendly climate by ensuring highest ease of doing business and would provide all the clearances within 21 working days. Further, the state also promises for 24 hours of uninterrupted power supply to investors setting up units. The Visakhapatnam–Chennai Industrial Corridor (VCIC) is a key part of the planned East Coast Economic Corridor, India's first coastal corridor. VCIC is aligned with the Golden Quadrilateral and is poised to play a critical role in driving India's "Act East Policy." VCIC's long coastline and strategically located ports provide it with an opportunity to create multiple international gateways to connect India with the vibrant global production networks of South East and East Asia that form the bedrock of global manufacturing today. VCIC is aimed at fulfilling the objectives of the Government of India, 'Make in India' Policy which aimed to promote manufacturing activities. Visakhapatnam node is one of the important nodes in VCIC. APIIC has identified four (04) nodes for development of industrial corridors, i.e., Visakhapatnam Node, Kakinada Node, Gannavaram-Kanikapadu Node and Yerpedu- Srikalahasti Node.

Visakhapatnam, one of the key districts coming within the immediate influence of VCIC has all the potential to become an industrial hub. Government of Andhra Pradesh (GoAP) has embarked on major initiative of positioning Visakhapatnam District as the central hub for various sunrise sectors in an endeavour to attract investments from National and International Players across the globe.

APIIC has identified land parcel in Visakhapatnam node at Rambilli and Nakkapalli. At Rambilli, about 1025 ha (2532 Acres) falling in Zirayati Chintuva, Gorapudi, Krishnampalem, Lalamkoduru villages in Rambilli Mandal of Visakhapatnam District for development of industrial park.

(v) **Total water requirement and its source:** Total water demand for the proposed IP is ~20.77 MLD but considering the reuse of ~955 KLD of treated sewage from the STP, the net fresh water demand is ~19.8 MLD and 900 KL of fire water demand.

The water will be sourced from the Yeleru Left Main Canal (YLMC) in line with the existing industrial water supply policy of the State located at ~16 km.

(vi) **Municipal solid waste generated disposal facility:** Total solid waste to be generated from the proposed industrial park is estimated as 114 tonnes per day which includes ~26 TPD of MSW (both biodegradable and Non–bio Degradable/Recyclable waste) and ~88 TPD of Industrial Waste (hazardous, non-hazardous and recyclable waste).

The municipal solid waste shall be disposed to APPCB approved vendors by respective industry.

The industrial solid waste generated daily shall be collected via trucks and transported to the landfill site.

A TSDF is being proposed to be developed by APIIC for common utilisation of industrial parks developed and under development in Visakhapatnam region. This TSDF will serve requirement of Rambilli Industrial Park and until it is operational, it is proposed to use JNU Pharma city TSDF. Industries shall follow Hazardous and Other Waste (Management and Trans boundary Movement) and amendment thereof, 2016.

(vii) **Waste water generation, treatment and disposal:** Industries willing to have own treatment facilities for effluent and sewage shall be developed by the industry in their premises.

If industry likes to utilise common treatment facilities, effluent and sewage generated in the industrial area, CFC, amenities and utilities will be treated in proposed CETP of 11.5 MLD capacity (to be developed on modular basis). Treated wastewater will be disposed into sea through APSEZ marine outfall facility. Sewage generated in IP totalling 1.19 MLD from Residential and R&R will be treated in proposed STP of 1.2 MLD capacity (to be developed on modular basis). Treated sewage will be reused for greenbelt and toilet flushing etc.

(viii) **Rain Water Harvesting:** Rambilli IP is planned with water recycling, waste management, rainwater harvesting, use of non-renewable energy like solar powered street lights, etc. for efficient use of resources.

(ix) **Water bodies, diversion if any:** Revenue water bodies, higher order drainage and canals will be retained by providing adequate green buffers. Natural drains of lower order are observed in the proposed site. Site needs to be levelled as per the development requirements and shall be limited to project site. Adequate Storm water drainage system along with Rainwater Harvesting structures will be provided to ensure that drainage pattern of the area is maintained.

(x) **If the project involves diversion of forest land, extend of the forest land:** No forest area is involved.

(xi) **Tree cutting, types, numbers, girth size etc.:** The following are the type of trees existing within site. Clearance of these trees is envisaged.

Scientific Name	Local Name
Borassus flabellifer	Thaadi
Cocos nucifera	Kobbari

Scientific Name	Local Name
Wrightia tinctoria	Ankudu
Annona squamosa	Seethaphal
Anacardium occidentale	Jeedimamidi
Acacia auriculiformis	Australia Tumma
Eucalyptus globulus	Neelagirichettu
Phoenix sylvestris	Eetha
Casuarina equisetifolia	Sarugudu
Mangifera indica	Mango

(xii) **Rehabilitation involved, if any:** About 1025 ha (2532 Acres) of land was identified at ZirayatiChintuva, Gorapudi, Krishnampalem, Lalamkoduru villages in Rambilli Mandal. APIIC is in the possession of 1329.4 acres as on date. The balance land is under progress of acquisition. The following is the list of villages falling in Rambilli project site.

Revenue Village	Settlements
Krishnapalem	Krishnampalem (Rajannakompalu) Narappapalem
Gorapudi	Gorapudi Appanapalem
Z. Chintuva	Z. Chintuva Manyapuchintuva Lovapalem Sitapalem
Lalamkodaru	No settlements

These villages contain some settlements. No resettlement will be taken up to the existing settlements, however some scattered dwellings will be relocated into the residential area proposed. An adequate green buffer and access roads to road network will be provided to the existing settlements which are falling in the project site.

(xiii) **Terrain, level with respect to MSL, requirement of filling, if any:** The existing terrain of the entire project site is relatively flat and gentle. Existing ground elevation is ranging from 0 m to 55 m. There are two hillocks present within the site. Generally, the fall direction of the site is from the hillock slopes towards the lower area radially. There is an existing water body straddles the northeast of the project site. The fall direction of the site is from the hillock towards the lower area such as the water body. the ground elevation of the site decreases towards eastern direction Mostly Cut and fill quantities will be managed within in the site. However, excess fill materials if any will be sourced from approved quarry and details will be provided in the EIA report.

(xiv) **Whether the project is in Critically Polluted area:** No.

(xv) **National Park/ Wild Life Sanctuary in 10 km radius area:** Not Applicable.

PBC.

(xvi) **If the project falls within 10 km of eco- sensitive area, Name of eco-sensitive area and distance from the project site:** Not Applicable

(xvii) **Investment/Cost of the project:** INR 681 Crores.

(xviii) **Employment potential:** Direct employment of about 39,000 and 2.5 times of direct employment will be generated during operation phase respectively, thereby opening up employment opportunities for the youth in the catchment region.

(xix) **Benefits of the project:**

- The total estimated manufacturing industry output in 25 years after the complete industrial plotted land is absorbed and all the industrial units commence production, is about Rs. 90,000 Crores.
- Proposed Park is likely to generate direct and indirect employment potential of about 39,000 respectively, thereby opening up employment opportunities for the youth in the catchment region.
- Employment opportunities to the local people for skilled, semi-skilled and unskilled work force during the construction and operation phases
- As a part of the Corporate Social Responsibility (CSR) initiatives, it is envisaged to create better and quality Education, Health, Hygiene and Sanitation, Empowerment and Livelihoods and Community Development Initiatives.
- The proposed project shall further act as a catalyst to industrialization and urbanization of the region.
- There will be improvement in living standards. General welfare will improve in the area as per capita income will go up in the post project period.
- Overall economic growth of Visakhapatnam District, in particular and State of Andhra Pradesh and Nation in general.
- The proposed project is in Visakhapatnam–Chennai Industrial Corridor (VCIC), is a key part of the East Coast Economic Corridor (ECEC), India's first coastal corridor Its development which is in line with the National/State objective of improving manufacturing GDP, promoting port-led industrialization etc.,

(xx) **If any court case pending for violation of the environmental laws:** No.

(xxi) Submitted a certificate from APPCB that proposed industrial area is more than 2 km away from the Critically Polluted Area.

(xxii) Submitted a certificate from APPCB stating that no activity has been started in the Krishnapalem Industrial Area for which EC was granted.

(xxiii) Submitted a copy of Government order for land acquisition.

(xxiv) Krishnapalem Environmental clearance was surrendered to SEIAA, Andhra Pradesh. SEIAA, Andhra Pradesh accepted the same based on

recommendations of SEAC, Andhra Pradesh, during its meeting held on 30th April, 2019.

(xxv) Submitted the revised Form-1 of application with details of integration of Krishnapalem Industrial Area.

(xxvi) Submitted the details of ETP/CETP and likely discharges:

- Effluent and sewage generated in the industrial area, CFC, amenities and utilities will be treated in proposed CETP of 11.5 MLD capacity
- CETP will be constructed on modular basis
- Industries will treat upto the CETP Characteristics
- Treated wastewater will be disposed into sea through marine outfall facility
- Sewage generated (1.19 MLD) from Residential area will be treated in STP of 1.2 MLD capacity (STP will be constructed on modular basis).
- Treated sewage will be reused for greenbelt and toilet flushing etc.

(xxvii) Proponent has mentioned that a separate marine outfall will be developed for Rambilli I.P. Mathematical model studies and CRZ demarcation for proposed marine outfall facility will be carried out.

(xxviii) Provided details of industries/activities to be established within distances of 50m-250m, 250m-500m and beyond 500m from settlements, as under:

Industries proposed within 50m–250m from settlement (orange, green and white category)	**Industries proposed within 250m–500m from settlement (red category)**	**Industries proposed beyond 500m from settlement (red category)**
- Industrial and consumer electronics - Auto components - Aero space and defense – R&D - Aero engine components, communication devices - MSME (Leather Products such as Sports goods excluding tanning and hide processing Plastic products for Packaging, automobile, consumer durables, healthcare by injection, low Moulding, Extrusion, Timber/Wood Products such as Furniture, Sports goods, Wood Flooring)	- Engineering (light and heavy engineering) - Building Materials Industry/Non Metalic minerals (processed minerals, Clay building products, bricks, AAC Blocks, Kerbs Stones) - Food and Agro Processing Industry - Automobile manufacturing - Aerospace and defense	- Pharmaceuticals - Chemical - Petrochemical - Tiles, Ceramics and refractories, glass and glassware, graphite, marbles

4. Based on the deliberations in the meeting and information provided by the proponent in support of the project, the EAC recommended for grant of TOR. As per the recommendation of the EAC, the Ministry of Environment, Forest and Climate Change hereby accords TOR for '**Development of Industrial Park in Z. Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District (1025 ha) by M/s Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited**' and for preparation of EIA/EMP report with public consultations subject to compliance of all conditions as notified in the standard ToR applicable for such projects and specific conditions, as mentioned below:

A. Project Specific Conditions:

(i) The PP has to apply for CRZ Clearance as per extant CRZ Regulations of this Ministry.

(ii) All the natural water bodies shall be protected.

(iii) Carry out study of project activities on quality of water, fisheries/fishermen (including traditional fishing) and marine life through Central Marine Fisheries Research Institute.

(iv) No ground water shall be used during construction and operation phases of the proposed project.

(v) Proponent shall prepare the 'Zoning Atlas' so that the polluting industries including Pharma/Chemical units are not scattered all over the region.

(vi) Proponent to indicate the details of type of Pharma and Petro-chemical industries proposed to be setup. Clustering of Pharma and Petro-chemical industries for separate CETP to be worked out.

(vii) Non-pharma, non-chemical and non-petro-chemical industries shall be established between 50 m and 500 m from the settlements.

(viii) Industries/activities permitted within distances of 50m-250m, 250m-500m and beyond 500m from settlements are as under:

Industries proposed within 50m–250m from settlement (orange, green and white category)	**Industries proposed within 250m–500m from settlement (red category)**	**Industries proposed beyond 500m from settlement (red category)**
- Industrial and consumer electronics - Auto components - Aero space and defense – R&D - Aero engine components, communication devices - MSME (Leather Products such as Sports goods excluding	- Engineering (light and heavy engineering) - Building Materials Industry/Non Metalic minerals (processed minerals, Clay building products, bricks, AAC Blocks,	- Pharmaceuticals - Chemical - Petrochemical - Tiles, Ceramics and refractories, glass and glassware, graphite, marbles

tanning and hide processing Plastic products for Packaging, automobile, consumer durables, healthcare by injection, low Moulding, Extrusion, Timber/Wood Products such as Furniture, Sports goods, Wood Flooring)	Kerbs Stones) - Food and Agro Processing Industry - Automobile manufacturing - Aerospace and defense	

(ix) Proponent has to submit the detailed mechanism for monitoring of parameters for marine outfall discharge.

(x) The activities and budget earmarked for Corporate Environmental Responsibility (CER) shall be as per ministry's O.M No 22-65/2017-IA.II (M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted at the time of appraisal of the project included in the EIA/EMP Report.

(xi) The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M), dated 25.10.2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.

B. **General Conditions**

(i) Reasons for selecting the site with details of alternate sites examined/rejected/selected on merit with comparative statement and reason/basis for selection. The examination should justify site suitability in terms of environmental damage, resources sustainability associated with selected site as compared to rejected sites. The analysis should include parameters considered along with weightage criteria for short-listing selected site.

(ii) Submit the details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site. Analysis should be made based on latest satellite imagery for land use with raw images. Check on flood plain of any river.

(iii) Submit details of environmentally sensitive places, land acquisition status, rehabilitation of communities/ villages and present status of such activities.

(iv) Examine the impact of proposed project on the nearest settlements.

(v) Examine baseline environmental quality along with projected incremental load due to the project taking into account of the existing developments nearby.

(vi) Environmental data to be considered in relation to the project development would be (a) land, (b) groundwater, (c) surface water, (d) air, (e) biodiversity, (f) noise and vibrations, (g) socio economic and health.

(vii) Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area, and any obstruction of the same by the project.

(viii) Details regarding project boundary passing through any eco- sensitive area and within 10 km from eco-sensitive area.

(ix) Green buffer in the form of green belt to a width of 15 meters should be provided all along the periphery of the industrial area. The individual units should keep 33% of the allotted area as a green area.

(x) Submit the details of the trees to be felled for the project.

(xi) Submit the details of the infrastructure to be developed, if applicable.

(xii) Submit the present land use and permission required for any conversion such as forest, agriculture etc.

(xiii) Submit details regarding R&R involved in the project.

(xiv) Zoning of the area in terms of 'type of industries' coming-up in the industrial area based on the resource requirement along with likely pollutants with quantity from the various industries.

(xv) The project boundary area and study area for which the base line data is generated should be indicated through a suitable map. Justification of the parameters, frequency and locations shall be discussed in EIA.

(xvi) Submit Legal frame work for the implementation of Environmental Clearance conditions - to be clearly spelt out in the EIA report.

(xvii) Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.

(xviii) Site justification of the identified industry sectors from environmental angle and the details of the studies conducted if any.

(xix) Ground water classification as per the Central Ground Water Authority.

(xx) Submit the source of water, requirement vis-a-vis waste water to be generated along with treatment facilities, use of treated waste water along with water balance chart taking into account all forms of water use and management.

(xxi) Rain water harvesting proposals should be made with due safeguards for ground water quality. Maximize recycling of water and utilization of rain water. Examine and submit details.

(xxii) Examine soil characteristics and depth of ground water table for rainwater harvesting.

(xxiii) Examine details of solid waste generation treatment and its disposal.

(xxiv) Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption.

(xxv) In case DG sets are likely to be used during construction and operational phase of the project, emissions from DG sets must be taken into

consideration while estimating the impacts on air environment. Examine and submit details.

(xxvi) Examine road/rail connectivity to the project site and impact on the traffic due to the proposed project. Present and future traffic and transport facilities for the region should be analysed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.

(xxvii) A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.

(xxviii) Examine the details of transport of materials for construction which should include source and availability.

(xxix) Examine noise levels - present and future with noise abatement measures.

(xxx) Identify, predict and assess the environmental and sociological impacts on account of the project. A detailed description with costs estimates of CSR should be incorporated in the EIA/EMP report.

(xxxi) Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.

(xxxii) Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.

(xxxiii) Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the Project should be given.

(xxxiv) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

(xxxv) Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry website "http://moef.nic.in/Manual/IndustrialEstate".

5. Following general guidelines shall be strictly adhered:

(i) The EIA document shall be printed on both sides, as for as possible.

(ii) All documents should be properly indexed, page numbered.

(iii) Period/date of data collection should be clearly indicated.

(iv) Authenticated English translation of all material provided in Regional languages.

(v) The letter/application for EC should quote the MoEF&CC File No. and also attach a copy of the letter prescribing the TOR.

(vi) The copy of the letter received from the Ministry on the TOR prescribed for the project should be attached as an annexure to the final EIA-EMP Report.

(vii) The final EIA-EMP report submitted to the Ministry must incorporate the issues in TOR and that raised in Public Hearing. The index of the final EIA-EMP report, must indicate the specific chapter and page no. of the EIA-EMP Report where the specific TOR prescribed by Ministry and the issue raised in the P.H. have been incorporated. Questionnaire related to the project (posted on MoEF&CC website) with all sections duly filled in shall also be submitted at the time of applying for EC.

(viii) Grant of TOR does not mean grant of EC.

(ix) Grant of TOR/EC to the present project does not mean grant of approvals in other regulations such as the Forest (Conservation) Act 1980 or the Wildlife (Protection) Act, 1972.

(x) Grant of EC is also subject to Circulars and Office Memorandum issued under the EIA Notification 2006 and subsequent amendments, which are available on the MoEF&CC website: www.envfor.nic.in.

(xi) The status of accreditation of the EIA consultant with NABET/QCI shall be specifically mentioned. The consultant shall certify that his accreditation is for the sector for which this EIA is prepared.

(xii) On the front page of EIA/EMP reports, the name of the consultant/consultancy firm along with their complete details including their accreditation, if any shall be indicated. The consultant while submitting the EIA/EMP report shall give an undertaking to the effect that the prescribed TOR (TOR proposed by the project proponent and additional TOR given by the MoEF) have been complied with and the data submitted is factually correct (Refer MoEF office memorandum dated 4th August, 2009).

(xiii) While submitting the EIA/EMP reports, the name of the experts associated with/involved in the preparation of these reports and the laboratories through which the samples have been got analysed should be stated in the report. It shall clearly be indicated whether these laboratories are approved under the Environment (Protection) Act, 1986 and the rules made there under (Please refer MoEF office memorandum dated 4th August, 2009). The project Coordinator of the EIA study shall also be mentioned.

(xiv) All the TOR points as presented before EAC shall be covered.

6. A detailed draft EIA/EMP report shall be prepared in terms of the above additional TOR and should be submitted to the State Pollution Control Board for Public Hearing. Public Hearing to be conducted for the project in accordance with the provisions of Environmental Impact Assessment Notification, 2006 and the issues raised by the public should be addressed in the Environmental Management

Plan. The Public Hearing shall be conducted based on the TOR letter issued by the Ministry and not on the basis of Minutes of the Meeting available on the website.

7. The project proponent shall submit the detailed final EIA/EMP report prepared as per TOR including issues raised during Public Hearing to the Ministry for considering the proposal for environmental clearance within 3 years as per the MoEF&CC OM No J-11013/41/2006-IA-II(I) (Part) dated 29th August, 2017.

8. The consultants involved in preparation of EIA/EMP report after accreditation with Quality Council of India/National Accreditation Board of Education and Training (QCI/NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other Organization(s)/Laboratories including their status of approvals etc. vide notification of the MoEF dated 19th July, 2013.

9. The prescribed TOR would be valid for a period of three years for submission of the EIA/EMP Reports.

10. This issues with the approval of Competent Authority.

Raghu 18/11/2019

(Raghu Kumar Kodali)

Director/Scientist F

Copy to: The Member Secretary, Andhra Pradesh Pollution Control Board, D. No. 33-26-14 D/2, Near Sunrise Hospital, Pushpa Hotel Centre, Chalamalavari Street, Kasturibaipet, Vijayawada - 520 010.

Raghu 18/11/2019

(Raghu Kumar Kodali)

Director/Scientist F

Appendix 16: PH with Photographs

ANDHRA PRADESH POLLUTION CONTROL BOARD
REGIONAL OFFICE, VISAKHAPATNAM
D.No. 39-33-20/4/1, Madhavadhara Vuda Colony, Visakhapatnam - 530018,
Phone: 0891 -2755356

Lr. No.PH-36/PCB/RO-VSP/2021-626 Date:01.10.2021

To
The Zonal Manager,
M/s. Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited,
One Stop Service Center,
Atchuthapuram,
Visakhapatnam District -531011.

Sir,

Sub :- APPCB – RO, Visakhapatnam – M/s.Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited – Proposal for establishment "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District over an area of 1025 ha – Environmental Public Hearing conducted on 23.09.2021 at 11.00 AM – Minutes – Communicated – Reg.

Ref :- Environmental Public Consultation held on 23.09.2021.

***

With reference to the above, a copy of the minutes of the Environmental Public Consultation held on 23.09.2021 for the proposal for establishment "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District over an area of 1025 ha is herewith forwarded for information.

Please acknowledge the receipt of the same.

Yours faithfully,

ENVIRONMENTAL ENGINEER
Environmental Engineer
A.P. Pollution Control Board
Regional Office, Visakhapatnam

Encl : 1. Copy of the Minutes of EPC.
2. Copy of Attendance of EPC.
3. CD of EPC Proceedings.
4. Copies of the Representations received from the Public/NGOs.

Minutes of the Environmental Public Hearing of M/s.Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited for "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District in an area of 1025 Ha held on 23.09.2021 at 11.00 A.M at project site.

M/s.Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited has proposed to establish an Industrial Park in an area of 1025 Ha in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District with an investment of Rs.681 Crores. The proposed project is categorized as A – 7(c) as per EIA, Notification dt.14.09.2006 & its amendments thereof. The project proponent submitted an application duly follow the stipulated procedure laid down in the EIA Notification, 2006 to the Ministry of Environment, Forest and Climate Change(Impact Assessment Division), GOI. After scrutiny of the application, the Ministry of Environment, Forests & Climate Change has issued letter of Terms of Reference (TORs) on 18.11.2019 to the proposed project and directed A.P. Pollution Control Board to conduct Environmental Public Hearing (EPH) with regard to "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District and to submit minutes of the proceedings to MOEF & CC, GOI as per procedure in vogue.

In compliance to provisions of EIA, Notification, 2006, the Environmental Engineer, APPCB, RO, Visakhapatnam has issued Environmental Public Hearing (EPH) Notification on 20.08.2021 in "Deccan Chronicle" (English) and "Sakshi" (Telugu), 30 days before the date of conduct of Public Hearing to be held on 23.09.2021 at Project Site inviting the public to offer their comments, objections, views, clarifications and suggestions, if any, on the proposed project for "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District in an extent of 1025 Ha by M/s.Andhra Pradesh Industrial Infrastructure Corporation Limited.

As per the date stated in EPH Notification, the present EPH was conducted on 23.09.2021 at 11.00 AM at Project site under the Chairmanship of the District Revenue Officer, Nominee of the District Collector, Visakhapatnam District & the Chairman of Environmental Public Hearing Panel.

The following members have attended :

Panel Members:

1. Sri S. Sreenivasa Murthy	District Revenue Officer & Addl. District Magistrate, Nominee of the District Collector, Visakhapatnam District.
2. Sri M. Pramod Kumar Reddy	Environmental Engineer, A.P. Pollution Control Board, Regional Office, Visakhapatnam.

PROJECT AUTHORITIES :

1) Sri. K. Satya Sai Sitaram,	Zonal Manager, APIIC, Atchutapuram, Visakhapatnam.
2) Smt. Susruta Amirapu	Representative from M/s. L&T Infrastructure Engineering Limited, Hyderabad.

At the outset, the Environmental Engineer, APPCB, Regional Office, Visakhapatnam, welcomed the gathering attended to the Public Hearing and informed that as per the Environmental Impact Assessment Notification, 2006 issued by MoEF&CC, the proposed project for Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District. As per the procedure laid down by the Ministry of Environment, Forests & Climate Change, Government of India vide Notification S.O. No. 1533, Dt. 14.09.2006 and its amendments thereof MOEF & CC, GOI issued Terms of Reference(ToR) to the proposed project on 18.11.2019 and with a direction to prepare EIA report based on the TOR with Public Hearing. Accordingly, Public Hearing is being conducted for Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District by APIIC with an extent of 1025 Ha. in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District with an estimated project cost of Rs.681 Crores. He informed that the District Collector is the Chairman of the Public Consultation panel as per EIA Notification 2006. The District Revenue Officer, Visakhapatnam District, Nominee of the Collector & District Magistrate, Visakhapatnam District will preside over today's EPH proceedings. In compliance to provisions of EIA, Notification, 2006, the Environmental Engineer, APPCB, RO, Visakhapatnam has issued notification published in the newspapers of "Deccan Chronicle" (English) and "Sakshi" (Telugu) on 20.08.2021, 30 days before the date of conduct of Public Consultation to be held on 23.09.2021 inviting

the public to offer their comments, objections, views, clarifications and suggestions if any, on the project proposal and also placed the EIA report and executive summary of the proposed project in Telugu & English at Government Offices mentioned in the paper notification for reference of Public. He also informed that whatever the opinion expressed by the public would be recorded in the form of video in addition to the written documentary evidence i.e., minutes of the Public Consultation proceedings and same would be submitted to MOEF & CC, GOI for consideration as MoEF&CC has issued TOR to this project under Category – A – 7(c) project. It was also emphasized by the Environmental Engineer to the public that the EPH panel is not empowered to take any decision on the issue of permission to the proposed project in this Public Hearing and he requested the public to submit the representations during the Public Consultation, who are not able to express their views orally and the same would be forwarded to MOEF & CC, GOI for consideration. Then he requested the Chairman of Public Hearing, Nominee of the District Collector, Visakhapatnam District to preside over the Public Hearing to conduct further proceedings.

The District Revenue Officer & Addl. District Magistrate, Visakhapatnam District, Nominee of the District Collector and Chairman of Environmental Public Hearing panel while welcoming the Public, has informed that before establishment of certain industrial activities, the Public Hearing is mandatory as per the procedures of Ministry of Environment & Climate Change, GOI to take views, suggestions, opinion and complaints on the proposed project. After review of the proceedings of Environmental public hearing, the Committee constituted by the Ministry of Environment & Climate Change to take appropriate action while processing the application of the project for grant of Environmental Clearance. He informed that the public can express their opinions, suggestions & objections if any or also submit written representations and video & audio of the entire public hearing proceedings along with the written proceedings will be submitted to the Ministry of Environment, Forests & Climate changes for further examination.

Then the Environmental Engineer, Regional Office, Visakhapatnam requested the Project Proponent to explain the details of the project to the Public.

Susruta Amirapu, Associate Project Consultant, M/s. L&T Infrastructure Engineering Limited, Hyderabad informed that the Visakhapatnam–Chennai

Industrial Corridor (VCIC) is a key part of the East Coast Economic Corridor proposed to be developed in the villages of Rambilli Mandal in Visakhapatnam District. She said that TOR was issued to APIIC by MoEF&CC on 18.11.2019. The land for the proposed project is in an area of 1025 Ha (2532 acres) which is falling in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages in Rambilli Mandal of Visakhapatnam district in Andhra Pradesh. She explained the land use details of study area which is mostly comprising of agriculture plantation; crop land; aquaculture, scrubland; water bodies and settlements. She informed that following sectors viz., Industrial and Consumer Electronics, Auto and Auto components; Aerospace and defence, Light and heavy Engineering (General purpose machinery, Casting and forging and Special purpose machinery etc.), CRZ permissible hazardous material storages, Building Materials Industry/Non-Metallic minerals, MSME (includes Leather, Plastics, wood etc.,). Food andAgro Processing Industry and Textile and apparel are proposed as part of the development. She informed that due to upcoming development local employment will be created and generates direct employment of about 39,000 no.s and 2.5 times (90,000 no. s) of indirect employment during operation phase. She said that APIIC will establish skill development centres to address the training requirements and employment creation. She informed that out of 2532 acres, only about 1425 acres will be allotted for industrial development and about 415 acres greenbelt will be developed and also stated that not only at park level even at industrial level also green belt will be developed making the green belt area as 33% of park level totalling about 835 acres.

She informed that as per the ToR guidelines, Zoning Plan was developed 50m of green area around the settlement. She informed that lot of emphasis was given for pollution control and said that about 7.00 MLD capacity CETP will be developed on modular basis and treated Wastewater discharge through marine outfall and STP of about 1.0 MLD is proposed. She told that solid waste will be treated appropriately and hazardous waste will be given to TSDF for safe disposal. She informed that baseline studies were carried out for project study area and all the parameters were within the standards.

She informed that CSR activities will be taken up and as part of CSR, roads will be developed, and women empowerment programmes and self-help groups will be developed and even construction phase women employment will be given importance

She told that as part of pollution control measures, Dust suppression by water sprinkling, Provide enclosures on all sides of construction site, Usage of PUC certified vehicles, Provision of PPE to workers like ear mufflers and ear plugs, Prohibition of waste disposal, marine outfall will be provided for disposal of wastewater from CETP, Adequate safety measures as per OSHA standards. She said that even in operational phase all the necessary Air Pollution Control Measures will be adopted by member industries, as per the CPCB norms pollution control measures will be provided. Storm Water Drainage System will be provided and will help in controlling the excess water during monsoon seasons.

She informed that Environmental monitoring programme has been formulated and the same will be implemented. For the coordination and implementation an institutional arrangement of Environmental Management Cell shall be established. Budgetary estimates for EMP implementation for Environmental Management Capital Cost is INR. 259 Crores and Annual Recurring Cost will be INR. 13.8 Crores. She informed that, to mitigate any threat, Disaster Management Plan (DMP) will be implemented. A framework for DMP was prepared to minimise damages in the event of a disaster. An On-Site Emergency Preparedness Plan and Off-Site Emergency Preparedness Plan were broadly prepared to deal with emergencies and prevent disasters. She informed that Expected Economic impact for the Industrial Park in terms of output will be 99,000 Crores. Due to existing industries and upcoming industrial activities Enhanced Socio-Economic Conditions will be created. Enhanced Social Infrastructure and Women Empowerment gain prominence.

She told that due to development of Rambilli IP overall area will be developed and employment will be generated. She also informed that there is no R&R and greenbelt will be developed for 50m from the settlements. As per the guidelines 50m of green area around the settlement, Orange, green and white category of industries are proposed within 50m to 250m from the settlement, Red category of industries (non-chemical, non-pharma etc. are proposed within 250m to 500m from the settlement, Pharmaceuticals, Chemical and Petrochemical), tiles, ceramics etc., are proposed beyond 500m from the settlement and clarified that as per the guidelines only greenbelt will be developed around the settlements. She informed that water requirement for proposed development is Net freshwater demand - 17.62 MLD (0.691 MLD of treated sewage

from the STP) and Source is Yeleru Left Main Canal (YLMC). Total greenbelt development will be 33%.

Sri Pyla Satti Babu, Krishnampalem Sarpanch has informed that land acquisition is being carried out many years back, but there is no clarity on land compensation procedures. Many companies have come up in phase-I and lot of employment is being generated but only some people got the employment from his village. He requested to permit Orange & Green category industries only. Further he informed that jobs were not given to land losers. There is air & water pollution due to 2-3 companies near Krishnampalem and wastewater is contaminating the wells. He requested the government to give compensation who lost their homes in 2014 Hudhudcyclone and for Kallu Geeta Karmikulu who lost their trees.

Sri G. Demudu Naidu, CPM party informed that SEZ has completed 16 years, Government has acquired Lands for development but not achieved the purpose for which the lands were given by the farmers. As per 2005 & 2006 notification, Government were given compensation of Rs.2.5 Lakhs to Rs.5.0 Lakhs, people who approached Court were given compensation upto Rs.20.0 Lakhs and farmers could not get justice accordingly. Gorapudi and Lalamkoduru villagers has approached Court with regard to land compensation of Rs. 8.0 lakhs against the market land value is about 50 lakhs to one crore. He stated that only polluting industries were established in SEZ & villagers are facing air/water pollution & health problems viz., lung diseases etc in surrounding area. He stated that nearly 50-60 industries were established in SEZ but not providing jobs to the local people and as per the Government Order, 75% of employment opportunities need to be provided to local villagers but not given employment to local people. Pharma industries are not giving employment to the local unemployees who have completed B.Tech & M.Tech. He further informed that earlier APIIC promised to give one job to every land loser family which was not yet fulfilled. He finally requested the authorities to cancel the public hearing as the surrounding villagers are not aware of the public hearing and requested to re-conduct the public hearing.

Sri U. V. R. Raju (Kanna Babu), MLA, Yelamanchili has welcomed the project and informed that as a part of PCPIR, Nakkapalli and Rambilli industrial parks are being developed. APIIC proposed the project at Rambilli to acquire about 2500 acres out of

which 1300 acres of land has been acquired by APIIC and remaining 1200 acres has to be acquired shortly. SEZ was established in the Year, 2004 due to efforts of the then Hon'ble Chief Minister, Sri Y.S.Raja Sekhar Reddy and compensation was given @ Rs.2.90 lakhs per acre as per the land cost prevailing in those days and now due to establishment of Industrial Park the land value was increased up to Rs. 2 crores. With regard to job opportunities, Bills have been passed by State Government to provide 75% employment for local people only. He clarified that the paper notification was given for conducting public hearing and to convey public grievance in all aspects for consideration and all the people are aware that there is public hearing today. Further, he informed that due to proposed industrial project economic development of Rs.90,000 crores investments will be raised and nearly 30,000-40,000 job opportunities will be created. He announced that many of the upcoming central Government, state Government and private development projects are going to be established and accordingly these industrial Development Plans are being executed. Further he requested the public to express their suggestions & objections if any. Further he requested APIIC and APPCB to take action on the complaints against the polluting industries and requested to provide safe drinking water to Lalamakodururu village. He further informed opinions of everyone will be recorded and it is responsibility of every one to support the project.

Sri S. Venkanna, Z. Chintuva informed that during land acquisition process the APIIC has given 20.0 lakhs for one block and 13 lakhs for another block and creating trouble to the farmers and not yet done full payment and payment of compensation was not yet completed to the farmers and not giving employment opportunity to the land loser families. Further he stated that the APIIC is changing the ownership of the land in online land records without informing to the owner of the land without paying compensation. Further he requested the authorities to take necessary action in the matter and to compensate land for land instead of amount.

Sri M. Ramu, Krishnampalem welcomed for establishment of pollution free industries. He opined that public should come to a common opinion together before attending the public hearing. He informed that air and water got polluted in Z.Chintuva, Krishnampalem and Rambilli villages and same was complained to the Collector Office & also mailed to Secretariat and other departments but none of them verified the air & water quality. Due to air & water pollution many of the people are suffering from health

issues. The Government has not implemented 75% of employment opportunities to local villagers even though they are having enough skills. He finally requested to relocate the villages which are nearer to the upcoming industries and save the health of public.

Sri Guttala Ganesh, Sarpanch, Gorapudi informed that the farmers are not aware about the public hearing and proper compensation was not given to the farmers. He informed that they had approached court of law against 2006, Notification but not provided proper package. Further, he informed that authorities are changing the name of the land owner in online without knowledge of original land owner. He opposed the public hearing and requested to re-conduct the public hearing to give opportunity to attend all the public.

Sri P. Nageswara Rao, Yelamanchili has opposed the public hearing and alleged that present public hearing and informed that the Government has not given compensation properly to the farmers as per the prevailing rates with a bad intension as this project is not at all useful for land losers and R & R Package was not given. APIIC has not fulfilled the earlier promises made to the land losers. He further informed that employment was not given to the local villagers. The Government has not implemented 75% of employment opportunities to local villagers even though they are having enough skills. The industries are giving HR posts, sand & labour contracts to the outsiders and only giving khalasi posts to local people even though there are qualified graduates are available in the village. He further informed that the issue of Z.Chinnuva, Gorapudi lands is in court of law and questioned how the Government conduct public hearing and also showing endowment land under land acquisition list. He informed that there is no proper execution while giving compensation to the land losers. Finally, he requested to cancel the public hearing and requested to re-conduct the public hearing after finalizing the court matter.

Sri Lalam Thathababu, Ex-MPTC, Gorapudi has opposed the proposed project and has informed that he is not willing to give lands for development as earlier many of them given land for development and not yet received full compensation. He complained that land registrations were stopped in the proposed project area even though the land acquisition process was not completed. The villagers filed the court cases against 2006 notification and some of the petitioners were expired and could not

able to reopen the case. He complained that villagers lands are transferred to APIIC in online without the knowledge of original land owners. He finally concluded that they are not willing to give even one cent of land to the project and requested the officers to save them.

Sri Kasireddi Prasad, Ex-Sarpanch, Krishnampalem has welcomed the proposed project for green category industries only and opposed red & orange category industries. He informed that public hearing is being was conducted without proper information to Krishnampalem villagers and also not given any opportunity to attend in Local Gram Sabha in the village for land acquisition. He further informed that in the year 2006, his forefathers had given land for good reason & development but not yet achieved by APIIC. Many of the people & children are suffering from health issues due air & water pollution caused by polluting industries. He finally requested the authorities to give monthly compensation for the aged people of Rs.20,000/- which should be beared by the upcoming industries, free health card, job opportunities, free bus facility and to provide drinking water facility to the villagers. He finally requested to rehabilitate their village to nearby Venkatapuram junction.

Sri Rajana Sankar Rao informed that he was a land loser and got compensation of Rs.5.0 Lakhs only and he was promised for a job in those days but not yet given. But more benefits were given for other people than the land losers. He alleged that the APIIC is doing real estate business by giving low compensation to the land losers and selling the land to the industry at higher price. Further he informed that industries are established for development but no development has taken up, but they are only facing the pollution problems. He finally requested to give compensation of Rs.20.0 Lakhs and job assurance for all land losers in the upcoming industries and to provide drinking water facility to the villages. He finally requested to relocate the village and to give special package to the land losers.

Sri Karri Apparao appreciated the officials for conducting public hearing and informed that they are not aware of the public hearing and requested to re-conduct the public hearing with proper communication to the villagers. He stated that the industries were established in year 2016, many of them are polluting the surrounding agricultural, cashew gardens and coconut plantation and the development helps to the real estate people not for land losers, many of them are working as a daily labour which is not

correct development. He finally welcomed the project for non-polluting industries for their livehood.

Sri M. Chinnababu stated that there is no proper compensation was given to land losers and also not provided jobs to the land losers. He stated that very few people have attended the public hearing that means so many have boycotted the public hearing. He stated that many of the lands of Z. Chintuva and Gorapudivillages are in court cases. He complained that during early hours and night time, pollution levels are very high. He requested to take necessary action against air polluting industries. Further he informed that some of the villages are existing nearby and middle of the upcoming industrial clusters. He finally requested to rehabilitate their village and to re-conduct public hearing after court decision.

Sri Ranganayakulu informed that there is no development for the villagers who given lands to APIIC. He also informed that Gorapudi villagers are not aware about the public hearing and also proper compensation was not given to them. He further informed that developing rich people is not real development and giving 70% jobs to the local people is the real development. He opposed the public hearing and requested to re-conduct the public hearing to give opportunity for justice.

Sri R. Ramu, Krishnampalem opposed the public hearing and informed that the APIIC is giving different compensation amounts for one village to another village, no rehabilitation issue was announced in this project. He requested to give one job for one household. He questioned that what kind of jobs are offered to villagers and also about the R&R packages for krishnampalem. He informed that lot of Industrial accidents are happening and the industrial management are not taking care of safety aspects. He finally requested to keep the land losers in mind and do proper action for their welfare.

Sri B. Venkkanna informed that in 2008, they have given lands for development and compensation was paid of Rs.3.0 lakhs per acre but not paid any compensation for trees existing in their land. He welcomed the project and requested to give proper compensation as per the Act. He further requested the authorities to give compensation for his land according to the law. He further requested to provide the details of concerned authority to resolve their problems with regard to survey no. 34/6b, S.No.143.

Sri Lalam Chinasatyam alleged that title deed of lands changed to APIIC without any information to the original land owners. He informed that the rate of land is prevailing in crores on other side of the road but APIIC is offering compensation in lakhs to the opposite side of the lands which is injustice. He stated that 57 no. of representations were given to the MRO but no response received so far. He finally requested for justice with regard to the payment of compensation while taking over the lands by APIIC.

Sri Lalam Hari Babu, Vijayapura Agraharam informed that earlier Vijayapura Agraharam was not listed in the proposed project land which is to be acquired. But he informed that he could not able to sell his land as the title is showing in the online as APIIC ownership. In this regard he submitted representation in Spandana portal and not received any response till date. He requested to exempt his Vijayapura Agraharam from land acquisition.

The District Revenue Officer & Addl. District Magistrate, Visakhapatnam District Nominee of the District Collector and Chairman of Environmental Public Hearing panel while concluding the meeting has informed that the issues raised by the public related to land acquisition, compensation, R&R package, Employment, CSR Package will be clarified soon and further informed that the proceedings of the public Hearing in the form of audio & visual recording along with the written minutes of the Public Hearing would be forwarded to the Competent Authority for taking necessary action on the proposed project for "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru villages of Rambilli Mandal in Visakhapatnam District by M/s.Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited.

Environmental Engineer
A.P. Pollution Control Board,
Regional Office, Visakhapatnam

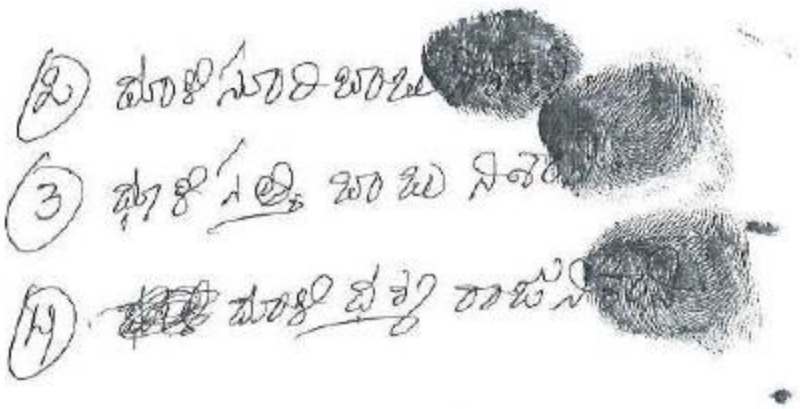
Environmental Engineer
A.P. Pollution Control Board
Regional Office, Visakhapatnam

District Revenue Officer,
Visakhapatnam District
Nominee of the District Collector,
Visakhapatnam District

DISTRICT REVENUE OFFICER
VISAKHAPATNAM

11

Environmental Engineer
A.P. Pollution Control Board
Regional Office, Visakhapatnam



ఫారం నెం. 6

ఆంధ్రప్రదేశ్ ప్రభుత్వము

GOVERNMENT OF ANDHRA PRADESH

వైద్య ఆరోగ్య మరియు కుటుంబ సంక్షేమ శాఖ

MEDICAL & FAMILY WELFARE DEPARTMENT

మరణ ధృవ పత్రము / Death Certificate

(Issued under Section 12(1) of the Registration of Births and Deaths Act, 1969 and Rules 8 (1) of the Andhra Pradesh Registration of Births and Deaths Rules, 1999)

ఆంధ్రప్రదేశ్ రాష్ట్రము వికృత పుష్యం జిల్లా ప్రకాశం మండలము

[illegible] గ్రామ పంచాయితీ / మున్సిపాలిటీ / మున్సిపల్ కార్పొరేషన్ లలో మరణ నిబంధనల ప్రకారం మరణానికి సంబంధించిన

అసలు లాగ్ నుండి, క్రింది సమాచారము తీసుకోబడినదని ధృవీకరించబడినది.

This is to certify that the following information has been taken from the original record of death, which is in the register for (local area / local body) ..... of Mandal ..... of District ..... of State Andhra Pradesh

పేరు
Name : భూమి వీరయ్యస్వామి (ఆధార్ 2760 0157 2801)

లింగము
Sex : (పురుషుడు)

మరణించిన తేది
Date of Death : 09-08-2015

మరణించిన ప్రదేశం
Place of Death : ఖాళీగా కోడూరు గ్రామం చిన్నచెరుకూరు పంచాయితీ

తల్లి పేరు
Name of Mother : మిక్కు కొండమ్మ (దేవేడు)

తల్లి ఆధార్ నెం. / UID No. of Mother (if Any)

తండ్రి పేరు
Name of Father : మిక్కు బాదయ్య (దేవేడు)

తండ్రి ఆధార్ నెం. / UID No. of Father (if Any)

భర్త / భార్య పేరు
Name of Husband / Wife : భూమి కొండయ్య (దేవేడు)

భర్త / భార్య ఆధార్ నెం. / UID No. of Husband / Wife (if Any)

మరణించినపుడు మృతుని చిరునామా
Address of the deceased at the time of Death

మిక్కు పుల్లం పిల్లి బాలిశ్వి మరియు
ఇతరుల కోడూరు గ్రామం చిన్నచెరుకూరు పంచాయితీ

మృతుని శాశ్వత నివాసపు చిరునామా
Permanent Address of Deceased

మిక్కు పుల్లం పిల్లి బాలిశ్వి మరియు
ఇతరుల కోడూరు గ్రామం చిన్నచెరుకూరు పంచాయితీ

నమోదు సంఖ్య
Registration No. -39-

నమోదు తేది
Date of Registration 12/08/2015

వ్యాఖ్యలు
Remarks

జారీ చేసిన తేది
Date of Issue 12/08/2015

జారీ చేయు అధికారి సంతకము, హోదా మరియు చిరునామా
Signature of the issuing authority, and address

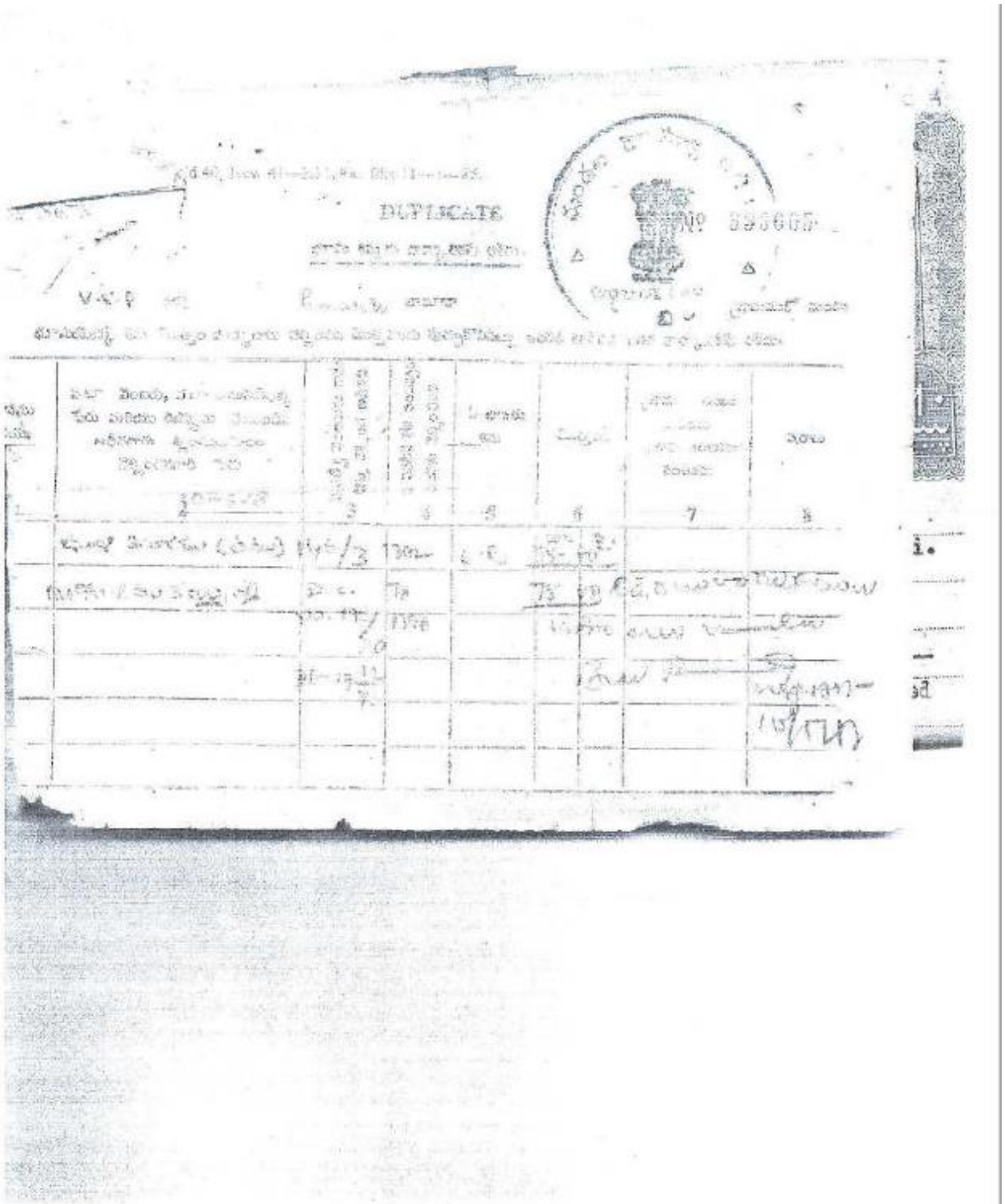
సీలు / Seal

[illegible]

[illegible]

ప్రతి జననము, ప్రతి మరణము తప్పకుండా 21 రోజులలో నమోదు అయ్యేలా చూడండి. / Ensure registration of every birth and death with in 21 days.

రిజిస్ట్రారుతో పాటుగానీ లేదా ఇన్ఫార్మెంట్ మరణానికి సంబంధించిన వారంతా 17 (1) సెక్షన్ ప్రకారము.


DUPLICATE

Copy of :-

D.C.No. Taluk Office, Narasapuram.

FORM-B.

Sri _____ son of _____

of _____ village is informed that his/her application for the grant of land described below has been accepted subject to the result of any appeal or revision that may be preferred and subject to the following conditions.

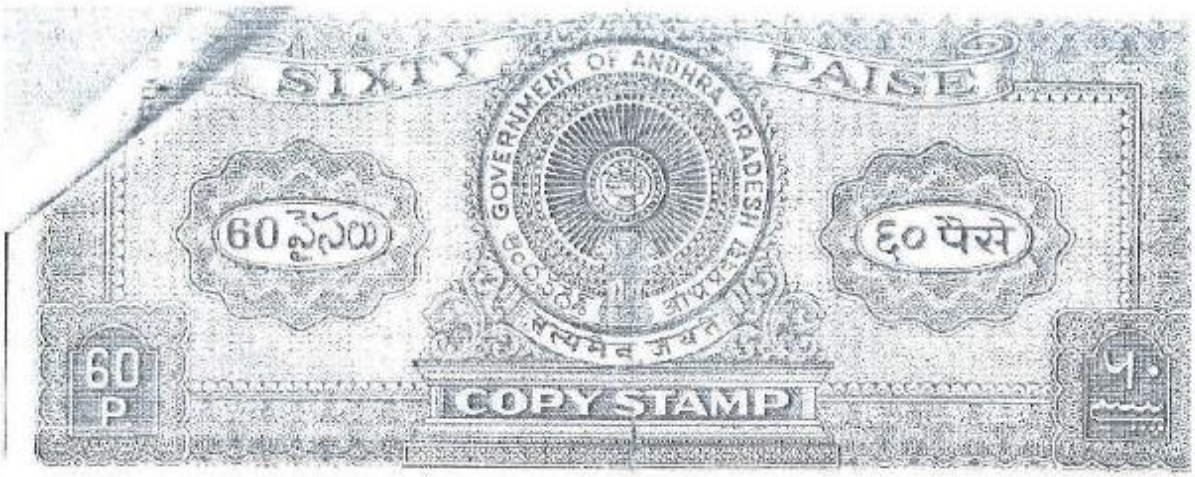
~~Name of the village etc.~~ | ~~Classification, Extent & assessment~~ (Wet or dry or irrigable dry)

CONDITIONS

1. Lands assigned shall be heritable but not alienable.

2. Lands assigned shall be brought under direct cultivation within three (3) years from the date of this order and shall not be leased out in any manner.

Contd..2..



-:: 2 ::-

3. Cultivation shall be done by the assignee or members of his family or with hired labour under the supervision of himself or his family.

4. No land tax shall be collected for the first three years except if any which has already been brought under cultivation. But cesses shall be charged on the land tax payable. Water rate and cesses thereon shall also be charged if the lands are irrigated with government water.

5. If the land is used for assuring plantations, no pits or ponds shall be excavated near such plantation irrigated by pots within 300 yards. If any "Puttam" and all pits [illegible] above limits shall be filled up as soon as the plants watered therefrom are three years old. Breach of any of these conditions will render the assignment liable for cancellation without payment of any compensation.

6. The existing and customary rights of the government and the public in roads, rivers streams and channels running through or bounding on the land and the right of the government to share in mines and quarries adjacent to the said pond are reserved and are in no way affected by grant.

Contd..3..

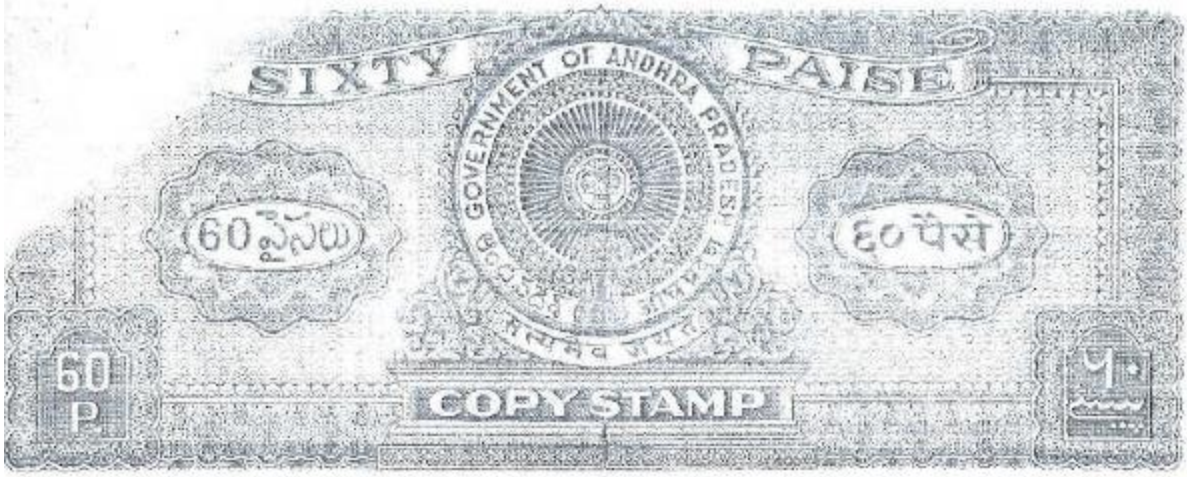
7. Government also reserve to themselves or persons authorised by them the powers necessary for the proper working of the minerals such as the full and free liberty and right to ingress and egress and regress to, as detailed in the rules in Andhra Pradesh Mining and the Minerals Concession Rules and the forms prescribed thereunder.

8. Land shall be subject to all general taxes and local Rates Payable by law or custom (except specific and in condition"4")

9. The government reserve the right in levying ground rent which will be liable to revision from time to time in accordance with the rules in force at the time of the revision in lieu of assessment if the land or portion of it after having been once brought under cultivation is used for non agricultural purpose.

10. The annual assessment on the land shall be liable to periodical revision at resettlement if any.

contd...4..



11. For breach of all or any of the aforesaid conditions, the Government will be at liberty to resume the land without compensation.

12. In the event of the cancellation of assignment either on appeal or on revision, the assignee shall not be entitled to any compensation for any improvements that he may have made to the land.

13. In the event of the land being required for a project of any other public purpose, the land will be resumed and no compensation shall be paid to the assignee. The decision of the government or other authority empowered by them in this behalf shall be final as to the question whether the purpose for which the land is to be resumed is a public purpose or not.

14. In the event of resumption of land assigned at market value the purchase money of such share of it as proportion to the area resumed will be repaid.

Contd..5..

-:: 5 ::-

15. The Government will not however, be liable to pay compensation for any improvement which may have been effected on the land before its resumption.

16. The assignment is also liable for cancellation if it is found to be grossly inequitable or under mistake of fact owing to misrepresentation or found in excess of the limits of the authority delegated to the assigning officer under R.O.15 read with G.O.Ms.No.11/2 Revenue dated 18-4-94 or that there was irregularity in the procedure.

Typed by :-

Compared by :-

//true copy//

భారత కమ్యూనిస్టు పార్టీ (మార్క్సిస్టు)
రాంబిల్లి - మండలం.

గౌరవనీయులైన పర్యావరణ ఇంజనీరు వారికి
ఆంధ్రప్రదేశ్ కాలుష్య నియంత్రణ మండలి
ప్రాంతీయ కార్యాలయం, విశాఖపట్నం.

తేదీ. 23-09-2021

సార్ !

విషయం:- నేడు క్రిష్ణంపాలెం గ్రామం, రాంబిల్లి మండలంలో
జరిగే ప్రజాభిప్రాయ సేకరణను రద్దు చేయాలని కోరుతూ!

రాంబిల్లి, ఉచ్చలతాడ్రపురం మండలాల పరిధిలో ప్రభుత్వం.
SEZ నిమిత్తం వేలాది ఎకరాలు భూములని తీసుకున్నారు.
ఇప్పటికి. గొరకుండి, Z చింతపల్లి, లలుంకొండూరు గ్రామస్థులు.
తమ భూములకి సక్రమమైన పరిహారం తీసుకోలేదు. మరియు న్యాయం
చేయాలని కోర్టును ఆశ్రయించారు. ప్రభుత్వం, ఉన్నతస్థాయి
అధికారులు ప్రజలకు ఎటువంటి సమాచారం వేయడం.
లేదా మౌఖికంగా ప్రజాభిప్రాయ సేకరణ కార్యక్రమాలు
పెట్టడం ఎంతవరకు న్యాయం.

* పరిశ్రమలు పెట్టినప్పటికి స్థానికులకు. 75% ఉపాధి.
కల్పించడం లేదు.
* వచ్చిన పరిశ్రమలు అన్నీ ప్రమాదకరమైనవే.
విషపూరితమైన పొల్యూషన్ వలన తీవ్ర
చుట్టు ప్రక్కల ప్రజలు అనారోగ్యం బారిన పడుతు
న్నారు. క్షోభతమండి. చనిపోతున్నారు.
* పరిశ్రమల్లో భద్రతాప్రమాణాలు పాటించకపోవటం
కారణంగా తరుచుగా ప్రమాదం జరుగుతుంది.
కార్మికులు చనిపోతున్నారు. పెద్ద ఎత్తున ఆవయవాలుకోల్పోతున్నారు

* పరిశ్రమలు పెట్టినవాళ్ళకు ఉన్న శ్రద్ధ, పరిశ్రమలు పెట్టిన తరువాత స్థానిక ప్రజలను, గ్రామాలను పట్టించుకోలేదని మా అభిప్రాయం.
* 2006లో భూములు కోల్పోయిన ప్రతి రైతుకి, వ్యవసాయ కూలీకి, కౌలుదారు వెళ్ళి నష్టపరిహారం పొందిన రైతు వలే 20 లక్షల రూపాయలు నష్టపరిహారం ఇవ్వాలి.
* ప్రస్తుతం ఇళ్ళు కోల్పోయిన వారికి, 20 లక్షల రూపాయలు నష్టపరిహారం, ఒక ఉద్యోగం ఇవ్వాలి.
* నిర్వాసిత గ్రామాలకు CSR ఫండ్స్ ను కేటాయించి అభివృద్ధి చేయాలి.
* ఫార్మా కంపెనీలు నుండి వెలువడే విషతుల్య పొల్యూషన్ నివారించే విధంగా చర్యలు చేపట్టాలి.

ఇట్లు
తమవిధేయులు.

1) R. Ramu
2) G. Demudu Naidu.
7893228069
3) N. Narayana Rao
4) Venu Amanchi
7013429718.

9/23/21, 3:53 PM Email

Email **RO Visakhapatnam**

రాంబిల్లి మండలం కృష్ణంపాలెం ప్రజాభిప్రాయ సేకరణ విషయంపై

From : cpimvizag@gmail.com Thu, Sep 23, 2021 11:48 AM

Subject : రాంబిల్లి మండలం కృష్ణంపాలెం ప్రజాభిప్రాయ సేకరణ విషయంపై 1 attachment

To : T.Rajendra Reddy JCEE <zovsp-jceee@appcb.gov.in>, RO Visakhapatnam <rovsp-ee1@appcb.gov.in>

--

K.Lokanadham, Secretary
Communist Party of india (Marxist)
Visakha Dist Committee
#28-6-8, NPR Bhavan, Visakhapatnam-530020
Cell : 9490098791, (o) 0891-2706678

Pollution RO letter.pdf
199 KB

ఫోన్‌నెం:9490098791

భారత కమ్యూనిస్టు పార్టీ (మార్క్సిస్టు)
విశాఖ జిల్లా కమిటీ

ఎన్.పి.ఆర్. భవన్, 28-6-8,
యల్లమ్మతోట, జగదాంబ జంక్షన్ పక్క,
విశాఖపట్నం-20.
e-mail: cpimvizag@gmail.com

సిపిఐ(ఎం) జిల్లా కార్యదర్శి : కె.లోకనాధం

గౌరవనీయులైన పర్యావరణ ఇంజనీరు వారికి,
ఆంధ్రప్రదేశ్ కాలుష్య నియంత్రణ మండలి,
ప్రాంతీయ కార్యాలయం, విశాఖపట్నం.

తేది : 23-10-2021

ఆర్యా!

విషయం : విశాఖ - మెచ్చె పారిశ్రామిక నడప ఏర్పాటుపై రాంబిల్లి మండలం కృష్ణపాలెంలో జరుగు ప్రజాభిప్రాయ సేకరణను వ్యతిరేకిస్తూ..

విశాఖ జిల్లా రాంబిల్లి మండలంలో ఏర్పాటు అయ్యే పారిశ్రామిక నడప కృష్ణంపాలెం, గొరపూడి, లాలంకోడూరు, జెడ్‌పింతువ గ్రామాల పరిధిలో ఉన్న ఎస్‌ఐజెడ్ కోసం సేకరించిన 2532 ఎకరాల భూమికి సంబంధించి ప్రజాభిప్రాయసేకరణ ఈరోజు (తేది : 23-09-2021) హడావడిగా నిర్వహిస్తున్నారు. దీనిని సిపిఎం పార్టీ విశాఖ జిల్లా కమిటీ వ్యతిరేకిస్తుంది.

విశాఖ జిల్లాలో వినిమిఐఆర్ పేరుతో వేలాది ఎకరాలు భూములు సేకరిస్తున్నారు. గతంలో సేకరించిన ఎస్‌ఐజెడ్, ఫార్మాలో భూములు కోల్పోయిన నిర్వాసితులకు కనీసం న్యాయం జరగలేదు. ఉపాధి కల్పించడంలో కూడా పూర్తిగా విఫలమయ్యారు. శాశ్వత ఉద్యోగాలు ఇవ్వకుండా నిరాకరిస్తున్నారు. కాంట్రాక్టు ఉద్యోగాలు కూడా స్థానికులకు ఇవ్వడంలేదు. భూములు కోల్పోయి ఉపాధి లేక అర్ధాకలితో ప్రజలు జీవిస్తున్నారు. ఒకవైపు రాష్ట్ర ప్రభుత్వం స్థానికులకు 75శాతం ఉపాధి అవకాశాలు కల్పించాలని జీవో ఇచ్చినా నేటికి కూడా ఏ పారిశ్రామిక ప్రాంతంలో అమలు చేయడంలేదు. నేడు ఈ ప్రాంతంలో భూములు కోల్పోయిన రైతులు, కూలీలకు కూడా అదే పరిస్థితి వస్తుంది. వస్తున్న పరిశ్రమలు కూడా ప్రజా ఆరోగ్యాన్ని, పర్యావరణానికి తీవ్ర హానికలిగించే పరిశ్రమలు వస్తున్నాయి. వీటివల్ల విశాఖ జిల్లా కాలుష్యకోరల్లో చిక్కుకుపోయే జిల్లాగా మారబోతుంది. దీనిని నివారించాల్సిన ప్రభుత్వాలు వాటికి భిన్నంగా విదేశాల్లో నిషేధించిన కాలుష్య పరిశ్రమలను ఇక్కడ స్థాపించడానికి పూనుకోవడం సమంజసంకాదు.

విశాఖ జిల్లాలో పలు ప్రాంతాలలో ఉన్న పరిశ్రమలలో అతి భయంకరమైన ప్రమాదాలు జరుగుతున్న విషయం అందరికీ తెలుసు. గత ఆరేడు సంవత్సరాలుగా ఫార్మా సిటీలోనే ముప్పయికి పైగా ప్రమాదాలు జరిగి అపారమైన ప్రాణ నష్టం జరిగింది. 2014 సంవత్సరంలో పాయకరావుపేట దగ్గర ఒక రసాయన పదార్థాల పరిశ్రమలో జరిగిన ప్రమాదం నాలుగైదు గ్రామాల ప్రజలకు నష్టం కలిగించడం కూడా మరచిపోలేము. ఇటువంటి ప్రమాదాలకు బాధ్యులైన పారిశ్రామిక వేత్తల మీద కాని, వారివారి బాధ్యతలను నిర్వర్తించని అధికారులమీద కాని ఇంతవరకు ఎటువంటి చర్యలు ప్రభుత్వం తీసుకోలేదు. అటువంటి పరిస్థితులలో ఈ ప్రాంతంలో మరిన్ని ప్రమాదకరమైన పరిశ్రమలను స్థాపించడం ప్రజాహితం కాదు.

కావున ఈ రోజు రాంబిల్లి మండలం కృష్ణాపాలెంలో జరుగుతున్న ప్రజాభిప్రాయ సేకరణను సిపిఎం పార్టీ విశాఖ జిల్లా కమిటీ వ్యతిరేకిస్తుంది.

ఇట్లు
ధన్యవాదములతో...
(కె.లోకనాధం)
జిల్లా కార్యదర్శి

Proposed public hearing for establishment of "Development of Industrial Park in Z.Chintuva, Gorapudi, Krishnampalem and Lalamkoduru Grampanchayats of Rambilli Mandal of Visakhapatnam District on 23.09.2021 at 11.00 AM at Project site

S.No.	Name of the person with address	Signature
1	District Revenue Officer Visakhapatnam	
2	Revenue Divisional Officer Anakapalli.	
3	Spl Deputy Collector (LA) APIIC, Visakhapatnam	23/9/2021
4	P.BHAGYAVANTH, Tahsildar, Rambilli	23/9/21
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15	Kothapalem	
16		

S.No.	Name of the person with address	Signature
11	Patnala V V Sanyasi Rao S/o Rama Rao Krishnam palem	
12	[illegible]	[illegible]
13	Yenipelli Chakravarthy Gollapalem	Chakravarthy
14	[illegible]	[illegible]
15	K.SN [illegible]	K.SN [illegible]
16	[illegible]	[illegible]
17	[illegible]	[illegible]
18	[illegible]	[illegible]
19	R.Vardhan	Vardhan
20	S. [illegible]	[illegible]
21	P Varshini Lolamkodurru	P. Varshini
22	[illegible]	[illegible]
23	R. Apparao Krishnapalem	R. Apparao
24	R. Ganga Adhar	[illegible]
25	[illegible]	[illegible]
26	A. V. A [illegible] Vellamm	A. [illegible]
27	[illegible]	[illegible]

S.No.	Name of the person with address	Signature
28	S. Narayanswamy NCL	
29	S.P. Patnaik NCL Talcher	23/07/24
30		
31	P.A.N. Raju Ramagiri	
32		
33	S. Pydi Rao Venkatapuram	
34	J. Appala Reddy C.K. Palli	
35	HARI BABU (Sarpanch) Kanpalli	
36		
37		
38		
39	M. RAMU Krishnampalem	
40	B.S. Naidu Krishnampalem	
41		
42	C. Nirmal Kachnapalem	
43		
44	P. Govinda Rao	

S.No.	Name of the person with address	Signature
45	R Rajaiah (Krishnampalem)	R Raju
46	D Aruna (Krishnampalem)	D Aruna
47	L. chandrika (Krishnampalem)	L. chandrika
48	A Manohar (Kambhampadu)	A Manohar
49	ch. Lalitha (Gorapudi)	ch
50	L. pushpalatha (Gorapudi)	Pushpa
51	L. Lakshmi (Gorapudi)	
52	S. Varalakshmi (Gorapudi)	
53	R. Paradeshamma	
54	[illegible]	[illegible]
55	[illegible]	[illegible]
56	[illegible]	[illegible]
57	[illegible]	[illegible]
58	L.V.S.N. [illegible] (Krishnampalem)	[illegible] (Krishnampalem)
59	L. Lazar	Lazar
60	R. Sampanna	Krishnam patha
61	L. Parvathi	Appanna

S.No.	Name of the person with address	Signature
62	M Nanji - Seethapalem	
63	Girls Rama krishna Raju	
64	K Srinivas - Kondhuvanipalem	
65	R.Naresh - krishnampalem	
66		
67		
68		
69	Y. chinna babu	
70	D. Nookaraju venkayyapalem	
71		
72	G. RAMESH APPANNAPALEM	
73	G. SURESH BABU APPANNAPALEM	
74		
75		
76		
77	R. Ramesh krishnampalem	
78	Praveen Guntur	

S.No.	Name of the person with address	Signature
79	L Gangaraju	L. Gangaraju
80	G. Narasinga Rao	G.N.Rao
81	D. [illegible]	
82	[illegible] (Chalam Kodumu)	[illegible]
83	Y. Soujanya (Chalam Kodumu)	Y. Soujanya
84	L Ramalakshmi (Chalam Kodumu)	L. Ramalakshmi
85	L. Babu Rao Yellamelka	B.R
86	M. Suresh Rao	
87	U.R.Rao Yellamelka	
88	[illegible]	[illegible]
89	[illegible]	[illegible]
90	[illegible]	[illegible]
91	[illegible]	[illegible]
92	[illegible]	[illegible]
93	[illegible]	[illegible]
94	[illegible]	[illegible]
95	[illegible]	[illegible]

S.No.	Name of the person with address	Signature
96	[illegible]	[illegible]
97	[illegible]	[illegible]
98	[illegible]	[illegible]
99	[illegible]	[illegible]
100	[illegible]	[illegible]
101	[illegible]	[illegible]
102	[illegible]	[illegible]
103	[illegible]	[illegible]
104	[illegible]	[illegible]
105	[illegible]	[illegible]
106	[illegible]	[illegible]
107	[illegible]	[illegible]
108	[illegible]	[illegible]
109	[illegible]	[illegible]
110	[illegible]	[illegible]
111	[illegible]	[illegible]
112	[illegible]	[illegible]

S.No.	Name of the person with address	Signature
113	రాజేశ్వరి	రాజేశ్వరి
114	P. Varalakshmi	P. Varalakshmi
115	రెడ్డి లచ్చియమ్మ	లచ్చియమ్మ
116	వైలా వైదేహిలక్ష్మి	వైదేహిలక్ష్మి
117	బత్తి లక్ష్మి కృష్ణాపురం	లక్ష్మి
118	బత్తిన లక్ష్మి	లక్ష్మి
119	రాజనాల కృష్ణమ్మ కృష్ణాపురం	చరణమ్మ
120	రాజనాల చిన్నమ్మి కృష్ణాపురం	చిన్నమ్మి
121	లాలసాగరపు రాజేశ్వరి కృష్ణాపురం	సాగరపు రాజేశ్వరి
122	ఆర్. వెంకటులు	వెంకటులు
123	కోతిరెడ్డి వారి అమ్మాయిలు	కోతిరెడ్డి వారి అమ్మాయిలు
124	కరరెడ్డి లక్ష్మి	కరరెడ్డి లక్ష్మి
125	R. Varalakshmi	R. Varalakshmi
126	R. V. Ramana	R. V. Ramana
127	R దేవి	R దేవి
128	వేద రాజమ్మ కృష్ణాపురం	రాజమ్మ
129	వేద వెంకటమ్మ కృష్ణాపురం	వెంకటమ్మ

S.No.	Name of the person with address	Signature
128	Nagamani Lalankodur	Nagamani
129	Kotla Rajeswari Lalankodur	K. Rajeswari
130	[illegible]	[illegible]
131	[illegible]	[illegible]

Photographs Taken During the Environmental Public Consultation Held on 23.09.2021











Appendix 17: APIIC Note on CETP for Tranche-2

APIIC
The Future is Here

Andhra Pradesh Industrial Infrastructure Corporation Ltd.,

(Govt. of Andhra Pradesh Undertaking)

Note on CETP under Tranche -II

Under the "National Industrial Corridor Development Programme" Government of Andhra Pradesh has taken up the Visakhapatnam-Chennai Industrial Corridor Development Program (VCIC-DP), with financial assistance from Asian Development bank (ADB) to develop State of the Art Infrastructure in three Industrial Clusters i.e. Nakkapalli and Rambilli in Visakhapatnam and Srikalahasthi – Yerpedu in Chittoor Node.

The Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC) is one of the Project Implementing Units. Under Tranche-II APIIC is implementing the projects including Infrastructure development sub projects (i.e. APIIC 06A, 08A, 09A and AMTZ-I) and 4 CETP sub-projects (i.e. APIIC 06B, 08B, 09B, 10).

The internal Infrastructure development sub-projects, i.e., APIIC/06A, APIIC/08A and APIIC/09A are undergoing tendering process in consultation with ADB and are essential for development of industrial clusters which can be monetized immediately. Further, the CETPs shall be required during the occupancy phase of these industrial clusters.

In light of above, it is proposed that, the CETPs will be taken up in Design Built Operate Finance and Transfer mode (DBFOT) post completion of the internal industrial infrastructure. It will be ensured that these CETP will be kept ready before the Industrial unit's starts their operations. Otherwise, Individual industries are advised to set up their own arrangements as per PCB Norms till CETP gets operated. Further, it is ensured that CETP's design will be in line with statutory approvals from MoEF & CC, Pollution Control Board, and other regulatory authorities.

Regarding maintenance of Green belt initially it will be maintained by raw water. Once CETP is commissioned, the recycle water is shall be used within the industrial park.

Engineer-In-Chief
APIIC Ltd, Mangalagiri.

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