

# ANDHRA PRADESH URBAN WATER SUPPLY AND SEPTAGE MANAGEMENT IMPROVEMENT PROJECT (APUWS & SMIP)

(UNDER APUFIDC WITH AIIB ASSISTANCE)

PROJECT MANAGEMENT CONSULTANCY SERVICES  
IN 50 ULBS OF ANDHRA PRADESH



## ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN FOR PUTTUR URBAN LOCAL BODY (ULB)

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## Acronyms

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
APPCB	Andhra Pradesh Pollution Control Board
AP SSS	Andhra Pradesh State Sanitation Strategy
APUFIDC	Andhra Pradesh Urban Finance Infrastructure Development Corporation
APUWS&SMIP	Andhra Pradesh Urban Water Supply and Septage Management Improvement Project
BOQ	Billing of Quantity
C&DMA	Commissioner & Director of Municipal Administration
CPCB	Central Pollution Control Board
CPHEEO	Central Public Health and Environmental Engineering Organization
CPRs	Community Property Resources
DFID	Department for International Development
DI	Ductile Iron
Dia	Diameter
EA	Environment Assessment
EIA	Environment Impact Assessment
ELSRs	Elevated Level Service Reservoirs
EMP	Environment Management Plan
EPA	Environment Protection Act
EPZs	Export Processing Zones
ESMPF	Environmental and Social Management Planning Framework
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
FRL	Full Reservoir Level
GL	Ground Level





GLBR	Ground Level Balancing Reservoir
GLSR	Ground Level Storage Reservoir
G.O.	Government Order
GoAP	Government of Andhra Pradesh
HDPE	High-density polyethylene
HSC	House Service Connection
IS	Indian Standards
ISO	International Organization for Standardization
JICA	Japan International Cooperation Agency
lpcd	liter per capita per day
MA&UD	Municipal Administration and Urban Development
MDDL	Minimum Drawdown Level
MLD	Million Litre per day
MoEF&CC	Ministry of Environment Forest & Climate Change
MT	metric ton
NEP	National Environment Policy
NGOs	Non- Government Organizations
NUSP	National Urban Sanitation Policy
O & M	Operation and Maintenance
PAPs	Project Affected Persons
PLI	Public Liability Insurance
PMC	Project Management Consultancy
PPEs	Personal Protective Equipments
PUC	Pollution Under Control
QCI-NABET	Quality Council of India - National Accreditation Board for Education and Training
RFCTLARR	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement



ROW	Right of Way
R&R	Resettlement and Rehabilitation
SEZs	Special Economic Zones
SIA	Social Impact Assessment
SMP	Social Management Plan
SoR	Schedule of Rates
SSR	Social Status Report
STP	Sewage Treatment Plant
TMC	Thousand million cubic feet
UFW	Unaccounted-for-water
ULB	Urban Local Body
WALT	Water, Land and Tree
WTP	Water Treatment Plant





## EXECUTIVE SUMMARY

### About the Project:

The Government of Andhra Pradesh has contemplated several development projects for the improvement of the civic amenities, under the Commissioner & Director of Municipal Administration (CDMA) and the Andhra Pradesh Urban Finance Infrastructure Development Corporation (APUFIDC). The present "Andhra Pradesh Urban Water Supply & Septage Management Improvement Project (APUWS & SMIP)" project for Puttur Municipality is taken up by the Government with the financial assistance from **Asian Infrastructure Investment Bank (AIIB)**.

### Benefits of the Project:

The project is planned to meet the 135 lpcd regular water supply demand in the base year (2017), prospective year (2032) and ultimate year (2047). The project development works are taken up to fulfill the demand of 16.48 MLD Clear water for the ultimate year (2047) by drawing raw water from reliable source ie Satya Sai Telugu Ganga Canal, lakshmipuram near Tirupathi Water Supply Off take. The project will reduce the burden on the household to collect the water and also improve the health, economic levels and social welfare of the ULB and its surrounding population.

### Classification of the Project:

The Overall Project had been assigned Category "A" in accordance with the AIIB's Environmental and Social Policy (ESP) and Environmental and Social Standards (ESS). This subproject is anticipated to have environmental and social impacts and risks that are limited, temporary in nature and reversible consistent with Category B classification. These are depicted as below:

### Identified Environmental Impacts and Risks:

The major impacts envisaged in the project are air environment, noise environment, drainage system and solid waste disposal.

- i. The dust emissions are significant during excavation of earth for laying pumping mains, construction of water treatment plants and ELSRs. Regular sprinkling of water is suggested as mitigation measure.



- ii. Noise is mainly observed during construction and operation phases of the project. During construction phase an adequate Personnel Protective Equipments (PPEs) to be given to all the workers, Provision for compensatory plantation & vegetative barriers are proposed.
- iii. The ULB predominantly depends on storm water drains for disposal of domestic waste waters. However, sometimes these storm water drains joins in to nearby water bodies and get the water bodies polluted. A well planned and designed Sewage Treatment plant (STP) is required to protect the water bodies by treating 4.0 MLD of sewage (At present 0.90 MLD and after commission of APUWSSMIP 3.0 MLD of Sewage).
- iv. During construction huge amount of debris/ solid waste will be generated, which is about 6.35 MT. Provision for carting of debris is already made in the project cost.
- v. During Implementation of the project, the health and hygiene conditions of the local population will be improved significantly and reduction in occurrence of water borne diseases in the area is expected.
- vi. The construction of the project will not only provide direct employment opportunities but also ensure the in direct employment through transfer of skills and technical proficiency to the local workforce.
- vii. The storage, in-plant handling and dosages of chlorine, safety of the manpower must be addressed as per the standard procedures and guidelines at State and National level. Periodic and need based training are also required in this regard.
- viii. The proposal for provision of 24X7 Water Supply scheme is designed to improve the standard of living of the population in the study area Puttur ULB.
- ix. There will be loss of the topsoil and vegetation such as native plants of 25 nos. are required to be removed during laying off the pipelines. Hence it is proposed to preserve the topsoil for future usage and saplings of 125 nos. shall be planted and maintained as per the guidelines.
- x. The total budget allocated Environmental implementation of the project is Rs. 28.0 lakhs.



### **Recommendation:**

In total, it is observed that minimum impact on environment is envisaged. A strict adoption of the complete Environment Management Plan with budgetary provision of Rs. 28.0 lakhs may reduce the adverse impacts absolutely to minimal. Hence, this project is **recommended for implementation.**



## **CHAPTER – 1**

### **INTRODUCTION**

#### **1.0 Introduction**

Infrastructure projects are generally undertaken to improve the economic and social welfare of the people. At the same time, they may also create an adverse impact on the surrounding environment. People and property in the direct path of the project related areas are affected. The environmental impact of infrastructure projects include damage to sensitive Eco-systems, soil erosion, changes to drainage pattern and thereby groundwater, interference with animal and plant life, loss of productive agricultural lands, resettlement of people, disruption of local economic activities, demographic changes, accelerated urbanization and increase in air pollution. Infrastructure development and operation should, therefore, be planned with careful consideration of the environmental impact. To minimize these adverse effects that may be created by urban infrastructure development projects, the techniques of EIA become necessary.

#### **1.1 Introduction to the overall state-wide project**

The Government of Andhra Pradesh has contemplated several development projects for the improvement of the civic amenities, under the Commissioner & Director of Municipal Administration (CDMA) and the Andhra Pradesh Urban Finance Infrastructure Development Corporation (APUFIDC). The present proposed “AP Urban Water Supply & Septage Management Project (APUWS & SMP)” project under which Puttur Municipality Urban Local Body (ULB) sub project is initiated by APUFIDC, which is a fully owned State Government company under the administrative control of Municipal Administration and Urban Development (MA&UD), Govt. of A.P. The task of preparation of Environment Impact Assessment (EIA) and Environment Management Plan (EMP) for this project has been assigned to **M/s. Aarvee Associates Engineers Architects and Consultants, Hyderabad.**

The proposed Sub project comprises an Intake well, Raw and Clear Water pipelines, Water pumping stations, ELSR and Balancing Reservoir, Water Treatment Plant and Water distribution system to fulfill the drinking water demand of the Puttur Municipality. After careful examination and screening



of the nature and scale of the project components, the sub project has been assigned EA category by the AIIB's.

Hence, the proposed project requires Environmental Impact Assessment (EIA) report which is to be prepared as per the Environmental and Social Management Planning Framework (ESMPF), as part of the Project Management Consultancy (PMC) services. Andhra Pradesh Urban Financial Infrastructure Development Corporation (APUFIDC), a full owned State Government company under the administrative control of Municipal Administration & Urban Development (MA & UD), Government of Andhra Pradesh has proposed the Urban water supply scheme for sub project Puttur municipality with the financial assistance from Asian Infrastructure Investment Bank (AIIB).

## **1.2 Sub-project justification**

It is necessitated at present to have a regular Improvement Water Supply Scheme along with the Distribution Network for the entire Town, drawing water from the dependable source, i.e. Satya Sai Telugu Ganga Canal, Lakshmipuram near Tirupathi Water Supply Offtake. In this context the Detailed Investigation is needed to identify the drawl of water from the Satya Sai Telugu Ganga Canal.

- i. There is need for dedicated water supply system for the town.
- ii. Need for Source identification for the town, i.e. surface water or groundwater, as per the water quality and quantity assessment.
- iii. Need for provision of proper treatment facilities.
- iv. Need for proper provision of transmission and distribution system for safe and reliable water supply system.

## **1.3 Requirement for an Environmental Impact Assessment**

As per the AIIB guidelines for Environmental and Social policy, the proposed sub project has to undergo Environmental Impact Assessment (EIA) process. As part of the Impact Assessment process, the following aspects are reviewed to find out the suitability and adoptability to this project.



Environmental Impact Assessment (EIA) Notification issued on 14th September 2006 (amended) by the MOEF&CC, Govt., of India states that new, expansion or modernization of any activity falling within the 39 categories of developmental and industrial activities shall be undertaken in any part of India only after it has been accorded environmental clearance by the MoEF&CC in accordance with the procedures specified in the notification. Among the 39 categories listed in Schedule -1 of Notification. The proposed water supply service improvement/ up gradation of project in Puttur Municipality neither falls in Category -A nor Category -B of MoEF EIA Notification and is exempted from getting Environmental Clearance from MoEF&CC.

However, it is realized that the water supply improvement/ up gradation project of this magnitude needs the EIA/EMP report in order to safeguard the interests of the environment and it will also act as an environmental guide to the Project Proponent & Environment Interested Groups/ NGOs.

**Box -1:**

- i. Category 'A' projects requires prior environmental clearance from Expert Appraisal Committee (EAC), Ministry of Environment Forest and Climate Change (MoEF&CC), Government of India.
- ii. Category 'B' projects require prior environmental clearance from the State Level Environment Impact Assessment Authority (SEIAA), (Category B1 requires environmental impact assessment studies and while Category B2 not requires EIA Studies).
- iii. This Notification suggests that, any project or activity specified in Category 'B' will be treated as Category A, if located in whole or in part within 10 km from the boundary of protected areas, notified areas and inter-state and international boundaries. Also, in the case where a SEIAA does not exist, Category B project will be reviewed by the MoEF&CC and reclassified as Category A.

The Asian Infrastructure Investment Bank (AIIB) operational policies also suggest having an environmental assessment and management plan in all the development projects. However, as per the AIIB-ESP and based on screening field observation AIIB classified this project as Environmentally "A" category. However this, subproject is Categorized as a "B".



## **1.4 Objectives of the Project's Environmental and Social Management Planning Framework (ESMPF)**

The principal objectives of ESMPF are:

- i. The objective of ESMPF is to ensure that the project complies with the National and State environmental regulatory policies and laws, and also with the guidelines and framework of Asian Infrastructure Investment Bank (AIIB) throughout the water supply project life cycle.
- ii. Generation of Environmental Baseline conditions by considering all the project components including water source, water treatment, and water transmission lines and their allied activities.
- iii. An environmental social assessment is to identify the potential and significant environmental impacts (both reversible and irreversible) & analysis.
- iv. To quantify the significance of impacts assessed for all the components and its activities.
- v. To evaluate the significant impacts on an environmental quality scale. To evaluate possible pollution levels, adopting necessary control/mitigation measures to avoid/minimize/ abate pollution and prepare Environmental Social Assessment Management Planning Framework (ESMPF) outlining additional control/ mitigation measures to be adopted for mitigation and monitoring of adverse impacts. Integration of EAMF to bid/contract documents and BoQ items for an effective implementation, operation and monitoring.
- vi. To prepare a post-project monitoring program and suggesting suitable institutional mechanism for checking and regulating the environmental quality within the limits stipulated by the Ministry of Environment, Forests & Climate Change (MoEF & CC), Government of India.

## **1.5 Scope of Work for this report**

The scope of the environmental report at detailed project report stage is given below:





- i. Review national, state and local environmental regulatory requirements on environmental social aspects, including necessary clearances from State and Central Government in the context of construction and operation of proposed project components.
- ii. Establishing Environmental baseline covering the scale and specific locations of water supply components including the designated project sites – such as water supply sources, site for locating water off-take, right of way for transmission mains and water treatment plants, storage reservoirs and pumping stations, sites for elevated service reservoirs, distribution network and existing facilities for wastewater disposal.
- iii. During screening and categorization of the project components, the following aspects to be considered:
  - a. Location of the sub-project with respect to environmentally sensitive areas, and community concerns.
  - b. Volume, nature and technology of construction.
  - c. Identification of potential environmental and social impacts
  - d. Stakeholder consultations including addressing the issues of affected people.
- iv. Conduct environmental analysis of alternatives for different project components and provide specific inputs to technical analysis of alternatives. The objectives of such analysis shall be to minimize environmental impacts and provide specific inputs to feasibility analysis. Analysis of alternatives shall identify opportunities for environmental enhancements, wherever feasible.
- v. To conduct the detailed Environmental Assessment (EA) covering all the components of the projects with supporting primary/ secondary surveys. The environmental assessment shall identify expected environmental impacts (wherever applicable with quantitative / qualitative information) due to the proposed project. The primary surveys shall include source water quality analysis (minimum one week), environmental surveys including identification of severance, tree cutting schedules and forest diversion proposal (if necessary), and baseline noise quality monitoring at pumping stations.
- vi. Prepare a project component specific and implementable environmental management plan to minimize and mitigate environmental impacts. The EMP shall be integrated in to bid/contract



documents with necessary contract covenants, technical specifications, and BOQ items for effective implementation. The EMP shall also include implementation and monitoring mechanism, and institutional mechanism and resources required for implementation.

- vii. To Prepare an Executive Summary of EIA and EMP and translate the same into local language to facilitate disclosure.

## 1.6 Other Legislative and Regulatory Considerations

### Applicability of the Environmental Rules and Regulations

The purpose of the Environment Screening is “to determine any significant economic, social and environmental issues, which could require further analysis to resolve such issues”. An effort has been made to summarize the screening of environmental & forest rules and regulations, screening with respect to project sub-components and reservoirs location for the water supply improvement project in Puttur Municipality are given in Table 1.1.

*Table 1.1 Screening of Environmental, Forest Rules and Regulations for Puttur Municipality Improvement Project*

Project	Project Components	Applicability of Environmental Laws, Policies and Notifications	Remarks
Water supply works.	<ul style="list-style-type: none"><li>• Land Acquisition</li><li>• Water Bodies</li><li>• Protected Social Forestry</li><li>• Sensitive Locations (Schools, hospitals, etc.)</li><li>• Archaeological Sites</li></ul>	The Environment (Protection) Act, 1986 and further notifications issued under this Act.	Any act during implementation causing damage to environment As per the Environment (Protection) Act (EP) 1986, ambient noise levels are to be maintained as stipulated by the Central Pollution Control Board (CPCB) for different categories of areas like, commercial, residential and silence zones, etc., during sub-project construction and operation. Section -3 (2) (iii & iv).



Project	Project Components	Applicability of Environmental Laws, Policies and Notifications	Remarks
		Water (Prevention and Control of Pollution) Cess Act, 1977 including Rules	Applicable to all activities, which discharge effluents because of process or operations.
		Water (Prevention and Control of Pollution) Act, 1974 – as amended in 1978 & 1988.	Section 3 (2) (a) of the Act and Cess to the Govt. of India as per Table -I & II for consumption of water for domestic, commercial and industrial purposes.
		Forest (Conservation) Act, 1980 – as amended in 1988.	Applicable if the project involves any activities in the reserved forests, village forests, protected forests and other areas as declared by the state Government. Forest Conservation Act –Chapter –2.4 and Chapter – 3.0.
		The Ancient Monuments and Archaeological Sites and Remains Act, 1958, as amended in 2010. Ancient Monuments and Archaeological Sites and Remains Rules, 1959.	Not applicable since the all the project site does not contain any Ancient monuments in the alignment.
		Wildlife Protection Act, 1972, amended thereof. The Wildlife (Protection) Rules, 1995.	Applicable incase the project is coming within 10 km radius of Ecological Sensitive areas. The act prohibits picking, uprooting, damaging, destroying,



Project	Project Components	Applicability of Environmental Laws, Policies and Notifications	Remarks
			<p>acquiring any specified plant from any forest land.</p> <p>It bans the use of injurious substances, chemicals, explosives that may cause injury or endanger any wildlife.</p>
		<p>Andhra Pradesh Sand Policy, 2016</p> <p>G.O.Ms.No.29 Dated: 20-02-2016</p>	<p>The act encourages the District level committee to decide the price for the sand based on the proximity, potential and quality.</p> <p>Government will strictly watch and monitor the sand consumption.</p>
		<p>Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016</p>	<p>Very partly applicable for storage, handling and usage of the emulsified oils, colours and cotton waste used in the project during construction and operation phase of the project.</p>
		<p>The Public Liability Insurance Act, 1991.</p>	<p>Act enables the people to access legal aid to claim compensation in the event of an accident occurred while handling any hazardous substance. So, insurance needs to be taken up by the project implementing agencies or contractors.</p> <p>PLI Act: Act 6 of 1991 as</p>



Project	Project Components	Applicability of Environmental Laws, Policies and Notifications	Remarks
			amended by Act 11 of 1992.
		Ministry of Environment Forests & Climate Change (MoEF&CC) EIA Notification (New) issued on 14th September, 2006 and subsequent amendments thereof till date.	Not Applicable. Project proponent must satisfy the air, water and noise Prevention and Control Acts during construction and operation phase of the project. The EIA Report should be prepared as per the AIIB guidelines.
		Noise Pollution (Regulation and Control) Rules, 2000	Applicable Under Rule 3(1) & 4 (1) - Clause 2, 3 & 6.
		Land Acquisition Act 1894; Land Acquisition Act 1989 & RFCTLARR Act, 2013.	Applicable. To set out rules for the acquisition of land by Government.
		Motor Vehicles Act, 1988 Rules of Road Regulations, 1989	To check all the vehicles operating during construction activity are having PUC certificates.
	Tree removal and Plantation	Andhra Pradesh Water, Land and Tree Act, 2002 and Rules 2004.	Yes. Adequate permission is needed to obtain from concerned for utilisation of water, tree cutting and land acquisition in the project.
	Construction and demolition waste	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016	The construction and demolition wastes must be disposed in designated or identified low lying



Project	Project Components	Applicability of Environmental Laws, Policies and Notifications	Remarks
			areas only.
	Domestic Solid Waste	Solid Waste Management Rules, 2016	The municipal solid waste should be segregated at the source followed by the proper collection, treatment and disposal. This way the water bodies will be prevented from getting polluted by the municipal solid waste.

Detailed explanation for these applicable acts and clearances are given below:

#### **Constitutional Guarantees**

- Article 48-A of the Constitution: This directive principle states that the State shall endeavor to protect and improve the natural environment.
- Article 51-A of the Constitution: This fundamental duty states that it is the duty of every citizen to protect and improve the natural environment. Courts have tended to enlarge the scope of fundamental rights so that environment dimensions are recognised.

#### **The Water (Prevention and Control of Pollution) Act, 1974**

The above Act, 1974 suggest that only State Governments can enact water pollution Legislation. Article 252 empowers Parliament to enact laws on state subjects for two or more states, where the State Legislatures have consented to such legislation. Under this Act, the State Boards were vested with the regulatory authority and were empowered to establish and enforce effluent standards for factories discharging pollutants into bodies of water. A Central Board performs the same functions for union territories and coordinates activities among the states.

The PCBs established under the Water Act, control sewage and industrial effluent discharges in the water bodies by approving, rejecting or conditioning applications for consent to discharge.



### **The Water (Prevention and Control of Pollution) Cess Act of 1977**

The main object of this Act is to meet the expenses of the Central and State Water Boards. Economic incentives are provided for control of pollution by differential levy of tax structure. The local authorities and certain designated industries are required to pay a cess for water consumption. The revenues accruing thus are in turn used for Implementation of the Water (Prevention and Control of Pollution) Act, 1977. The Central Government, after making deductions for collection expenses, pays the Central board and the States such sums as it deems necessary to enforce the provisions of the Water (Prevention and Control of Pollution) Act, 1974. On the installation of effluent treatment equipment and meeting the applicable norms the polluter is entitled to get a rebate of 25% on applicable cess.

### **Air (Prevention and Control of Pollution) Act 1981**

The objective of this Act is to provide for the prevention, control and abatement of air pollution, for the establishment, with a view to carrying out the aforesaid purposes, of Boards, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith.

### **Noise Control Rules 2000**

The objective of these rules, is to regulate and control the ambient noise levels in public places from various sources inter-alia industrial activity, construction activity (fire crackers, sound producing instruments) gen sets, loud speakers, public addressing system, vehicular horns and other mechanical devices have deleterious effects on human health and psychological wellbeing of the people, it is considered necessary to regulate to regulate and control the ambient noise levels.

### **The Environment (Protection) Act, 1986 (EPA)**

According to EPA, "Environment" includes water, air and land and the interrelationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property; Section 3 of the EPA states, that Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and





improving the quality of the environment and preventing controlling and abating environmental pollution.

### **National Environment Policy, 2004**

The National Environment Policy (NEP, 2004) is a response to the national commitment to a clean environment, mandated in the Constitution in Articles 48A and 51 A (g), strengthened by judicial interpretation of Article 21. The Objective of NEP 2004 is:

- i. Conservation of Critical Environmental Resources
- ii. Intra-generational Equity: Livelihood Security for the Poor

### **Solid Waste Management Rules, 2016**

Every municipal authority shall, within the territorial area of the Municipality, be responsible for the implementation of the provisions of these rules, and for any infrastructure development for collection, storage, segregation, transportation, processing and disposal of municipal solid wastes.

### **Clearances**

#### ***Forest Clearance:***

If there is no forest exists in the project area and no trees are disturbed due to construction activity of laying Pipeline, no permission is required from concerned authorities. However, in case the proposed project activities cover the forest areas, it will need the Forest Clearance.

***Other Clearances:*** Implementing agency shall ensure that the following clearances before commencement of providing Water supply pipeline.

- i. Clearance from Highways Department for cutting roads.
- ii. Permission for breaking or shifting of public utilities like sewer lines or water pipelines from Municipality.
- iii. Permission and clearance from Electricity board for shifting/ moving of streetlights, cables etc.



## CHAPTER - 2

### PROJECT LOCATION AND BASELINE DATA

#### 2.0 Project Location

Puttur is located at 13.45°N 79.55°E. It has an average elevation of 144 meters (472 feet). Puttur is situated on the way from Tirupati to Chennai. It is situated at distance of 35 km from Tirupathi and 11 km from Nagari and 18 kilometers from Andhra Pradesh's border with Tamil Nadu.

As per census, 2001 Puttur has a population around 29436 and as per census, 2011 Puttur has a Population around 54,092. Puttur has an average literacy rate of 85%, higher than the national average of 59.5%. Male literacy is 84% and Female literacy is 73%.

Puttur is the one of fastest developing town in Chittoor District. Puttur was formed as 3<sup>rd</sup> grade Municipality in June 2005 through G.O.Ms.No.610 & 611 Dt: 24-6-2005 duly merging two major Panchayats and 6 minor Panchayats. The city is developing rapidly owing to its importance as Commercial, Educational center in the District. Puttur is Mandal headquarters as well.

#### 2.1 Baseline Data

Environmental baseline conditions shall provide an overall description of the existing environmental conditions on all project components, including water source, clear water sump, and water transmission alignments, and their project activities. Studies are undertaken to generate baseline data within a 10 km radius study region around the proposed project site on such environmental parameters as air quality, ground and surface water quality, noise levels, land environment including geomorphology, land-use pattern, forest cover, biological environment and socio-economic status of the population, etc. From these inputs, environmental screening of project will be identified based on the field conditions.

#### Site and its Surroundings

##### Topography & Salient Features

Name of the Town: Puttur

District & State: Chittoor, Andhra Pradesh

Geographical Location: 14° 91' N Latitude: 75.55°E.



Avg Elevation: + 144.00 M

Area of the Town: 31.89 sq. km

Population as per 2011 census: 54092

Annual Average Rainfall: 969 mm

### **2.1.1 Geographical & Demographic characteristics**

Puttur is located at 13.45°N 75.55°E. It has an average elevation of 144 meters (472 feet). Puttur is situated on the way from Tirupathi to Chennai. It is situated at distance of 35 km from Tirupathi and 11 km from Nagari and 18 kilometers from Andhra Pradesh's border with Tamil Nadu. Puttur experiences a tropical climate. The weather in Puttur can be distinguished as summer, monsoon and winter. Puttur is very hot during summer. The average maximum temperature in Puttur varies between 28.3°C. The average annual rain fall is about 969mm. The red sandy types of soils are found to occur in most parts of Anantapur, Chittoor, Kadapa and parts of Kurnool district. Red loamy soils mostly occur in the northwestern part of Chittoor district.

#### **Characteristics of the Puttur Municipality**

Puttur is the one of fastest developing town in Chittoor District. Puttur was formed as 3<sup>rd</sup> grade Municipality in June, 2005 through G.O.Ms.No.610 & 611 Dt:24-6-2005 duly merging two major Panchayats and 6 minor Panchayats. The city is developing rapidly owing to its importance as Commercial, Educational centre in the District. Puttur is mandal headquarters as well.

#### **Demography**

The population of the Town is 54092 as per 2011 census. It is observed, there is fast growth in population due to Agriculture Market, Educational & Commercial Institutions and also Mandal Head Quarter.

*Table 2.1 Puttur Municipality at a Glance*

Sl. No	Description	Details
1	ULB Establishment year	2005
2	Area of the town	31.89 Sq.Km



Sl. No	Description	Details
3	No of municipal Wards	24
4	Population of the town (as per 2011 census)	54092
5	Total No. of Households (2011)	13533
6	<b>Roads:</b> CC Roads	56.55 Kms
7	BT Roads	12.68 Kms
8	WBM Roads	2.67 Kms
9	Others	61.81 Kms
10	Total	133.71 Kms
11	<b>Drains - Pucca</b>	
12	Kutcha	45.0 Kms
13	Storm Water Drains	18.23 Kms
14	Present Water Supply	40 LPCD
15	Total Quantity supply daily	2400 KL
16	Total no. of Hand Bore wells	180

## Drainage

The town has no proper drainage system. The main roads of the town are provided with side drains and the drain water is let into Fields. In the absence of adequate drainage system and proper disposal arrangements the sullage water of the town is stagnated in many areas of the town creating mosquito menace.

## Seismic Details of the Area

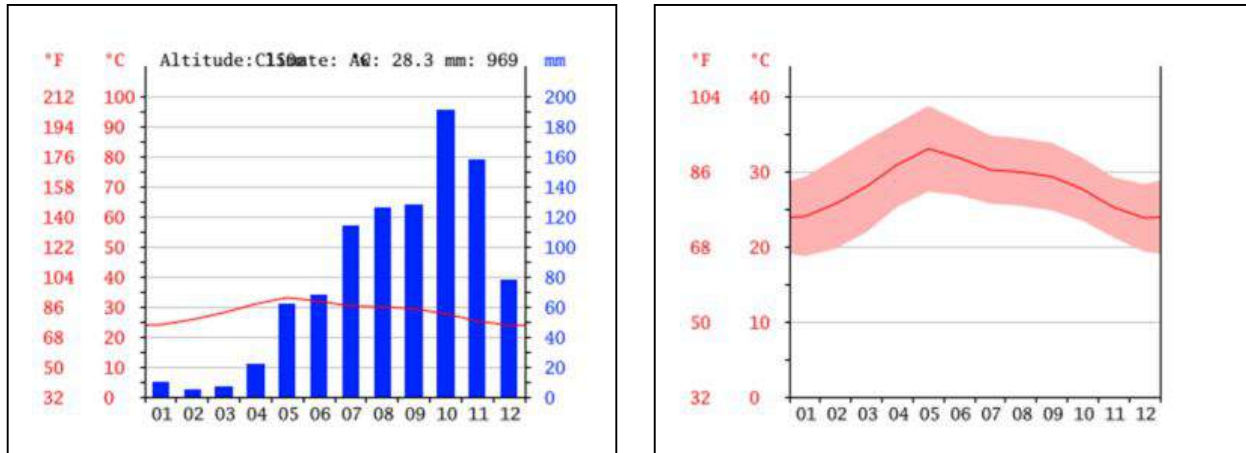
As per the District Disaster Management Plan for Chittoor district prepared by District administration with the support of United Nations Development Program, India, the project area falls in Zone III (moderate seismic zone) as per the latest Seismic Zoning Map of India. The project area however falls in 'moderate' active seismic zone.



## 2.1.2 Meteorology of Puttur

### Temperature, Rainfall

Figure 2.1 Month wise rainfall and temperature details



(Source: <https://en.climate-data.org/asia/india/andhra-pradesh/puttur-172386/>)

The climate here is tropical. In winter, there is much less rainfall in Puttur than in summer. This location is classified as Aw by Köppen and Geiger. The average annual temperature in Puttur is 28.3 °C. Precipitation here averages 969 mm. The driest month is February, with 5 mm of rain. In October, the precipitation reaches its peak, with an average of 191 mm. May is the warmest month of the year. The temperature in May averages 33 °C. At 23.8 °C on average, December is the coldest month of the year.

Puttur has a tropical climate. In winter, there is much less rainfall in Puttur than in summer. The temperature here averages 25.77 °C. The average annual rainfall 1050mm. The driest month is January, with 6mm of rainfall. With an average of 69mm, the most precipitation falls in October. The warmest month of the year is May, with an average temperature of 33.4°C. December has the lowest average temperature of the year. It is 24.1 °C. The graphical representation of month wise rainfall and temperature were placed in Figure 2.1 and overall month wise details were placed in Figure 2.2.



## Puttur monthly weather averages

Figure 2.2 Month wise rainfall and temperature details

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	24	25.7	28	30.9	33	31.8	30.2	29.9	29.3	27.6	26.2	23.8
Min. Temperature (°C)	18.7	19.7	21.9	25.3	27.3	26.8	25.7	25.4	24.8	23.4	21.2	19.3
Max. Temperature (°C)	29.3	31.7	34.2	36.5	38.7	36.8	34.8	34.4	33.8	31.8	29.2	26.3
Avg. Temperature (°F)	75.2	78.3	82.4	87.6	91.4	89.2	86.4	85.8	84.7	81.7	77.4	74.8
Min. Temperature (°F)	65.7	67.5	71.4	77.5	81.1	80.2	78.3	77.7	76.6	74.1	70.2	66.7
Max. Temperature (°F)	84.7	89.1	93.6	97.7	101.7	98.2	94.6	93.9	92.8	89.2	84.6	82.9
Precipitation / Rainfall (mm)	10	5	7	22	62	68	114	126	128	191	158	78

Source: <https://en.climate-data.org/asia/india/andhra-pradesh/puttur-172386/>

The difference in precipitation between the driest month and the wettest month is 186mm. During the year, the average temperatures vary by 9.2°C.

The primary baseline information on different environmental components were collected through field survey. Field survey were carried out to collect information on the major environmental features such as settlement facilities, drainage pattern of the area, forest, trees within RoW of the alignment of pipeline, water bodies, river crossing, sensitive receptors, air, water, noise and soil quality etc. and were studied in detail, which helped in identifying areas of concern along the stretch and critical issues. Consultation with the local officials and public were carried out also on the salient environmental features of the project area.

Further primary samples surveys for the environmental components, such as air, surface water, noise and soil characteristics that are critical in the context of the project were carried out. The pre-monsoon season monitoring was carried out in the months of May to June 2019.

**Ambient Air Quality:** Ambient air monitoring stations were established at various locations along the project section accessing the ambient air quality in the project area. The air quality parameters considered for the study included Particulate Matter (PM<sub>10</sub>), Particulate Matter (PM<sub>2.5</sub>), Nitrogen oxides (NO<sub>x</sub>), Sulphur dioxide (SO<sub>2</sub>), and Carbon Monoxide (CO). The criteria for the selection of sampling sites were based on type of activity, residential, commercial, traffic congestion, urban



centers, location of sensitive receptors etc. 24-hourly monitoring was carried out twice in a week for one season.

**Water Quality:** Grab samples were collected from Telugu Ganga Canal and farm ponds/lakes in the study area of Puttur to assess the surface water quality in the project area. Ground water samples were collected from hand pumps. The water samples were tested for different physico-chemical parameters such as dissolved oxygen, total alkalinity, pH, conductivity, TDS, BOD, COD, etc. using standard methods (APHA, 1998). Bacteriological quality of the water was tested using the membrane filter method (APHA, 1998).

**Soil Quality:** The composite soil samples were collected from different locations in the study area. They were analyzed for relevant physico-chemical parameters using standard analytical methods (Allen, 1989; Anderson and Ingram, 1993; Rowell, 1994) to assess the soil quality of the area.

**Noise Level:** 24 hourly ambient noise level was measured using noise level meter at various key locations of study area during day and nighttime. The selection of sampling locations was based on land use & categorization of the study area. The noise levels have been expressed as an equivalent noise level (Leq), which is the measurement of sound pressure level as the logarithmic averaging time.

**Flora and Fauna Study:** A list of all macroscopic plants and animals is prepared based on field survey covering the entire project site or core area. If any species cannot be identified, photos of the plant and plant parts are taken, and a field note is prepared on the plant for subsequent identification. Data related to the faunal species is collected from secondary data. . Data from field study is recorded the total Floral species are : 53 species for trees, 5 for climbers, 7 for shrubs, 11 for Herbs, 2 for Cactus and 6 species for grasses. Data from field study is recorded the total Faunal species are: 16 species for Mammals, 52 for Birds, 9 for Reptiles, 4 for Amphibians and 3 species of Fishes.

### 2.1.3 Air Quality

After a preliminary reconnaissance of the study area and taking into account of major activities in water supply system & up gradation proposals, it is concluded that no major source of air pollution



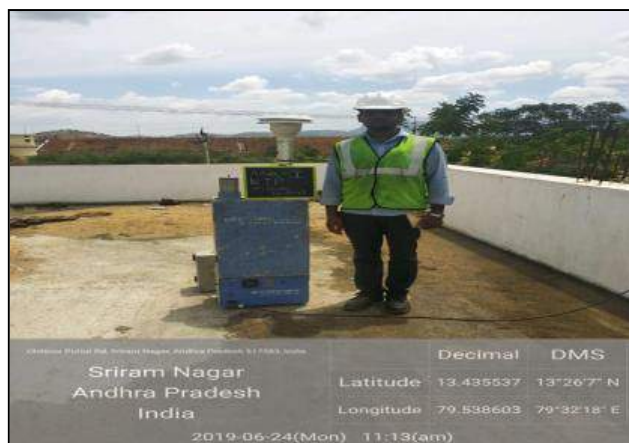


exists in the project area. The other sources identified for air pollution are local traffic, small scale industries and domestic emissions. Ambient air quality in the study area is collected from the two monitoring locations for the assessment of the air quality. The list of air quality monitoring stations in the Puttur Municipality is given in the Table 2.2 and the analysis results of the monitoring were placed in Table 2.3. The photographs pertaining to the monitoring were placed as Figure 2.3.

*Table 2.2 Ambient Air Quality Monitoring Locations*

Location	Name of the Location
AQ-1	Near WTP Area SS tank Puttur
AQ-2	Near Swarna Housing Colony Puttur Near Hanuman Statue

*Figure 2.3 Ambient Air Quality Monitoring Locations in Puttur*



*Table 2.3 Ambient Air Quality sample analysis for Puttur*

S.No.	Parameter(s)	Units	Results Obtained (Range)	NAAQ Standard
1	Sulphur Di-oxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	6.2-9.4	80 (24 Hours)
2	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	13.2-18.7	80 (24 Hours)
3	Particulate Matter size Less than 10 µ	µg/m <sup>3</sup>	42.2-55.9	100 (24 Hours)
4	Particulate Matter size Less than 2.5 µ	µg/m <sup>3</sup>	20.5-28.0	60 (24 Hours)
5	Carbon Monoxide	mg/m <sup>3</sup>	<1.0	4 (1 Hours)

Note: - 1. The standards for RPM, SO<sub>2</sub> and NO<sub>2</sub> are adopted from NAAQ Standards 2009.

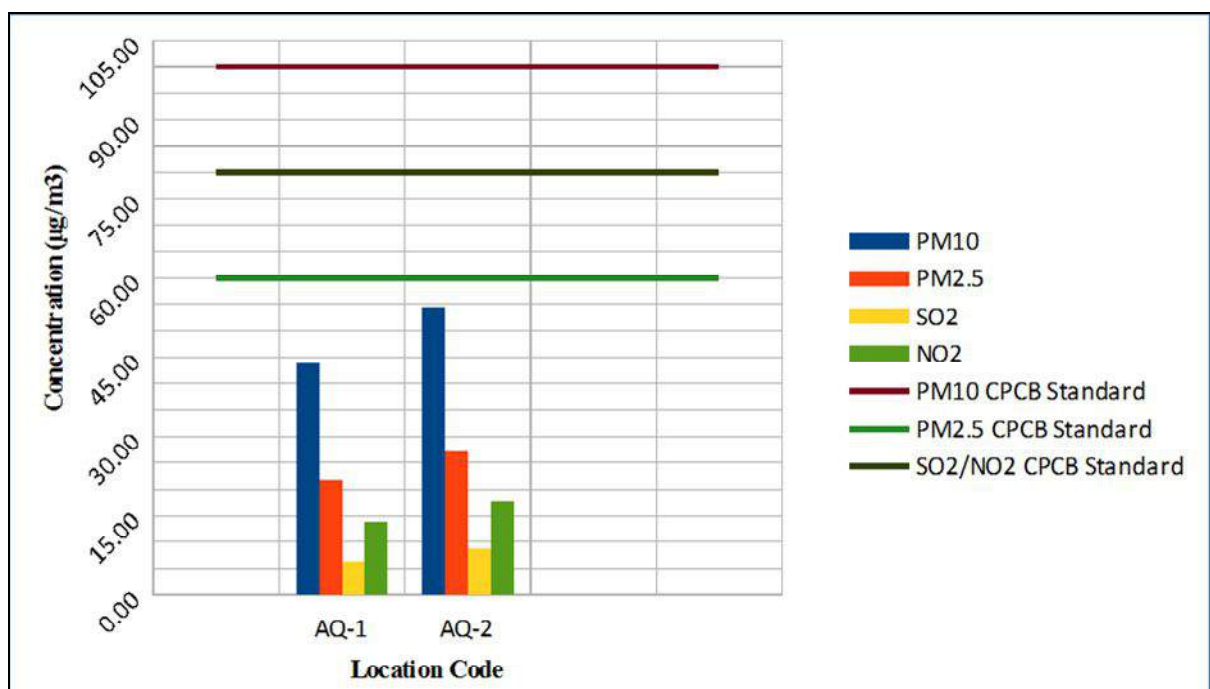


## Results and Discussions:

It is observed from the analysis of Ambient Air quality in the study area as observed from the Table 2.3, The PM<sub>10</sub>, Sulphur Di-oxide and Oxides of Nitrogen values are well within the stipulated standard of 100 & 80 µg/m<sup>3</sup> respectively.

The graphical representation of the analysis results are placed in the Figure 2.4.

Figure 2.4 Graph showing the analysis results of Ambient Air Quality Monitoring at Puttur



### 2.1.4 Noise Pollution

Keeping in view of the proposed up-gradation of water supply system in Puttur Municipality area, the field monitoring of noise level was carried out at four (03) locations. The locations were given below. Precision integrating sound level meter having statistical unit with digital display was used for ambient noise level monitoring. Instantaneous noise quality monitoring was carried out at selected locations. The noise quality monitoring locations and the recorded noise levels are given in Table 2.4.



Table 2.4 Noise Quality Monitoring Locations and the recorded values

Code No.	Category	Name of the location	Day time Noise level dB(A)	Standard for Leq Day dB(A)	Night time Noise level dB(A)	Standard for Leq Night dB(A)
N-1	Residential	Near WTP Area SS tank Puttur	53.20	55	41.90	45
N-2	Commercial	Near Ambethkar Circle Puttur	62.50	65	47.40	55
N-3	Commercial	Near Railway Station Puttur (Commercial)	60.90	55	47.30	45

### Results and Discussions:

The noise levels are observed at various locations covering all the project sub-components in the water supply scheme. At all the locations, the noise levels are found to be consistent. The graphical representation of the Noise quality recorded in the residential category monitoring locations are placed Figure 2.5 and the commercial category monitoring locations are placed as Figure 2.6.

Figure 2.5 Graph showing the analysis results of Noise levels at Residential category locations of Puttur

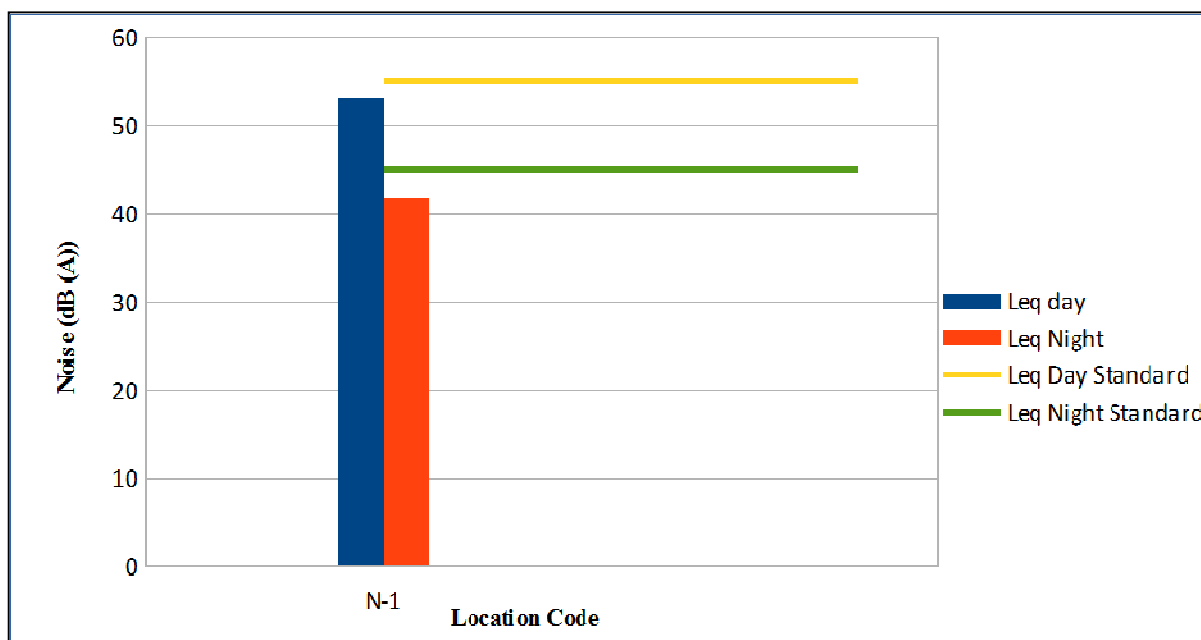
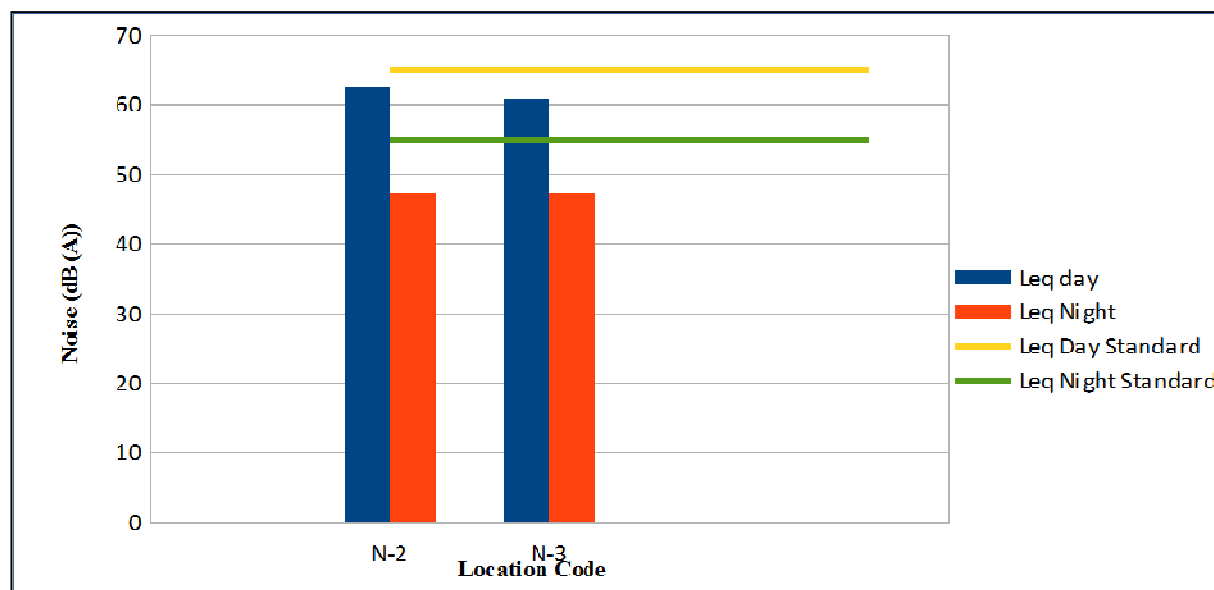




Figure 2.6 Graph showing the analysis results of Noise levels at Commercial category locations of Puttur



## 2.1.5 Water Quality

Drinking water standard parameters as per IS: 3025 standards have been selected for analysis of physico-chemical and bacteriological indicators of pollution which will be used for describing the baseline status of water environment. Generation of baseline data for water quality covers surface water sources. The major water source for Puttur Municipality and environmental issues related to water quality in the study area are given in Table 2.5.

Table 2.5 Major Environmental Issues Related to Water Quality Assessment

S.No.	Environmental water quality related issues	Status
1	Surface water quality sources	Satya Sai Telugu Ganga Canal, lakshmipuram near Tirupathi Water Supply Offtake
2	Ground water sources	Bore wells, tube wells, dug wells (Majority of water is used for irrigation purposes and very less quantity of water used for drinking)
3	Environmental issues in respect of current water supply sources.	In general, the water qualities of the various sources are observed to be good and no major environmental



S.No.	Environmental water quality related issues	Status
		issues are involved from the current sources.
4	Upstream pollution points for the current sources,	No pollution sources are observed.
6	Any pending Public Interest Litigation (PIL) on existing water supply system.	No

### 2.1.6 Source sustainability

Sustainable development implies the fulfillment of preserving the overall balance, concern for the environment, and preventing the exhaustion of natural resources. The evaluation of "sustainability of water supply sources" is essential as it details the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability assessment (SA) is conducted for supporting decision-making and policy in a broad environmental, economic and social context, and transcends a purely technical/scientific evaluation.

Water flows in to a reservoir is a renewable resource. The cycle must be harnessed so that the project continues to generate benefits such as irrigation, flood control, water supply etc., for a long period, certainly decades, preferably a hundred years or more. In the narrow sense, sustainability means the hydro's lifetime should be as long as possible. In the broad sense, sustainability means environmental and social damage has been prevented or offset such that net residual impacts are insignificant. In particular to sustainability of water source system is the maintenance of desired quantity and acceptable quality standard of water supply services throughout the design life may be considered as sustainability.

For Puttur ULB, Government of Andhra Pradesh had accorded permission to allocate and draw 0.300 TMC of water in Satya Sai Telugu Ganga Canal, lakshmipuram near Tirupathi Water Supply Off take for drinking water needs of the Puttur ULB. This permission was issued to meet the drinking water needs as the drinking water needs is first charge. The relevant Government Orders Government of Andhra Pradesh Water Resources (WRG-GRC) Department G.O.RT.NO.302 dated 24.06.2019 letter number From the Chief Engineer, NTR TGP, Tirupati, Lr.No. CE/TGP/TPT/DW/EE1/DEE1/AEE2/AIIB/Puttur water supply/348 Dt: 09.04.2019 by the Water Resources Department, is presented at **Annexure-I**. The source sustainability report incorporated as **Annexure-II**.



## 2.1.7 Surface Water Quality

During field visits to the study area, water samples have been collected at existing & proposed water supply sources like river /canals, clear water sump locations and distribution network locations for assessing the water quality. The sampling locations are designated as SW is listed in Table. These locations were identified considering proximity to the project site, their activities and depending upon their utility by the people in the study area. As a part of the primary surveys, the samples were collected in the month of June 2019 and the samples were analyzed at the NABL approved laboratory. The details of the surface water sampling locations are given in Table 2.6. The surface water sample SW-1 represents the water quality of the Source as the location of the sample is upstream of Satya Sai Telugu Ganga Canal which is about 1 km.

*Table 2.6 Surface water quality sampling locations*

Code No.	Name of the location
SW-1	Near Gullur Cheruvu Puttur
SW-2	Near Puttur Pedda Cheruvu
SW-3	TG Canal (Intake Well)

The photographs showing the samples collection are given in Figure 2.7. The results of the water samples analysis are given in the following Table 2.7.

*Figure 2.7 Surface water sampling in Puttur*







*Table 2.7 Surface Water Quality analysis results in the study area*

S.No	Parameter	Units	Test Method	SW-1	SW-2	SW-3	IS:229 6-Class C Limits	IS 10500:2012 Permissible Limits
1	pH at 25 °C	-	IS:3025 (Part 1) 1983	8.40	7.40	8.50	6.5 – 8.5	NR
2	Color	Hazen	IS:3025 (Part 4) 1983	200	400	30	300	15
3	Conductivity at 25 °C	µS/cm	IS:3025 (Part 14) 1984	894	370	545	--	--
4	Turbidity (NTU)	NTU	IS 3025 (Part 10) 1984	85.0	104.4	8.4	--	5
5	Total Dissolve solids	mg/L	IS:3025 (Part 16) 1984	616	255	376	1500	2000
6	Total Hardness as CaCO <sub>3</sub>	mg/L	IS 3025 (Part 21) 2009	160	70	110	--	600
7	Total Alkalinity	mg/L	IS 3025 (Part 23) 1986	180	60	100	--	600
8	Calcium as Ca	mg/L	IS 3025 (Part 40) 1991	32	12	24	--	200
9	Magnesium as Mg	mg/L	IS 3025 (Part 46) 1994	19.2	9.6	12	--	100
10	Chloride as Cl	mg/L	IS 3025 (Part 32) 1984	100	55	70.0	600	1000
11	Sulphate as SO <sub>4</sub>	mg/L	IS 3025 (Part 24) 1986	108	37.5	60.8	400	400
12	Fluorides as F <sup>-</sup>	mg/L	IS 3025 (Part 60) 2008	0.46	0.24	0.28	1.5	1.5
13	Nitrates as NO <sub>3</sub>	mg/L	IS 3025 (Part 34) 1988	7.8	5.7	6.0	50	NR
14	Sodium as	mg/L	IS 3025	127.4	49.2	70.6	--	--





S.No	Parameter	Units	Test Method	SW-1	SW-2	SW-3	IS:229 6-Class C Limits	IS 10500:2012 Permissible Limits
	Na		(Part 45) 1993					
15	Potassium as K	mg/L	IS 3025 (Part 45) 1993	3.1	2.3	2.7	--	--
16	Iron as Fe	mg/L	IS 3025 (Part 53) 2014	0.12	0.08	0.08	0.5	NR
17	Zinc as Zn	mg/L	IS 3025 (Part 49) 1994	0.026	0.004	<0.001	15.0	15
18	Chemical Oxygen Demand	mg/L	IS 3025 (Part 58) 2006	180	210	30	--	--
19	Silica as SiO <sub>2</sub>	mg/L	IS 3025 (Part 35) 1988	6.2	4.2	4.0	--	--
20	Temperature at site	°C	IS 3025 (Part 9) 1984	26.5	26.6	25.5	--	--
21	Total Suspended Solids	mg/L	IS 3025 (Part 17) - 1984	64.2	81.9	6.8	--	--
22	Ammoniacal Nitrogen as N	mg/L	IS 3025 Part 34 - 1988	0.14	0.22	0.12	--	--
23	Total Kjeldahl Nitrogen	mg/L	IS 3025 Part 34 - 1988	1.80	2.16	1.08	--	--
24	Dissolved Oxygen	mg/L	IS 3025 (Part 38) 1989	3.6	3.2	4.4	≥4.0	--
25	Biochemical Oxygen Demand	mg/L	IS 3025 (Part 44) 1993	58	66	08	≤3.0	--
26	Phosphate as PO <sub>4</sub>	mg/L	IS 3025 (Part 31) 1988	<0.02	<0.02	<0.02	--	--
27	Oil & grease	mg/L	IS 3025 (Part 39) 1991	<0.1	<0.1	<0.1	0.1	--
28	Phenolic	mg/L	IS 3025	<0.001	<0.001	<0.001	0.005	0.002



S.No	Parameter	Units	Test Method	SW-1	SW-2	SW-3	IS:229 6-Class C Limits	IS 10500:2012 Permissible Limits
	Compounds (max)		(Part 43) 1992					
29	Boron as B(max)	mg/L	IS 3025:(Part-57) 2005	0.072	0.054	<0.001	--	1.0
30	Lead as Pb(max)	mg/L	IS 3025 (Part 47) 1994	<0.001	<0.001	<0.001	0.1	NR
31	Arsenic as As(max)	mg/L	IS 3025 (Part-37) 1988	<0.001	<0.001	<0.001	0.2	0.05
32	Mercury as Hg(max)	mg/L	IS 3025(Part -48) 1994	<0.000 1	<0.000 1	<0.000 1	--	NR
33	Cadmium as Cd(max)	mg/L	IS 3025 (Part 41) 1992	<0.001	<0.001	<0.001	0.01	NR
34	Manganese as Mn(max)	mg/L	APHA 23rd Ed 3111-B	<0.001	<0.001	<0.001	--	0.3
35	Total Chromium(max)	mg/L	IS 3025 (Part 52) 2003	<0.001	<0.001	<0.001	0.05	NR
36	Copper as Cu(max)	mg/L	IS 3025 (Part 42) 1992	0.110	0.045	<0.001	1.50	1.5
37	Coliform	MPN/ 100 ml	APHA 23 <sup>rd</sup> Ed 9221 B	7900	7000	1400	5000	Must not be detected
38	Faecal Coliforms	MPN/ 100 ml	APHA 23 <sup>rd</sup> Ed 9221 B	2600	1700	310	--	--

## Results and Discussions

In view of the above results, the existing water quality is found to be potable and fit for drinking. The same water supply sources can also be used for future up gradation of the water supply schemes. The graphical representation of the trends of important parameters like pH, Dissolved



Oxygen, Biological Oxygen Demand, Total Dissolved solids, Chlorides, Sulphates as  $\text{SO}_4$  and Nitrates as  $\text{NO}_3$  are placed as Figures 2.8, 2.9 and 2.10.

Figure 2.8 Graph showing pH values at different surface water sampling locations of Puttur



Figure 2.9 Graph showing DO and BOD trends at different surface water sampling locations of Puttur

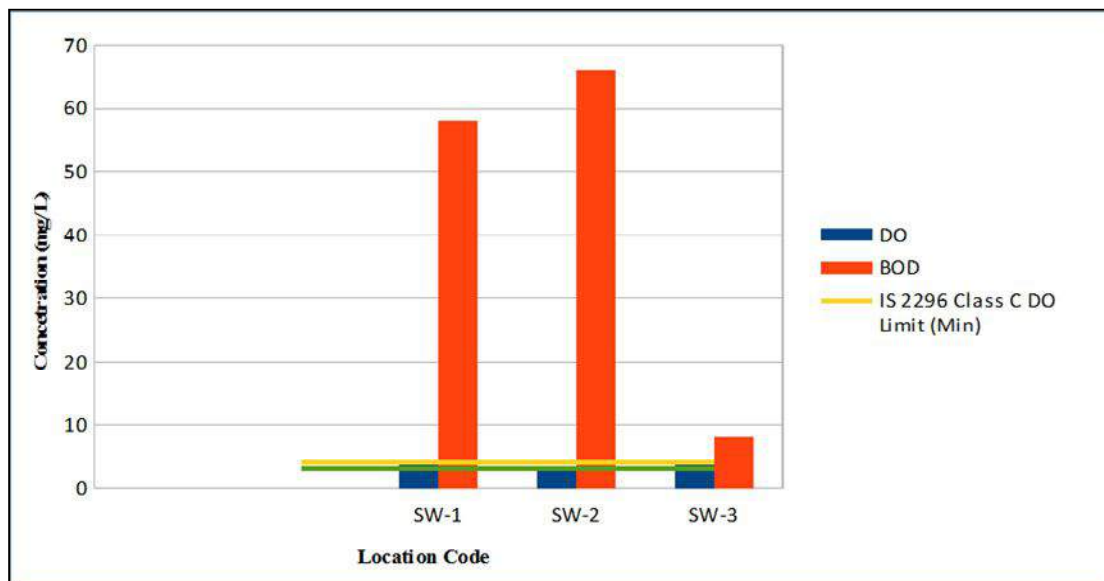
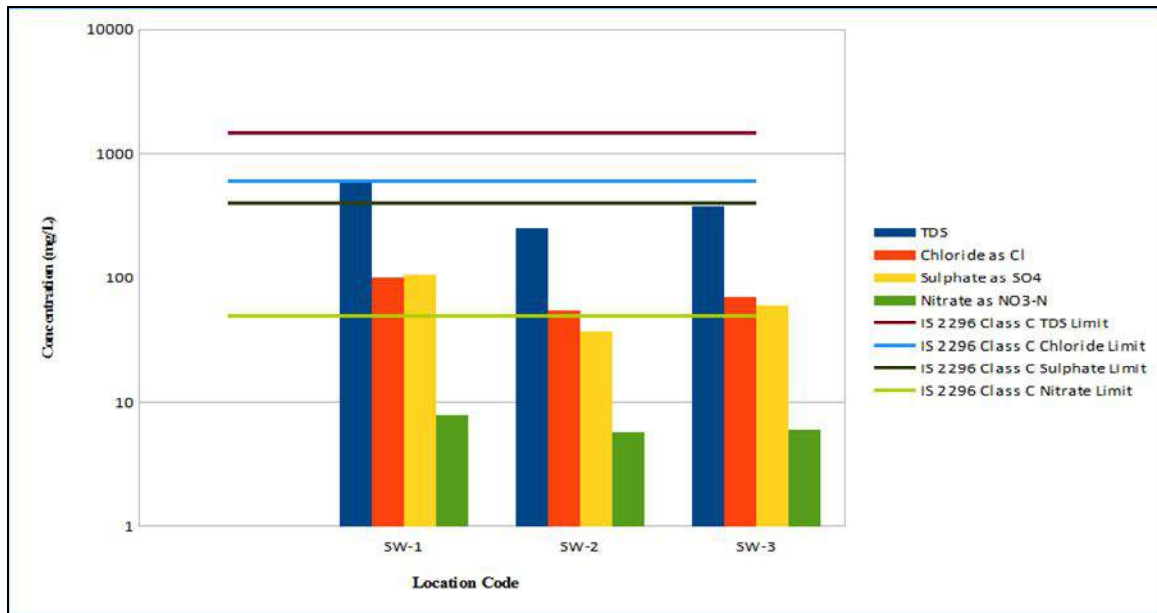




Figure 2.10 Graph showing TDS, Chlorides as Cl, Sulphates and Nitrates trends at different surface water sampling locations of Puttur



## 2.1.8 Ground Water Quality

Ground water is one of the main sources of water supply in the project corridor for domestic, commercial and other irrigation use. Hence the rate of extraction of ground water is at a considerable level. Mostly ground water is used for domestic, drinking, gardening & floor washing purposes in the region. The assessment of the ground water quality in the region is given in the following Table 2.8.

Table 2.8 Ground Water Quality Sampling Locations

Code No.	Name of the location
GW-1	Near Railway Station
GW-2	Near WTP Area SS tank Puttur

The photos pertaining to the ground water sampling are placed as Figure 2.11.



*Figure 2.11 Ground water sampling in Puttur*



The results of the water samples analysis are given in the following Table 2.9.

*Table 2.9 Ground Water Quality analysis results*

S.No.	Parameter	Units	Test Methods	GW-1	GW-2	IS 10500:2012 Drinking Water Specifications	
						Acceptable Limits	Permissible Limits in the Absence of Alternate Source
1	pH at 25 °C	-	IS:3025 (Part 1) 1983	7.50	6.98	6.5 – 8.5	NR
2	Color	Hazen	IS:3025 (Part 4) 1983	<01	<01	5	15
3	Odor	-	IS:3025 (Part 5) 1983	Agreeable	Agreeable	Agreeable	Agreeable
4	Conductivity at 25 °C	µS/cm	IS:3025 (Part 14)1984	1897	1600	--	--
5	Turbidity (NTU)	NTU	IS 3025 (Part 10) 1984	3.46	2.84	1	5
6	Total Dissolve solids	mg/L	IS:3025 (Part 16) 1984	1310	1104	500	2000
7	Total	mg/L	IS 3025	420	520	200	600



S.No.	Parameter	Units	Test Methods	GW-1	GW-2	IS 10500:2012 Drinking Water Specifications	
						Acceptable Limits	Permissible Limits in the Absence of Alternate Source
	Hardness as CaCO <sub>3</sub>		(Part 21) 2009				
8	Total Alkalinity	mg/L	IS 3025 (Part 23) 1986	540	350	200	600
9	Calcium as Ca	mg/L	IS 3025 (Part 40) 1991	56	116	75	200
10	Magnesium as Mg	mg/L	IS 3025 (Part 46) 1994	67.2	55.2	30	100
11	Chloride as Cl	mg/L	IS 3025 (Part 32) 1984	210	225	250	1000
12	Sulphate as SO <sub>4</sub>	mg/L	IS 3025 (Part 24) 1986	91.3	112.8	200	400
13	Fluorides as F <sup>-</sup>	mg/L	IS 3025 (Part 60) 2008	1.24	0.79	1.0	1.5
14	Nitrates as NO <sub>3</sub>	mg/L	IS 3025 (Part 34) 1988	10.4	9.1	45	NR
15	Sodium as Na	mg/L	IS 3025 (Part 45) 1993	237	123	--	--
16	Potassium as K	mg/L	IS 3025 (Part 45) 1993	4.3	4.1	--	--
17	Iron as Fe	mg/L	IS 3025 (Part 53) 2014	0.14	0.16	0.3	NR
18	Zinc as Zn	mg/L	IS 3025 (Part 49) 1994	0.016	0.026	5	15
19	Chemical Oxygen Demand	mg/L	IS 3025 (Part 58) 2006	<02	<02	--	--



S.No.	Parameter	Units	Test Methods	GW-1	GW-2	IS 10500:2012 Drinking Water Specifications	
						Acceptable Limits	Permissible Limits in the Absence of Alternate Source
20	Silica as SiO <sub>2</sub>	mg/L	IS 3025 (Part 35) 1988	8.1	7.4	--	--
21	Temperature at site	°C	IS 3025 (Part 9) 1984	26.3	25.9	--	--
22	Total Suspended Solids	mg/L	IS 3025 (Part 17) - 1984	<01	<01	--	--
23	Ammoniacal Nitrogen as N	mg/L	IS 3025 Part 34 - 1988	<0.1	<0.1	--	--
24	Total Kjeldahl Nitrogen	mg/L	IS 3025 Part 34 - 1988	<0.1	<0.1	--	--
25	Dissolved Oxygen	mg/L	IS 3025 (Part 38) 1989	<0.2	<0.2	--	--
26	Biochemical Oxygen Demand	mg/L	IS 3025 (Part 44) 1993	<01	<01	--	--
27	Phosphate as PO <sub>4</sub>	mg/L	IS 3025 (Part 31) 1988	<0.02	<0.02	--	--
28	Oil & grease	mg/L	IS 3025 (Part 39) 1991	<0.1	<0.1	--	--
29	Phenolic Compounds	mg/L	IS 3025 (Part 43) 1992	<0.001	<0.001	0.001	0.002
30	Boron as B	mg/L	IS 3025:(Part-57) 2005	0.010	0.042	0.5	1.0
31	Lead as Pb	mg/L	IS 3025 (Part 47) 1994	<0.001	<0.001	0.01	NR
32	Arsenic as As	mg/L	IS 3025 (Part-37)	<0.001	<0.001	0.01	0.05



S.No.	Parameter	Units	Test Methods	GW-1	GW-2	IS 10500:2012 Drinking Water Specifications	
						Acceptable Limits	Permissible Limits in the Absence of Alternate Source
			1988				
33	Mercury as Hg	mg/L	IS 3025(Part-48) 1994	<0.0001	<0.0001	0.001	NR
34	Cadmium as Cd	mg/L	IS 3025 (Part 41) 1992	<0.001	<0.001	0.003	NR
35	Manganese as Mn	mg/L	APHA 23rd Ed 3111-B	<0.001	<0.001	0.1	0.3
36	Total Chromium	mg/L	IS 3025 (Part 52) 2003	<0.001	<0.001	0.05	NR
37	Copper as Cu	mg/L	IS 3025 (Part 42) 1992	0.058	0.096	0.05	1.5
38	Total Plate Count	CFU/ml	IS: 5402:2012	Not detected	Not detected	--	--
39	Coliform	CFU/100 ml	IS 15185: 2016	Not detected	Not detected	Must not be detected	
40	Faecal Coliforms	MPN/100 ml	IS 1622: 1981	<02	<02	--	--

## Results and Discussions

It is observed from the analysis of ground water quality in the study area that, the hydrogen ion concentration (pH) varies from 6.98 to 7.50, indicating the slight alkaline nature of ground water. Calcium together with magnesium and carbonates impart the property of hardness to water. The concentration of calcium and magnesium in ground water is within the permissible limits for domestic use. All the other parameters are within permissible limits. The graphical representation of the trends of important parameters like pH, Total Dissolved Solids, Total hardness, Chlorides, Sulphates as SO<sub>4</sub> and Nitrates as NO<sub>3</sub> are placed Figures 2.12, 2.13, 2.14 and 2.15.





Figure 2.12 Graph showing pH values at different ground water sampling locations of Puttur

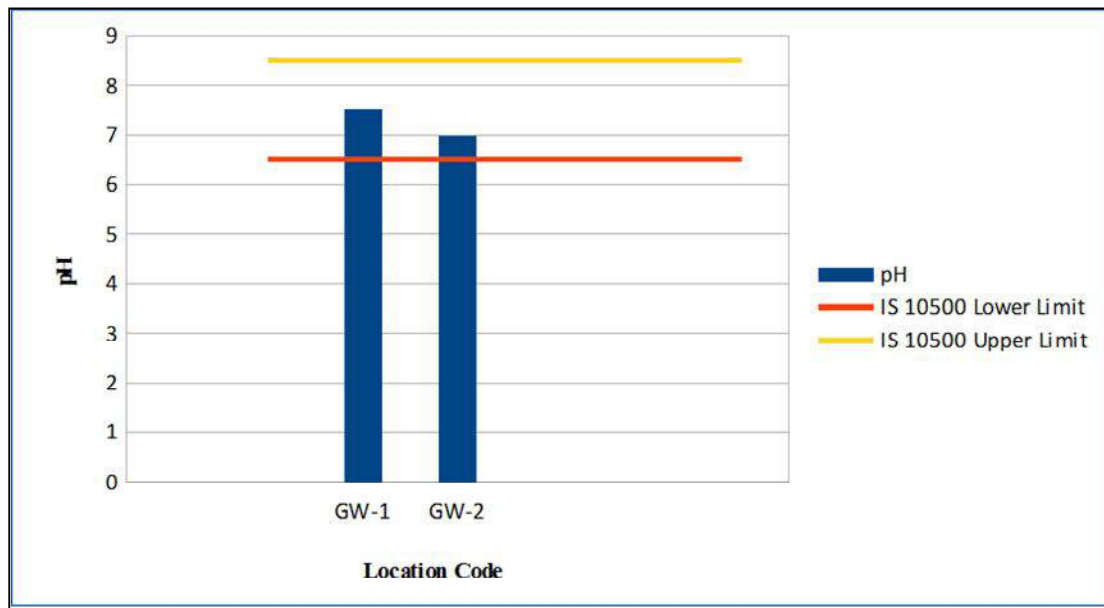


Figure 2.13 Graph showing TDS and Total hardness trends at different ground water sampling locations of Puttur

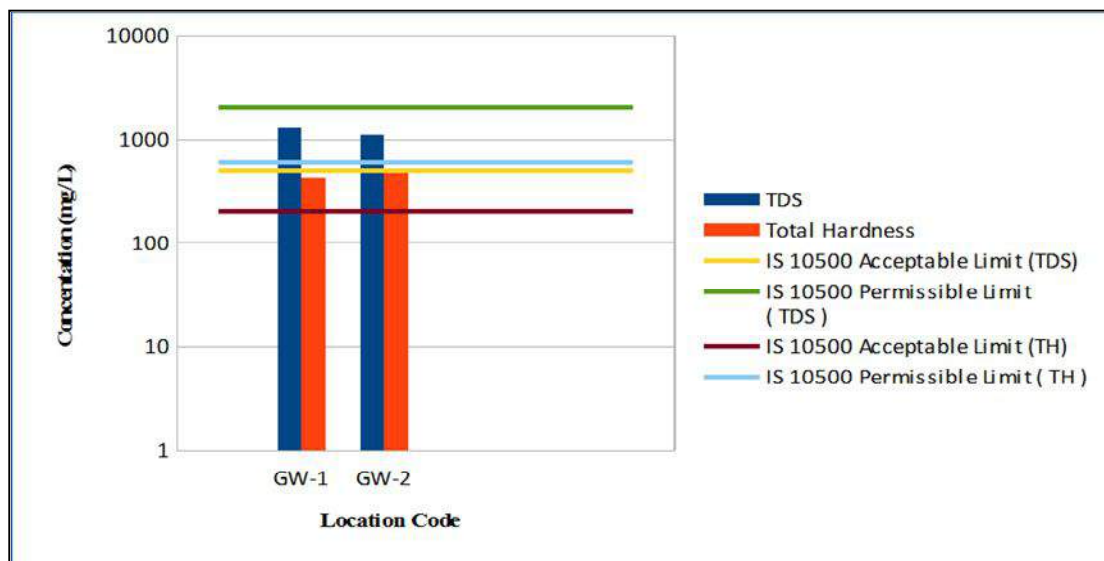




Figure 2.14 Graph showing Chlorides, Sulphate trends at different ground water sampling locations of Puttur

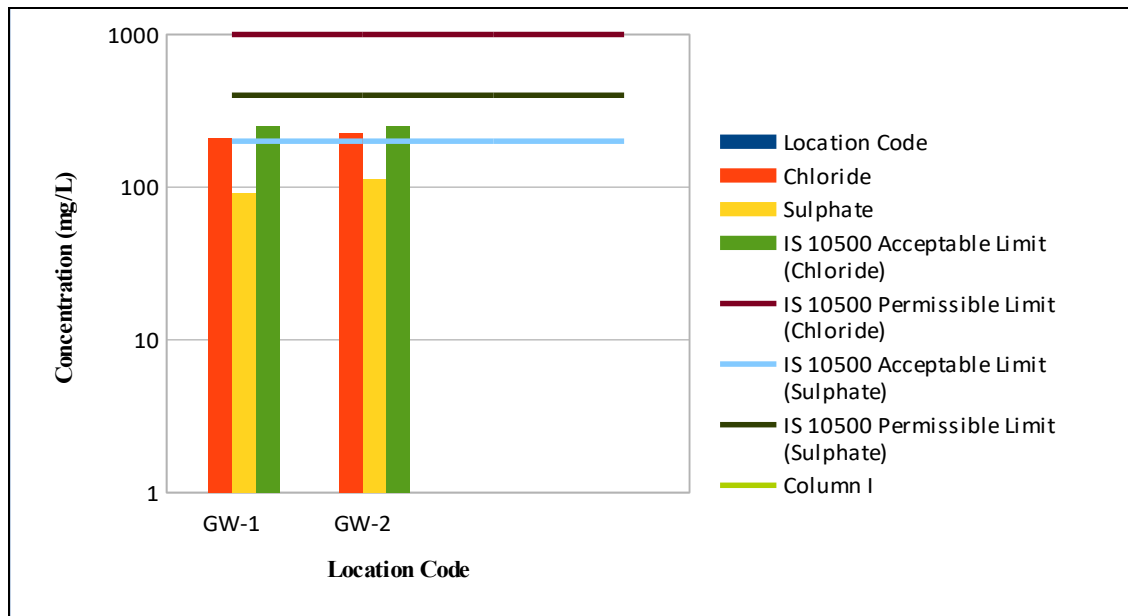
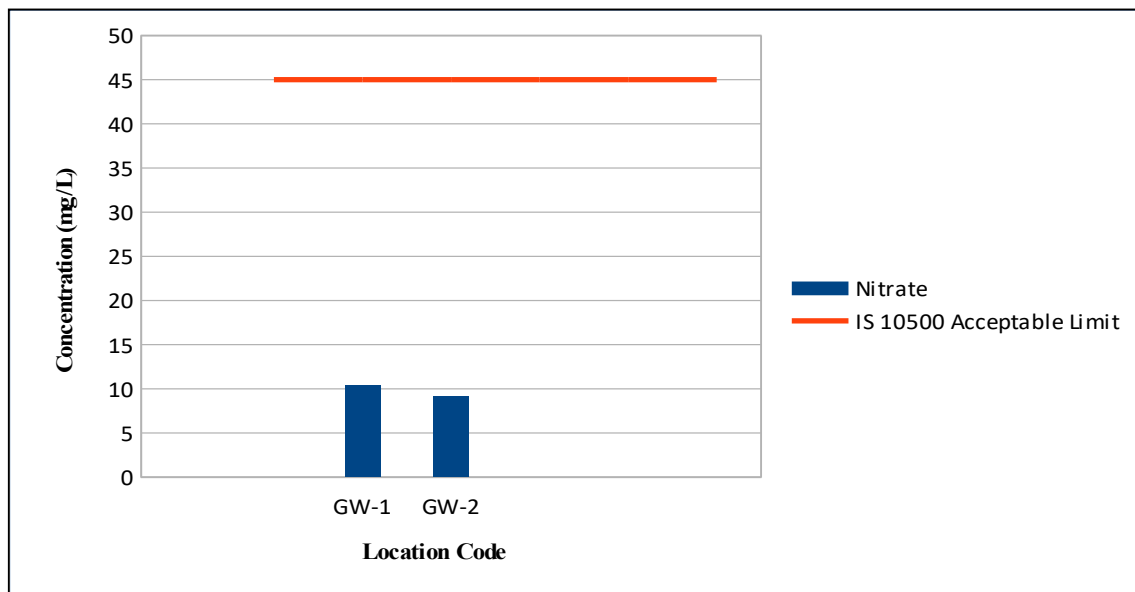


Figure 2.15 Graph showing Nitrates trends at different ground water sampling locations of Puttur





## 2.2 Soils

For land environment, two sampling locations were selected from different villages in the study area to understand the physio-chemical properties of the soil. The activities around the sampling sites are also taken into consideration to understand the sources of pollution if any. Meticulous attention was paid to collect adequate amount of composite soil samples at three depths for analysis. The samples were collected in dependable, waterproof containers and marked accurately, distinctly and brought to the laboratory for analysis. The soil sampling locations and results of the analysis are presented in the following Table 2.10.

*Table 2.10 Soil Quality Sampling Locations*

S.No	Location Code	Location Name
1	SQ-1	Near WTP Area Puttur
2	SQ-2	Near Bharat Petrol Pump Puttur

The photographs of the soil sampling are placed as Figure 2.16.

*Figure 2.16 Soil sampling in Puttur*



The soil analysis results are presented in the following Table 2.11.



*Table 2.11 Soil Quality samples analysis results*

S. No	Parameter	Units	Test Method	S-1	S-2
1	Texture			<b>Sandy Clay</b>	<b>Sandy Clay</b>
	Sand	%	FAO Method 2007	45	41
	Silt	%	FAO Method 2007	16	15
	Clay	%	FAO Method 2007	39	44
2	pH at 25 °C (1:5 Slurry)	-	IS 2729(Part 26):1987	7.96	8.05
3	Conductivity at 25 °C (1:5 Slurry)	µs/cm	IS 14767:2000	155	204
4	Bulk Density	g/cc	FAO Method 2007	1.88	1.90
5	Available Nitrogen	mg/kg	IS 14684: 1999	378	392
6	Available Phosphorus as PO <sub>4</sub>	mg/kg	FAO Method 2007	64	72
7	Available Potassium as K	mg/kg	FAO Method 2007	190	202
8	Exchangeable Ca	meq/100gr	FAO Method 2007	7.88	8.14
9	Exchangeable Mg	meq/100gr	FAO Method 2007	1.14	1.08
10	Exchangeable Na	meq/100gr	FAO Method 2007	2.96	3.06
11	Organic Carbon	%	FAO Method 2007	2.92	3.18
12	Manganese as Mn	meq/100gr	EPA 3050B – 1996	0.14	0.15
13	Zinc as Zn	meq/100gr	EPA 3050B – 1996	2.88	2.90
14	Boron as B	meq/100gr	USEPA 6010 B Dec.1996	0.14	0.12

## Results and Discussions

- The pH values are varying between 7.96– 8.05.
- If soil's Electrical Conductivity (EC) is falling below 1000 micro Siemens, the soil can be classified as normal. In analyzed samples, EC is varying between 155 – 204 µS/cm.
- The available Nitrogen, available Phosphorous and available Potassium in the soil are varying between 378–392 mg/Kg, 64 – 72 mg/Kg and 192 – 202 mg/Kg respectively which are found to be sufficient for the plantation and agricultural purposes.
- The trace metal concentrations are found to be low.



## 2.3 Flora & Fauna

The land use of the study area is characterized by agricultural lands, ponds, canal system. Major part of the land area is being used for rice, sugar cane etc the land is very fertile. The built-up area is characterized by residential, commercial, hospitals, schools, village Panchayats etc.

### 2.3.1 Flora

Puttur falls in Chittoor district of Andhra Pradesh. The major crops in the study area are rice, jowar, bajra, korra, sunflower, red gram, cotton, groundnut, tobacco, chilies, fruits and vegetables. The list of important plant species present in the study area is given in the following Table 2.12.

Table 2.12 List of floral species in the study area

S.No	Scientific name	Local name	Family	As per IUCN Redlist
<b>Trees</b>				
1	<i>Acacia nilotica</i>	Nalla tumma	Mimosaceae	Least concern
2	<i>Achras sapota</i>	Sapota	Sapotaceae	Not Assessed
3	<i>Acacia auriculiformis</i>	Australian Wattle	Mimosaceae	Least concern
4	<i>Aegle marmelos</i>	Maredu	Rutaceae	Not Assessed
5	<i>Ailanthus excels</i>	Pedreservoiraanu	Simaroubaceae	Not Assessed
6	<i>Albizia lebbek</i>	Dirisanam	Mimosaceae	Not assessed
7	<i>Allamanda cathartica</i>	Allamanda	Apocynaceae	Not assessed
8	<i>Alstonia scholaris</i>	Alstonia	Apocynaceae	Least concern
9	<i>Anacardium occidentale</i>	Cashew nut	Anacardiaceae	Not assessed
10	<i>Anogeissus latifolia</i>	Chiru manu	Combretaceae	Not assessed
11	<i>Annona squamosa</i>	Custard apple	Annonaceae	Not assessed
12	<i>Artocarpus heterophyllus</i>	Panasa	Moraceae	Not assessed



S.No	Scientific name	Local name	Family	As per IUCN Redlist
13	<i>Azadirachta indica</i>	Vepa	Meliaceae	Least concern
14	<i>Bauhinia racemosa</i>	Aare chettu	Caesalpiniaceae	Not assessed
15	<i>Bombax ceiba</i>	Buruga	Malvaceae	Not assessed
16	<i>Borassus flabellifer</i>	Taati / Taadi	Arecaace	Not assessed
17	<i>Boswellia serrata</i>	Guggilam	Burseraceae	Not assessed
18	<i>Butea monosperma</i>	Modugu	Fabaceae	Not assessed
19	<i>Carica papaya</i>	Papaya	Caricaceae	Data Deficient
20	<i>Casuarina equisetifolia</i>	Sarvi	Casuarinaceae	Not assessed
21	<i>Cocos nucifera</i>	Coconut	Arecaceae	Not assessed
22	<i>Dalbergia sissoo</i>	Sisso or Seesum	Caesalpiniaceae	Not assessed
23	<i>Diospyros melanoxylon</i>	Tunki	Fabaceae	Not assessed
24	<i>Ficus benghalensis</i>	Marri	Moraceae	Not assessed
25	<i>Ficus racemosa</i>	Medi	Moraceae	Not assessed
26	<i>Ficus religiosa</i>	Raavi	Moraceae	Not assessed
27	<i>Hardwickia binata</i>	Yepi	Caesalpiniaceae	Not assessed
28	<i>Emblica officinalis</i>	Usiri	Euphorbiaceae	Not assessed
29	<i>Lagerstroemia parviflora</i>	Chennangi	Lythraceae	Not assessed
30	<i>Leucaena leucocephala</i>	Subabul	Mimosaceae	Not assessed
31	<i>Citrus limonum</i>	Lime	Rutaceae	Not assessed
32	<i>Mangifera indica</i>	Mamidi	Anacardiaceae	Data Deficient



S.No	Scientific name	Local name	Family	As per IUCN Redlist
33	<i>Mimusops elengi</i>	Pogada	Sapotaceae	Not assessed
34	<i>Morinda pubescens</i>	Togaru	Rubiaceae	Not assessed
35	<i>Moringa oleifera</i>	Munaga	Moringaceae	Not assessed
36	<i>Muntingia calabura</i>	Wild cherry	Elaeocarpaceae	Not assessed
37	<i>Peltophorum pterocarpum</i>	Konda chinta	Caesalpiniaceae	Not assessed
38	<i>Phoenix sylvestris</i>	Eetha	Arecaceae	Not assessed
39	<i>Phyllanthus emblica</i>	Usiri	Euphorbiaceae	Not assessed
40	<i>Pithecellobium dulce</i>	Seema chinta	Mimosaceae	Not assessed
41	<i>Polyalthia longifolia</i>	Ashoka	Annonaceae	Not assessed
42	<i>Pongamia pinnata</i>	Ganuga	Fabaceae	Least concern
43	<i>Prosopis juliflora</i>	English tumma	Mimosaceae	Not assessed
44	<i>Prosopis cineraria</i>	Jammi	Fabaceae	Not assessed
45	<i>Sapindus emarginatus</i>	Kunkundu	Sapindaceae	Not assessed
46	<i>Syzygium cumini</i>	Neradu	Myrtaceae	Not assessed
47	<i>Tamarindus indica</i>	Chinta	Caesalpiniaceae	Least concern
48	<i>Tectona grandis</i>	Teak / Teku	Verbenaceae	Not assessed
49	<i>Terminalia arjuna</i>	Tella maddi	Combretaceae	Not assessed
50	<i>Terminalia catappa</i>	Baareservoir	Combretaceae	Not assessed
51	<i>Thespesia populnea</i>	Ganga Raavi	Malvaceae	Least concern
52	<i>Zizyphus jujuba</i>	Regu	Rhamnaceae	Not assessed





S.No	Scientific name	Local name	Family	As per IUCN Redlist
53	<i>Ziziphus nummularia</i>	Nela Regu	Rhamnaceae	Not assessed
<b>Climbers</b>				
54	<i>Bougainvillea</i>	Paper flower	Nyctaginaceae	Not assessed
55	<i>Cissus quadrangularis</i>	Nalleru	Vitaceae	Not assessed
56	<i>Clitoria ternatea</i>	Sankupushpam	Fabaceae	Not assessed
57	<i>Diospyros chloroxylon</i>	Ulinda	Ebenaceae	Not assessed
58	<i>Quisqualis indica</i>	Rangoon creeper	Combretaceae	Not assessed
<b>Shrubs</b>				
59	<i>Alangium salvifolium</i>	Ooduga	Alangiaceae	Not assessed
60	<i>Calotropis gigantea</i>	Tella Jilledu	Asclepiadaceae	Not assessed
61	<i>Calotropis procera</i>	Jilledu	Asclepiadaceae	Not assessed
62	<i>Cassia auriculata</i>	Tangedu	Caesalpiniaceae	Not assessed
63	<i>Cassia fistula</i>	Rela	Caesalpiniaceae	Not assessed
64	<i>Cascabela thevetia</i>	Patcha ganneru	Apocynaceae	Not assessed
65	<i>Nerium indicum</i>	Ganneru	Apocyanaceae	Not assessed
<b>Herbs</b>				
66	<i>Achyranthus aspera</i>	Uttareni	Amaranthaceae	Not assessed
67	<i>Datura stramonium</i>	Ummetta	Solanaceae	Not assessed
68	<i>Carissa spinarum</i>	Kalivi / Vaaka	Apocynaceae	Not assessed
69	<i>Tephrosia purpurea</i>	Vempali	Fabaceae	Not assessed





S.No	Scientific name	Local name	Family	As per IUCN Redlist
70	<i>Hemidemus indicus</i>	Sugandhapala	Periplocaceae	Not assessed
71	<i>Jatropha glandulifera</i>	Wild Castor	Euphorbiaceae	Not assessed
72	<i>Lantana camara</i>	Makkareservoirbu	Verbenaceae	Not assessed
73	<i>Ocimum sanctum</i>	Tulasi	Lamiaceae	Not assessed
74	<i>Parthenium hysterophorus</i>	Congress grass	Asteraceae	Not assessed
75	<i>Tridax procumbens</i>	Tatapilakaaku	Asteraceae	Not assessed
76	<i>Croton bonplandianum</i>	Gaalivaana mokka	Euphorbiaceae	Not assessed
<b>Cactus</b>				
77	<i>Opuntia dillenii</i>	Naaga Jemudu	Cactaceae	Not assessed
78	<i>Opuntia vulgaris</i>	Nagajemudu	Cactaceae	Not assessed
<b>Grasses</b>				
79	<i>Aristida setacea</i>	Paraka gaddi	Poaceae	Not assessed
80	<i>Eragrostis tenella</i>	Garika gaddi	Poaceae	Not assessed
81	<i>Cynodon dactylon</i>	Lawn grass	Poaceae	Not assessed
82	<i>Cymbopogon caesius</i>	Grass	Poaceae	Not assessed
83	<i>Aristida adscensionis</i>	Grass	Poaceae	Not assessed
84	<i>Bambusa arundanacea</i>	Veduru	Cyperaceae	Not assessed



Figure 2.17 Photographs showing the sites where the trees might get affected



### 2.3.2 Fauna

Based on the secondary survey the faunal species found in the study area is tabulated at Table 2.13. From the study, it has been observed that there are no endangered, endemic or threatened species in the study area.

Table 2.13 List of Faunal species in the study area

S.NO	Scientific name	Common name	Family	As per IUCN status
<b>MAMMALS</b>				
1	<i>Cynopterus sphinx</i>	Short-nosed fruit bat	Pteropodidae	Least Concern
2	<i>Funambulus palmarum</i>	Three striped squirrel	Sciuridae	Least Concern
3	<i>Axis axis</i>	Spotted deer	Cervidae	Least concern
4	<i>Lepus nigricollis</i>	Hare	Leporidae	Least concern
5	<i>Canis lupus pallipes</i>	Wolf	Canidae	Not assessed
6	<i>Bubalus bubalis</i>	Buffalo	Bovidae	Not assessed
7	<i>Hyaena hyaena</i>	Hyenas	Hyaenidae	Near threatened
8	<i>Herpestes edwardsii</i>	Indian grey mongoose	Mungeesa	Least concern
9	<i>Vulpes benghalensis</i>	Fox	Canidae	Least concern



S.NO	Scientific name	Common name	Family	As per IUCN status
10	<i>Macaca mulatta</i>	Rhesus Macaque	Cercopithacidae	Least concern
11	<i>Mus musculus</i>	Home mouse	Muridae	Least concern
12	<i>Sus scrofa</i>	Wild boar	Adavi Pandi	Least concern
13	<i>Capra hircus aegagrus</i>	Goat	Bovidae	Not assessed
14	<i>Melursus ursinus</i>	Bear	Ursidae	Vulnerable
15	<i>Canis lupus familiaris</i>	Dog	Canidae	Not assessed
16	<i>Bos taurus indicus</i>	Cow	Bovidae	Not assessed
<b>BIRDS</b>				
17	<i>Accipiter badius</i>	Shikra	Accipitridae	Least concern
18	<i>Acridotheres tristis</i>	Common myna	Sturnidae	Least concern
19	<i>Aegithinia tiphia</i>	Common Iora	Irenidae	Least concern
20	<i>Ardeola grayii</i>	Pond heron	Ardeidae	Least concern
21	<i>Alcedo atthis</i>	Smallblue kingfisher	Alcedinidae	Least concern
22	<i>Athene brama</i>	Spotted owlet	Noctuidae	Least concern
23	<i>Bubulcus ibis</i>	Cattle Egret	Ardeidae	Least concern
24	<i>Centropus sinasis</i>	Greater coucal	Phasianidae	Least concern
25	<i>Ceryle rudis</i>	Lesser pied Kingfisher	Alcedinidae	Least concern
26	<i>Columba livia</i>	Blue rock pigeon	Columbidae	Least concern
27	<i>Coracias benghalensis</i>	Indian roller	Coraciidae	Least concern
28	<i>Corvus splendens</i>	House crow	Corvidae	Least concern
29	<i>Dendrocitta vagabunda</i>	Indian tree pie	Corvidae	Least concern
30	<i>Dendrocygna javanica</i>	Lesser whistling-duck	Anatidae	Least concern
31	<i>Dicaeum erythrorhynchos</i>	Tickell's flower pecker	Dicaeidae	Least concern
32	<i>Anas poecilorhyncha</i>	Duck	Anatidae	Least concern
33	<i>Dicrurus macrocercus</i>	Black drongo	Dicruridae	Least concern
34	<i>Egretta garzetta</i>	Little egret	Ardeidae	Least concern
35	<i>Elanus caeruleus</i>	Black-shouldered kite	Accipitridae	Least concern



S.NO	Scientific name	Common name	Family	As per IUCN status
36	<i>Eudynamys scolopaceus</i>	Asian koel	Cuculidae	Least concern
37	<i>Halcyon smyrnensis</i>	White-Breasted King fisher	Alcedinidae	Least concern
38	<i>Hierococcyx varius</i>	Brain fever bird	Ardeidae	Least concern
39	<i>Himantopus himantopus</i>	Black-winged stilt	Recurvirostridae	Least concern
40	<i>Hydrophasianus chrugus</i>	Pheasant tailed Jacana	Jacanidae	Least concern
41	<i>Lanius excubitor</i>	Great grey shrike	Daniidae	Least concern
42	<i>Megalaima haemacephala</i>	Copper smith Barbet	Capitonidae	Least concern
43	<i>Merops orientalis</i>	Small Bee eater	Meropidae	Least concern
44	<i>Milvus migrans</i>	Black kite	Accipitridae	Least concern
45	<i>Motacilla alba</i>	White wagtail	Motacillidae	Least concern
46	<i>Motacilla flava</i>	Yellow wagtail	Motacillidae	Least concern
47	<i>Motacilla maderaspatensis</i>	Large pied wagtail	Motacillidae	Least concern
48	<i>Nectarinia asiatica</i>	Purple sunbird	Nectariniidae	Least concern
49	<i>Nectarinia zeylonica</i>	Purple-rumped sunbird	Nectariniidae	Least concern
50	<i>Passer domesticus</i>	House sparrow	Passeridae	Least concern
51	<i>Pericrocotus cinnomomeus</i>	Small Minivet	Phasianidae	Least concern
52	<i>Phalacrocorax carbo</i>	Large Cormorant	Phalacrocoracidae	Least concern
53	<i>Phalacrocorax niger</i>	Little cormorant	Phalacrocoracidae	Least concern
54	<i>Gallinula chloropus</i>	Moorhen	Rallidae	Least concern
55	<i>Prinia inornata</i>	Plain prinia	Cisticolidae	Least concern
56	<i>Prinia socialis</i>	Ashy prinia	Cisticolidae	Least concern
57	<i>Psittacula cyanocephala</i>	Blossom headed Parakeet	Psittacidae	Least concern
58	<i>Psittacula krameri</i>	Rose-Ringed Parakeet	Psittacidae	Least concern
59	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	Least concern
60	<i>Copsychus fulicatus</i>	Indian robin	Turdinae	Least concern
61	<i>Streptopelia</i>	Spotted dove	Columbidae	Least concern



S.NO	Scientific name	Common name	Family	As per IUCN status
	<i>chinensis</i>			
62	<i>Streptopelia decaocto</i>	Eurasian Collared-Dove	Columbidae	Least concern
63	<i>Streptopelia Senegalensis</i>	Little brown dove	Columbidae	Least concern
64	<i>Streptopelia tranquebarica</i>	Red Collared-Dove	Columbidae	Least concern
65	<i>Sturnus pagodarum</i>	Brahminy starling	Sturnidae	Least concern
66	<i>Turdoides caudatus</i>	Common babbler	Timalinae	Least concern
67	<i>Upupa epops</i>	Common hoopoe	Upupidae	Least concern
68	<i>Vanellus indicus</i>	Red-wattled lapwing	Charadriidae	Least concern
<b>REPTILES</b>				
69	<i>Bungarus caeruleus</i>	Common Indian Krait	Katla paamu	Not assessed
70	<i>Calotes versicolor</i>	Garden lizard	Thonda	Not assessed
71	<i>Ahaetulla nasuta</i>	Vine snake	Colubridae	Not assessed
72	<i>Echis carinatus</i>	Saw scaled viper	Viperidae	Not assessed
73	<i>Geochelone elegans</i>	Indian star tortoise	Testudinidae	Vulnerable
74	<i>Hemidactylus flaviviridis</i>	Indian wall lizard	Gekkonidae	Not assessed
75	<i>Naja naja</i>	Cobra	Elapidae	Not assessed
76	<i>Ptyas mucosa</i>	Rat snake	Colubridae	Not assessed
77	<i>Varanus bengalensis</i>	Common Indian Monitor	Varanidae	Not assessed
<b>AMPHIBIANS</b>				
78	<i>Bufo melonosticatus</i>	Common Indian Toad	Bufonidae	Least concern
79	<i>Hoplobatrachus tigerinus</i>	Tiger Frog	Dicroglassidae	Least concern
80	<i>Rana hexadactyla</i>	Green Pond Frog	Dicroglassidae	Least concern
81	<i>Sphaerotheca breviceps</i>	Indian Burrowing frog	Burada kappa	Least concern
<b>FISHES</b>				
82	<i>Channa marulius</i>	Korrameenu	Channidae	Least concern
83	<i>Labeo catla</i>	Boche cheap	Cyprinidae	Least concern



S.NO	Scientific name	Common name	Family	As per IUCN status
84	Labeo rohita	Rohu	Cyprinidae	Least concern

However, the following faunal species are found near to the project sites as shown in Table 2.14.

*Table 2.14 Fauna near project site*

S.No	Scientific Name of the animal	Common name	Family	Classification as per IUCN Redbook
1	<i>Bubalus bubalis</i>	Buffalo	Bovidae	Not assessed
2	<i>Bos taurus indicus</i>	Cow	Bovidae	Not assessed
3	<i>Capra hircus aegagrus</i>	Goat	Bovidae	Not assessed
4	<i>Ovis guineensis</i>	Sheep	Bovidae	Not assessed
5	<i>Canis lupus familiaris</i>	Dog	Canidae	Not assessed
6	<i>Sus scrofa domesticus</i>	Pig	Suidae	Not assessed





## CHAPTER – 3

### PROJECT DESCRIPTION AND ANALYSIS OF ALTERNATIVES

#### 3.1 Existing and Proposed Water Supply System in Project Area

The existing water supply system for Puttur Municipality fulfills demand only for 40 to 50 lpcd. Presently, the town is being supplied with 2.00 MLD of water covering a population of 50,000 (2006 population) with an extended area of 21 Sq. Km with a distance of 35 Kms. Presently, the water is being supplied to the town from these three sources viz.,

##### **Moolakona Infiltration wells**

These are two 6 m dia infiltration wells in the Aruna river which yields a quantity of 0.25 MLD supplied to the town.

##### **Taduku**

Power bores near Sirigurajupalem connected to 40 KL GLBR @ Grampanchayat Office at Taduku supplied a quantity of 0.25 MLD to the town.

##### **Power Bores**

Apart from the above there are 80 - power bores in the town yielding a quantity of 1.48 MLD. Further these are 180 Nos. hand bores yielding quantity of 0.018 MLD.

As seen from the above the total quantity of water generated out of the three sources are 2.0MLD with UFW of 15% and the Existing Service Reservoirs in Puttur Municipality which are in function are 22 no. with total 2040 KL capacity.

The Existing Water Supply Scheme for Puttur Municipality is executed under UIDSSMT Scheme. GNSS Canal was considered as source for executed scheme.



### Major Components Executed under this scheme are:

Storage Reservoir in Puttur Minor Irrigation Tank	2400 ML
Treatment Plant	8 MLD
Clear Water Sump	250KL
Reservoirs	
GLSR at Aretamma gutta	600KL
Balancing Reservoir at Aretamma gutta	600KL
GLSR at NGO Colony Hillock	400KL
ELSR at Govindayapalem	500KL
ELSR at K.M. Agraharam	400KL
ELSR at Turukumitta	400KL
Total	2900KL
Distribution Network - HDPE 110mm – 315mm	47.56Km

### 3.2 Potential Impacts and Risks form the Proposed Water Supply Components

The list of Potential Impacts and Risks form the Proposed Water Supply Components given in the following Table 3.1

*Table 3.1 Impacts/ Risks from proposed water supply components*

S.No	Sources	Potential Impacts/Risks	Mitigation Measures
1	Intake well	Air and Noise pollution expected during construction and during operations phases ,  Aquatic disturbances,  Solid waste issues especially during Construction period	<ul style="list-style-type: none"> <li>i. Excavation of Intake well dust will be generated. Water will be sprinkling.</li> <li>ii. The major noise generating sources are water pumps and diesel generators which will be located at intake points. These intake points are far away from the habitations.</li> <li>iii. The excavated soil during the construction period. The excavated soil is used for construction of road, bunds, low lying area.</li> <li>iv. Phytoplanktons and zooplankton species</li> </ul>





S.No	Sources	Potential Impacts/Risks	Mitigation Measures
			will be taken care. v. The top soil will be preserved
2	DI Pipes	Air and Noise pollution, Plants removal and utilities shifting along alignment, Solid waste issues during construction period	<b>During Construction Period:</b> i. Laying of Pipe line dust arise from excavation, raw material storing. Mitigation measure is sprinkling of water arrangement ii. Noise will be generating during construction period earth moving machines, Trucks etc. iii. Excavated soil will be disposed or backfilling the trenches.
3	Water treatment Plant	Air and Noise pollution, Solid waste issues during construction period  Effluents and sludge during operation period  During construction Period Solid waste and Sludge disposal and Effluent  Generation of Sludge and effluents  Storage of Chemicals such as coagulants, chlorine gas/liquid etc.	<b>During the construction period :</b> i. Excavation of water treatment dust will be generated and raw material handling. Mitigation Measures is water will be sprinkling. ii. Expected noise generating sources during construction periods are heavy machineries, trucks, dewatering pumps etc... However these activities will be executed during day timings and confined to little periods only. iii. The excavated soil during the construction period. iv. Mitigation Measure: The excavated soil is used for construction of road, bunds, low lying area. <b>During Operation Period:</b> i. The WTP effluents shall be characterized for particle composition along with the other chemical parameters. The sludge disposal mechanism will be chosen either by dry disposal or wet disposal depends upon the percentage of particle in the Effluents. The effluents shall also be



S.No	Sources	Potential Impacts/Risks	Mitigation Measures
			<p>characterized to understand about the nature of the effluents and for identification of appropriate technologies such as manure preparation, dry cakes for usage as fuels.</p> <p>ii. Chlorine and bleaching powder are toxic to humans. Ingestions, inhalations, application to body parts, especially to such parts as eyes, nose and mouth is extremely hazardous.</p> <p>iii. The storage, in-plant handling and dosages of chlorine (bleaching powder) must be addressed and procedures set up and guidelines developed for its handling and first aid measures to be introduced for emergencies and the training and operational supervision of system staff.</p>
4	Structures	<p>Construction of Elevated Level Service Reservoirs (ELSR) and other structures</p> <p>Proper storage and handling of raw materials</p> <p>Labor management</p> <p>Risks due to working at Higher elevations</p> <p>Issues related Debris disposal , Tree cuttings, Top soil preservation etc.</p>	<p>i. Raw material storing: Dust will be generating.</p> <p>ii. Mitigation Measure: Water sprinkling the raw materials and proper storage and stacking of raw materials.</p> <p>iii. A separate labor camps shall be set up and organized by contractors near to the project sites. The planned camps shall be maintained as per the approved EHS guidelines and periodic instructions given by supervisory staff.</p> <p>iv. Working at high elevations belt will be provided and necessary precaution will be taken care.</p> <p>v. Tree removal Possibility for Elevated Level Service Reservoirs (ELSR) and other structures of trees and tree composition 1:5 ratio.</p> <p>vi. The excavated top soil will be</p>



S.No	Sources	Potential Impacts/Risks	Mitigation Measures
			<p>preserved.</p> <p>vii. The excavated Soil will be used as backfilling, disposed to low lying area.</p>
5	<p>Pumping mains</p> <p>Distribution systems</p>	<p>Air, Noise, Solid waste pollution during construction periods.</p> <p>Damages caused to the Household stair cases/Ramps/ utilities etc.</p>	<p>viii. Pumping mains: Noise will be generated these are away from localities.</p> <p>ix. Construction related activity such as digging of trenches for lying of pipes can affect the local land system causing silt runoff. Ponding of street surfaces could create problems.</p> <p>x. The mitigation measures are of more precautionary type such as proper and timely back filling of the excavated trenches; reuse of the excavated earth and proper disposal of the surplus excavated soil. The excavated trench will be refilled immediately after laying of pipes and brought back to normal conditions.</p> <p>xi. The expected noise generating sources during construction periods are breakers, batch mix plants, heavy machineries, trucks, dewatering pumps etc... However these activities will be executed during day timings and confined to little periods only.</p> <p>xii. Tree removal Possibility for alignments of trees and tree composition 1:5 ratio.</p> <p>xiii. Broken stair/shop will provided access to their home. Where work is progress by providing pathways and if any losses been considered will pay compensation to shop vendors. Utility damages will be repaired by the contractor</p>



S.No	Sources	Potential Impacts/Risks	Mitigation Measures
6	House hold metering	Leakages  Possibility for drainage contamination	i. Checking the leakages daily and repairing ii. Avoid the drainage contaminations
7	-	Environmental Health and Safety Guidelines during Construction/Operation/Maintenance	Approved EHS guidelines shall be adopted during implementation of the Project.

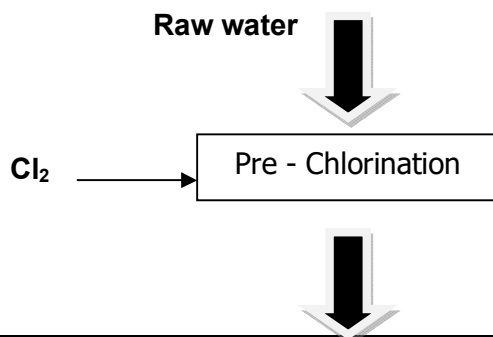
### 3.3 Proposed Water Supply System in Puttur

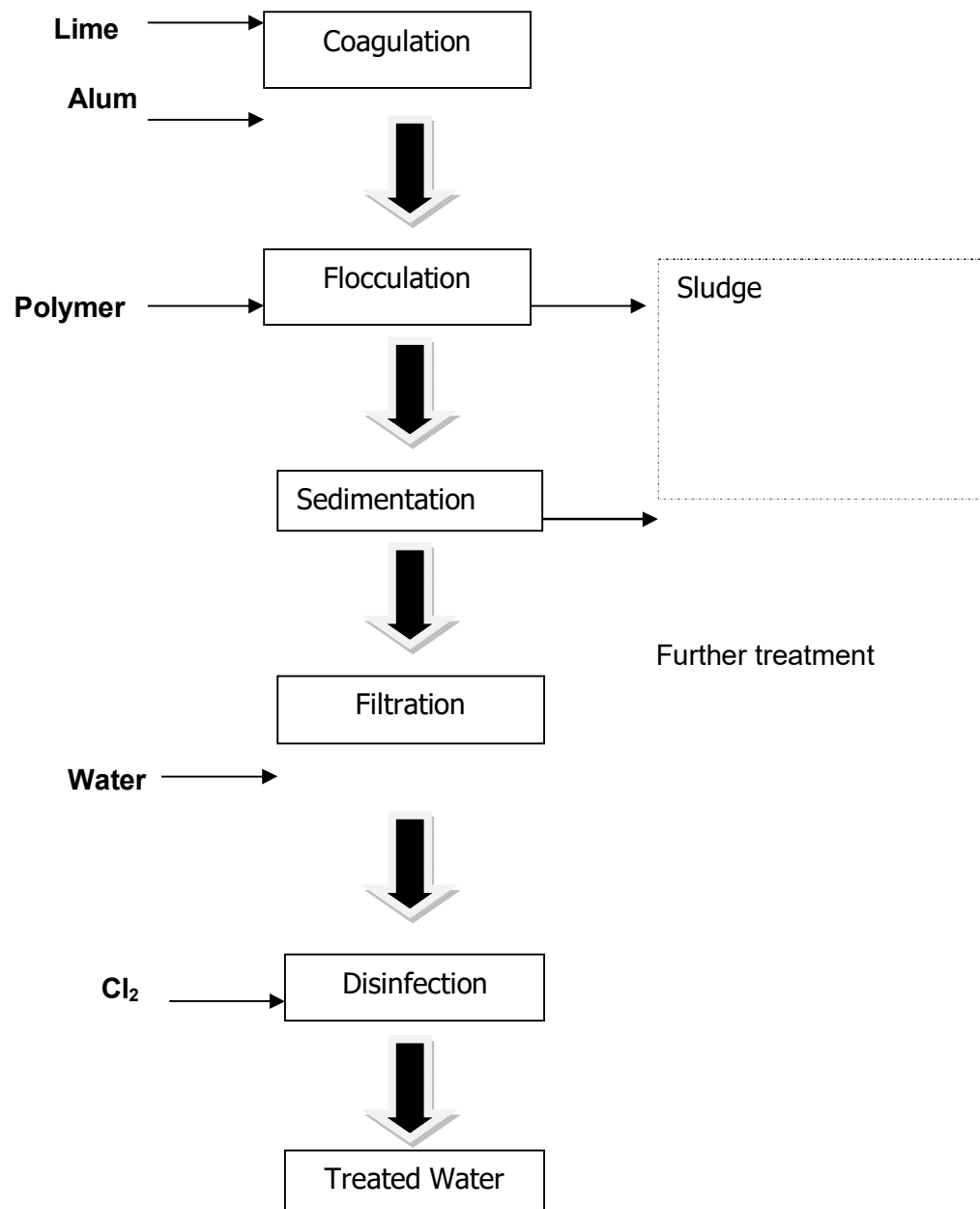
In order to supply portable water and to make functional existing completed scheme, the drawal of the water from the assured and dependable Sri Sai Ganga Canal has been proposed, so as to fillup the existing 2400ML SS tank in 90 days in 2 spells with raw water pumping mains of 700mm dia DI K9.

#### Water Treatment Plant:

The objective of the treatment of water is to produce water which shall be free from pathogenic micro organisms and other toxic components and shall be clear and fresh meaning no smell, no taste, no color and have cool temperature. The treatment process shall be suitable to treat large volume of water and ensure safe and easy operation of the WTP. Typical steps in a conventional water treatment process are given below. The type of treatment to be provided will depend on the raw water characteristics. Conventional Water Treatment Steps in a drinking WTP is shown below Figure 3.1.

*Figure 3.1 Flowchart showing the Water Treatment Process*





## Water Demand

Considering the Sewerage is not contemplated in near future, the demand is estimated as per the CPHEEO Manual. The same is placed in Table 3.2.

The Per capita demand: 135 LPCD

UFW losses: 15%



Transmission losses: 5%

Firefighting: As per the norms & population

Commercial & Industrial demand is considered as the Commercial & Educational Institutions are existing in the town. 5% of demand is taken for Industrial and Commercial.

135 LPCD + 15% UFW Losses (Clear Water Demand)

*Table 3.2 Year wise clear water demand estimate*

S.No.	Component	Base year 2017	Prospective year 2032	Ultimate 2047
1	Population	62772	84473	106173
2	Prorata Water supply	135	135	135
3	Add UFW @15%	20.25	20.25	20.25
4	Prorata Water supply	155.25	155.25	155.25
<b>5</b>	<b>Clear water requirement in MLD</b>	<b>9.75</b>	<b>13.11</b>	<b>16.48</b>

## Raw Water Demand

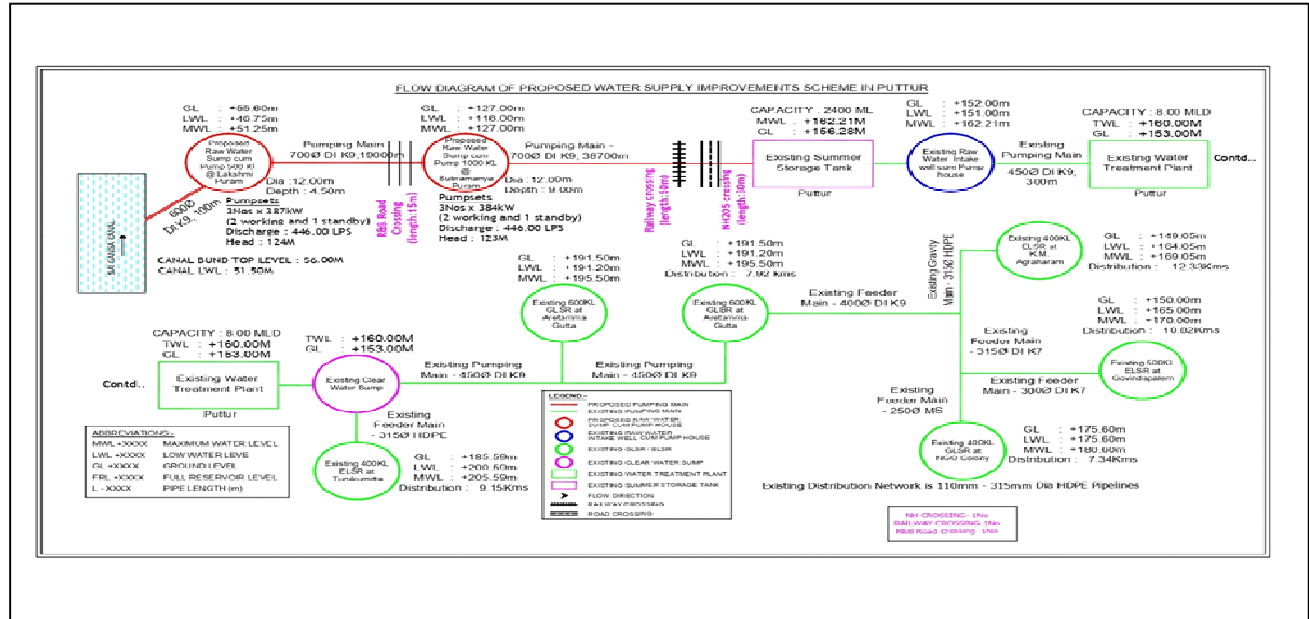
Year wise raw water demand is shown in Table 3.3.

*Table 3.3 Year wise Raw water demand*

S.No	Component	2011	Base year 2018	Intermediate year 2033	Ultimate year 2048
1	Population	62772	84473	106173	62772
2	Per-capita Supply	135	135	135	135
3	Total Clear water requirement in MLD	9.75	13.11	16.48	9.75
4	Raw Water (MLD) with filtration losses @ 5%	<b>10.72</b>	<b>14.43</b>	<b>18.13</b>	<b>10.72</b>
5	Total raw water requirement per day considering SS Tank	<b>27.42</b>	<b>36.89</b>	<b>46.37</b>	<b>27.42</b>

### 3.4 Description of the Sub-Project Components

Figure 3.2 Diagram showing the components of water supply scheme at Puttur



**Source:**

The Satya Sai Telugu Ganga Canalis situated 58 Km away from the town.

The salient features of the Satya Sai Telugu Ganga Canal are as follows:

GL	: + 52.40 M	55.6 M
Canal Bed Level	: + 46.60 M	
Bund Level	: + 52.00 M	56.0 M
MWL	: + 50.73 M	51.25 M





### **Collection Well at Satya Sai Telugu Ganga Canal, lakshmipuram near Tirupathi Water Supply Offtake**

A Collecting well is proposed near Canal at starting point of the Canal. The total raw water requirement for the ultimate year 2047 i.e; 46.370 MLD to be drawn from this Collecting well which is 5.0 m dia.

### **Raw Water Gravity Main from Collection point to proposed SS Tank**

The raw water demand for 2047 is 16.48 MLD. Raw water transmission main is proposed by Gravity up to Lakshmipuram sump cum pump through a DI K7, 600 mm diameter for a length of 100m. The Lakshmipuram sump cum pump capacity is 500KL with 0.446 m<sup>3</sup>/s discharge. The pumping main 700 mm diameter, DI K9 has been proposed from sump at Lakshmipuram to Subramanyapuram sump cum pump with a capacity of 1000KL for a length of 19 Km. Existing summer storage tank is connected with the subramanyapuram sump through a 700 mm DI K9 pumping main over a length of 38.7 Km.

### **SS Tank**

The Existing Summer Storage tank capacity in Puttur is 2400ML, which is sufficient to store 3months water required (i.e. 2270 ML) during canal OFF period. Hence storage reservoirs are not proposed in this scheme.

### **Water Treatment Plant**

There is an existing 8 MLD water treatment plant in Puttur municipality, So no proposal has been taken for new WTP.

### **Chemicals use and Storage at Water works**

There are numerous chemicals used at water treatment plants in the production of drinking water. Hence, it is become imperative to be familiar with the chemicals used at their facilities, specific chemical selection and applications, and safe storage and handling. All chemicals are potentially dangerous and necessary precautions must be taken before handling any chemical.



## **Material Safety Data Sheets (MSDS)**

A Material Safety Data Sheet (MSDS) is the best source of information regarding a chemical. The MSDS is required to be made available to employees and operators whenever there is the likelihood of the hazardous substance or mixture being introduced into the workplace. No chemical should be received, stored or handled without essential safety information being provided to those who come into contact with the substance.

### **The MSDS will provide at least the following information:**

- i. Identification of composition, formula, and common and scientific names;
- ii. Specific gravity, boiling/freezing points, solubility and vapour pressure;
- iii. Incompatible substances and decomposition products;
- iv. Health hazards;
- v. Environmental Impacts;
- vi. Personal Protective measures and engineering/administrative controls; and
- vii. Safe handling, storage, disposal and cleanup procedures.
- viii. Chemical Storage at Waterworks: Water treatment chemicals can be stored in a number of ways including:
  - ix. Solid (dry) form (bags, cartons, drums);
  - x. Liquid form (drums, tanks, cylinders); and
  - xi. Gaseous form (cylinders).

When unloading or transferring chemicals, one has to be especially careful. Moreover, one needs to be familiar with the locations and use of all safety showers and eye wash fountains and test them periodically to be sure they function properly. Wear protective clothing when working with chemicals. Goggles and face shields will protect your eyes and face. Protect other exposed portions of the body by wearing rubber or neoprene gloves, aprons or other protective clothing. Chemical dust can irritate the eyes and respiratory system. Use respirators when appropriate and always use dust collectors if available. Promptly wash down or clean up all chemical spills to prevent falls and/or physical contact with the chemical.



Chemicals should be stored in accordance with the manufacturer's written recommendations and in accordance with the requirements of Hazardous and Other Wastes (Management and Trans boundary Movement) Amendment, Rules, 2019.

The general requirements for storage of hazardous substances in containers that are required for the water treatment plant are as follows:

- i. Containers must be situated in an area which is constructed and maintained to prevent any release from entering a water supply, sanitary sewer or storm sewer or from contaminating any other area.
- ii. Containers must be stored within a building or area outside of a building which is fenced and posted to restrict access and warn of the materials stored within.
- iii. Containers must be clearly marked or labeled.
- iv. Containers must be kept in segregated storage which, in the event of a spill or release, will prevent chemical reactions or fires. Chemicals must also be stored apart from food items.
- v. Certain records and documents must also be kept including MSDSs, an inventory of chemicals (hazardous substances) in storage, records of spills, leaks or unaccountable inventory discrepancies, inspection and maintenance records for leak detection and containment systems at the facility and an emergency response plan in relation to chemicals stored on site.
- vi. Additionally, at least semi-annually, a current copy of the chemical storage inventory must be provided to the local fire department. A copy of the facility chemical storage emergency response plan must be provided to the local fire department either annually or whenever the plan is revised.

### **Chlorine Gas Storage:**

Chlorine is one of the most common chemicals used in the water treatment plant. Chlorine is a strong respiratory irritant, and either prolonged exposure to chlorine gas or high concentrations of chlorine gas could be fatal. Wherever chlorine gas is stored or used, the following safety equipment should be provided:

- i. Shower and eye wash facility;
- ii. Emergency breathing apparatus;



- iii. Chlorine gas detector;
- iv. Floor level vents; and
- v. Fans that maintain a positive air pressure in the storage facility.

The safety equipment mentioned is not a regulatory requirement, but is an important safety consideration. These safety related items are in line with the Occupational Health and Safety Regulations. All water treatment plant operators should be fully trained in chlorine safety and leak detection procedures.

### **Clear Water Pumping and gravity Mains**

The existing Clear water mains are noted down in the following Table 3.4.

*Table 3.4 Pumping /Gravity main from WTP to the Reservoirs*

Pumping/Gravity main location	Diameter & material
Pumping main- CWS to turukumitta	315mm dia HDPE
Pumping main- CWS to Aretamma Gutta	450mm DI K9
pumping main- Aretamma Gutta to Balancing Reservoir at aretamma gutta	450mm DI K9
Gravity main- B.R to K.M reservoir	400mm DIK9 + 315mm HDPE
Gravity main- B.R to Govindapalem Reservoir	400mm DIK9 + 315mm DI K7+ 300mm DI K7
Gravity main- B.R to NGO colony Reservoir	400mm DIK9 + 315mm DI K7+ 250 mm MS

Note: CWS - Clear water sump (existing)

B.R. - Balancing Reservoir

### **Zonal Service Reservoirs**

As the existing 5 no. Service Reservoirs are constructed recently in UIDSSMT, whose condition is good and running, further no new ELSRs are proposed.

### **Clear Water Pumps & Pumping Equipment**

Clear water pumps provided accordingly in the existed scheme to pump clear water to various zonal reservoirs from clear water sump at WTP with Pump Room.



## **Distribution Network**

The existing distribution network of size varying from 110 mm to 315 mm dia of HDPE pipes. So no distribution network has been proposed.

## **House Service Connections**

No House Service Connections has been proposed . The Total no. of HSC s provided are Zero.

## **Sludge generation and disposal**

It is estimated based on the submitted design that an amount of 0.06MLD of sludge will be generated. The generated sludge will be properly utilized after drying it in sludge drying beds. The sludge will be given to the farmers as a fertilizer.

## **Miscellaneous**

All the Miscellaneous items are estimated, and provisions are made in the project such as power lines, staff quarters, protection walls, land acquisition, payments to the other departments etc.,

Comprehensive planning of Puttur town Urban water supply scheme is a medium water supply scheme, which is proposed for implementation in the Base year 2017, designed Intermediate year is 2032 and ultimate year is 2047. The concept plan has been developed based on the outcome of feasibility analysis and decision taken in the meeting held with PH Engineering Dept. and commissioner, Puttur Municipality. The total Project cost is worked out based on the Common SoR Rates for the year 2018-19. The total cost of the project including O&M cost of the seven years excluding power charges has been estimated at 138.72 Crore.

The Proposed and Existing Puttur Water Supply Improvement Scheme consists of the following main components.

- i. Water Supply Source at Satya Sai Telugu Ganga Canal, Lakshmipuram near Tirupathi Water Supply Offtake.



- ii. Proposed 600mm DI K7 for a length of 100m for Raw Water Gravity main (Offtake point to Sump cum pump house at Lakshmipuram)
- iii. Proposed 500KL capacity Raw Water Sump cum Pump House at Lakshmi Puram.
- iv. Proposed 700mm DI K9 Raw water pumping main for a length of 19000m from Sump at Lakshmipuram to Sump at Subramanyapuram
- v. Proposed 1000KL capacity Raw Water Sump cum Pump House at Subramanyapuram.
- vi. Proposed 700mm DI K9 Raw water pumping main from Sump at Subramanyapuram to Existing Summer Storage tank at Puttur town.
- vii. Existing Summer Storage tank capacity in Puttur is 2400 ML.
- viii. Existing Intake cum pump house at SS tank.
- ix. Water Treatment Plant.
- x. Clear water pumping mains to all Service Reservoirs.
- xi. Elevated Level Service Reservoirs (ELSR).
- xii. Distribution System
- xiii. Household Connection with Metering
- xiv. O&M for seven years

**The hydraulic designs are carried out of the following components:**

- i. Raw Water Rising Main
- ii. Clear Water Rising Main
- iii. Distribution System
- iv. Water Treatment Plant

### **3.5 Analysis of Alternatives**

#### **Summary of Alternative Analysis**

Since the scope of the project is laying of rising mains, construction of water storage reservoirs, laying of pipes for distribution, the environmental impact is low. Practically in all the isolated project locations, government land is considered, therefore displacement of any community does not arise, or no alternative sites need to be selected. The laying of pipeline will be done within Right of Way (ROW) which results no encroachment of land in project area near Puttur. In the screening exercise,



areas of concern- congested place on the sides of the road, existence of sensitive area, extent of physical displacement if any, etc. was studied in detail. The findings have been used as inputs for engineering design to change the alignment of pipeline within the technical requirements and cost effectiveness. The criteria selected for selection of alternatives from Draw off well to Distribution is given in the Table 3.5.

*Table 3.5 Summary of Alternative analysis*

<b>Working components</b>	<b>Location options</b>	<b>Selected option</b>	<b>Reason of selection</b>
Draw off well	Construction of proposed intake well at Satya Sai Telugu Ganga Canal, lakshmipuram near Tirupathi Water Supply Offtake on river Tungabhadra to meet the proposed project requirements.	Location at Satya Sai Telugu Ganga Canal, lakshmipuram near Tirupathi Water Supply Offtake	Plain land owned by the government no additional analysis is required as this is the best place to tap the water from the source.
Raw water rising main from Draw off well to WTP	This is planned to transmit raw water to WTP by pumping.	Shortest route, design consideration and minimal social and environmental issues.	Follow along the road alignment/ vacant land – no impact on agricultural land Easy to access near project sites No land acquisition is needed Alignment selected as per design considerations.
Seven Service Reservoirs (ELSRs)	Proposed to construct one new distribution reservoir of 900 KI at Mannar Poluru in Zone-1, 1200 KI at Kalakshetram in Zone-2, 300 KL at Sullur Harijanawada in Zone-2, 1100 KI at Raghavayya pond in Zone-3.	Selected as per the design considerations and also for meeting 40% demand by 2033.	8 Zones divided in the Puttur area. Service Reservoir locations selected on the basis of design at different zones and as per the availability of Govt. land for construction. These sites are selected because they are at a higher topographic level.





<b>Working components</b>	<b>Location options</b>	<b>Selected option</b>	<b>Reason of selection</b>
Distribution line	Will be provided along the entire road system in Puttur Municipality for a length of 75.83 Km by covering unserved and replacement areas.	Mandatory to provide water to complete Puttur Area.	Since water is to be supplied to the complete Puttur area, no additional alternative analysis is required.
Water Treatment Plant (Existing)	Mangalampadu village	Mangalampadu village	Since the option is near to the town and land is filled only with Thorny bushes.



## **CHAPTER – 4**

### **KEY ENVIRONMENTAL IMPACTS**

#### **4.1 Identification of Impacts**

The purpose of the impact statement is to study and provide information on the nature and extent of environmental impacts arising from the establishment and operation of proposed project and proposing the mitigation measures for the identified impacts. This information shall contribute decisions on the following;

Overall acceptability of any adverse environmental consequences that are likely to arise as a result of the proposed project. Conditions and requirements for the detailed design, establishment and operation of the proposed projects to mitigate against adverse environmental consequences wherever practicable and acceptability of minimized impacts after the proposed mitigation measures is implemented.

The environmental impact study of the establishment activity shall cover all developments within the proposed project sites and any other works associated with these developments outside the study area. The impact prediction shall include specific impacts namely; air quality impact, water pollution impacts, noise impacts, impacts due to solid waste etc.

Most of the individual elements of the sub-project are relatively small and involve straight forward construction and operation, so impacts will be mainly temporary and localized in nature. The proposed project enhances the public health of the project area.

However, the impact study is carried out for the 1) establishment / construction phase and 2) operation phase of the project. The environmental impacts arising from the development on air, water, soil, noise, traffic and socio-economic conditions are systematically examined and evaluated.



## 4.2 Potential Environmental Impacts and Rises during Construction Phase

*Table 4.1 Potential environmental Impacts and Rises during Construction Phase*

S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
<b>Physical Environment</b>			
1	Landslide, Soil Erosion and Disturbance of Land	Construction related activity such as digging of trenches for laying of pipes can affect the local land system causing silt runoff. Pending of street surfaces could create problem.	<ul style="list-style-type: none"> <li>i. Solid waste will be generated, which is about <b>6.35 MT</b> per day.</li> <li>ii. Disposal of solid waste to nearest temporarily identified low-lying areas very near to the project construction area.</li> <li>iii. Timely back filling of the excavated trenches;</li> <li>iv. Reuse of the excavated earth and proper disposal of the surplus excavated soil.</li> <li>v. The excavated trench will be refilled immediately after laying of pipes and brought back to normal conditions.</li> </ul>
<b>Water Quality</b>			
1	Water Quality	Impairment of receiving water quality due to construction activity.	Ensure proper cleaning of construction material and completion of the work before opening to operation
2		Raw Water Rising Main; Clear Water Rising Main; Distribution System; Water Treatment Plant; The Existing Water Treatment Plant is proposed	<ul style="list-style-type: none"> <li>i. Calculated based on the design provided by the agency that the amount of sludge generated will be <b>0.06 MLD</b>.</li> <li>ii. The collected sludge can be used as a fertilizer.</li> </ul>
3		Water supply activity Impairment of receiving water quality due to mixing of wastewater from domestic waste.	The ULB's water supply system is strengthened by Existing WTP to treat the water.
4		Nuisance due to clogging of pipes and formation of mosquito breeding grounds	<ul style="list-style-type: none"> <li>i. Ensure timely maintenance of distribution lines.</li> </ul>



S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
		at water leaked areas	ii. Create awareness among people on how to use the water supply scheme properly and how to report about leakages etc.,
5	Drainage and Waste /water	The ULB predominantly depends on storm water drains for disposal of domestic waste waters. However, sometimes these storm water drains joins in to nearby water bodies and get the water bodies polluted.	A well planned and designed Sewage Treatment plant (STP) is required to protect the water bodies by treating <b>4.0 MLD</b> of sewage (At present <b>0.90 MLD</b> and after commission of APUWSSMIP <b>3.0 MLD</b> of Sewage).
6	Improved Health and Hygiene	Deteriorating water quality and unsanitary conditions are often the causes of water borne communicable diseases. The people in the project area are mostly dependent on water from existing sources such as , wells, tube wells etc. which have high chances of hardness in water more than the standards and contamination.	After the implementation of the project, the health and hygiene of the local people will improve and help reduce occurrence of water borne diseases in the area.
<b>Air and Noise Quality</b>			
1	Air and Noise Quality	Trucks, tractors and other vehicles used for the transportation of construction materials will create noise and release emissions.  The excavation activities will also release dust.  All these effects are temporary and will last for the construction period only.	i. The workers exposed to more than 90-db noise level must be provided with ear plugs.  ii. The vehicles used for transportation must be checked for its condition.  iii. The equipment will be checked by technicians before the commencement of work and working at night with equipment producing high noise will be prohibited.  iv. To minimize dust and particulate matters, sprinkling of water will be done and the construction



S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
			<p>materials will be covered during transportation to avoid dust generation.</p> <p>v. Also open burning of solid wastes generated particularly from labor camps and construction activities will be completely banned.</p>
2	Air and Noise Quality	<p>Noise, vibration and dust from construction activities. Protection of residential / sensitive receptors.</p> <p>At the construction of Intekewell structures, ELSR's , Pipe line laying works dust will be arises</p>	<p>i. Use of less noise generating equipment for all activities, provision for personal protective equipment, earmuffs, etc. for construction laborer's;</p> <p>ii. Provision of enclosing generators and concrete mixers at site.</p> <p>iii. Water spraying activity thoroughly implementing to the work activity zones to arrest the air borne dust.</p> <p>iv. The major noise generating sources are water pumps and diesel generators which will be located at intake points. These intake points are far away from the habitations. The Other expected noise generating sources during construction periods are breakers, batch mix plants, heavy machineries, trucks, dewatering pumps etc... However these activities will be executed during day timings and confined to little periods only.</p>
<b>Biological Environment</b>			
1	Degradation of Cultivated Land and Vegetation	<p>The major structures of the project will be constructed on the land acquired by ULB.</p> <p>There will be no major disturbance of vegetation</p>	<p>i. Minimization of vegetation clearing and careful cutting of ground vegetation will be done. In view of the Andhra Pradesh WALTA act, we need to provide twice the number of each tree</p>



S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
		and There are <b>25 nos. of native plants</b> having girth size less than 30 cm needs to be cut for proposed project construction works. Some of the topsoil and vegetation may be lost during pipe laying works.	cut.  ii. But it is proposed to plant <b>125 nos. of saplings</b> in the project which works out to be more than the stipulated norms. These plants will be planted at the empty areas around ELSR, GLBR areas.
<b>Socio-Economic Environment</b>			
1	Employment Generation	Socio Economic Impact	i. The project will generate direct employment opportunities to the local people of the area.  ii. The amount of money earned by the local people will directly affect the local economy thereby reducing the chances of seasonal migrations of the local people.  iii. The project will provide short term direct employment benefits to the majority of the construction workers and even long term employment to few workers during the operation of the project
2	Skill Enhancement	Socio Economic Impacts ;	i. The construction of the project will not only provide direct employment opportunities but also ensure the transfer of skills and technical proficiency to the local workforce.  ii. The project activities such as constructing tanks, drains, and slope stabilization methods will provide transferable skills.
3	Local Trade and Business Opportunities	Socio Economic Impacts;	i. In order to meet the food and other demands of the construction workers, there will be opportunities to establish small tea shops and eating places



S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
			<p>around the vicinity of the project area.</p> <p>ii. The demand of the local food items; beverages and other necessary items of the workshop will provide direct benefits to the supplier, farmers and retailers.</p>
4	Increased Economic Opportunities	After the construction of the project, due to improved living conditions, there could be increased migration towards the town from surrounding rural areas which will create opportunities for shops and other business activities in the area.	Due to increased economic opportunities, the land value of the area could increase which will uplift the economic status of the local people.
5	Benefits to Women	Socio Economics Impacts;	<p>i. Women and girls are mainly responsible for household activities such as fetching water and cleanliness.</p> <p>ii. Improved water supply will improve the health and hygiene of women, girls and the entire household members.</p>
6	Impact to Local Residents	The construction related activities that generates dust, noise and impede access could disturb the local residents. It may also create traffic problems due to traffic jams near the construction site.	<p>i. The local residents will be consulted and informed about the disturbances in advance.</p> <p>ii. Temporary diversions and signboards will be provided for the pedestrians.</p> <p>iii. Traffic management will be done to mitigate the impacts.</p>
7	Problems from Outside Work Force	Haphazard disposal of solid waste and improper sanitary conditions generated by the construction workers .	i. Mechanism of safe disposal of waste will be developed in the project site and construction camps before the actual commencement of work and unwanted littering and discharge





S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
			<p>of waste will be prohibited.</p> <p>ii. A dustbin in the work site will be provided to collect the waste and then finally disposed to a solid waste carrying vehicle which eventually will be discarded.</p> <p>iii. A separate labor camps shall be set up and organized by contractors near to the project sites. The planned camps shall be maintained as per the approved EHS guidelines and periodic instructions given by supervisory staff. These camps shall also be maintained as per the the COVID -19 pandemic guidelines issued by Government of India and Government of Andhra Pradesh and other project authorities.</p> <p>iv. The project required amenities and facilities shall be provided to the labors by the contractors. Necessary health checkups and awareness programs shall be provided. The necessary precautions on the gender base violence, sanitation, health etc. shall be taken care by the contractor as per norms.</p>
<b>Occupational Health and Safety</b>			
1	Occupational Health and Safety	During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and accidents	<p>i. A site health and safety plan will be prepared encouraging the use of safety measures and personal protective equipment (PPE).</p> <p>ii. The labourer will be insured for their health and safety.</p> <p>iii. A first aid box will be kept at a proper and easily accessible place.</p> <p>iv. The general public will be</p>



S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
			excluded from all the construction sites.
<b>Operational Phase (O&amp;M)</b>			
1	Inadequate Operation and Maintenance	Under suboptimal operations, the Project will create hazards in term of the overall delivery of the outputs and safety of the personnel. Under such conditions the existence of the Project will be at risk. The people consuming water from such sources will be at higher risks as the whole population will be consuming the same water.	<ul style="list-style-type: none"> <li>i. In order to avoid such a state regular O&amp;M of water treatment plants including chlorinators;</li> <li>ii. Regular water quality monitoring of water in the distribution system; Immediate action in case of water quality problems;</li> <li>iii. And training and Operational supervision of system staff will be conducted.</li> </ul>
2	Toxic Chemical Hazard	Chlorine and bleaching powder are toxic to humans. Ingestions, inhalations, application to body parts, especially to such parts as eyes, nose and mouth is extremely hazardous.	The storage, in-plant handling and dosages of chlorine (bleaching powder) must be addressed and procedures set up and guidelines developed for its handling and first aid measures to be introduced for emergencies and the training and operational supervision of system staff.
3	Repair and Maintenance	<p>Repair of pipe networks will disrupt business in the market area and will be a nuisance to the public.</p> <p>The workers and the public will be at risks from accidents.</p>	<ul style="list-style-type: none"> <li>i. In order to avoid such issues people of the area should be informed of any work in advance and avoid work during sensitive times;</li> <li>ii. Provide walkways/bridges for people and vehicles if trenches have to be dug;</li> <li>iii. Provide diversions with the help of the police;</li> <li>iv. Complete works quickly in sensitive areas. Also workers are to be provided with health and safety measures to avoid risks from accidents at sites during pipe repairs and installation of new connections.</li> </ul>



S.No	Project Component	Identification of Quantified environment Impacts & Risks	Suggested Mitigation Measures
4	Sludge Management	The sludge produced during the operation of the treatment plant, if disposed haphazardly will create an unsanitary situation and effluent after backwash water after treatment will create soil erosion.	<ul style="list-style-type: none"><li>i. A small sludge collection pit will be designed and proposed at the drain to collect the washed sludge.</li><li>ii. The collected sludge can be used as a fertilizer.</li><li>iii. The WTP effluents shall be characterized for particle composition along with the other chemical parameters.</li><li>iv. The sludge disposal mechanism will be chosen either by dry disposal or wet disposal depends upon the percentage of particle in the Effluents.</li><li>v. The effluents shall also be characterized to understand about the nature of the effluents and for identification of appropriate technologies such as manure preparation, dry cakes for usage as fuels etc.</li></ul>

### 4.3 Impacts During Construction And Operation Stages:

#### Air Quality Impacts:

Air quality impacts associated with the establishment / construction and operation of the proposed Water Supply are studied. Worst case impacts on the representative receivers have been assessed. Two major sources of air pollution have been identified namely construction dust emission and road traffic emissions. The sources of air pollutants at the different phases of the development are categorized as follows;

#### Establishment / Construction Phase Impacts



The principal potential source of air quality impact arising from the establishment / construction of the proposed project is fugitive dust generation. The dust, measurable as Total Suspended Particulate Matter and Respirable Suspended Particulates would be generated as a result of construction activities during the construction phase of the projects.

The potential dust sources associated with construction activities are loading and unloading of the materials, topsoil removal, travel over unpaved roads and wind erosion etc. The construction works associated with the proposed development are broadly given below.

- i. Site development and foundation works including excavation
- ii. Dust generation due to vehicles bringing raw materials
- iii. Un loading of raw materials, removal of unwanted waste material from site

From the above activities it is not expected any significant impacts on the air quality of neighborhood. However, adequate mitigation measures are suggested to overcome the air quality issues.

### **Operation Phase Impacts**

Absolutely no impact on air quality is expected during operation phase of the project.

### **Water Quality Impacts:**

#### **Establishment / Construction Phase Impacts**

Source of Water Supply is Ramateertham Balancing Reservoir. The construction activity of the Water Supply will not have any impact on water environment in the project area.

#### **During Operation Stage**

Absolutely no impact on water quality is expected during operation phase of the project.

### **Noise Levels impacts:**

#### **Establishment / Construction Phase Impacts**

The major activities which produce periodic noise, during establishment / construction phase are as follows:



- i. During Demolition of Existing Utilities such as old unused pipeline etc
- ii. Operation of construction equipment
- iii. Movement of vehicles

### **Solid Waste Impacts:**

#### **Establishment / Construction Phase Impacts**

The category of waste in the proposed project due to different types of raw materials being used during establishment stage in general may comprise the following

- i. Debris from demolition of existing utilities
- ii. Cement concrete
- iii. Bricks, tiles, sand, stone, timber/wood, paints/varnishes.

Besides above there are minor components namely conduits, pipes, electrical fixtures, panels, etc in all the proposed project.

The Proposed project in Puttur Municipality ULB approximate quantity's of construction materials may used. Reinforcement is 152.43 Metric Ton and Cement is 2685 Metric Ton.

The construction schedule of proposed project is about 24 months from starting date to ending date.

#### **During Operation Phase**

Absolutely no impact of solid waste on environment is expected during operation phase of the project.

#### **Impact due to Traffic Diversion**

During construction phase the traffic is to be directed from the work location which leads to congestion of main roads. These impacts will however is short term and limited to the traffic diversion period.

#### **Impact on biological environment:**

#### **Establishment / Construction Phase Impacts**



The activities of the construction phase will have impact on flora and fauna of the area.

The trees which are coming in the right of the way of the pipeline laying and also at the construction sites of ELSRs and GLBRs will be affected and thus may need to be removed. However, the removal of trees will be compensated with the proposed compensatory plantation with budgetary provision in the Environment Management Plan.

With reference to the fish population available at the intake well area, the impact will be minimal as necessary precautionary measures will be taken like placing the wired meshes. However, with regard to other faunal species, very less impacts are anticipated. Necessary protective measures should be taken in the case of Near Threatened/ Vulnerable Species of Fauna.

### **During Operation Phase**

Absolutely no impact on biological environment is expected during operation phase of the project. Moreover, the compensatory plantation may increase the faunal species based on the increased availability of water.

## **4.4 Existing Drainage Systems in Urban Local Bodies of Andhra Pradesh**

### **Need for the Drainage Systems in Urban Areas:**

The prime function of the Urban Local Body (ULB) is to provide basic amenities to its citizens and undertake the construction of large number of public utility services. Supply of portable water is one of the most important services of the ULB as water is most essential for survival. For a long-time, people in the ULBs depended on wells, tanks, ponds and rivers for water. The system of supplying water through pipes was adopted since long ago, 19<sup>th</sup> century onwards in India.

The supply of potable water leads to increase in drainage levels particularly in the vicinity of the thickly populated urban agglomerations. The well planned and designed drainage systems remove the drainage waters and runoffs from urban areas. Hence, the ULBs recognized the need for construction and maintenance of drainage systems to abate odour nuisance and subsequent environmental hazards raised due to sewage and sullage. Eventually providing adequate drainage



systems in urban areas has been identified as a essential component in maintaining the overall health, welfare, and economic well-being of a Urban areas.

### **The Urban Drainage Scenario in the State of Andhra Pradesh:**

The National Urban Sanitation Policy (NUSP) envisaged a key role for the State Governments to develop their state sanitation strategies by recognizing the water and sanitation problems existing across urban local bodies in the state. Under NUSP, the AP State Sanitation Strategy (AP SSS) recognizes primacy to integral solutions that covers sub sectors of solid waste, waste water (including septage), storm water drainage and drinking water. There are various initiatives undertaken in the sector of water and sanitation in the state of Andhra Pradesh which have been facilitated and supported by Commissioner and Director of Municipal Administration (C&DMA).

As per the census 2011,

Approx. 85.14% of urban Households (HHs) in Andhra Pradesh have access to toilets as compared to national figure of 81.4 percent.

Approx. 18.07% of Andhra Pradesh urban population have connected to Piped Sewerage networks (Under Ground Drainage).

Only 8 cities have existing partial Underground Drainage facility. Sewerage facility in 3 towns (Guntur, Narasaraopet and Nellore) of Andhra Pradesh is under implementation. Lack of formal mechanism and improper septage management is leading to disposal of sewage and septage into water bodies in and around the cities without any treatment in more than 100 ULBs of the state.

### **4.5 Existing Drainage System in Puttur Municipality ULB:**

The town has no dedicated sewerage system and septage management. The following drainage issues are identified broadly and described as follows:

- i. There is no Sewage collection/Septage and Treatment system.
- ii. Most of the houses are provided with individual septic tanks and there are a few public toilets.
- iii. Sewage flows into the septic tanks and its supernatant overflows in to storm water drains.
- iv. The sewage and sullage from the residential areas are presently discharged into Irrigation canal/ Puttur Municipality drain which may degrade the water quality.





- v. The effluent of septic tanks is flushed into the open drains or low lying areas.

As per the Census 2011, the population of the ULB is 54092. The estimated population to the base year 2017 is 62772. With respect to sanitation system, most of the town's households are covered with individual toilets. A small proportion of the slum population defecate in the open.

Presently, the town predominantly depends on storm water drains for disposal of waste water. These storm water drains are designed to withhold the waters 10 to 15 percent excessively to meet the present and future unforeseen demand during peak rainy seasons. Hence, the sewage collected through the storm water drains is being let into the nearby Canal/ Puttur Municipality Drain. Hence these drains may contaminate the nearby water bodies in the ULB.

However, sometimes these storm water drains joins in to nearby water bodies and get the water bodies polluted. To avoid this type of future scenario, and to treat the sewage during operational phase of the proposed APUWSSMIP and also the septage, a well planned and designed Sewage Treatment plant (STP) is required. Presently, there is no STP To protect the water bodies in the ULB, a need to construct a Sewage Treatment Plant(STP) needed to be installed to treat 4.0 MLD of sewage (At present 0.90 MLD and after commission of APUWSSMIP 3.0 MLD of Sewage).

## **4.6 Mitigation Measures:**

### **Air Quality:**

#### **Establishment / Construction Phase**

- i. For the proposed project site clearance, excavation, site leveling, and grading will be carried out before the water supply lines are laid. According to the engineering assessment; most of the excavated material shall be carted within the project area or will be utilized for filling in low lying areas in the city. The movement of cut and fill material will be limited.
- ii. Most of the construction dust will be generated from the movement of construction vehicles on unpaved roads. Unloading and removal of soil material shall also act as a potential source for dust nuisance. The control measures proposed to be taken up are given below.



- iii. The important dust suppression measures proposed will be regular water sprinkling on main haul roads in the project area, this activity will be carried out at least twice a day, if need arises frequency will be increased on windy days, in this way around 50% reduction on the dust contribution from the exposed surface can be achieved.
- iv. Temporary tin sheets of sufficient height (3m) will be erected around the site of dust generation or all around the project site as barrier for dust control.
- v. All the vehicles carrying raw materials will be covered with tarpaulin / plastic sheet, unloading and loading activity will be stopped during windy period.
- vi. To reduce the dust movement from construction site to the neighborhood the external part of the site will be covered by plastic sheets.

Given the implementation of proper control measures for dust suppression, no adverse impacts are expected and compliance to maintain the Ambient Air Quality is achieved at all times.

## **Noise Quality**

### **Establishment / Construction Phase**

During construction phase, sources of noise pollution will be due to demolition of existing utilities such as unused pipeline, structures etc, movement of construction equipment, concrete mixers. This might cause nuisance to the occupants of nearby areas. The following measures will be adopted to mitigate the impact:

- i. Use of equipment generating noise of not greater than 90 dB (A).
- ii. The construction activities will be restricted to the daytime and no construction will be practiced during night.
- iii. Installation use and maintenance of mufflers if possible, on noisy equipment.
- iv. Workers working near high noise construction machinery will be supplied with earmuffs/ear plugs
- v. Barricades will be provided around the construction site to confine noise within the site

### **During Operation Stage:**

There are no potential noises impacts that are expected during operation stage in the project area.



## **Water Quality**

### **Establishment / Construction Phase**

The following mitigation measures will be followed during construction phase to mitigate the impact on water contamination.

- i. Avoid excavation during monsoon season
- ii. No discharge of wastewater to soil and ground water body
- iii. During site development necessary precautions will be taken, so that the runoff water from the site gets collected to catch pit and if any overflow same will be diverted to nearby greenbelt / plantation area

## **Solid Waste Management**

### **Establishment / Construction Phase / Operation Phase**

The solid waste generated during this period being predominantly inert in nature, construction and demolition waste does not create chemical or biochemical pollution. Hence maximum effort would be made to reuse and recycle them. Most of the solid waste material can be used for filling/ leveling of low-laying areas. All attempts shall be made to stick to the following measures.

- i. All construction waste shall be stored within the site itself. A proper screen will be provided so that the waste does not get scattered.
- ii. Attempts will be made to keep the waste segregated into different heaps as far as possible so that their further gradation and reuse is facilitated.
- iii. Materials, which can be reused for purpose of construction, leveling, making roads/ pavement will also be kept in separate heaps from those which are to be sold or land filled.
- iv. The silt generated from desilting activity will be land filled at the exiting solid waste dumping site.
- v. The Chemical Waste generated from the WTP will be hazardous in nature and will be handed over to the APPCB authorized vendor by the ULB. This waste will be stored, transported and disposed off as per the provisions of the Hazardous and Other Wastes (Management and Transboundary movement) Rules, 2016 and its amendments.



### **Traffic Diversion**

The following precautions shall be taken due to traffic diversion during construction.

- i. Reduce speed through construction zones.
- ii. Proper cautionary signs shall be displayed at construction sites. Diversion roads will be provided wherever needed.
- iii. The construction site is provided with barricades.

### **Vegetation**

The proposed pipeline is selected along the side of the existing roads on the government land. During the design stage, alignment is selected so as to have minimum tree cutting. However, trees shall not be removed unnecessarily to build the trenches, and to mitigate any such losses if unavoidable, the Contractor shall be required to plant and maintain FIVE new tree saplings (of the same species) for each one that is felled.

In order to compensate the no. of trees lost due to the construction activity, it is proposed to plant 5 times the no. of saplings to be removed, which is far more than the requirement of WALTA Act.

There are **25 nos.** of native plants having girth size less than 30 cm needs to be cut for proposed project construction works. But it is proposed to plant **125 nos. of saplings in the project** which works out to be more than the stipulated norms. These plants will be planted at the empty areas around ELSR, GLBR areas.

## **4.7 Public Health and Solid Waste Management**

- i. Existing Municipal Solid waste Disposal in Puttur ULB:
  - a. In Puttur Municipality the existing disposal site for municipal solid waste is Dumping Yard at Govindapalem.
  - b. Daily 28 Metric Tonnes (Wet Waste – 20 MT & Dry Waste-8 MT) of municipal solid waste is being generated in Puttur municipality.
- ii. Proposed Municipal Solid waste Disposal in Puttur ULB:
  - a. In Puttur Municipality the Proposed disposal site for municipal solid waste is Dumping Yard at Govindapalem.



b. Waste to vermi compost units was sanctioned by SAC and work to be started.

**iii. Coronavirus disease 2019 (COVID-19)** is a respiratory illness caused by a virus. The virus is spreading mainly from person to person. The Covid 19 pandemic and mitigation measures will be adopted at construction sites as per guide of Government of India. Ministry of Personnel, Public Grievances and Pensions (Department of Personnel and Training) Issued the Guidelines:

### **COVID-19 Preventive Measures to be Taken:-**

#### **Do's**

- i. Maintain personal hygiene and physical distancing.
- ii. Encouraging all the workers and person involved to do frequent hand washing with soap and water or use alcohol-based hand rub. This practice is to be followed irrespective of hands appearing visibly clean.
- iii. Strict instruction will be given to all to cover nose and mouth with handkerchief/tissue while sneezing and coughing.
- iv. Disposing off tissues into closed bins immediately after the usage.
- v. Maintenance of safe distance (at least 1-2m) from persons during interaction/meeting, especially with those having flu-like symptoms.
- vi. Sneezing/coughing into the sideways of the either side of arm instead of into the palms.
- vii. Check the temperature on the regular basis and report in case of any respiratory symptoms. Immediately visit the nearest hospital/health-centre and diagnosed by the doctor in case of feeling unwell (fever, difficulty in breathing and coughing). While visiting doctor, wear a mask/cloth to cover mouth and nose.
- viii. For any fever/flu-like signs/symptoms, call State helpline number or 24x7 helpline number of the Ministry of Health & Family Welfare at 011-23978046.

#### **Don'ts**

- i. Shake hands.



- ii. Have a close contact with anyone, especially experiencing cough and fever.
- iii. Touching eyes, nose and mouth.
- iv. Sneeze or cough into palms of your hands.
- v. Spit in Public.
- vi. Travel unnecessarily, particularly to any affected region/containment zones.
- vii. Participate in large gatherings, including sitting in groups at canteens.
- viii. Visit gyms, clubs and crowded places etc.
- ix. Spread rumours or panic.



## CHAPTER- 5

### ENVIRONMENTAL MANAGEMENT PLAN (EMP)

#### 5.1 Environmental and Social Management Planning Framework (ESMPF)

Design Consultants are obliged to produce Request for opinion regarding necessity of EIA procedure for each sub-project which is found to be completely or partially placed adjacent or within the nature/cultural protected area. Decision will provide this Request to implementing agencies together with other relevant project documentation, which mandatory include preconditions of institutions in charge of the environmental protection. Based on the extent of environmental impact obtained from the environmental screening, the decision for further environment impact assessment will be made. EIA procedure is needed for the particular sub-project –Consultants will prepare EIA Study and complete public disclosure process (as outline herein). The EIA Study should include, but not be limited to:

**Project Description:** Description of the existing as well as proposed scenario in respect to right of way, water supply, distribution network, planned drainage works, cross drainage structures, community facilities, traffic projections etc.

**Environmental Regulatory Framework:** Presents the legal and administrative framework of the GoAP and AIIB environmental guidelines. This section should present various approvals applicable for the project.

**Analysis of Alternatives** to be carried out during feasibility stage, covered in the Environmental screening and scoping report, and the approved alternative to be discussed in detail along with environmental attributes under impact.

**Baseline Environmental Status,** the existing environmental conditions, by conducting a recognizance survey along with collection of secondary information. Primary data for various environmental parameters is to be generated using suitable monitoring devices.





**Environmental Impacts,** addressing all the anticipated impacts on the physical and social environment of the sub project. The quanta of all the impacts on natural environment and social/cultural environment.

### **Mitigation Measures**

The assessment methods shall be capable of identifying and evaluating mitigation measures in order to avoid, reduce or remedy the impact defining the residual environmental impact, which is the net impact remaining with mitigation measures in place.

## **ENVIRONMENTAL IMPACTS AND ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

### **Identification of Impacts**

The purpose of the impact statement is to study and provide information on the nature and extent of environmental impacts arising from the establishment and operation of proposed project and proposing the mitigation measures for the identified impacts. This information shall contribute decisions on the following;

Overall acceptability of any adverse environmental consequences that are likely to arise as a result of the proposed project. Conditions and requirements for the detailed design, establishment and operation of the proposed projects to mitigate against adverse environmental consequences wherever practicable and acceptability of minimized impacts after the proposed mitigation measures is implemented.

The environmental impact study of the establishment activity shall cover all developments within the proposed project sites and any other works associated with these developments outside the study area. The impact prediction shall include specific impacts namely; air quality impact, water pollution impacts, noise impacts, impacts due to solid waste etc.

Most of the individual elements of the sub-project are relatively small and involve straight forward construction and operation, so impacts will be mainly temporary and localized in nature. The proposed project enhances the public health of the project area.



However, the impact study is carried out for the 1) establishment / construction phase and 2) operation phase of the project. The environmental impacts arising from the development on air, water, soil, noise, traffic and socio-economic conditions are systematically examined and evaluated.

## **5.2 Environmental Monitoring Plan during Project Implementation**

### **Pre-construction phase**

The environmental monitoring program is a vital process of any Environmental Management Plan (EMP) of development project for review of indicators and takes immediate preventive action. This helps in signaling the potential problems resulting from the proposed project activities and will allow for prompt implementation of corrective measures. APUFIDC has keen interest in environmental monitoring as it is an integral part towards better environmental management of air, noise, water quality etc., both during construction and in operation.

Generation of dust and noise are two main issues during any large construction activity. Degradation of water quality is another. During construction, management of dust was carried out by monitoring Suspended Particulate Matter. Now, the same is being done by monitoring Particulate Matter (size less than 10microns). Similarly, for example, noise monitoring is carried out by recording dB(A) values. The parameters are monitored in pre-construction, construction and operation phase and are based on the need to evaluate the deviation of environmental conditions from baseline environmental conditions due to construction and operation of the infrastructure components. If it is observed that environmental conditions are deteriorating, then proper mitigation measures will be taken.

The monitoring parameters are thus those that are generally impacted during construction activities. Impact monitoring during construction help to discipline the contractors and assist them in meeting their contractual obligations. Construction phase monitoring data is also intended to evaluate the efficacy of some control mechanisms found in the environmental manual which are then either modified, upgraded or deleted. Monitoring is also extended to the operational phase, to ascertain the impacts over a long-term period. These parameters are also of immediate public concern. Over a period, much environmental monitored data has been generated and is also of academic interest. The data is much sought after by Institutions, NGOs and interested public. The environmental



monitoring will be required during both construction and operational phases. The following parameters are proposed to be monitored:

- i. Water Quality,
- ii. Air Quality,
- iii. Noise
- iv. Soil Quality
- v. Workers health and safety

Environmental monitoring during pre-construction phase is important to know the baseline data and to predict the adverse impacts during construction and operations phases. Pre-construction phase monitoring has been done for the proposed project for air, noise, water, soil quality and ecology. The results so obtained will be discussed in the baseline studies chapter.

During construction stage, environmental monitoring will be carried out for air quality, noise levels, water quality, and ecology. Environmental monitoring should be carried out at the locations where baseline monitoring was carried-out. These numbers could be modified based on need when the construction commences. The contractor shall ensure daily, weekly and monthly environmental monitoring, mitigation & management measures for preparing monthly report, the PMC personnel would consist of a dedicated Environmental Specialist to monitor the compliance throughout the construction phase of the project and report the same to the PMC/ Puttur ULB. The monitoring program shall also be conducted by third party on a random sample basis covering 20% of sampling requirements in addition to, and independent of the tests that need to be carried out by the contractor as specified in the EMP under the supervision of PMC/ Puttur ULB.

### **Water Quality**

Since water contamination leads to various water related diseases, the project authorities shall establish a procedure for water quality surveillance and ensure safe water for the consumers. The water quality parameters are to be monitored during the entire period of project construction. Monitoring should be carried out by NABL certified private or Government agency. Water quality should be analyzed following the procedures given in the standard methods. Parameters for Surface water quality monitoring will be as per IS: 2296 and for Ground water quality monitoring will be as per IS: 10500. The monitoring points could be ground and surface water.



### **Air Quality**

Air quality should be monitored at the locations of baseline monitoring as reported in baseline studies. The parameter recommended is Particulate Matter (PM<sub>10</sub>). The contractor will be responsible for carrying out air monitoring during the entire construction phase under the supervision of Puttur ULB.

### **Noise Quality**

The noise will be monitored at construction sites for entire phase of construction by the site contractor and under the supervision of Puttur ULB.

### **Soil Quality**

Soil quality should be monitored at the locations of baseline monitoring as reported in baseline studies chapter.

### **Workers health and safety**

Monitoring of health risk issues that might arise throughout the project lifetime will be done. Epidemiological studies at construction sites and workers camp will be performed to monitor the potential spread of diseases. Regular inspection and medical checkups shall be carried out to worker's health and safety monitoring. Any reoccurring incidents such as irritations, rashes, respiratory problems etc., shall be recorded and appropriate mitigation measures shall be taken. Contractor will be the responsible person to take care of health and safety of workers during the entire period of the construction and project proponent shall review/ audit the health and safety measures/ plants. However, supervision agency for workers health and safety is the project proponent, Puttur ULB, which should include site representation, compliance monitoring, training and incident management.

### **Environment Monitoring Program**

In order to monitor an environmental impact in the project, an effective monitoring program is essential. The environmental monitoring program will consider the following:

- i. Summary of environmental monitoring, for all phases of the project viz. construction and operation.



- ii. Technical aspects of monitoring for achieving effectiveness in mitigation measures.
- iii. Requirement of monitoring facilities and methods adopted.
- iv. Frequency, location, parameters of monitoring.
- v. Compilation and analysis of data and reporting system.
- vi. Procurement schedules and budgets in detail.
- vii. Training requirements.

The EMP will primarily be implemented by the Project Proponent & Civil Contractor. However, for an effective implementation of EMP, it is proposed to have two level monitoring. The first one is internally by the top management of Contracting Agency and the second one by the Puttur ULB. The environmental monitoring schedule is included in the Environment Management Budget.

The detailed Environment Management Plan is placed in Table 5.1.

*Table 5.1 Detailed Environment Management Plan*

Activity and Potential Negative Impact / Concern	Mitigation Measures	Reporting	Supervision Institution	Implementation
<b>Construction Phase</b>				
Mining construction for materials	Ensure that construction materials (sand, aggregate and gravel) are obtained from quarries licensed by Geology and Mining Departments	Monthly	Puttur ULB/ PMC	Contractor
Excavation activities: Soil and water contamination due to improper disposal of excavated material.	The disposal of soil, de-silted material and construction waste shall be strictly deposited into the identified low-lying areas very near to the project site. Ensure immediate disposal of accumulated waste in the above identified low lying areas near to project construction area	Weekly	Puttur ULB/ PMC	Contractor



<b>Activity and Potential Negative Impact / Concern</b>	<b>Mitigation Measures</b>	<b>Reporting</b>	<b>Supervision Institution</b>	<b>Implementation</b>
Shifting of common utilities	Ensure community consensus and minimum impact to common utilities like telephone cable, electric cables, electric poles, water taps and etc.,	Monthly	Puttur ULB/PMC	Contractor
Storage of materials	Site for storage of construction materials to be identified, without affecting the traffic and other common utilities	Monthly	Puttur ULB/ Contractor	Contractor
Barricading site	The construction site should be barricaded at all time in a day with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians at the contractor's expenses, to the entire satisfaction of the Municipal Engineer.	Monthly	Puttur ULB/PMC	Contractor
Dust Pollution near settlements	i) All earth work will be protected in manner acceptable to the Municipal Engineer to minimize generation of dust.	Monthly	Puttur ULB/PMC	Contractor
	ii) Construction material shall be covered or stored in such a manner so as to avoid being affected by wind direction.			
	iii) Trucks carrying construction material to be adequately covered to avoid the dust pollution and to avoid the material spillage			
Temporary flooding during construction activity.	In all the proposed water supply pipes and sewerage network drains, the desilting activity shall be scheduled during non-flooding season by the Contractor.	Weekly	Puttur ULB/ PMC	Contractor



Activity and Potential Negative Impact / Concern	Mitigation Measures	Reporting	Supervision Institution	Implementation
	Provide suitable arrangements for drainage control in all the proposed project activities.			
Planning of temporary Traffic arrangements	<p>i) Temporary diversion will be provided with the approval of the Municipal Engineer. Detailed traffic control plans will be prepared and submitted to the engineers for approval, one week prior to commencement of works.</p> <p>ii) The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day</p>	Monthly	Puttur ULB/PMC	Contractor
Noise, vibration and dust from construction activities. Protection of residential / sensitive receptors.	<p>Use of less noise generating equipment for all activities, provision for personal protective equipment, earmuffs, etc. for construction laborer's;</p> <p>Provision of enclosing generators and concrete mixers at site.</p>	Monthly	Puttur ULB/PMC	Contractor
Health hazards due to hazardous nature of silt Safety of labor.	Provide adequate safety precautions such as helmets, safety shoes, gloves, etc. to the workers working the area.	Monthly	Puttur ULB/PMC	Contractor
Vehicular noise pollution	i) Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas.	Monthly	Puttur ULB/PMC	Contractor



Activity and Potential Negative Impact / Concern	Mitigation Measures	Reporting	Supervision Institution	Implementation
Impairment of receiving water quality due to construction activity	Ensure proper cleaning of construction material and completion of the work before opening to operation.	Monthly	Puttur ULB/ PMC	Contractor
Impact on the trees adjacent to the proposed Project construction works	Identify priority trees for protection. Mark their locations on the base map and sketch in approximate Tree Protection Zones (TPZs) where temporary fences should be located around priority trees.	Monthly	Puttur ULB/ PMC	Contractor
	Maintain a radius of at least 1.25 feet of protected area for each inch of trunk diameter.			
	Mark trees that need to be partially removed or pruned to make room for future structures and construction equipment.			
	Do not store construction equipment or materials in TPZs.			
	Monitoring of the trees till it is handed over to the ULB.			
	Budgetary provision of Rs. 4.35 lakhs is made in the EMP for compensatory plantation and Green belt development of the proposed project.			
Muck / Waste earth Disposal Due to proposed project construction works, there is about <b>6.35 MT of muck / waste earth</b> disposal is likely	i. The carting away / disposal of solid waste to nearest low-lying areas very near to the project construction area.	Weekly	Puttur ULB/ PMC	Contractor
	ii. A total provision of <b>12 lakhs</b> made in the capital cost of the project for proposed activity.			





<b>Activity and Potential Negative Impact / Concern</b>	<b>Mitigation Measures</b>	<b>Reporting</b>	<b>Supervision Institution</b>	<b>Implementation</b>
generated.	iii. Top priority will be given to reuse the debris/ solid waste material in the project i.e., development of existing service roads, development of landscaping in the available ULB lands.			
Construction Camps; Health impacts due to absence of housing and sanitation facilities in labor camps for the proposed project.	Laborers' residing in the camps shall be provided with safe drinking water, adequate sanitation facilities, Gas for cooking and all other amenities as per the prevailing Labor laws. Domestic waste generated from the camps will be treated as per IS-2470 norms.	Quarterly	Puttur ULB/ PMC	Contractor
Risk from Electrical Equipment(s)	<p>The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that –</p> <p>i) No material will be so stacked or placed as to cause danger or inconvenience to any person or the public.</p> <p>ii) All necessary fencing and lights will be provided to protect the public in construction zones.</p> <p>iii) All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer</p>	Monthly	Puttur ULB/ PMC	Contractor



Activity and Potential Negative Impact / Concern	Mitigation Measures	Reporting	Supervision Institution	Implementation
Impacts on surrounding environment due to improper drainage and solid waste management facilities in construction camps.	Temporary drainage facilities will be provided, and solid waste collection and disposal facilities will be provided at the construction site.	Quarterly	Puttur ULB/ PMC	Contractor
Safety Aspects	<p>i) All machines used shall confirm to the relevant Indian standards Code and shall be regularly inspected by the Municipal Engineer.</p> <p>ii) Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil.</p> <p>iii) Protective footwear and protective goggles to all workers employed on mixing of materials like cement, concrete etc.</p> <p>iii) Welder's protective eye-shields shall be provided to workers who are engaged in welding works.</p> <p>iv) Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation.</p> <p>v) The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staffs.</p>	Monthly	Puttur ULB/ PMC	Contractor
First Aid	<p>The contractor shall arrange for:</p> <p>i) A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone</p>	Monthly	Puttur ULB/ PMC	Contractor



Activity and Potential Negative Impact / Concern	Mitigation Measures	Reporting	Supervision Institution	Implementation
	ii) Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital			
Site Restoration	On completion of the works, all temporary structures will be cleared away, all rubbish cleared, or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the ULB Engineer.	Monthly	Puttur ULB/ PMC	Contractor
<b>Operation Phase</b>				
Water supply activity Impairment of receiving water quality due to mixing of wastewater from domestic waste.	The ULB's water supply system is strengthened by Existing WTP to treat the water.	Quarterly		Puttur ULB / Contractor
Nuisance due to clogging of pipes and formation of mosquito breeding grounds at water leaked areas.	1. Ensure timely maintenance of distribution lines. 2. Create awareness among people on how to use the water supply scheme properly and how to report about leakages etc., A budget provision of Rs. 4,35,000 is made for the same	Quarterly	Health Department	Puttur ULB / Contractor
Tree Plantation /Protection of Trees. There are <b>25 nos.</b> of native plants having girth size less than 30 cm needs to be cut for proposed project construction works	In view of the Andhra Pradesh WALTA act, we need to provide twice the number of each tree cut. But it is proposed to plant <b>125 nos. of saplings in the project</b> which works out to be more than the stipulated norms. These plants will be planted at the empty areas around ELSR, GLBR and WTP areas.	Monthly	Puttur ULB/ PMC	Contractor



<b>Activity and Potential Negative Impact / Concern</b>	<b>Mitigation Measures</b>	<b>Reporting</b>	<b>Supervision Institution</b>	<b>Implementation</b>
Sludge disposal	Necessary sludge disposal mechanism will be in place for sludge handling and disposal. It will be distributed to farmers which can be used as a fertilizer.	Monthly	Puttur ULB/PMC	Contractor

### **Draw off well:**

#### **Construction Technology**

The new Draw off well are proposed to be constructed where sand depth is more than 2m, the sand should be free from silt. Uniformity coefficient should be between 2.4 to 2.65. The proposed reservoir bed satisfies all the above required criteria. Hence Draw off well is proposed.

#### **Associated Environmental Impacts**

- There is a temporary disturbance of the air & noise environment during the construction Draw off well in the bed of Satya Sai Telugu Ganga Canal Collection well cum Pump house. Draw off well cum Pump house. All the heavy equipment and machinery used in the project i.e., earth movers, cranes, dozer, tippers, generators etc., should satisfy Bharath Stage –II or III air and noise norms to mitigate the pollution.
- It is observed that no habitations exist near the Draw off well. No forest land exists in the sub-component area. No comments received during the stakeholder meeting on Draw off well.

#### **Major Observations**

Applicable Acts during construction and operation phases:

- Water (Prevention and Control of Pollution) Act, 1974 - as amended in 1978 & 1988.
- The Environment (Protection) Act, 1986 and further notifications issued under this Act.
- No environmental sensitive areas involved in the sub-component area.



- iv. No community concern observed.

### **Clear Water Pipeline:**

#### **Construction Technology (For all pipelines)**

Trenches will be dug using a backhoe digger, supplemented by manual digging where necessary. Excavated earth will be placed alongside, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench by hand or using a small rig for the larger Ductile Iron (DI) pipes. Pipes will be joined by hand, after which sand from local quarries will be shoveled into the trench beneath and around the pipe for support and protection. Excavated earth will then be replaced manually on top of the pipe and compacted by a vibrating compressor. Where trenches are dug into an existing roadway, the bitumen or concrete surface will be broken by hand-held pneumatic drills, after which the trench will be excavated by backhoe and the appropriate surface will be reapplied on completion.

#### **Associated Environmental Impacts**

- i. During construction of pipeline there is considerable dust will be generated & suspended in ambient air and the same can be suppressed by sprinkling of water arrangement.
- ii. Due to huge excavation activity, noise levels in the particular area may rise up, it can be mitigated by providing adequate earmuffs to the workers associated with those operations.
- iii. During construction noise monitoring shall be carried periodically to check the noise levels. Thus, the environmental impact due to noise pollution will be minimum / temporary and localized in nature.

#### **Major Observations**

- i. New pipeline will be laid along the existing Right of Way (RoW).
- ii. No land acquisition is involved in the sub-project component except, replacement.

#### **Applicable Acts during construction and operation phases:**

- i. Water (Prevention and Control of Pollution) Act, 1974 - as amended in 1978 & 1988.
- ii. The Environment (Protection) Act, 1986 and further notifications issued under this Act.
- iii. Noise Pollution (Regulation and Control) Rules, 2000.



- iv. AP Water, Land and Tree (WALT) Act 2002.
- v. No environmental sensitive areas involved in the sub-component area.
- vi. No community concern observed.

### **Sludge generation:**

As a result of Water Treatment process at Water Treatment Plant, sludge will generate. It is calculated based on the design provided by the agency that the amount of sludge generated will be 0.06 MLD.

### **Associated Environmental Impacts**

- i. During operation of Water Treatment Plant, the estimated sludge will be generated and the same will be first placed in sludge thickener which will give dried sludge cakes. The remaining portion will re-circulate in the sludge thickener.
- ii. Improper disposal of sludge will lead to several problems. In order to reduce associated environmental problems, the sludge will be given to the farmers which will be used as a fertilizer.

### **Other Issues:**

- i. During construction, the noise monitoring shall be carried periodically to check the noise levels. Thus, the environmental impact due to noise pollution will be minimum / temporary and localized in nature.
- ii. The proposed site for clear water sump is covered with grass and the number of trees which have to be cut will be compensated with five times to the number of trees cut which is more than the suggested ratio by WALT Act, 2002.

## **5.3 Proposed Institutional Mechanism during Implementation of EMP**

The Environmental Specialist (ES) in the PMC, has to review, monitor and manage the Environmental aspects and activities at the Project level. At the circle level, the Environmental Associates (EA) will be held responsible to monitor and manage the environmental aspects at circle level and report to the Environment specialist on the progress of the environmental related project activities. In each ULB, the Resident Engineer (RE) of PMC will take the environmental responsibility



and closely monitor the package level environmental activities by taking necessary support from AE from PHMED.

The tender awarded contractor shall require to appoint the Environmental expert who shall be held responsible for adoption and implementation of EMP, ESHS and Environmental Safeguards specific to the sub project/package during construction/ implementation of the project. The PMC staff shall prepare periodic reports and submitted to the PMU and AIIB on the implementation of EMP, EHS plans and Safeguard measures by the contractor.

## **5.4 Budget for Environmental Management Plan Implementation:**

The project tender is divided into two work packages i.e, one is from Draw offwell to ELSRs and another is entire distribution system. The EMP implementation budget is Rs.28.00 lakhs is made in the Project cost. The cumulative cost of EMP implementation is Rs.28.00 Lakhs. The details of the Budget implementation with item wise breakup are given in Table 5.2.

*Table 5.2 Budget Items for implementation of EMP to be included in the estimate*

S.No.	Item	No of Samples	Unit cost/ Lump sum cost (Rs.)	Total cost (Rs.)
<b>I.</b>	<b>Monitoring Costs: Construction Phase (Two years)</b>			
	Air Quality Monitoring (2 Monitoring stations) twice in a month for three seasons during the construction period covering Draw off well, Sump & PH, WTP, ELSRs, and Distribution network	24	Rs.4,000 per station	96,000/-
	Noise level (5 Monitoring station) once in a month for three seasons during the construction period at Draw off well/, Sump & PH, WTP, ELSRs, Pipelines & Distribution network	30	Rs.1,500 per station	45,000/-
	Water Quality Monitoring surface / ground	48	Rs.5,000 per station	2,40,000/-



S.No.	Item	No of Samples	Unit cost/ Lump sum cost (Rs.)	Total cost (Rs.)
	(8 Monitoring stations) once in a month for three seasons during the construction period covering Draw off well, Sump & PH, WTP, ELSRs, Pipelines & Distribution network			
<b>II.</b>	<b>Monitoring Costs: Operation Phase (One year)</b>			
	Air Quality Monitoring (4 Monitoring stations) twice in a year during operation period at Draw off well/Off take chamber, Sump & PH, Filtration Plant/WTP, ELSRs, Pipelines & Distribution network	8	Rs.4,000 per station	32,000/-
	Noise level Monitoring (10 Monitoring station) twice in a year during operation period at Draw off well, Sump & PH, WTP, ELSRs, Pipelines & Distribution network	20	Rs.1,500 per station	30,000/-
	Water Quality Monitoring (12 Monitoring station) twice in during operation period at Draw off well/Off take chamber, Sump & PH, Filtration Plant/WTP, ELSRs, Pipelines & Distribution network	24	Rs.5,000 per station	1,00,000/-
<b>III.</b>	Compensatory plantation and three years maintenance (Compensatory afforestation ratio is 1:5)	125no's plants & tree guards	Rs.1000	1,25,000/-
<b>IV.</b>	Greenbelt development and maintenance in the surroundings / Buffer zone		Lump sum	5,00,000/-
<b>V.</b>	Miscellaneous			
	Health checkups and free medicine distribution		LS	2,00,000/-
	Awareness program/training		LS	1,50,000/-
	Noise barriers and PPEs for workers		LS	3,50,000/-
<b>VI.</b>	Sprinkling of water once in a day for two years (excluding rainy days): 500 days @ Rs.1000/trip		Rs.1000 per day	5,00,000/-
	<b>Sub Total</b>			<b>23,68,000</b>
	<b>GST@ 18%</b>			<b>4,26,240</b>
				<b>27,94,240</b>
	<b>Grand Total</b>			<b>Say 28.00 lakhs</b>





The above items in the Environmental Management Plan shall be executed by the Contractor during project implementation.

## **5.5 Conclusion and Recommendations:**

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. Based on the findings there are no significant impacts.

The project will generate direct employment opportunities to the local people of the area. As the project involves construction work it will offer opportunities for various skilled and non-skilled workers. The amount of money earned by the local people will directly affect the local economy thereby reducing the chances of seasonal migrations of the local people. The project will provide short term direct employment benefits to the majority of the construction workers and even long term employment to few workers during the operation of the project. In order to augment such benefits, priority will be given to employ local laborers as far as possible.

The proposed project will bring about:

- (i) The benefits of access to reliable supply of safe and potable water.
- (ii) Promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts.
- (iii) Enhanced public health, improved quality of life and safe communities.

### **Recommendations are:**

In order to sustain the availability of water, over extraction should be avoided especially in urban and rural areas and it should be used judiciously, otherwise the future generation will have to face crisis of water.

- i. Micro-level rainwater harvesting culture should be adopted in every household.
- ii. Water supply should be metered and monetized.
- iii. The supply pipes need timely repair to reduce water leakage especially in urban areas.

Overall, the project will lead to enhanced public health and urban environment, significantly contributing to a qualitative improvement in the lives of Puttur Municipality ULB residents.



## **CHAPTER- 6**

### **DISCLOSURE OF CONSULTANT ENGAGED**

The preparation of the Environment Impact Assessment and Environment Management Plan (EMP) was entrusted by APUFIDC to M/s. Aarvee Associates, Architects, Engineers & Consultants Pvt., Ltd., Hyderabad. The scope of AARVEE associates includes preparation of EIA & EMP report.

M/s. Aarvee Associates Architects Engineers and Consultants Pvt., Ltd., Hyderabad is **Re-Accredited with "A" grade by QCI-NABET** in their Vide AC. MoM dated 25<sup>th</sup> April 2019 for doing EIA and EMP Studies for five (6 sectors) including "River Valley, Mining, Thermal Power plants, Isolated storage and handling of hazardous chemicals, Industrial estates (SEZs, EPZs), Highways".

The brief professional profile of M/s AARVEE Associates is given in the following section: Aarvee Associates is a premier, ISO 9001:2015 certified multi-disciplinary engineering consulting company, established in 1989 and based at Hyderabad in India. We have a pan-India presence, with branch offices in New Delhi, Ahmedabad and Bhubaneswar, and project offices in all the major states across the country. We also have a wholly owned Australian subsidiary, Aarvee Associates Pty Ltd, based at Brisbane, Queensland. In addition to over 1,000 successful assignments in India, we have carried out projects in Australia, Bangladesh, Ethiopia, Gabon, Mozambique, Nigeria, South Africa, Sri Lanka, and Uganda. We have worked on projects funded by various international agencies including the World Bank, the Asian Development Bank (ADB), the Department for International Development (DFID), and Japan International Cooperation Agency (JICA).



## **CHAPTER- 7**

### **SOCIAL IMPACT ASSESSMENT**

Based on the number of Project Affected Persons (PAPs) who may be affected by the project and magnitude of impact the projects have been categorized as S-1, S-2 or S-3 projects

- i. S-1 projects are those that will affect 200 PAPs (30 – 40 Households) or more or if PAPs are physically displaced and will require a detailed Social Assessment Report (SAR) that would include a resettlement plan.
- ii. S-2 projects are those in which no PAP is physically displaced and less than 10% of their productive assets are lost (or) less than 200 PAPs are affected. In this case a Social Management Plan (SMP) that would include an abbreviated resettlement plan can be submitted.
- iii. S-3 projects, on the other hand will not have any households affected at all i.e. they can be classified as 'socially benign'. However, Social Status Report (SSR) can be submitted.

As per the proposals made for Providing Water Supply within the town there is no requirement for Land Acquisition. As per the guidelines the present project can be categorized under S-3 category as there is no PAP. The details are explained in Social Assessment Report.

#### **Social Assessment**

The proposal for provision of 24X7 Water Supply scheme designed to improve the standard of living of the people in Puttur and the environmental and social policy is to promote environmentally sound, socially acceptable and economically viable urban infrastructure under Puttur town.

The proposed scheme will ensure environmental soundness by conserving natural resources, preserving biodiversity and ecological equilibrium; and integrating mechanisms within projects to maintain and enhance environmental quality in Puttur town.

The scheme shall address the Social reliability and acceptability by

- i. Addressing legitimate concerns of relevant stakeholders, especially project affected persons.



- ii. Avoiding or minimizing resettlement and rehabilitation due to land acquisition and transfer of government land under different tenure system through appropriate technical and management measures.
- iii. Ensuring appropriate resettlement and rehabilitation of project affected persons Irrespective of legal status with a view to provide sustainable livelihood options that at least restore, if not improve, their standard of living.
- iv. Protecting marginalized and vulnerable groups, including the economically and socially disadvantaged.
- v. Minimizing health and safety hazards.

### **Public Disclosure and Development Options:**

All the proposals will be presented in the presence of officials from line departments viz highways, water resources, electricity board and Municipality. The suggestions and comments will be received to modify the proposals if required for better drainage system within the town.

### **Development Option for minimizing the Impact:**

From the design stage itself the alignment of proposed pipeline is selected in such a way that it will minimize land acquisition and R&R cost. Mostly the pipeline is proposed along the existing roads in government land.

### **Need for Resettlement and Rehabilitation:**

All the components of the project are proposed on government owned lands and there is no private land acquisition in the project. The pipelines will be laid all along the roads, in the right of way.

For the project in Puttur town, there is no requirement of private land. For all the proposed components government land has been proposed. There is no impacts on any structures either permanently or temporarily. However, in Puttur town mobile vendors were found affected due to laying of pipeline. Details of the mobile vendors was collected. Apart from that there are no impacts



on Community Property Resources (CPRs). The present project does not involve any displacement or adverse impacts on livelihood.

### Details of Mobile Vendors Affected

The survey has found that 5 mobile vendors are affected in the entire town due to lying of pipelines for the water supply project. The activities of mobile vendors include chat bhandar, chicken snacks and petty shop. The distribution of affected mobile vendors by locations indicated that about 3 vendors constituting 60 percent belonged to RDM Circle Nagari Road and 1 vendor each from RTC Bus Stand opposite and Nagari road respectively.

*Table 7.1 Distribution of Mobile Vendors by Locations*

S.No	Location	No	%
1	Nagiri road	1	20.0
2	RTC Busstand opposite	1	20.0
3	RDM Circle Nagari road	3	60.0
	<b>Total</b>	<b>5</b>	<b>100.0</b>

With regard to the religion of mobile vendors it was found that 4 of them constituting 80 percent belonged to Hindu religion while 1 vendor constituting 20 percent belonged to Muslim religion.

*Table 7.2 Religion*

S.No	Religion	No	%
1	Hindu	4	80
2	Muslim	1	20
	<b>Total</b>	<b>5</b>	<b>100</b>

Of the total 5, Mobile vendors 3 constituting 60 percent belonged to Scheduled Caste social group while the remaining majority of 2 vendors constituting 40 percent belonged to General Caste. Out of 5 there is one Women Headed vendor.

*Table 7.3: Social Group*

S.No.	Social Group	No	%
1	SC	3	60.0
2	BC	2	40.0
	<b>Total</b>	<b>5</b>	<b>100</b>



Of the 5 mobile vendors, 3 vendors each are conducting business at the location for more than 10 year and remaining 2 are doing business upto 10 years.

*Table 7.4: Years of Conducting Business at the Location*

<b>S.No.</b>	<b>Years of business</b>	<b>No</b>	<b>%</b>
1	Up to 10yrs	2	40.0
2	>10yrs	3	60.0
	<b>Total</b>	<b>5</b>	<b>100</b>

With regard to nature of business it was found that 3 vendors constituting 60 percent are engaged in petty shop, 1 vendor each constituting 20 percent each are engaged in chicken pakoda and chat bhandar respectively.

*Table 7.5: Nature of Business*

<b>S.No</b>	<b>Nature of Business</b>	<b>No</b>	<b>%</b>
1	Chatbhandar	1	20.0
2	Chicken pakoda	1	20.0
3	Petty shop	3	60.0
	<b>Total</b>	<b>5</b>	<b>100.0</b>

According to the survey 2 vendors each constituting 40 percent have a daily income of INR 2000 respectively while 2 vendors each constituting 40 percent reported a daily income of INR 500 respectively and 1 vendor constituting 20 percent reported a daily income of INR 300.

*Table 7.6: Daily Income of Mobile Vendors (in INR)*

<b>S.No</b>	<b>Daily Income</b>	<b>No</b>	<b>%</b>
1	300	1	20.0
2	500	2	40.0
3	2000	2	40.0
	<b>Total</b>	<b>5</b>	<b>100.0</b>

All 5 vendors indicated market area as preferred location for shifting. However, all 5 vendors stated that they would conduct business just outside the affected location if place is available. All 5 vendors experienced livelihood loss in terms of temporary loss of income. However, they did not provide information on type of support required in case of displacement.



### **Socio-Economic Survey of Households**

The study has conducted a random socio-economic survey of 109 households constituting about 1 percent of total households in town as per 2011 census to understand the demographic and socio-economic characteristics. The purpose of the survey is to assess the existing socio-economic status which can provide the baseline information for planning and performance assessment.

The survey has shown that total population of surveyed families is 295 of which males constituted about 51 percent while females constituted about 49 percent.

*Table 7.7: Gender Composition*

<b>S.No</b>	<b>Gender</b>	<b>No</b>	<b>%</b>
1	Male	151	51.2
2	Female	144	48.8
	<b>Total</b>	<b>295</b>	<b>100.0</b>

With regard to marital status, it was found that about 75 percent of the surveyed population was married while 23 percent were unmarried. The remaining 1 percent belonged to widow/widower category and 1 person constituting less than 1 percent was divorced.

*Table 7.8: Marital Status*

<b>S.No</b>	<b>Marital Status</b>	<b>No</b>	<b>%</b>
1	Married	223	75.6
2	Unmarried	67	22.7
3	Divorced	1	0.3
4	Widow/Widower	4	1.4
	<b>Total</b>	<b>295</b>	<b>100.0</b>

The distribution of surveyed population by age group shows that majority constituting about 82 percent belonged to the age group of above 15 years to 60 years. About 6 percent belonged to the age group of above 60 years and the remaining about 12 percent belonged to the age group of up to 15 years.



*Table 7.9: Age Group*

S.No	Age Group	No	%
1	UP to 15	37	12.5
2	>15-30	75	25.4
3	>30-60	166	56.3
4	Above 60	17	5.8
	<b>Total</b>	<b>295</b>	<b>100.0</b>

The distribution of surveyed population by education shows that majority constituting about 26 percent passed high school standard while around 16 percent studied up to under graduate education and about 15 percent were post-Graduates. 12 percent passed intermediate while Graduates constituted 9 percent and about 7 percent were illiterates. Around 7 percent each studied secondary school Standard while 1 percent have studied technical/vocational education and remaining 2 percent were in non-school going age.

*Table 7.10: Education*

S.No	Education	No	%
1	Illiterate	20	6.8
2	Up to Primary	17	5.8
3	Secondary	20	6.78
4	High School	76	25.76
5	Passed Intermediate	37	12.5
6	Under Graduate	46	15.6
7	Graduate	27	9.2
8	Post Graduate	43	14.6
9	Technical / Vocational Education	3	1.0
10	Non School going age/ (<6 Years)	6	2.0
11	<b>Total</b>	<b>295</b>	<b>100.0</b>

The distribution of surveyed population by occupation shows that a large majority of 26 percent of the surveyed population was not in work force while 25 percent were unemployed. 21 percent were engaged in private service while around 14 percent were engaged in business. 5 percent were engaged as non-agriculture labour and about 4 percent were retired/pensioners and 2 percent were professionals. Less than 1 percent each were engaged in agricultural activity, agriculture labour, shrimp culture and priests respectively.





*Table 7.11: Occupation*

S.No	Occupation	No	%
1	Agriculture	1	0.3
2	Agriculture Labour	2	0.7
3	Non agriculture labour	16	5.4
4	Private service	62	21.0
5	Professional (Doctor/Lawyer/CA/Software professional/Engineer)	7	2.4
6	Business	41	13.9
7	Retired/Pensioner	11	3.7
8	Priests	1	0.3
9	Unemployed	75	25.4
10	Shrimp culture	1	0.3
11	Not in work force	78	26.4
<b>Total</b>		<b>295</b>	<b>100.0</b>

The major reasons for not in work force included student followed by housewife, child and old age.

*Table 7.12: Reasons for not in work force*

S.No	Reason	No	%
1	Child	13	4.4
2	Housewife	16	5.4
3	Old age	7	2.4
4	Student	42	14.2
	<b>Total</b>	<b>78</b>	<b>100.0</b>

The distribution of surveyed families in terms of income shows that a large majority of about 90 percent had an annual income of INR above 20000 to INR 50000. 6 percent had an annual income of INR above 100000 to 300000 while about 2 percent had an annual income of INR 20000 and remaining 1 percent each had an annual income of INR above 500000 and income above INR 300000 to 500000 respectively.



*Table 7.13 : Annual Income in INR*

S.No	Income	No	%
1	<20000	2	1.8
2	>20000-50000	98	89.9
3	>100000-300000	7	6.4
4	>300000-500000	1	0.9
5	Above 500000	1	0.9
	<b>Total</b>	<b>109</b>	<b>100.0</b>

A large majority of 97 households constituting 89 percent were headed by men while remaining 12 households constituting 11 percent are women headed households.

*Table 7.14: Gender of Head of the Households*

S.No	Gender	No.	%
1	Men	97	89.0
2	Women	12	11.0
	<b>Total</b>	<b>109</b>	<b>100.0</b>

The religious composition of households indicated that majority of 98 percent belonged to Hindu religion followed by remaining 1 percent each belong to Christian and Muslim religion.

*Table 7.15: Religion*

S.No	Religion	No	%
1	Hindu	107	98.2
2	Muslim	1	0.9
3	Christian	1	0.9
	<b>Total</b>	<b>109</b>	<b>100.0</b>

Majority of 61 percent of the surveyed families were nuclear families and remaining 39 percent were joint families.

*Table 7.16: Type of Family*

S.No	Type of family	No	%
1	Joint	43	39.4
2	Nuclear	66	60.6
	<b>Total</b>	<b>109</b>	<b>100.0</b>



The social composition of surveyed households indicated that a significant 65 percent belonged to Backward Castes while about 15 percent belonged to Scheduled Castes; about 16 percent belonged to 'Other' Castes and the remaining about 5 percent belonged to Scheduled Tribes who are mainstreamed.

*Table 7.17: Social Groups*

S.No	Social group	No	%
1	SC	16	14.7
2	ST (Mainstreamed)	5	4.6
3	BC	71	65.1
4	General Caste	17	15.6
	<b>Total</b>	<b>109</b>	<b>100.0</b>

The survey has assessed the vulnerability status. All 109 households constituting 100 percent belonged to the vulnerable category. 67 households constituting 61 percent belonged to BPL category. 9 households constituting about 8 percent belonged to BPL plus SC category. Around 7 percent belonged to the category of BPL plus women headed households while 5 percent each belonged to BPL plus above 60 years and 'none of these categories' respectively. Around 3 percent household each belonged to categories like ST plus BPL and SC plus BPL plus above 60 years, etc.

*Table 7.18: Vulnerability Status*

S.No	Vulnerability	No	%
1	ST+BPL	3	2.8
2	SC+BPL	9	8.3
3	BPL	67	61.5
4	SC	1	0.9
5	SC+WHH+BPL	2	1.8
6	SC+BPL+>60Y	3	2.8
7	BPL+>60y	5	4.6
8	WHH+BPL	8	7.3
9	None of the above	6	5.5
10	>60Y	1	0.9
11	WHH+BPL+>60yrs	1	0.9
12	WHH+SC	1	0.9
13	ST+BPL+>60yrs	2	1.8
	<b>Total</b>	<b>109</b>	<b>100.0</b>



## CHAPTER- 8

### PUBLIC CONSULTATION/DISCLOSURE

The main purpose of the Public Consultation/Disclosure process is to reveal the Environmental impacts at ULB level due to the proposed project APUWS&SMIP. The Public consultation was organized digitally (during the period of Covid-19 pandemic scenario) as suggested by AIIB, from 15.07.2020 to 29.07.2020 at all 21 ULB's at Commissioner Offices and PHMED offices concerned. The whole process was conducted by PHMED with technical assistance from PMC, as for the bank norms and suggestions made during the process. Necessary precautions were taken to capture the opinions/feedbacks from the wide range of stakeholders and other populations.

whatsapp group discussions were also invited on the Environmental Impact Assessment and Environmental management Plan reports. Feedback forms were collected respective stakeholders. Also attached **Annexure -III**

### Public Consultation Outcomes:

The following are the some of the key findings/observations during the process is placed in Table 8.1

*Table 8.1 Public consultation feedback questions and Answers*

S.No	Stake Holders Questions Raised	Answers
1	During construction huge amount of debris/ solid waste will be generated, How those wastes manage?	<ul style="list-style-type: none"><li>i. Top priority will be given to reuse the debris/ solid waste material in the project i.e., development of existing service roads, development of landscaping in the available ULB lands.</li><li>ii. Temporary drainage facilities will be provided, and solid waste collection and disposal facilities will be provided at the construction site.</li></ul>
2	The construction related activities that generates dust, noise and impede access could disturb the local residents. It may also create traffic problems due to traffic jams near the construction site?	<ul style="list-style-type: none"><li>i. The local residents will be consulted and informed about the disturbances in advance.</li><li>ii. Temporary diversions and signboards will be provided for the pedestrians.</li></ul>



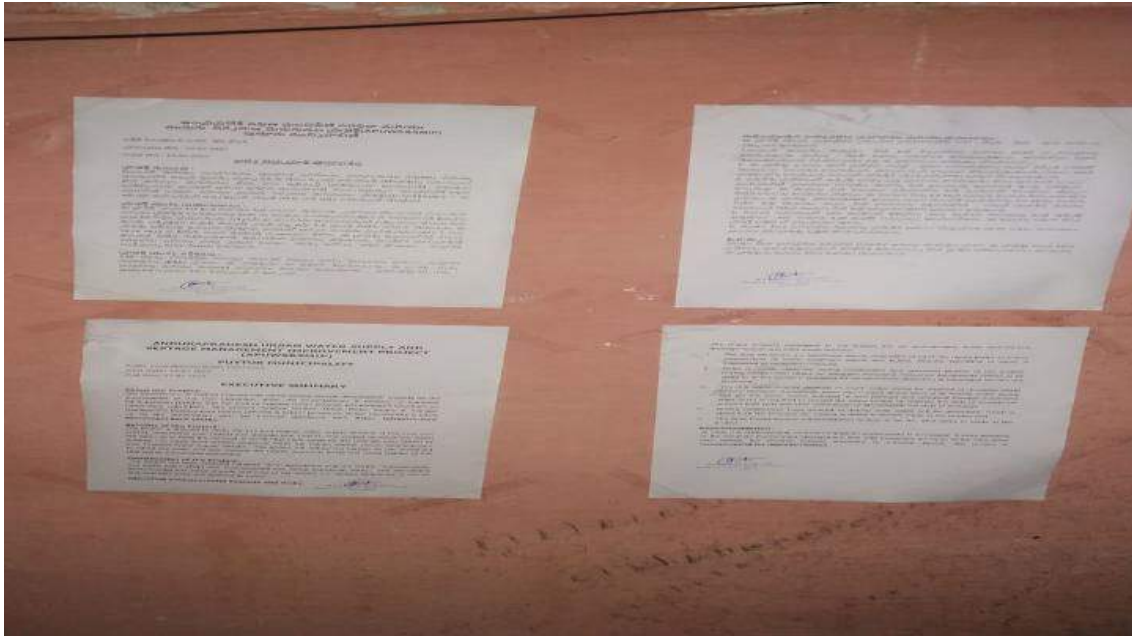
S.No	Stake Holders Questions Raised	Answers
		iii. Traffic management will be done to mitigate the impacts.
3	While project Implementation time ambient noise levels are generated at ELSR's and Construction sites how to control it?	<p>i. Noise is mainly observed during construction and operation phases of the project. During construction phase an adequate Personnel Protective Equipments (PPEs) to be given to all the workers, Provision for compensatory plantation &amp; vegetative barriers are proposed.</p> <p>ii. Use of less noise generating equipment for all activities, provision for personal protective equipment, earmuffs, etc. for construction laborers.</p>
4	This Water Supply Project will Disturb the Biological Environment & Degradation of Cultivated Land and Vegetation can you Please Explain?	<p>i. Compensatory plantation and three years maintenance (Compensatory afforestation ratio is 1:5)</p> <p>ii. It is proposed to plant each removal plant to plant a 5 trees in the project which works out to be more than the stipulated norms. These plants will be planted at the empty areas around ELSR, GLBR and WTP areas.</p>

The public Consultation Executive Summaries English/Telugu displayed Notice Boards at SE/EE/DE/Commissioner office. The displayed notice board is placed below as Figure No 8.1.

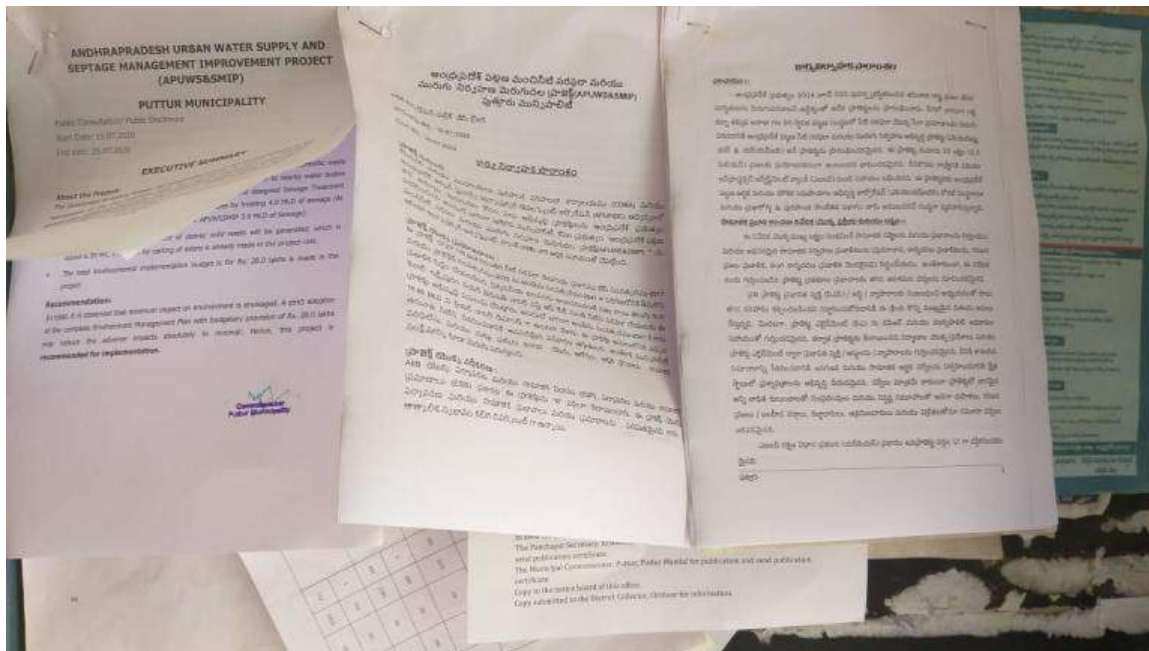


Figure 8.1 Displayed Notice Boards at SE/EE/DE/Commissioner Offices

**PHMED OFFICE- PUTTUR ULB**



**MUNICIPAL OFFICE – PUTTUR ULB**



# ANNEXURE-I

## GOVERNMENT OF ANDHRA PRADESH ABSTRACT

Water Resources Department- Permission to allocate 0.300 TMC water from Kandaleru Reservoir to Puttur drinking water supply improvement scheme taken under AIIB for drinking and permission to construct Off Take sluice on the TGP main canal i.e., S.S.G canal @ KM 89.225 - Orders - Issued.

### ----- WATER RESOURCES (WRG-GRC) DEPARTMENT

G.O.RT.No. 302

Dated: 24-06-2019.

Read:-

From the Chief Engineer, NTR TGP, Tirupati, Lr.No.  
CE/TGP/TPT/DW/EE1/DEE1/AEE2/AIIB/Puttur water supply/ 348  
Dt:09.04.2019.

@@@

### ORDER:

In the letter read above the Chief Engineer, NTR Telugu Ganga Project, Tirupati has requested the Government to accord permission to allocate 0.300 TMC of water from Kandaleru Reservoir towards Puttur drinking water supply improvement scheme taken under AIIB for drinking and permission to construct Off take sluice on the TGP main canal i.e., S.S.G canal @ KM 89.225 @ the earliest.

2. Government after careful examination, hereby accord permission to allocate and draw 0.300 TMC water from Kandaleru Reservoir towards Puttur drinking water supply improvement scheme taken under AIIB for drinking along with construction of Off Take sluice on the TGP main canal i.e., at KM 89.225 on S.S.G canal.

3. The Chief Engineer, NTR Telugu Ganga Project, Tirupati shall take necessary further action in the matter.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

ADTYA NATH DAS  
SPECIAL CHIEF SECRETARY TO GOVERNMENT

To

The Chief Engineer, NTR Telugu Ganga Project, Tirupati.

The Engineer-in-Chief , Water Resources Department, A.P.,Vijayawada.

Copy to:

The P.S to Hon'ble Minister for Water Resources Management.

The P.S. to Secretary to Govt., Water Resources Department.

S.F./S.C.

//FORWARDED BY ORDER//

SECTION OFFICER



## ANNEXURE-II

### GOVERNMENT OF ANDHRA PRADESH WATER RESOURCES DEPARTMENT

From  
Sri M.Subramanyam, M.Tech,  
Executive Engineer,  
NTR TGP Division,  
Srikalahasti

To  
The Superintending Engineer,  
TGP & GNSS Circle,  
Tirupati.

Lr.No.EE/ NTR TGP.Divn/SKHT/ AEE(T)/ W.R. File/ 188<sup>SE</sup> Dt:28/07/2020.

Sir,

Sub:- Andhra Pradesh Urban Water Supply and Sewerage Management Improvement Project (APUWSSMIP)- Water Supply Improvement Schemes including operation and maintenance in municipal towns of sullurpeta & Naidupeta in SPSR Nellore District, Chittoor & Puttur in Chittoor District, Addanki, Kangiri, Chimakurthy & Giddalur in Prakasam District of Public Health Circle, Nellore (Package-I ) with Asian Infrastructure Investment Bank (AIIB) funding – Hydraulic particulars of Kandaleru reservoir and canal flow particulars of SSG Canal- Submitted -Reg.

Ref:-1)The Superintending Engineer, Public Health, Nellore  
Lr.No.,01/NLR-CLUSTER/ PUTTUR/ AIIB/ WSIS/  
P-1/DB/ATO/2019, Dt: 25-06-2020 communicated vide  
Superintending Engineer, TGP& GNSS Circle, Tirupati office  
Endt No.SE/TGP & GNSSC/TPT/AEE3/ Drinking water file/168<sup>SKHT</sup>,  
Dt: 25.07.2020.

\*\*\*

With reference to the Superintending Engineer's endorsement cited, I  
here with enclose the canal flow particulars of SSG Canal during the periods from 2016  
to 2020.


Encl:- Water guage reading statements.

Yours faithfully,

  
Executive Engineer,

NTR TGP Division, Srikalahasti.

Copy submitted to the Superintending Engineer, Public Health, Nellore for information and  
necessary action.

  
Executive Engineer,  
NTR TGP Division, Srikalahasti.



**Water Gauge Readings**

Sl. No.	Date	KM 69.375	KM 82.016	KM 95.700	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge	Discharge
	10.10.2016.						
	11.10.2016.						
	12.10.2016.						
	13.10.2016.						
	14.10.2016.						
	15.10.2016.	167					
	16.10.2016.	457	432	314	150		
	17.10.2016.	487	468	341	343		
	18.10.2016.	513	468	375	343	223	
	19.10.2016.	530	519	390	350	342	15.41
	20.10.2016.	589	577	406	380	357	80.09
	21.10.2016.	728	712	505	472	395	103.64
	22.10.2016.	825	795	646	600	507	165.9
	23.10.2016.	885	860	746	712	625	240.83
	24.10.2016.	891	864	729	715	633	332.54
	25.10.2016.	845	795	636	625	551	328.53
	26.10.2016.	835	783	581	555	503	297.00
	27.10.2016.	828	774	551	534	479	251.75
	28.10.2016.	828	774	514	491	406	255.43
	29.10.2016.	819	774	514	491	406	259.12
	30.10.2016.	823	744	466	393	296	240.83
	31.10.2016.	968	907	596	479	406	129.13
	01.11.2016.	1042	979	759	680	305	205.63
	02.11.2016.	954	906	768	741	422	251.75
	03.11.2016.	784	743	471	453	446.72	274.07
	04.11.2016.	681	638	452	420	300.37	209.06
	05.11.2016.	531	476	294	265	283.93	165.9
	06.11.2016.	420	376	197	178	115.94	72.7
	07.11.2016.	225	195	149	125	57.3	28.32
	Total(cusecs)	16655	15559	11400	10495	8060.26	3907.63
	Mcft	1438.992	1344.2976	984.96	906.768	696.406464	337.619232

*Pragade* 27/11/2016  
**DEPUTY EXECUTIVE ENGINEER**  
**NTR T.G.P. SUB DIVISION**  
**B.N. KANDRIGA.**

*S. Sri Kalahasti* 27/11/2016  
**EXECUTIVE ENGINEER**  
**TELUGU GANGA PROJECT DIVISION**  
**SRIKALAHASTI**

### Water Gauge Readings 6 A.M

Sl.No.	Date	KM 69.375	KM 85.050	KM 95.700	KM 107.200	KM 125.000	Flume @ KM 151.700
		Discharge	Discharge	Discharge	Discharge	Discharge	Discharge
1	12.11.2016	187	99	190	-	-	-
2	13.11.2016	571	518	130	228	-	-
3	14.11.2016	531	480	266	103	-	-
4	15.11.2016	487	408	263	232	129	-
5	16.11.2016	487	414	219	203	124	23.18
6	17.11.2016	442	275	252	178	80	18.39
7	18.11.2016	432	364	278	203	104	15.41
8	19.11.2016	460	364	231	178	96	6.5
9	20.11.2016	409	324	188	173	96	1.93
10	21.11.2016	409	328	208	138	67	-
11	22.11.2016	383	304	206	192	67	-
12	23.11.2016	423	322	232	194	67	-
13	24.11.2016	492	402	530	178	67	-
14	25.11.2016	690	646	530	340	104	-
15	26.11.2016	928	823	785	652	472	65.5
16	27.11.2016	953	832	753	697	580	293.14
17	28.11.2016	906	790	717	734	673	374
18	29.11.2016	836	687	637	635	607	399
19	30.11.2016	908	760	670	635	617	357
20	01.12.2016	1014	764	675	665	633	408
21	02.12.2016	1068	877	852	825	709	408
22	03.12.2016	1022	840	810	796	726	429
23	04.12.2016	1023	852	849	853	775	465
24	05.12.2016	1122	892	818	759	726	492
25	06.12.2016	1068	870	825	804	727	456
26	07.12.2016	1113	898	849	811	773	487
27	08.12.2016	1006	759	700	762	773	515
28	09.12.2016	975	720	662	689	747	510
29	10.12.2016	1019	800	712	654	642	451
30	11.12.2016	1005	834	765	678	699	451
31	12.12.2016	486	420	434	532	467	411
32	13.12.2016	217	193	248	262	413	282
Total		23072	18859	16484	14983	12755	7319.05
Mcft		1993.42	1629.42	1424.22	1294.53	1102.03	632.37

### Water Gauge Readings

Sl.No.	Date	KM 67.500	KM 69.375	KM 85.050	KM 95.700	KM 107.20	KM 125.000	Flume @ KM 151.700
		Discharge	Discharge	Discharge	Discharge	Discharge	Discharge	Discharge
1	11.01.2017	450	440	271	176	0	0	0
2	12.01.2017	475	465	304	212	160	0	0
3	13.01.2017	522	414	267	186	138	51	0
4	14.01.2017	485	399	238	176	103	22	0
5	15.01.2017	622	490	303	192	138	22	0
6	16.01.2017	661	546	371	223	160	22	0
7	17.01.2017	744	502	363	244	178	56	7.62
8	18.01.2017	870	681	423	268	233	78	2.69
9	19.01.2017	1010	847	526	377	305	50	1.93
10	20.01.2017	999	700	509	392	378	170	11.29
11	21.01.2017	1045	885	709	512	391	171	112
12	22.01.2017	893	863	692	530	431	206	118
13	23.01.2017	981	950	712	628	499	327	178
14	24.01.2017	985	955	759	624	501	408	206
15	25.01.2017	1145	1081	855	680	652	540	248
16	26.01.2017	1128	1046	868	699	601	470	309
17	27.01.2017	1136	1041	823	703	552	532	325
18	28.01.2017	1151	1064	945	881	757	629	329
19	29.01.2017	1163	1059	944	867	790	664	442
20	30.01.2017	1125	1041	899	812	780	713	460
21	31.01.2017	1093	1033	855	689	594	680	447
22	01.02.2017	1044	992	862	777	724	648	425
23	02.02.2017	1073	1022	862	771	704	586	425
24	03.02.2017	945	899	749	706	685	674	442
25	04.02.2017	1069	1010	862	778	753	649	425
26	05.02.2017	1029	992	841	825	729	649	451
27	06.02.2017	961	920	793	745	729	649	434
28	07.02.2017	895	863	762	674	692	649	416
29	08.02.2017	784	728	637	609	588	540	399
30	09.02.2017	815	764	631	538	509	489	369
31	10.02.2017	874	821	664	513	497	427	325
32	11.02.2017	940	890	772	627	585	506	333
33	12.02.2017	914	863	785	619	604	489	349
34	13.02.2017	950	886	699	562	538	506	349
35	14.02.2017	1036	966	841	775	667	569	345
36	15.02.2017	1036	966	845	749	684	583	403
37	16.02.2017	1011	821	793	688	711	693	469
38	17.02.2017	988	802	760	749	677	693	483
39	18.02.2017	972	780	748	688	638	665	492
40	19.02.2017	915	724	695	596	560	583	442
41	20.02.2017	864	680	677	634	562	512	399
42	21.02.2017	831	644	631	602	550	512	357

### Water Gauge Readings 2017

Sl.No.	Date	KM 67.500	KM 85.050	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
	06-12-2017	392.00	-	-	-	-
	07-12-2017	407.00	256	150	-	-
	08-12-2017	370.00	206	150	-	-
	09-12-2017	281.00	166	126	-	-
	10-12-2017	87.00	-	-	-	-
	11-12-2017	87.00	-	-	-	-
	12-12-2017	71.00	-	-	-	-
	13-12-2017	64.00	-	-	-	-
	14-12-2017	87.00	-	-	-	-
	15-12-2017	298.00	-	-	-	-
	16-12-2017	137.00	-	-	-	-
	17-12-2017	186.00	-	-	-	-
	18-12-2017	244.00	-	-	-	-
	19-12-2017	155.00	-	-	-	-
	20-12-2017	154.00	-	-	-	-
	21-12-2017	136.00	-	-	-	-
	22-12-2017	85.00	-	-	-	-
	23-12-2017	216.00	154	-	-	-
	24-12-2017	122.00	47	-	-	-
	25-12-2017	126.00	47	-	-	-
	26-12-2017	130.00	40	-	-	-
	27-12-2017	180.00	108	-	-	-
	28-12-2017	773.00	346	70	-	-
	29-12-2017	841.00	398	200	-	-
	30-12-2017	890.00	481	230	60	-
	31-12-2017	773.00	388	303	91	-
	01-01-2018	889.00	545	333	228	12.62
	02-01-2018	838.00	573	476	310	45.65
	03-01-2018	966.00	668	574	357	90.31
	04-01-2018	1001.00	678	578	388	129.13
	05-01-2018	983.00	732	640	406	126.21
	06-01-2018	1021.00	772	661	445	215.99
	07-01-2018	1059.00	756	502	402	270.30
	08-01-2018	1029.00	743	601	449	248.09
	09-01-2018	993.00	732	572	432	255.43
	10-01-2018	996.00	772	580	432	237.23
	11-01-2018	996.00	806	613	504	251.75
	12-01-2018	1064.00	772	643	504	274.02
	13-01-2018	1054.00	828	656	551	289.29
	14-01-2018	1019.00	800	634	565	308.7
	15-01-2018	1008.00	772	626	551	320.55
	16-01-2018	1007.00	792	597	504	312.63
	17-01-2018	985.00	772	639	504	312.63
	18-01-2018	1037.00	820	601	513	308.7
	19-01-2018	1037.00	820	601	477	308.7
	20-01-2018	920.00	720	613	551	312.63
	21-01-2018	993.00	770	601	513	316.58
	22-01-2018	1044.00	770	613	513	304.79
	23-01-2018	1056.00	820	646	534	316.58
	24-01-2018	1212.00	954	753	610	320.55

### Water Gauge Readings 2018

Sl.No.	Date	KM 67.500	KM 85.050	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
	01-02-2018	1200.00	970	729	591	390.42
	02-02-2018	1184.00	892	739	631	407.52
	03-02-2018	1200.00	970	758	591	403.22
	04-02-2018	1141.00	908	780	692	420.50
	05-02-2018	1090.00	877	716	634	429.23
	06-02-2018	1167.00	936	825	706	433.62
	07-02-2018	1077.00	847	794	706	464.74
	08-02-2018	1067.00	853	774	634	446.87
	09-02-2018	1036.00	853	774	682	442.44
	10-02-2018	986.00	772	716	662	438.02
	11-02-2018	942.00	732	646	591	407.52
	12-02-2018	955.00	738	613	513	373.57
	13-02-2018	1085.00	853	638	551	356.97
	14-02-2018	1079.00	877	716	631	398.94
	15-02-2018	1098.00	877	691	631	420.5
	16-02-2018	1122.00	908	758	648	424.86
	17-02-2018	1189.00	970	845	677	438.02
	18-02-2018	1241.00	1091	956	783	501.19
	19-02-2018	1235.00	1086	963	860	557.54
	20-02-2018	1241.00	1112	997	860	601.1
	21-02-2018	1148.00	1022	941	860	601.1
	22-02-2018	1071.00	970	866	754	552.77
	23-02-2018	1018.00	939	817	748	533.81
	24-02-2018	1094.00	1031	847	748	533.81
	25-02-2018	1102.00	1022	867	769	552.77
	26-02-2018	968.00	862	714	748	557.54
	27-02-2018	916.00	839	705	701	505.80
	28-02-2018	855.00	777	696	701	505.80
	<b>Total (Cusecs)</b>	<b>30507.00</b>	<b>25584.00</b>	<b>21881.00</b>	<b>19303.00</b>	<b>13100.19</b>
	<b>Mcft</b>	<b>2635.80</b>	<b>2210.46</b>	<b>1890.52</b>	<b>1667.78</b>	<b>1131.86</b>

  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRIGA,

### Water Gauge Readings 2018 6 A.M

Sl.No.	Date	KM 67.500	KM 85.050	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
	01-03-2018	744.00	668	607	610	487.41
	02-03-2018	820.00	651	582	581	455.78
	03-03-2018	762.00	668	618	550	416.16
	04-03-2018	710.00	653	575	550	416.16
	05-03-2018	618.00	545	454	486	381.97
	06-03-2018	609.00	555	423	404	297
	07-03-2018	557.00	509	413	367	262.83
	08-03-2018	577.00	525	388	367	226.53
	09-03-2018	577.00	525	413	367	219.49
	10-03-2018	527.00	467	360	301	209.06
	11-03-2018	459.00	402	280	220	159.56
	12-03-2018	417.00	394	280	220	106.38
	13-03-2018	417.00	394.00	255	247	144.08
	14-03-2018	379.00	355	295	237	126.21
	15-03-2018	343.00	314	276	282	141.05
	16-03-2018	328.00	302	260	247	141.05
	17-03-2018	295.00	268	261	247	135.05
	18-03-2018	251.00	235	217	236	138.04
	19-03-2018	262.00	246	216	181	80.09
	20-03-2018	262.00	246	220	205	87.71
	21-03-2018	232.00	216	170	140	72.70
	22-03-2018	241.00	225	142	131	98.23
	23-03-2018	241.00	225	144	123	35.68
	24-03-2018	81.00	70	124	103	52.02
	25-03-2018					31.93
	26-03-2018					6.500
	<b>Total (Cusecs)</b>	<b>10709.00</b>	<b>9658.00</b>	<b>7973.00</b>	<b>7402.00</b>	<b>4928.67</b>
	<b>Mcft</b>	<b>925.26</b>	<b>834.45</b>	<b>688.87</b>	<b>639.53</b>	<b>425.84</b>

*B. N. Kandriga*  
27/7/2020

DEPUTY EXECUTIVE ENGINEER  
NTR T.G.P. SUB DIVISION  
B.N. KANDRIGA. ✓




### Water Gauge Readings 2018

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
1	26-09-2018	245	227			
2	27-09-2018	417	279			
3	28-09-2018	893.00	854	516	404	39.57
	29-09-2018	1054.00	1017	885	784	352.80
	30-09-2018	1090.00	1042	905	863	581.6
	01-10-2018	1030.00	992	877	863	665.90
	02-10-2018	921.00	892	711	784.5	620.8
	03-10-2018	1012.00	983	872	834	615.86
	04-10-2018	1012.00	988	892	851	686.29
	05-10-2018	1065.00	1052	940	898	727.67
	06-10-2018	1065.00	1052	949	898	717.25
	07-10-2018	1046.00	1017	898	868	706.88
	08-10-2018	1046.00	1022	892	851	691.42
	09-10-2018	1032.00	1007	906	868	717.25
	10-10-2018	1032.00	1002	892	851	722.46
	11-10-2018	1032.00	1007	906	852	701.72
	12-10-2018	1032.00	1007	833	746	706.88
	13-10-2018	1051.00	1022	913	834	630.74
	14-10-2018	1032.00	1007	892	852	722.46
	15-10-2018	1051.00	1022	906	868	722.46
	16-10-2018	985.00	949.00	833	770	722.46
	17-10-2018	944.00	895.00	749	675	645.73
	18-10-2018	985.00	944.00	749	689	640.72
	19-10-2018	985.00	944.00	739	689	601.1
	20-10-2018	885.00	845.00	686	621	581.6
	21-10-2018	985.00	912.00	721	621	562.32
	22-10-2018	1012.00	969.00	749	665	596.2
	23-10-2018	944.00	907.00	771	669	620.8
	24-10-2018	1022.00	963.00	791	665	596.20
	25-10-2018	1015.00	963.00	680	582	591.32
	26-10-2018	989.00	916.00	721	706	548.01
	27-10-2018	619.00	562.00	546	480	501.19
	28-10-2018	241.00				230.08
	29-10-2018	197.00				56.41
	30-10-2018					
	<b>Total (Cusecs)</b>	<b>30966.00</b>	<b>29260.00</b>	<b>24320.00</b>	<b>22601.50</b>	<b>18824.15</b>
	<b>Mcft</b>	<b>2675.46</b>	<b>2528.06</b>	<b>2101.25</b>	<b>1952.77</b>	<b>1626.41</b>

  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRIGA.

### Water Gauge Readings 2019

Sl.No.	Date	KM 67.500	KM 84.350	KM 95.700	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge	Discharge
	06-02-2019	378	169	0	0	0	0
	07-02-2019	601	319	196	0	0	0
3	08-02-2019	843.00	561	438	310	0	0
4	09-02-2019	1008.00	674	552	330	0	0
5	10-02-2019	1100.00	763	655	409	150	10.01
6	11-02-2019	1102.00	738.00	630.00	359.00	123.00	39.57
7	12-02-2019	1217.00	904.00	639.00	438.00	145.00	41.57
8	13-02-2019	1297.00	1014.00	728	623	262	98.23
9	14-02-2019	1323.00	1041.00	887	655	436	188.73
10	15-02-2019	1324.00	1168.00	984	834	668	340.62
11	16-02-2019	1206.00	1036.00	923	790	748	420.5
12	17-02-2019	1206.00	1005.00	914	766	668	381.97
13	18-02-2019	1206.00	1050	875	780	668	394.67
14	19-02-2019	1065.00	866	736	723	729	424.86
15	20-02-2019	1002.00	791.00	653	602	572	377.76
16	21-02-2019	964.00	723	577	602	548	324.53
17	22-02-2019	880.00	668	570	573	513	316.58
18	23-02-2019	856.00	668	552	478	432	251.75
19	24-02-2019	809.00	662	517	438	380	248.09
20	25-02-2019	562.00	440	331	361	327	195.43
21	26-02-2019	470.00	379	256	265	250	129.13
22	27-02-2019	407.00	333	215	210	189	153.31
23	28-02-2019	290.00	269	215	190	150	85.15
24	01-03-2019	261.00	230	175	153	150	45.65
25	02-03-2019	185.00		0	0	0	10.01
	<b>Total (Cusecs)</b>	<b>21562.00</b>	<b>16471.00</b>	<b>13218.00</b>	<b>10889.00</b>	<b>8108.00</b>	<b>4478.12</b>
	<b>Mcft</b>	<b>1862.96</b>	<b>1423.09</b>	<b>1142.04</b>	<b>940.81</b>	<b>700.53</b>	<b>386.91</b>

  
 27/7/2020  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRIGA.



### Water Gauge Readings 2019 6 A.M

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume	Flume Cumulative
		Discharge	Discharge	Discharge	Discharge	Discharge	
1	27-09-2019	880	641	219			
2	28-09-2019	1469	1368	955	689		
3	29-09-2019	1380	1283	1155	1136	630	
4	30-09-2019	1408	1377	1256	1215	785.87	
5	01-10-2019	1419	1379	1255	1187	812.81	
6	02-10-2019	1346	1365	1228	1142	834.29	
7	03-10-2019	1012	983	851	1082	802	
8	04-10-2019	1036	986	846	989	722.46	
9	05-10-2019	1121	1081	894	868	676.08	
10	06-10-2019	1145	1102	971	920	706.88	
11	07-10-2019	1150	1112	971	920	712.06	
12	08-10-2019	1093	1051	929	885	706.88	
13	09-10-2019	1097	1056	929	885	717.25	
14	10-10-2019	984	946	835	885	706.88	
15	11-10-2019	1067	1023	866	801	655.80	
16	12-10-2019	1108	1066	901	801	610.92	
17	13-10-2019	1053	930	699	616	615.86	
18	14-10-2019	1126	1081	813	705	424.86	
19	15-10-2019	1137	1097	920	817	601.10	
20	16-10-2019	1147	1101	979	851	706.88	
21	17-10-2019	1182	1143	998	881	706.88	
22	18-10-2019	1182	1142	1010	887	722.46	
23	19-10-2019	1118	1066	931	851	706.88	
24	20-10-2019	1142	1076	977	851	691.42	
25	21-10-2019	1147	1092	970	867	701.71	
26	22-10-2019	1127	1077	956	885	785.87	
27	23-10-2019	1147	1101	979	911	775.18	
28	24-10-2019	1142	1096	971	911	785.87	
29	25-10-2019	1249	1205	1058	939	780.52	
30	26-10-2019	1197	1149	1023	952	802.00	
31	27-10-2019	1156	1106	994	938	775.18	
32	28-10-2019	1159	1107	968	876	727.67	
33	29-10-2019	1104	1004	794	815	665.91	
34	30-10-2019	924	819	705	720	630.74	
35	31-10-2019	1043	939	794	693	576.76	
	<b>Total (Cusecs)</b>	<b>40197.00</b>	<b>38150.00</b>	<b>32600.00</b>	<b>30371.00</b>	<b>23263.93</b>	<b>0.00</b>
	<b>Mcft</b>	<b>3473.02</b>	<b>3296.16</b>	<b>2816.64</b>	<b>2624.05</b>	<b>2010.00</b>	<b>0.000</b>

  
 27/11/2019  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRICA.

# Water Gauge Readings 2019 6 A.M

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume	Flume Cumulative
		Discharge	Discharge	Discharge	Discharge	Discharge	
1	27-09-2019 to 31-10-2019	40197	38150	32600	30371	23263.93	
2	01-11-2019	933	848	734	681	567.12	
3	02-11-2019	802	707	602	635	538.53	
4	03-11-2019	813	706	483	512	411.83	
5	04-11-2019	892	639	483	418	332.54	
6	05-11-2019	884	591	440	383	300.89	
7	06-11-2019	939	632	475	318	244.45	
8	07-11-2019	1157	706	495	339	182.11	
9	08-11-2019	1226	754	556	373	182.11	
10	09-11-2019	1226	740	556	353	185.41	
11	10-11-2019	1213	719	591	342	175.57	
12	11-11-2019	1214	713	591	342	175.57	
13	12-11-2019	1101	586	591	342	172.33	
14	13-11-2019	1094	522	431	299	165.90	
15	14-11-2019	1042	452	352	286	153.31	
16	15-11-2019	1104	522	332	250	129.13	
17	16-11-2019	1168	651	332	250	126.21	
18	17-11-2019	1088	666	332	250	132.08	
19	18-11-2019	1071	637	400	200	95.57	
20	19-11-2019	1050	622	400	149	56.41	
21	20-11-2019	975	577	400	149	56.41	
22	21-11-2019	1002	591	360	176	82.00	
23	22-11-2019	1024	577	360	259	135.05	
24	23-11-2019	1039	578	360	227	109.14	
25	24-11-2019	975	500	400	149	56.41	
26	25-11-2019	933	487	360	149	56.41	
27	26-11-2019	887	434	321	149	56.41	
28	27-11-2019	924	474	321	149	54.20	
29	28-11-2019	924	467	321	149	56.41	
30	29-11-2019	1117	725	400	202	111.93	
31	30-11-2019	1226	765	456	335	198.81	
Total (Cusecs)		71240.00	56738.00	45835.00	39186.00	28564.18	0.00
Mcft		6155.14	4902.16	3960.14	3385.67	2467.95	0.000

*Pragathi*  
27/11/2019  
DEPUTY EXECUTIVE ENGINEER  
NTR T.G.P. SUB DIVISION  
R.N. KANDRICA.

Water Gauge Readings 2019 6 A.M						
Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
1	27-09-2019 to 30-11-2019	71240.00	56738.00	45835.00	39186.00	28564.18
2	01-12-2019	1414	971	571	451	285.46
3	02-12-2019	1439	1047	892	785	543.26
4	03-12-2019	1207	901	805	850	665.91
5	04-12-2019	1254	935	769	801	620.80
6	05-12-2019	1254	902	647	688	571.94
7	06-12-2019	1248	967	647	576	455.78
8	07-12-2019	1319	1102	892	752	548.01
9	08-12-2019	1343	1234	1049	975	722.46
10	09-12-2019	1373	1262	1092	975	791.23
11	10-12-2019	1241	1156	1049	975	785.87
12	11-12-2019	1098	993	892	926	743.40
13	12-12-2019	1036	928	720	801	650.76
14	13-12-2019	1053	943	604	675	543.26
15	14-12-2019	1053	952	574	635	505.80
16	15-12-2019	1053	958	786	692	543.26
17	16-12-2019	1053	943	786	692	586.45
18	17-12-2019	1091	976	798	722	596.20
19	18-12-2019	983	928	873	784	640.72
20	19-12-2019	881	817	814	753	655.80
21	20-12-2019	877	795	742	692	591.32
22	21-12-2019	877	791	724	675	571.94
23	22-12-2019	862	778	705	663	557.54
24	23-12-2019	862	789	705	663	543.26
25	24-12-2019	776	709	681	631	524.42
26	25-12-2019	771	709	631	571	473.77
27	26-12-2019	767	701	631	551	455.78
28	27-12-2019	767	691	596	537	438.02
29	28-12-2019	752	675	569	513	403.22
30	29-12-2019	756	684	569	513	403.22
31	30-12-2019	752	669	569	513	407.52
32	31-12-2019	765	687	552	479	377.76
Total (Cusecs)		103219.00	84331.00	68769.00	60695.00	45768.32
Mcft		8918.12	7286.20	5941.64	5244.05	3954.38

  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRICA.

**Water Gauge Readings 2020 6 A.M**

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
1	27-09-2019 to 31-12-2019	<b>103219.00</b>	<b>84331.00</b>	<b>68769.00</b>	<b>60695.00</b>	<b>45768.32</b>
2	01-01-2020	730	655	552	479	381.97
3	02-01-2020	747	661	552	479	386.19
4	03-01-2020	738	666	596	524	420.5
5	04-01-2020	749	672	596	524	433.62
6	05-01-2020	767	678	596	524	429.23
7	06-01-2020	771	692	633	565	464.74
8	07-01-2020	780	695	635	592	482.85
9	08-01-2020	789	703	635	592	487.41
10	09-01-2020	780	695	635	592	487.41
11	10-01-2020	780	701	635	592	482.85
12	11-01-2020	786	698	625	595	478.30
13	12-01-2020	758	646	598	551	446.00
14	13-01-2020	734	655	578	513	407.00
15	14-01-2020	721	634	578	513	424.86
16	15-01-2020	721	634	578	513	420.5
17	16-01-2020	707	629	578	513	416.16
18	17-01-2020	664	587	551	487	398.94
19	18-01-2020	668	581	460	397	304.79
20	19-01-2020	738	659	460	397	300.89
21	20-01-2020	738	664	618	513	386.19
22	21-01-2020	738	664	618	513	390.42
23	22-01-2020	694	608	561	487	386.19
24	23-01-2020	687	561	501	430	332.54
25	24-01-2020	670	530	461	389	304.79
26	25-01-2020	679	538	438	385	281.64
27	26-01-2020	679	538	438	385	277.85
28	27-01-2020	690	545	438	374	266.56
29	28-01-2020	742	596	461	398	304.79
30	29-01-2020	853	704	633	487	324.53
31	30-01-2020	889	738	671	606	464.74
32	31-01-2020	889	738	671	623	533.81
<b>Total (Cusecs)</b>		<b>126295.00</b>	<b>104296.00</b>	<b>86349.00</b>	<b>76227.00</b>	<b>58076.58</b>
<b>Mcft</b>		<b>10911.89</b>	<b>9011.17</b>	<b>7460.55</b>	<b>6586.01</b>	<b>5017.82</b>

  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRICA.

### Water Gauge Readings 2020 6 A.M

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
1	27-09-2019 to 31-01-2020	126295.00	104296.00	86349.00	76227.00	58076.58
2	01-02-2020	894	734	671	623	519.75
3	02-02-2020	923	776	671	623	515.08
4	03-02-2020	962	797	701	648	533.81
5	04-02-2020	947	777	701	663	552.77
6	05-02-2020	957	806	750	678	571.94
7	06-02-2020	957	800	756	707	601.10
8	07-02-2020	938	776	701	638	576.16
9	08-02-2020	943	789	731	678	567.12
10	09-02-2020	877	725	731	678	571.94
11	10-02-2020	819	671	701	648	543.26
12	11-02-2020	735	594	671	623	515.08
13	12-02-2020	847	690	653	606	510.44
14	13-02-2020	843	668	671	623	533.81
15	14-02-2020	809	628	625	592	533.81
16	15-02-2020	809	609	552	502	433.62
17	16-02-2020	809	605	535	475	386.19
18	17-02-2020	774	573	485	385	293.14
19	18-02-2020	802	597	501	422	324.53
20	19-02-2020	807	602	535	475	377.76
21	20-02-2020	786	573	502	452	352.86
22	21-02-2020	809	601	438	372	285.46
23	22-02-2020	806	610	438	372	277.85
24	23-02-2020	770	573	469	372	285.46
25	24-02-2020	770	592	504	404	300.89
26	25-02-2020	742	559	504	434	344.68
27	26-02-2020	708	518	443	389	300.89
28	27-02-2020	689	480	408	353	266.56
29	28-02-2020	689	496	394	346	248.09
30	29-02-2020	704	516	394	346	259.12
<b>Total (Cusecs)</b>		<b>150220.00</b>	<b>123031.00</b>	<b>103185.00</b>	<b>91354.00</b>	<b>70459.75</b>
<b>Mcf</b>		<b>12979.01</b>	<b>10629.88</b>	<b>8915.18</b>	<b>7892.99</b>	<b>6087.72</b>

  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.N. KANDRICA.



### Water Gauge Readings 2020 6 A.M

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
1	27-09-2019 to 29-02-2020	150220.00	123031.00	103185.00	91354.00	70459.75
2	01-03-2020	718	532	394	346	259.12
3	02-03-2020	732	553	438	366	259.12
4	03-03-2020	718	529	438	366	259.12
5	04-03-2020	709	513	373	274	169.11
6	05-03-2020	709	513	373	265	159.56
7	06-03-2020	709	502	394	285	175.57
8	07-03-2020	815	610	438	316	198.81
9	08-03-2020	1030	803	598	452	270.30
10	09-03-2020	1007	783	617	518	377.76
11	10-03-2020	1207	928	712	592	416.16
12	11-03-2020	1212	1016	920	736	548.01
13	12-03-2020	1240	1047	949	784	625.76
14	13-03-2020	1245	1097	996	839	645.73
15	14-03-2020	1229	1057	951	839	676.08
16	15-03-2020	1234	1046	929	829	665.91
17	16-03-2020	1268	1046	921	811	645.73
18	17-03-2020	1169	1019	951	829	660.85
19	18-03-2020	1147	1007	951	863	706.88
20	19-03-2020	1142	943	899	829	686.29
21	20-03-2020	1095	879	806	779	645.73
22	21-03-2020	1069	879	806	732	606.00
23	22-03-2020	1185	952	779	687	562.32
24	23-03-2020	1240	1030	806	671	510.44
25	24-03-2020	1228	1072	899	811	635.72
26	25-03-2020	1229	1072	921	829	670.99
27	26-03-2020	1263	1051	899	796	645.73
28	27-03-2020	1268	1097	899	796	625.76
29	28-03-2020	1268	1072	864	763	610.92
30	29-03-2020	1268	1092	899	763	596.2
31	30-03-2020	1258	1072	899	779	596.2
32	31-03-2020	1143	952	743	640	505.8
<b>Total (Cusecs)</b>		<b>183974.00</b>	<b>150795.00</b>	<b>126647.00</b>	<b>111539.00</b>	<b>86077.43</b>
<b>Mcft</b>		<b>15895.35</b>	<b>13028.69</b>	<b>10942.30</b>	<b>9636.97</b>	<b>7437.09</b>

  
 DEPUTY EXECUTIVE ENGINEER  
 NTR T.G.P. SUB DIVISION  
 B.M. KANDRIGA.

**Water Gauge Readings 2020 6 A.M**

Sl.No.	Date	KM 67.500	KM 84.350	KM 107.200	KM 125.000	Flume
		Discharge	Discharge	Discharge	Discharge	Discharge
1	27-09-2019 to 31-03-2020	<b>183974.00</b>	<b>150795.00</b>	<b>126647.00</b>	<b>111539.00</b>	<b>86077.43</b>
2	01-04-2020	<b>1132</b>	<b>897</b>	<b>648</b>	<b>513</b>	<b>381.97</b>
3	02-04-2020	<b>687</b>	<b>609</b>	<b>648</b>	<b>572</b>	<b>438.02</b>
4	03-04-2020	<b>405</b>	<b>339</b>	<b>286</b>	<b>250</b>	<b>297</b>
5	04-04-2020	<b>405</b>	<b>325</b>	<b>263</b>	<b>184</b>	<b>123.31</b>
6	05-04-2020	<b>387</b>	<b>314</b>	<b>165</b>	<b>107</b>	<b>67.91</b>
7	06-04-2020	<b>378</b>	<b>314</b>	<b>165</b>	<b>107</b>	<b>65.55</b>
8	07-04-2020	<b>378</b>	<b>299</b>	<b>165</b>	<b>80</b>	<b>43.6</b>
9	08-04-2020	<b>372</b>	<b>293</b>	<b>165</b>	<b>80</b>	<b>39.57</b>
10	09-04-2020	<b>372</b>	<b>293</b>	<b>165</b>	<b>89</b>	<b>47.75</b>
11	10-04-2020	<b>372</b>	<b>293</b>	<b>165</b>	<b>89</b>	<b>56.41</b>
12	11-04-2020	<b>323</b>	<b>245</b>	<b>139</b>	<b>89</b>	<b>67.91</b>
13	12-04-2020	<b>290</b>	<b>220</b>	<b>110</b>	<b>59</b>	<b>41.57</b>
14	13-04-2020	<b>290</b>	<b>220</b>	<b>110</b>	<b>48</b>	<b>19.95</b>
15	14-04-2020	<b>290</b>	<b>220</b>	<b>94</b>	<b>34</b>	<b>8.79</b>
16	15-04-2020	<b>284</b>	<b>215</b>	<b>94</b>	<b>30</b>	<b>4.46</b>
17	16-04-2020	<b>200</b>	<b>161</b>	<b>0</b>	<b>0</b>	<b>0.00</b>
	<b>Total (Cusecs)</b>	<b>190539.00</b>	<b>156052.00</b>	<b>130029.00</b>	<b>113870.00</b>	<b>87781.20</b>
	<b>Mcft</b>	<b>16462.57</b>	<b>13482.89</b>	<b>11234.51</b>	<b>9838.37</b>	<b>7584.30</b>

*Pragade*  
27/5/2020  
DEPUTY EXECUTIVE ENGINEER  
NTR T.G.P. SUB DIVISION  
B.N. KANDRICA.

*[Signature]* 27/7  
EXECUTIVE ENGINEER  
TELUGU GANGA PROJECT DIVISION  
SRICALAHASTI

### ANNEXURE-III

### PUBLIC CONSULTATION AND DISCLOSURE PUTTUR ULB

### STAKEHOLDER QUESTIONNAIRE

File No: PUTTUR / APURASMITP / E/S / 06

DATE: 08-07-2020

PLACE: పుత్తూరు.

FROM:

*[Signature]*

P. ప్రసాదు

పాలమేనగల్గం చాక్  
నారాయణ ప్రింట్ మేషిన్

TO  
మేయర్ ఆఫీసు  
పుత్తూరు

Sub: దాదా నల్ల ప్రాజెక్టు గురించి సుదీర్ఘ గురించి అవగాహన  
పెట్టగలరు.

- 1) ప్రాజెక్టు వేసికొనుట - చిన్న చిన్న చావులు అడ్డంగా వచ్చినందుకు మీరు ఏ  
అభిప్రాయాలు చెబుతారు. ఆసక్తికరమైనవి.
- 2) ఈ ప్రాజెక్టు వలన దుష్ప్రభుత్వం, భూమి మొదలగు దానికి మీరు ఏ అభిప్రాయ  
చెబుతారు.
- 3) ఏదైనా కట్టడాల నిర్మాణం వలన మరల ప్రాజెక్టు వేసికొనుట  
వలసివచ్చినందుకు మీరు ఏ అభిప్రాయం చెబుతారు.
- 4) మీరు పనిచేస్తున్నందుకు మట్ల, ప్రమాదాలకు వచ్చినందుకు మీరు ఏ  
అభిప్రాయాలు చెబుతారు.
- 5) ఈ ప్రాజెక్టు - ప్రాజెక్టు వలన ప్రాజెక్టు క్రింద ప్రాజెక్టు ప్రాజెక్టు  
అవగాహన కలగమని మీ అభిప్రాయం చెబుతారు.

*[Signature]*  
ASSISTANT ENGINEER  
PUTTUR MUNICIPALITY

*[Signature]*  
P. ప్రసాదు  
చైర్మన్.



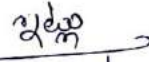
Date-29/07/2020  
పుత్తూరు.

To  
మ్యునిసిపల్ కమిషనర్ గారు,  
పుత్తూరు.

File No: puttur/APUWS & SMIP/E&S/05.

1. ఏదైనా కట్టడాలు నిర్మించబడిన మరలం చెట్లెత్తు  
చెట్లెత్తుకు ముందు మరలం మౌలా ఉండన-రాని  
వినిధిమైన పరిస్థితి అవుతుంది.
2. చెట్లెత్తు చెట్లెత్తుకు ముందు మరలం మౌలా ఉండన-రాని  
మౌలా ఉండన-రాని వినిధిమైన పరిస్థితి అవుతుంది.
3. ఈ ప్రాంతం చెట్లెత్తుకు చెట్లెత్తుకు ముందు  
మౌలా ఉండన-రాని వినిధిమైన పరిస్థితి  
అవుతుంది.
4. ఈ ప్రాంతం చెట్లెత్తుకు ముందు మౌలా ఉండన-రాని  
మౌలా ఉండన-రాని వినిధిమైన పరిస్థితి అవుతుంది.

  
ASSISTANT ENGINEER  
PUTTUR MUNICIPALITY

  
శ్రీమతి విజయలక్ష్మి  
K. నాగేశ్వరరావు  
మొన్ రెడ్.  
KVB పుత్తూరు.

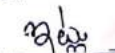
Date : 23-07-2020  
పుత్తూరు.

To.  
కమిషనర్ గారు,  
యూనిఫర్డ్ కార్పొరేషన్.  
పుత్తూరు.

File no. puttur/APWS & SMIP/ E&S/03.

1. యీరు పని పరిస్థితులను మెరుగు, ప్రైవేట్ గాతలు పనికి నాణ్యతను  
హాకి వి విభాగం చర్యలు తీసుకుంటారు.
2. ప్రైవేట్ ట్రస్ట్ పని పరిస్థితుల మెరుగు ఉపయోగిస్తారు, హాకి యన్  
శాఖల వస్త్రాలు. హాకి వి విభాగం చర్యలు యీరు తీసుకుంటారు.
3. ఈ ప్రాజెక్టు పరిస్థితులను చిన్న చిన్న వియలుగ్గి యిన్ లో  
పని పరిస్థితులను, హాకి వి విభాగం చర్యలు తీసుకుంటారు.
4. ఈ ప్రాజెక్టు పని పరిస్థితులను, చిన్న వియలుగ్గి హాకి యీరు  
వి విభాగం చర్యలు తీసుకుంటారు.
5. ప్రైవేట్ ట్రస్ట్ పరిస్థితులను చిన్న చిన్న శాఖల పరిస్థితులను  
యీరు వి విభాగం చర్యలు తీసుకుంటారు.

  
ASSISTANT ENGINEER  
PUTTUR MUNICIPALITY

  
శ్రీమతి బాబ్జి  
J. Babji  
a-town, pichaluru,  
pichaluru mandal.

Date: 19-07-2020

Place: Puttur

TO  
Municipal Commissioner,  
Puttur.

File No: PUTTUR/APUWS & SMIP/E&S/O-2

Sub: Kindly explain the implementation measurements on  
water supply project.

Respected Sir/Madam,

- 1) This project is given sufficient water to all in summer time.
- 2) When working on pipeline execution time, how to control the debris.
- 3) How to control the Air borne dust
- 4) If plants are remove when working time how to manage.
- 5) This water is good quality of drinking water after completion of the project.

Yours sincerely

Prem  
Gvinath,  
Narayanaaram road,  
Puttur.

*Nisat*  
ASSISTANT ENGINEER  
PUTTUR MUNICIPALITY

29-07-2020,  
puducherry  
municipal office.

File no: puttur/APUWse smg/06,05,03,02

Ans ఈ ప్రాంతాన్ని మెరుగ్గా మిగిలిన ప్రాంతాల land and government land లో  
plan చేయాలి. బాగుండుగా వస్తే కొద్దిగా వచ్చిన అంటే? Compensation  
ఇస్తారు చెప్పిస్తారు.

2) ಈ ಪ್ರಾಂತ್ಯದಲ್ಲಿನ ಮಳೆನೀರಿನ  
 ಮಟ್ಟವು ಹೆಚ್ಚಿದೆಯೇ?  
 Am ಅದು ಹೆಚ್ಚಿದೆಯೇ ಎಂದು ಹೇಳಲು ಸಾಧ್ಯವಿಲ್ಲ. Dust suppression  
 ಮಾಡುವ ಕಾರ್ಯವನ್ನು ಮಾಡುವುದು  
 ಇಲ್ಲ. ಇದು ಮಳೆಯಿಂದ ಹೆಚ್ಚಿದೆ ಎಂದು ಹೇಳಲು ಸಾಧ್ಯವಿಲ್ಲ.

3) విజ్ఞాన రేఖలను గురించి  
మోడల్లులు యానీ రిఫ్రాగా వచ్చినట్లుగా వాటిని  
రిఫ్రాగా వచ్చిన మోడల్లులను 1:5 నష్టం తో 8గే మళ్ళీ ప్రోటోమోడల్లు  
నుబట్టి ఒకరినొకరికి ప్రోటోమోడల్లు 60 FIA and 60 FIA మోడల్లు  
వచ్చినవి  
మోడల్లు ప్రోటోమోడల్లు రిఫ్రాగా వచ్చి యానీ





[illegible]

5



## STAKEHOLDER OPINIONS AND FEEDBACKS

### Feed Back /Opinion of the Stakeholder Form

S.No	Name of Stakeholder	Address of the Stakeholder	Query	Reply given by the concern official	Signature
1	K. Sankarapandey	KVB, 2nd floor, 1st floor, KVB, 2nd floor, 3rd floor.	1st Q.	Kireeti, MAE puttur.	
2	G. Vinodh	4-4/6, Narayana Venam, road, puttur.	2nd Q.	Kireeti, MAE puttur.	
3	J. Babji	2-Town, pickatur pickatur mandal.	3rd Q.	Kireeti, MAE puttur.	
4	P. Sundaradach	2-6-4, 2nd floor, KVB, puttur.	4th Q.	Kireeti, MAE puttur.	
5					
6					
7					

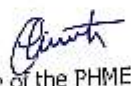
## **ACKNOWLEDGEMENT**

### **ACKNOWLEDGEMENT**

As suggested by Asian Infrastructure Investment Bank (AIIB), the Project Management Unit (PMU) of Andhra Pradesh Urban Water Supply and Septage Management Improvement Project (APUWSSMIP) has planned to organize a Public Consultation or Public Disclosure of EIA and EMP report, prepared for Puttur Municipality/ ULB through online/ digital processes. The Purpose of the online Public Consultation/Public Disclosure is to make known to the public, about the Environmental Impacts of the project.

In this context, the following documents have been submitted to this office by PMC/ Aarvee Associates Architects Engineers and Consultants Pvt., Ltd., to make them available in the online public disclosure process.

1. EIA and EMP report for Puttur Municipality/ULB in soft copy.
2. Executive Summary of the EIA and EMP report in English and Telugu versions in soft copies to display the print outs on the Notice Board.
3. Feedback/ Opinion form in soft copy.

  
Signature of the PHMED Engineer:

Name of the Circle/Divisional office:


Date: 30-09-2020

### **ACKNOWLEDGEMENT**

As suggested by Asian Infrastructure Investment Bank (AIIB), the Project Management Unit (PMU) of Andhra Pradesh Urban Water Supply and Septage Management Improvement Project (APUWSSMIP) has planned to organize a Public Consultation or Public Disclosure of EIA and EMP report, prepared for Puttur Municipality/ ULB through online/ digital processes. The Purpose of the online Public Consultation/Public Disclosure is to make known to the public, about the Environmental Impacts of the project.

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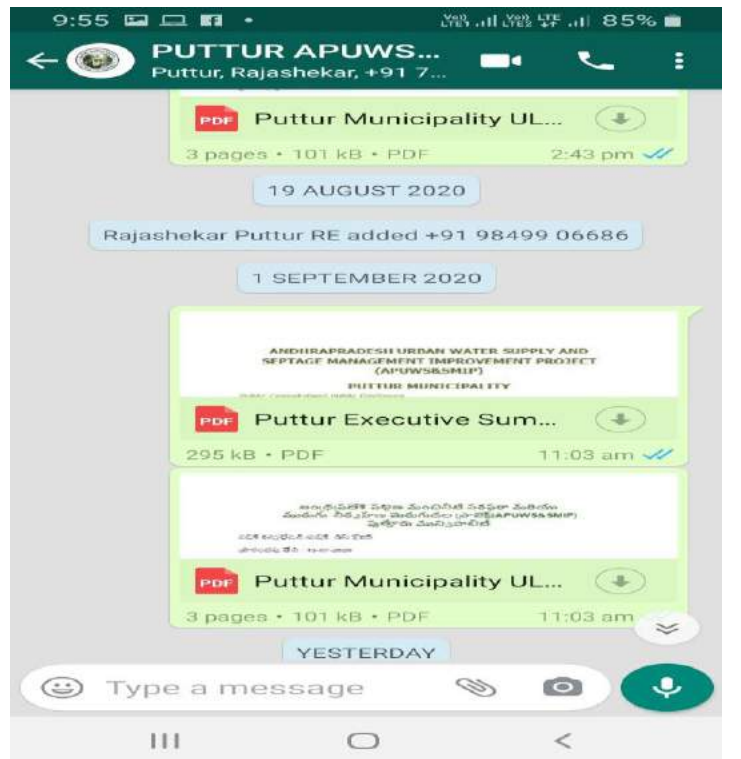
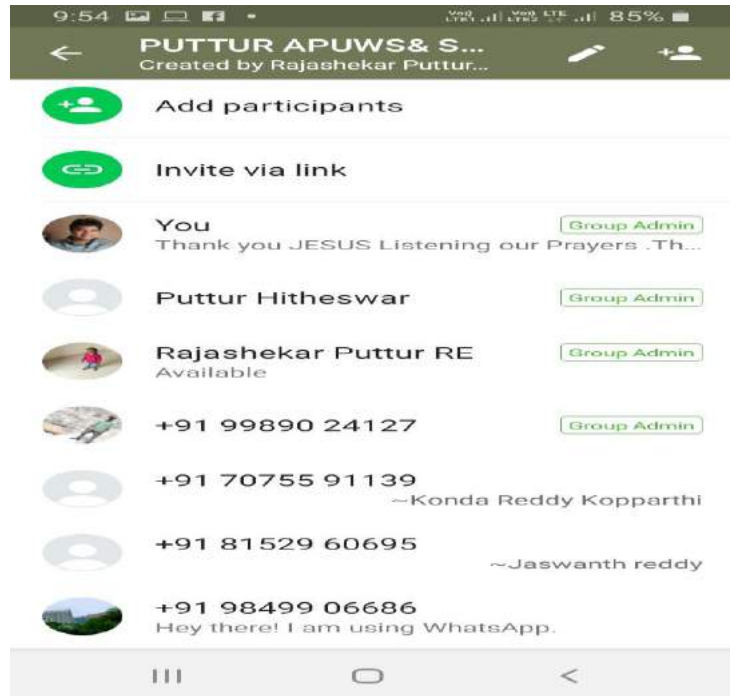
1. EIA and EMP report for Puttur Municipality/ULB in soft copy.
2. Executive Summary of the EIA and EMP report in English and Telugu versions in hard copies to display on the Notice Board.
3. Feedback/ Opinion form in soft copy.

  
Signature of the Commissioner:

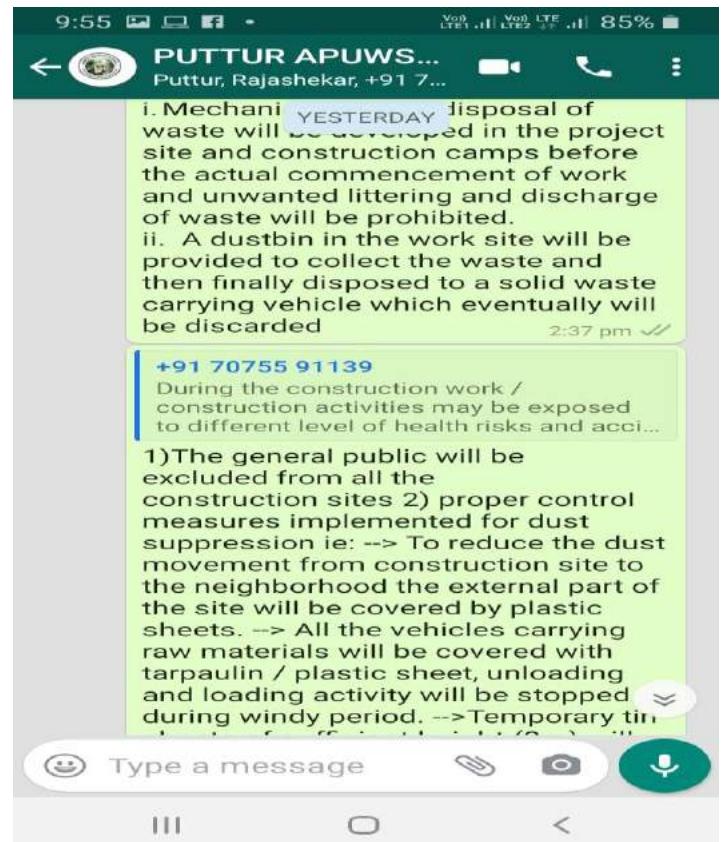
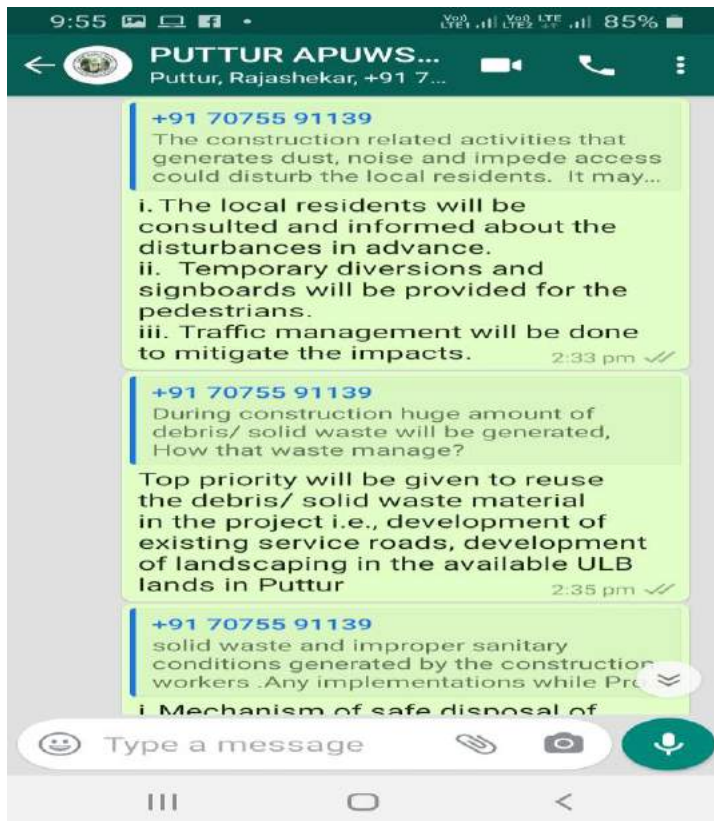
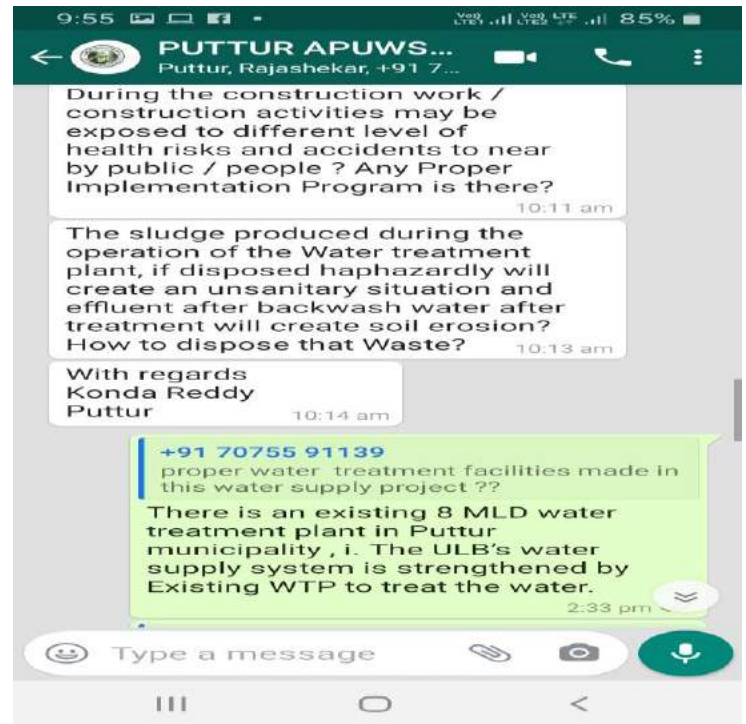
ULB Name:

Date:

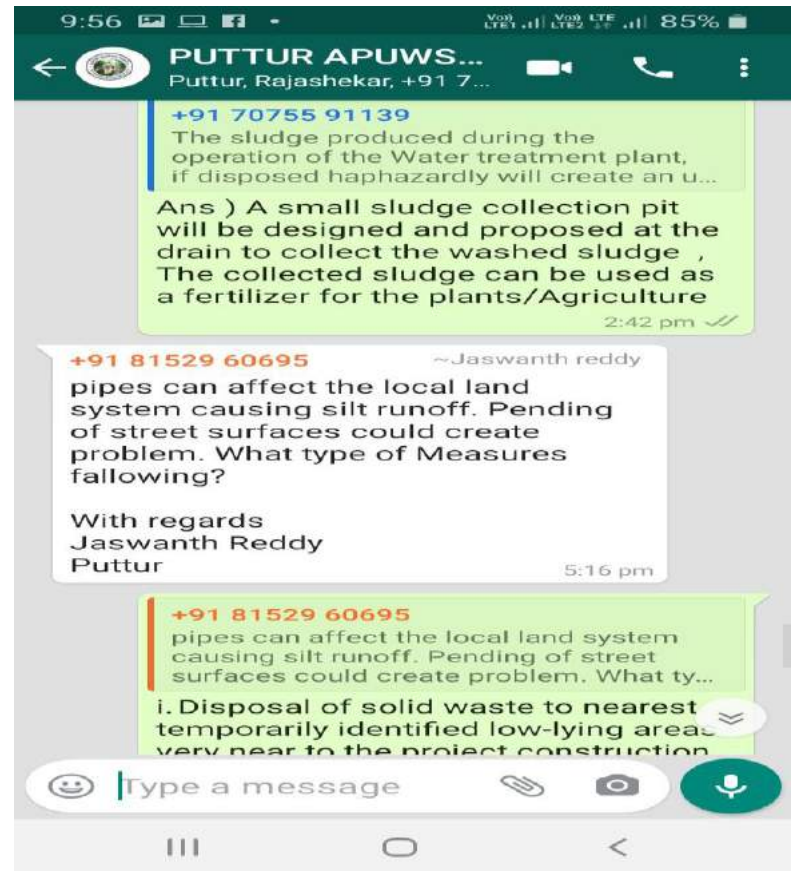
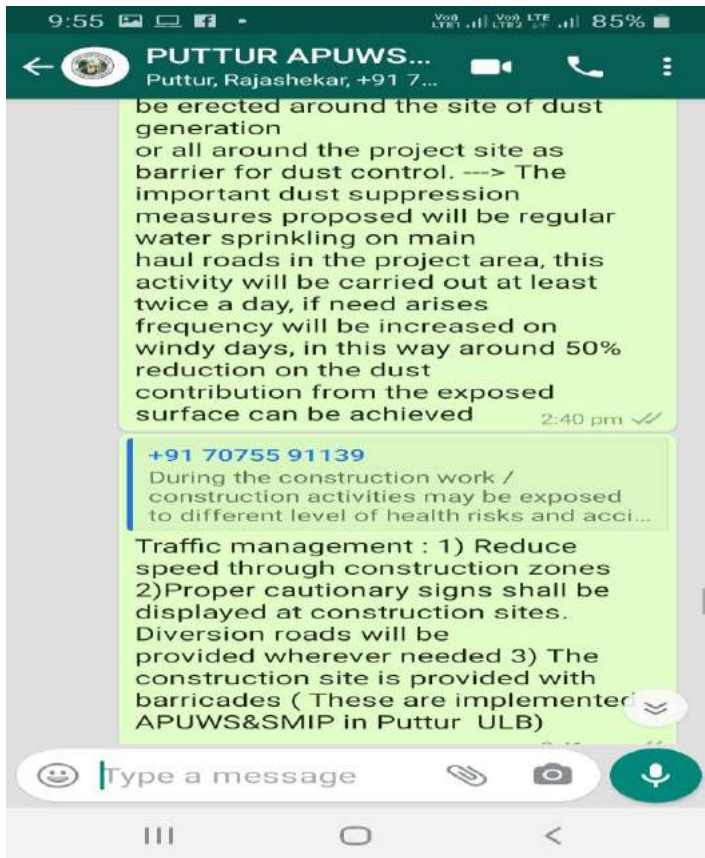
## CONSULTATION OVER WHATSAPP GROUP

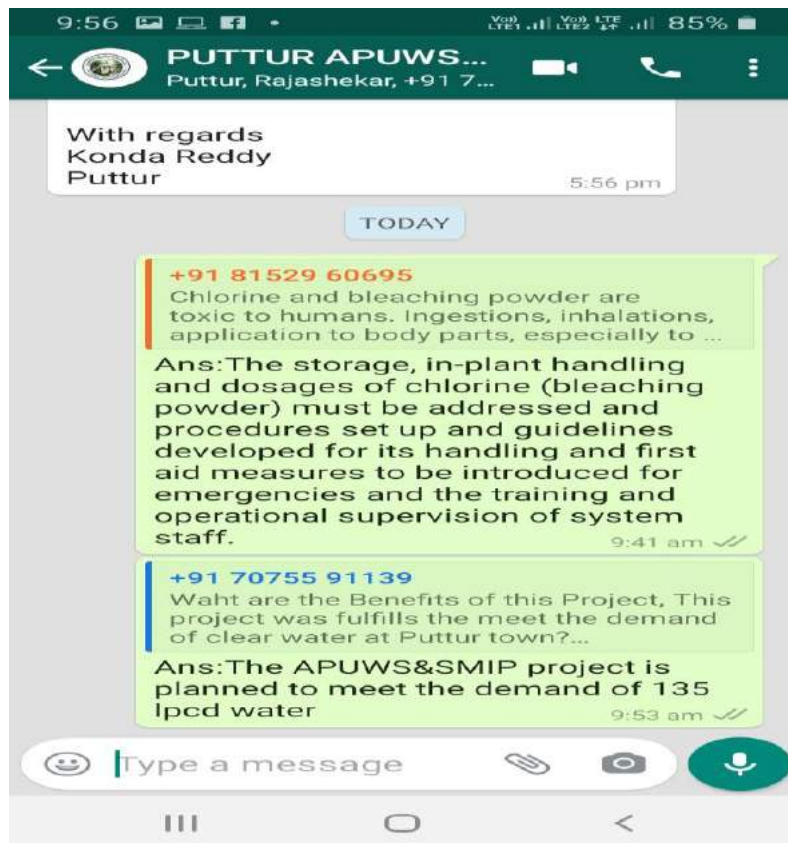














## ANDHRA PRADESH URBAN WATER SUPPLY & SEPTAGE MANAGEMENT IMPROVEMENT PROJECT

### Environmental Impact Assessment Review Checklist

#### Objective of this document

This document is intended to provide guidance, in the first instance, to PHMED staff located in each ULB, and, in the second instance, to the PMU, in reviewing and verifying the completeness and accuracy of environmental impacts as captured in the ULB-level EIAs prepared by the PMC. This checklist is focused on the scientific and technical adequacy of the EIAs and specific themes which are important to the AIIB as reflected in its Environmental and Social Policy. The checklist provides guidelines to PHMED and the PMU for offering high quality feedback to the PMC in order to ensure the EIAs and EMPs prepared meet AIIB's Environmental and Social Standard 1 on *Environmental and Social Assessment and Management*.

By replying to a set of questions, PHMED and PMU staff should be able to conclude which parts, if any, of the EIAs do not yet meet the standards outlined in AIIB's ESP and which information may be missing or is under-evaluated. By doing so, PHMED and PMU reviewers can formulate constructive and credible feedback to share with the PMC.

#	Item	Status <sup>1</sup>	Comments/Notes
<b>Executive Summary</b>			
1	Does the report have an Executive Summary (1 page) including key environmental impacts, properly categorized according to severity, mitigation measures, and results of public consultation.	Yes	
2	Was full consultation carried out during scoping, and are the comments and views fully presented? <sup>2</sup>	Yes	As suggested by AIIB Workshops were conducted at state level in Guntur and 3 regional level public consultations were conducted at ananthapur, Kaklnada and vijayanagaram by PMU.
<b>1. INTRODUCTION</b>			
3	<b>Sub-project justification.</b> Has the justification for the sub-project been clearly laid out?	yes	
4	Has the subproject been screened against the list of ineligible activities (negative list of the AIIB)?	yes	

<sup>1</sup> If "Partially" is checked, please provide further details in the "Comments/Notes" column, as well as in any other case where further information is needed, e.g. to elaborate on identified risks and impacts of the sub-project.

<sup>2</sup> Although not required under Indian Regulations for this project, section 13.5.2 of the project's Environmental and Social Management Planning Framework (ESMPF) requires the EMP (in English) as well as the Executive Summary of the EIA/EMP (in English and Telugu) to be displayed at the Municipal Commissioner Offices as well as the local offices of PHMED. These documents should be displayed for a period of at least 14 days. Comments received, if relevant, should be incorporated into the EIA and Executive Summary.



5	<b>Indian regulatory and AIIB policy requirements.</b> Is the alignment of the project with relevant strategies, development plans, and regulatory frameworks including AIIB ESP explained?	Yes	As per the present regulatory system, the EIA notification-2006, the present project does not attract notification as the nature of the project is water supply which is not listed in the schedule of EIA
6	<b>Other legislative and regulatory considerations.</b> Does the report adequately summarize the policy/legal framework?	Yes	
<b>2. PROJECT LOCATION AND BASELINE DATA</b>			
7	<b>Project location.</b> Has the project location been clearly identified including through an adequately scaled map?	Partially	Only Geographical coordinates are incorporated. Scaled Map is not enclosed.
8	<b>Geographical and demographic characteristics.</b> Are locations or features of landscape, townscape, archaeological, historic, architectural or other community or cultural importance in the area that may be negatively affected by project described, including any designated or protected sites, landscapes and important viewpoints?	No	There are no negatively affected places & Sensitive areas identified in Puttur Municipality for Present proposed project.
9	Is the existing land use plan of the area to be occupied by the project and the surrounding area presented? Are the land uses of the area to be occupied by the project and the surrounding area described, including any potential land use conflicts with existing land uses?	No	Not Described in the report
10	<b>Meteorological characteristics.</b> Is meteorological baseline data presented and is this data based on long-term as well as recent measurements?	Yes	
11	<b>Air quality.</b> Has air quality data been accurately presented and is this data based on long-term as well as recent measurements?	Yes	
12	<b>Noise pollution.</b> Has noise data been accurately presented and is this data based on long-term as well as recent measurements?	Yes	
13	<b>Water quality.</b> Has water quality data been accurately presented and is this data based on long-term as well as recent measurements?	Yes	
14	<b>Soils.</b> Has data on soils been accurately presented and is this data based on long-term as well as recent measurements?	Yes	
15	<b>Flora and fauna.</b> Has data on the project area's flora and fauna been accurately presented and is this data based on long-term	Yes	



	as well as recent measurements?		
16	<b>Public health and solid waste management.</b> Is data on public health and solid waste management in the project area presented and is this data based on both long-term as well as recent observations?	Yes	Data from the ULB Is Incorporated.
<b>3. PROJECT DESCRIPTION AND ANALYSIS OF ALTERNATIVES</b>			
17	<b>Existing water supply system.</b> Does the report accurately describe the existing water supply scheme?	Yes	
18	<b>Proposed water supply system.</b> Does the report adequately describe the proposed project, using appropriately-scaled maps and diagrams?	Yes	
19	Is the program for implementation of the project described, giving estimated duration of the project, for construction, operation, and decommissioning (if appropriate)?	Yes	Shall be included as per the DPR report
20	Are all activities described during (i) construction, (ii) operation and (iii) decommissioning stages (if appropriate), including size, capacity, throughput, input and output?	Yes	
21	Are any other existing or planned developments with which the project could have cumulative effects identified?	Yes	There is no existing or planned a developmental activity in parallel with APUWSSMIP
22	Are the types and quantiles of raw materials and energy needed for construction and operation discussed?	Yes	Yes , All the raw materials shall be brought from licensed /Approved Quarries only
23	<b>Analysis of alternatives.</b> Are alternatives considered during the project development described in detail, with their respective environmental effects?	Yes	Practically in all the isolated project locations, government land is considered, therefore displacement of any community does not arise, or no alternative sites need to be selected.
24	Is the baseline environmental situation in the 'no action' situation described?	-	
<b>4. KEY ENVIRONMENTAL IMPACTS</b>			
25	<b>General.</b> Have impacts been separated out by phase (planning and design, construction, operation)?	Yes	
26	Have all impacts been clearly indicated, including in tabular form, to be either non-existent, insignificant, moderate, or significant?	Yes	
27	Are any risks associated with the project discussed, such as risks from handling of	Yes	



	hazardous materials, risks from spills, fire, explosion, risks of traffic accidents, risks from breakdown or failure of processes or facilities, and risks from exposure of the project to natural disasters?		
28	<b>Air quality.</b> Has potential deterioration of air quality during construction or operation been assessed?	Yes	
29	<b>Noise pollution.</b> Have impacts short-terms construction phase impacts such as noise and vibration from construction equipment been assessed?	Yes	
30	<b>Water quality.</b> Are relevant direct, primary effects on the hydrology and water quality of water features described, and where appropriate quantified?	Yes	
31	Is the assessment of Water Quality based on IS 10500 for drinking water standards?	Yes	
32	Does the report assess the potential degradation of water bodies due to discharge of wastes/ effluents from the sub-project, e.g. through the increase in untreated liquid waste due to increased supply of water?	Yes	
33	Has the potential risk of accidental release of potentially hazardous solvents, acidic and alkaline materials, or chlorine gas from water treatment plants been assessed?	Yes	
34	<b>Water quantity/Source sustainability.</b> Has the information on source sustainability been requested by PHMED from the Irrigation Department?	Yes	Water allocation G.O was received from irrigation department
35	Is the sustainability of the water source adequately described? Does it justify the construction of the water supply system? Are the hydrology, water quality and use of any water resources that may be affected by the project described?	Yes	
36	Are there any ground sources being used in the ULB scheme and, if so, is the result of the last yield test described?	No	Yield test was not required, as the source for the scheme is Surface water
37	What is the status of the statutory water allocations and permissions in this ULB?	Yes	
38	<b>Flora and Fauna.</b> Are relevant direct, primary effects on fauna, flora, and habitats described, and where appropriate quantified?	Yes	
39	Is the Project located within or nearby environmentally sensitive areas, protected	No	

	areas (e.g. intact natural forests, mangroves, wetlands or other habitats including endangered/threatened species?)		
40	Does the report assess the potential impact of ecological disturbances on sensitive habitats, if applicable?	Yes	
41	Public health and solid waste management. Are public health risks from the sub-project due to discharge of solid or liquid waste, noise or air pollution assessed?	Yes	Covid 19 scenario Impact should be included Mitigative measures adopted
42	Has the report assess the potential impacts from an aggravation of solid waste streams in the area?	Yes	
43	Disease transmission from inadequate waste disposal? Nuisance created by open defecation by workers at construction sites.	No	Waste will be disposed to the nearest dump yard. There is no open defecation.
<b>5. ENVIRONMENTAL MANAGEMENT PLAN</b>			
44	Does the report include an EMP?	Yes	
45	Are the measures cited in the EMP specific to the project site?	Yes	
46	Where there are significant adverse effects on any aspect of the environment is the potential for mitigation of these effects discussed?	Yes	
47	Are any measures which the PMC proposes to implement to mitigate effects clearly described and their effect on the magnitude and significance of impacts clearly explained?	Yes	
48	Specific disposal-related mitigation measures. Are the methods for collecting, storing, treating, transporting, and finally disposing of all appropriate residues and emissions (i.e. solid wastes, liquid effluents, gaseous and particulate emissions) described?	Yes	
49	Are the locations for final disposal of all appropriate residues and emissions (i.e. solid wastes, liquid effluents, gaseous and particulate emissions) clearly indicated by way of a map and GPS coordinates?	-	
50	Are responsibilities for implementation of mitigation, including funding, clearly defined by contract (source vs distribution)?	Yes	
51	Is a monitoring plan elaborated in the EIA?	Yes	
52	Are the indicators for monitoring clearly defined based on the baseline information, the objective, and likely impacts identified by the EIA?	Yes	



53	Is a plan outlined for how affected stakeholders will be informed of these adverse effects?	Yes	Online public consultation on EIA EMP reports at each ULB is under progress.
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Please return comments on the EIA to the PMC by way of an unsigned but dated checklist, if the review of the EIA, using this checklist as a guide, indicates that there are major gaps in the information and assessment conducted which the PMC should address.

#### CERTIFICATION

(to be filled in once EIA/EMP is, in the opinion of the PHMED engineer, finalized and can be submitted to the PMU for further review)

I certify that I have thoroughly examined and reviewed the EIA report submitted and reviewed all potential adverse effects of this subproject. To the best of my knowledge, all environmental impacts are adequately identified and the proposed environmental management plan will be adequate to avoid or minimize all adverse environmental impacts.

PHMED Engineer (signature) .....  
Name (capital letters): ..... C. Hitheshwar, AE, PH Sub-Division, Tirupathi  
Date: ..... 29-07-2020  
(DD-mmm-YYYY)

#### Reference Sources:

AIIB Environmental and Social Policy (ESP)  
International Association for Impact Assessment (IAIA) guide to review of EIA reports.