Initial Environmental Examination

April 2009

IND: North Karnataka Urban Sector Investment Program Tranche 4 – Sub-projects in Raichur

Prepared by Karnataka Urban Infrastructure Development and Finance Corporation, Government of Karnataka for the Asian Development Bank.

Currency Equivalent

Currency Unit	-	Indian Rupee/s (Re/Rs)
Re. 1.00	=	US$ 0.022
US$ 1.00	=	Rs. 45

Abbreviations

ADB	:	Asian Development Bank
ASP	:	Activated Sludge Process
BM	:	Bituminous Macadam
DoEEF	:	Department of Ecology, Environment and Forests
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
EP Act	:	Environment (Protection) Act, 1986
GoI	:	Government of India
GoK	:	Government of Karnataka
GSB	:	Granular Sub-base
IEE	:	Initial Environmental Examination
KSPCB	:	Karnataka State Pollution Control Board
MLD	:	Million Litre per Day
MoEF	:	Ministry of Environment and Forests
MSL	:	Mean Sea Level
MSS	:	Mix Seal Surface
NKUSIP	:	North Karnataka Urban Sector Investment Program
NOC	:	No Objection Certificate
NOx	:	Oxides of Nitrogen
OM	:	Operations Manual
PCC	:	Profile Concrete Course
PWD	:	Public Works Department
SOx	:	Oxides of Sulphur
STP	:	Sewage Treatment Plant
RSPM	:	Respirable Suspended Particulate Matter
TSPM	:	Total Suspended Particulate Matter
WMM	:	Wet Mix Macadam
WRDO	:	Water Resource Development Organization

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CHAPTER - I
INTRODUCTION

1.1 Overview

The North Karnataka Urban Sector Investment Program (NKUSIP) proposes to improve the environmental quality of the urban areas through better urban infrastructure facilities and thus improve living conditions of the urban people. In the wake of poor infrastructure facilities and services such as water supply, sewerage and sanitation, the risk of infectious diseases through exposure to unhealthy environment runs high, particularly in the case of urban poor. Hence, the proposed Investment Program aims at minimizing or mitigating the risk and ensures the well-being of people.

Though the Investment Program aims to improve the environmental condition of urban areas, the proposed improvements of infrastructure facilities may exert certain adverse impacts on the natural environment. While developing urban infrastructure facilities, impacts during the construction stage are expected to be more severe than the operation phase, though for a short duration. Exceptions being some facilities such as sewage treatment plant, which may also exert adverse impacts during the operation phase also, if due care is not taken. Again, most of the impacts are activity- specific. However, if due care is taken during the construction phase, investment Program negative impacts will be far outweighed by positive impacts.

1.2 Environmental Regulatory Compliance

The components of NKUSIP include environmental sanitation infrastructure, water supply infrastructure, urban roads improvement, slum infrastructure, and non-municipal infrastructure projects. Sub-components, which fall under the ambit of environmental regulations and mandatory requirement, are indicated in the **Table -1**.

Table – 1 Environmental Regulatory Compliance of NKUSIP Components

Sub- Component	Applicability of Acts/Guidelines	Compliance Criteria
Sewage Treatment Plant	Environmental (Protection) Act, 1986 Water (Prevention and Control of Pollution) Act, 1974	• Consent for Establishment and Consent for Operation from KSPCB as per Water Act.
All sub-components	The Environment Policy and Operations Manual (OM) 20: Environmental Considerations in ADB Operation	• Categorization of sub-project components into A, B or C and developing required level of environmental assessment for each component

The above table indicates that as far as GoI and GoK Acts/Guidelines are concerned, the proposed Investment Programs may not need to go through environmental assessment process; however, as specified, few sub-pro90ject components may require consent from Competent Authorities. The ADB guidelines, on the other hand, stipulate addressing environmental concerns, if any, of a proposed activity in the initial stages of Investment Program preparation. For this, the ADB Guidelines categorizes the proposed components into varies categories (A, B or C) to determine the level of environmental assessment required to address the potential impacts. Level of Environmental Assessment required for each category of Investment Program, as per ADB's Environmental Assessment Guidelines 2003 is presented below.

(i) **Category A**. Sub-project components with potential for significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.

(ii) **Category B.** Sub-project components judged to have some adverse environmental impacts, but of lesser degree and/or significance than those for Category A projects. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) **Category C**. Sub-components unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are still reviewed.

1.3 Purpose of Initial Environmental Examination

The NKUSIP Package IV – Bellary covers Seven sub- project towns. To fulfil the ADB's Environmental Assessment requirement for sector loans, the Initial Environmental Examination of sub-project were carried out. Owing to the scale and nature of the proposed infrastructure components and environmental profile of the NKUSIP sub – project towns, prima facie almost all Investment Program components are unlikely to have adverse environmental impacts.

Therefore, as per the ADB's Environmental Assessment Guidelines, the sub-project components proposed in Raichur under NKUSIP are categorized as 'B' and it is proposed to carryout Initial Environmental Examination (IEE) for the proposed activities/Project.

1.4 Scope of IEE

The IEE was based mainly on secondary sources of information and field reconnaissance surveys; no field monitoring (Environmental) survey was conducted. Stakeholder consultation was an integral part of the IEE.

CHAPTER – II

DESCRIPTION OF THE INVESTMENT PROGRAM COMPONENTS

2.1 NKUSIP Goal

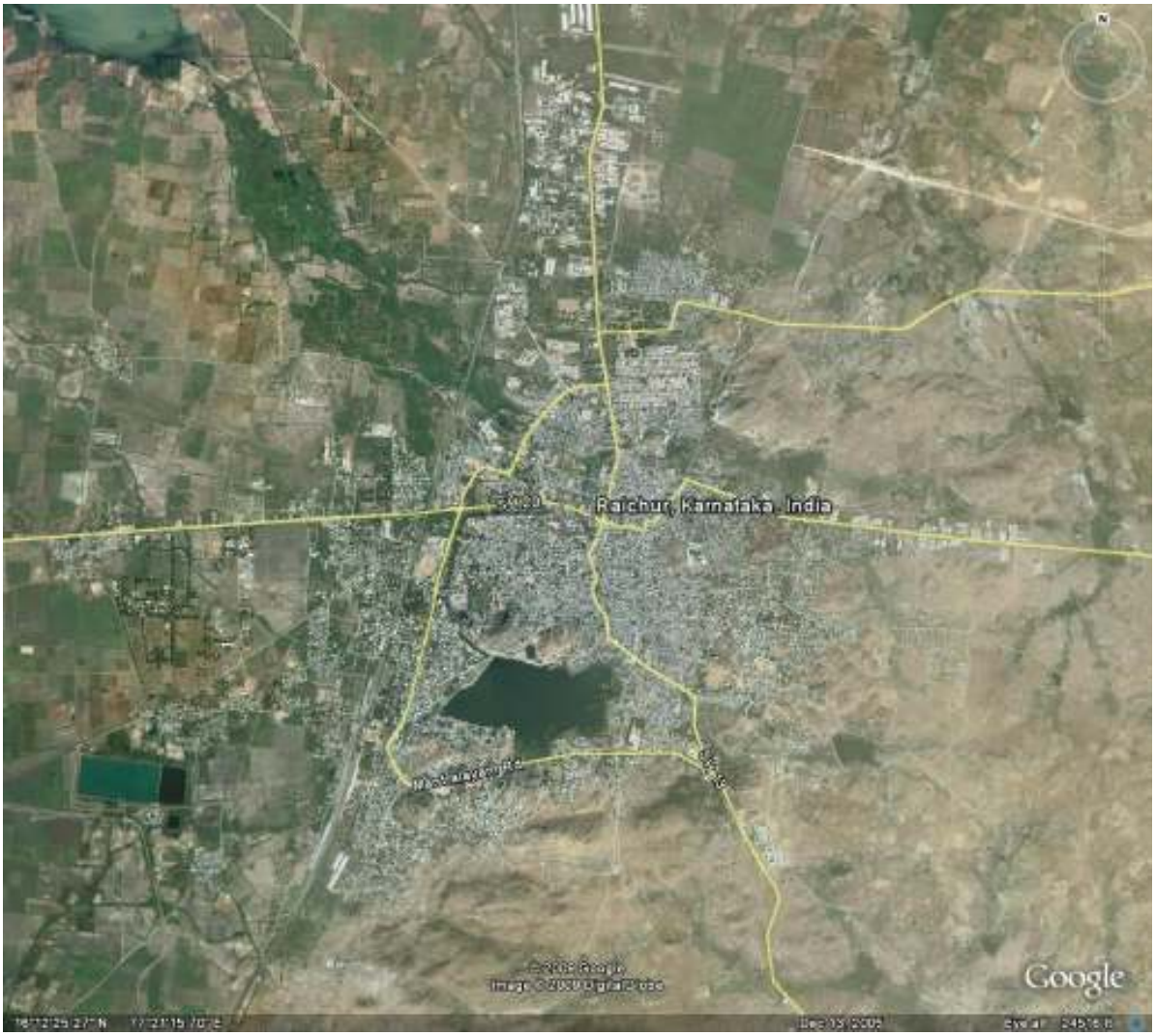
The North Karnataka Urban Sector Investment Program (NKUSIP) will finance investment for (i) Environmental Sanitation Infrastructure; (ii) Water supply Infrastructure; (iii) Urban Roads Improvement; (iv) Poverty Alleviation; (v) Non- Municipal Infrastructure; (vi) Institutional Development; and (vii) Investment Program Assistance. The overall development goal of the NKUSIP is to facilitate economic growth in the towns of North Karnataka and bring about urban development through equitable distribution of urban basic services to the citizens that are environmentally sound and operationally sustainable. The development purpose is designed to assist Urban Local Bodies (ULBs) to "promote good urban management, and develop and expand urban infrastructure to increase economic opportunities and to reduce vulnerability to environmental degradation and urban poverty".

The following are the urban infrastructure components proposed under the NKUSIP.

1. Water Supply;
2. Sewerage;
3. Urban Drainage;
4. Urban Roads; and,
5. Poverty alleviation and
6. Slum improvement

The location Map of Raichur is presented in **MAP 1**

Map: 1 Location Map of Raichur Town



2.2 Need Infrastructure Improvement

Raichur is an important destination for industrial and commercial growth due to availability of water. Providing basic amenities to ensure high level of performance in Environmental safe guard is quite necessary to ensure long term urban sustainability. A study conducted by Department of Forest , Ecology & Environment, Government of Karnataka, 2003 has shown that the cities in the state of Karnataka has poor Environmental performance due to lagging in ensuring basic infrastructure facilities to the urban population.

2.2.1 Karnataka - Health Status

In addition to the associated Environmental pollution, importantly, due to lack of safe and adequate water supply and sanitation facilities, the risk of infectious diseases through exposure to unhealthy environment runs high, particularly in the case of urban poor The State of Environment Report (SOER), 2003, Karnataka, brings out the fact that the lack of safe water supply and sanitation facilities is essentially leading to the health related consequences.

The yearly occurrence of water borne diseases like Cholera and Gastroenteritis makes it very clear that Environmental Impacts of water on health is very profound and significant."

Table 2: Water borne/related Diseases in Karnataka

Year	Gastroenteriti		Cholera		Leptospirosi		Viral Hepatitis		Typhoid	
1991	17455	691	747	16	-	-	659	17	-	-
1992	15262	608	402	14	-	-	282	17	-	-
1993	16206	855	424	13	-	-	678	7	26047	1
1994	15932	325	304	10	-	-	382	0	20349	0
1995	18645	396	532	38	-	-	7146	1	10250	0
1996	22983	377	657	6	-	-	1332	6	22221	12
1997	23665	361	714	10	67	2	1714	4	3880	5
1998	23881	501	434	2	1	0	3824	2	2435	0
1999	17743	126	134	3	54	2	4792	2	24356	1
2000	31132	265	354	3	3	1	3011	10	27210	0
2001	23893	198	342	1	68	7	5438	28	33346	6
2002	25218	146	384	0	27	0	4578	15	42936	2

Source: SOER 2003

Hence, it is evident that the lack of safe water supply and sanitation facilities in the State adversely affects health conditions of the population. The following section details the status of water supply, sanitation and other basic infrastructure facilities in Raichur

i) Sewerage
ii) Water supply
iii) Urban Drainage
iv) Urban road
v) Poverty alleviation and
vi) Slum improvement

Existing Infrastructure Facilities in Raichur town

2.2.2 Sewerage System

First sewerage system in Raichur was commissioned during the year 1971 with sewer lines of 55 km length. Subsequently another 30 km sewer were laid during 1991. The total network of sewers length of 85 km thus covers only about 40% of the town area. In the remaining area, only septic tanks and dry latrines exist to dispose the human waste / waste water. Also in certain areas, sludge and night soil is directly disposed into the roadside/storm water drains causing unhygienic conditions. Even in the areas covered by UGD are also most of the wastewater joins the open drains as the sewerage system is damaged.

- Total area of Raichur town – 50.70 Sq.kms
- Total coverage Raichur area about 40 %.
- Coverage of Individual House Hold Connection 19.77%w
- Total length of roads of various categories – 476 km.
- Tentative length of sewers laid –85 km.

Table 3: Existing Sewerage System salient Feature

1	Existing sewerage system	Ist Stage Scheme commissioned in 1971 2nd Stage commissioned in 1991
	Area covered	40% of the town
	Length of Network	85 Km
	No. of Manholes	3500 no.
2	Condition of the Existing Sewerage system	Poor
	Type of Sewerage Treatment Plant	Oxidation Pond
3	Condition of STP	Not working
4	Land Availability	2 acres
5	Disposal of Treated Sewage	Sewage not Treated and dispose to Nalla

Table - 4 indicates the access to the sewerage and sanitation facilities for various households in Raichur. Only 6 percent of the surveyed non-slum households are connected to the UDG system, while none of the slum households are connected. Majority (49 percent) of the non-slum households depend on septic tanks and 16 percent use low- cost sanitation (LCS). Around 45 percent of the slum households and 21 percent of the non-slum households do not have any facilities and resort to open defecation.

Table 4: Access to Basic Services-Sewerage and Sanitation

S. No.	Description	Access to Non-slum Households (%)	Access to Slum Households (%)
1	UGD	6	-
2.	Septic Tank	49	-
3	Dry Latrines	8	-
4	Individual LCS	16	10
5	Public convenience	-	45
6	None	21	45

Source: Socio-economic sample survey, 2004

At present there are two sewage treatment plants based on waste stabilization ponds with total capacity of 20.50 MLD, located near Hosur village and Ekalaspur village. Sewage does not reach Hosur STP, as the outfall sewer is damaged and Ekalaspur STP receives only 10 percent of the sewage flow of the three zones. The farmers tap the sewage from the outfall sewer for irrigation use. Thus, both the STPs are not working up to their efficiency. The wastewater from the ponds is pumped into the fields and is being used for agricultural purpose with out any treatment.

The anticipated demand for sewerage facility in Raichur in 2026 will increase to 36 MLD. The existing sewer network falls short even the present demand. Thus an Up gradation of the system is proposed under this investment Program

2.2.3 Water Supply Rehabilitation

Presently Raichur has three water supply schemes which were subsequently implemented during the year of 1936 and 1976 on a bank of Krishna River and Tungabhadra canal (Rampur water source) with capacity of 2.27 MLD and 18.16 MLD respectively with a distance 4 km from town near Rampur village. . In addition to this in 2003, augmentation of water supply with Krishna River as source was implemented designed to supply 40 MLD water (New Krishna WSS). Out of this, 10 MLD is provided for supply to the Industrial Growth Centre. The WTP is located in the Industrial Growth Centre. The source works are located upstream of raw water intake of Raichur Thermal Power Station. Thus the present available supply of water is 42.27 MLD against the requirement at consumer end of 25.21 MLD at 100 lpcd.

Intake of Left Bank canal (Tungabhatra river)

Impound Reservoir for Rampur

Krishna river – New Krishna scheme

Krishna river

2.2.4. Drainage Up gradation

The drainage system in Raichur town mainly consists of five primary drains, which run through the town in East-West or South North direction and tertiary drains which are built around these primary drains.

Table : 5 Drainage system in Raichur.

Drains.	Length in Km	Distribution
Open drains (Pucca)	44.00 Kms.	67.50%
Open drains (Kutcha)	3.20 Kms.	4.90%
Closed drains (Pucca)	7.50 Kms.	11.50%
Primary drain channels	10.50 Kms.	16.10%
Total	**65.20 Kms.**	

Source : DPR (Detail Project Report) Raichur.

The existing Drainage System carries Storm in rainy season and waste water in other season. The field inspection reveals that the most of the drains are choked up due to dumping of garbage and debris in secondary and tertiary drains. Practically the above drains are used by households as a dumping yard. In addition due to long neglect of O&M operation of the system most of the drains are in choked condition. Considering and taking in account above problems it is prime importance to up grade existing drainage system.

Proposed Improvement in Basic Infrastructures Of Raichur Town

2.3 Sub-project Component Description

2.3.1 Sewerage System

Around 85 km of the existing sewers lines is in bad condition and cannot be rehabilitated due to non-conformity with the proposed sewer network, being at greater depths. So new sewer network of 299.3km will be provided to replace the existing and expand the system into uncovered areas and also to cater for the future growth. This additional network will serve populations upto the year 2026

Figure 1: Sewage connecting to the nearby nallah behind IOC colony

It is proposed to construct two new STP's as per the zones at existing sites of STP's one at Ekalaspur and Hosur Villages of total capacity 36.00MLD. Hence the total capacities of the proposed facultative aerated lagoons based STPs at Ekalaspur and Hosur will be 24.00 MLD and 12.00 MLD respectively.

STPs based on facultative aerated lagoons are designed to treat the sewage to the standards for stream disposal even though the treated sewage is expected to be utilized for agricultural purposes. Above 75% reduction in the BOD and COD values shall be expected in the facultative ponds attributing to the design requirement. **Table-6** shows the design parameters of STPs.

Table 6: Design Parameters of STP

Parameter	Unit	Domestic Sewage	Design Influent	Design Effluent	CPCB norms**
Design Flow	MLD	--	36.00	36.00	
Biochemical Oxygen Demand	Mg/l	250	300	20	30
Chemical Oxygen Demand	Mg/l	600	700	250	250
Total Dissolved Solids	Mg/l	650	800	500	2100
pH		6.5-8.2	6.5 – 8.2	6.5 – 7.5	5.5 – 9.0

Source: * KUWSDB, Raichur and Design Standards.

** CPCB standard to discharge effluent into Inland surface water & IS 2490 (1974).

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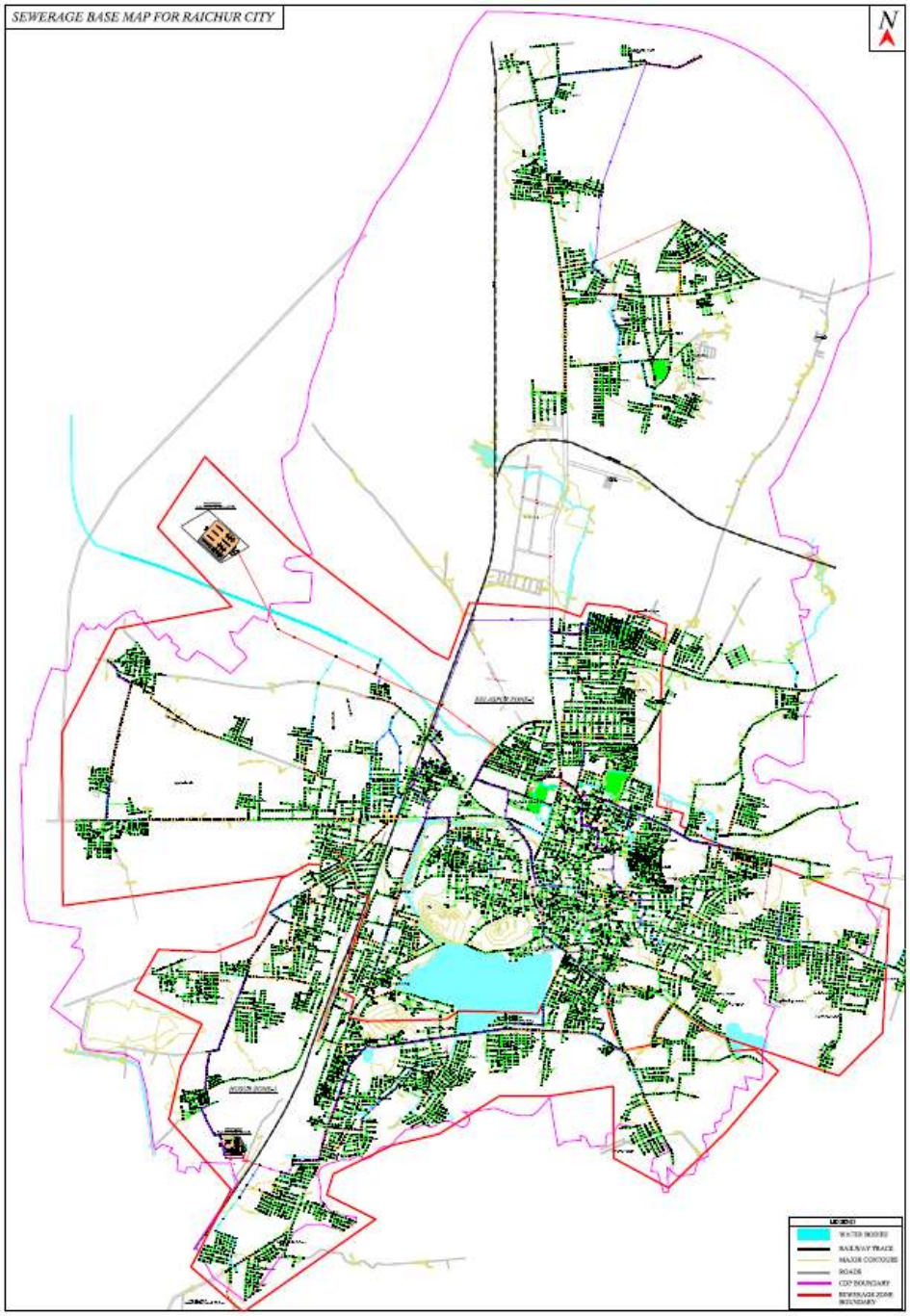
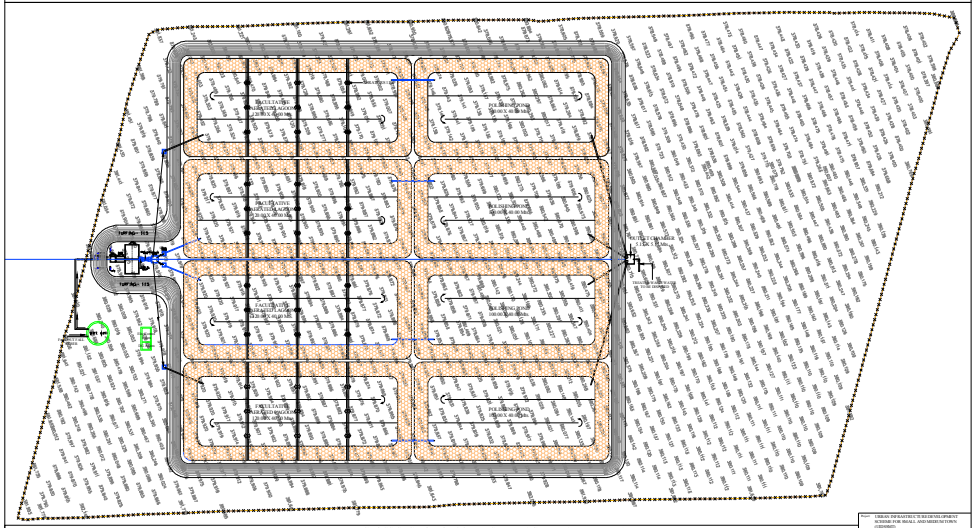
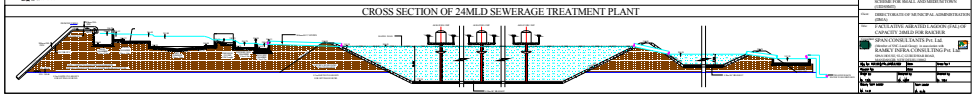
Map 2 shows the lay out of proposed sewerage network with treatment facility.



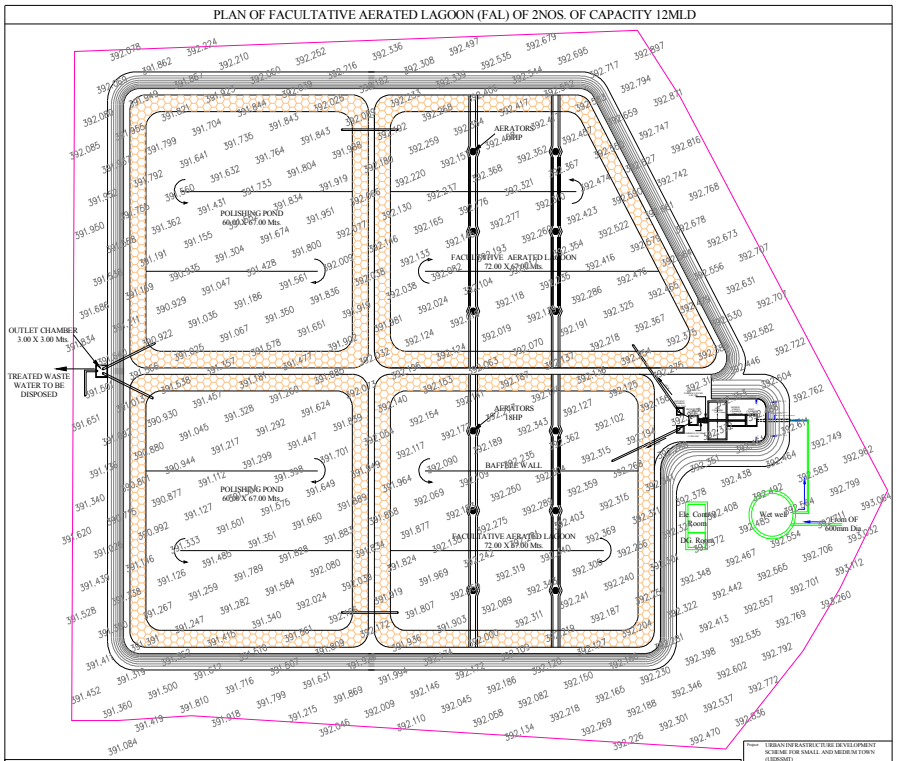
FACULATIVE AERATED LAGOON (FAL) OF 24MLD FOR EKLASPUR ZONE



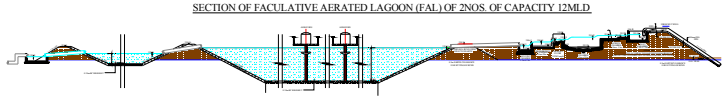
CROSS SECTION OF 24MLD SEWERAGE TREATMENT PLANT



PLAN OF FACULTATIVE AERATED LAGOON (FAL) OF 2NOS. OF CAPACITY 12MLD



SECTION OF FACULATIVE AERATED LAGOON (FAL) OF 2NOS. OF CAPACITY 12MLD



The proposed treatment plant consists of preliminary, secondary and tertiary treatment units. The Primary Treatment Units comprises of Inlet Chamber, bar screen chamber, Grit Removal Unit with Grit Hopper, Par shall flume or Flow measuring unit with devices, Distribution Box, connecting channels and Inlet weirs. The secondary treatments units are the aerated lagoons/ with a liquid depth of 5.0mts and1.5mts for second and third stages. Impervious lining to the bed of the pond and sidewalls with retaining is proposed.

The tertiary treatment is proposed with chlorine disinfection and mixing baffles to mix the chlorine solution. The disinfected treated sewage flows to outlet channel and proposed to be used for irrigation purpose. The Buffer Zone is also proposed for green plantations around the site. There are provisions for access roads, lighting, and etc. with the total area completely fenced and entry into the STP premises is restricted to the authorized ones

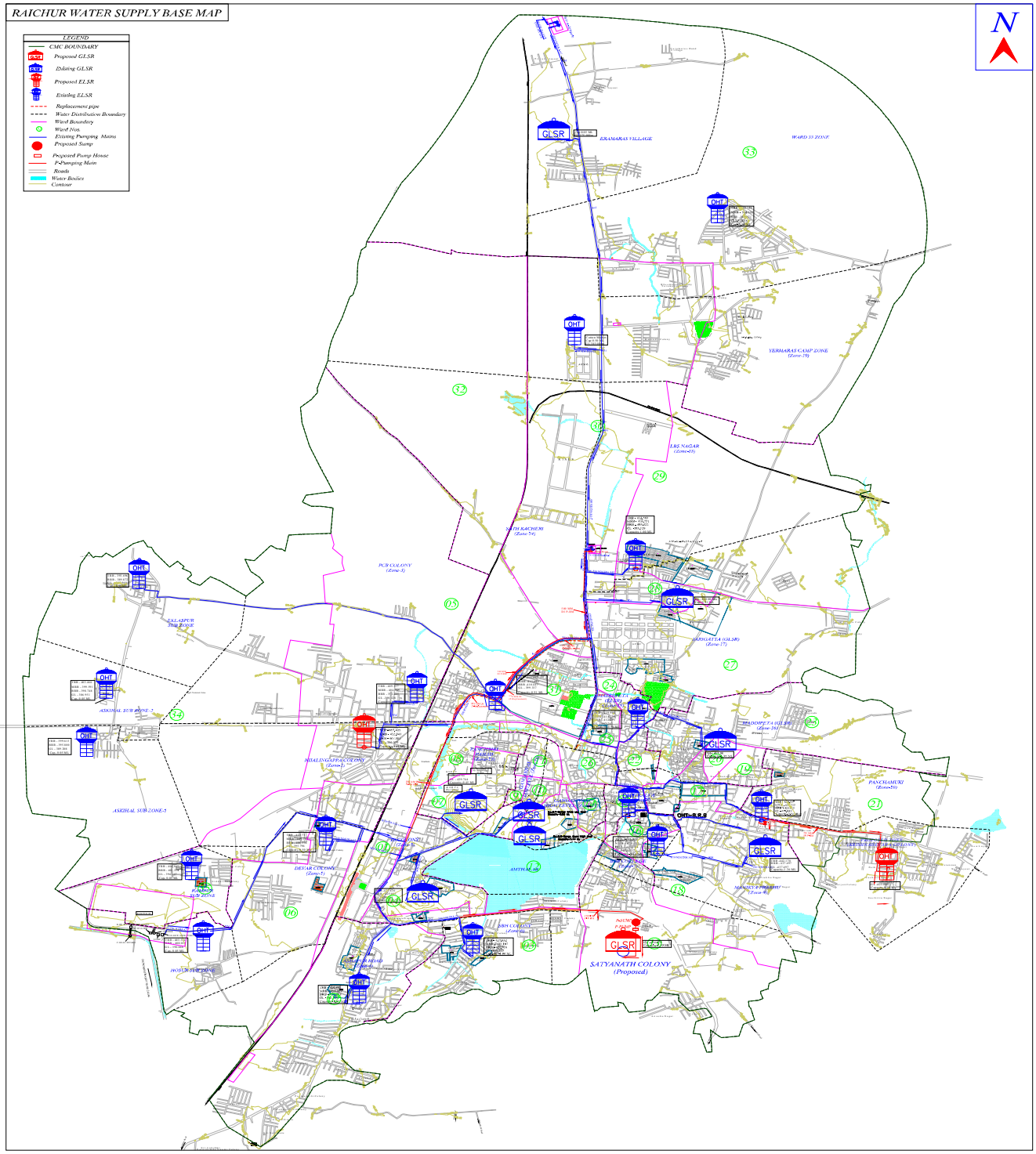
2.3.2 Water Supply

As per the population forecast for 2011, 2026 and 2041 and considering at 100 lpcd at consumer end the requirements are 27.13 Mld, 38.40 Mld and 52.63mld against the present scheme which meet total requirement up to 2026 including the system losses. Hence it is necessary to augment some components of the scheme to meet the proposed demands for the projected population for the year 2026 and 2041 and accordingly the project is formulated.Raichur is more or less situated mid way between Tunga Bhadra River 30 Kms on the south and Krishna River 22 Kms on the north. These sources are studied and investigated in order to meet demand of projected population with demand of water of 38.40 Mld and 52.30 Mld in 2041. The proposed water supply system rehabilitation in Raichur aims at providing safe, adequate and reliable water supply to the inhabitants. The objectives of system improvement are:

(i) Improving the longevity of the individual components and the system;
(ii) Improving the operational performance of the components and the system; and
(iii) Reducing the loss of the water and increasing the utilizable output of the system.

	
OHT for Rampur	**OHT near Rampur**
	
PCB colony OHT (10 LL)	OHT at Nijalingappa nagar

Map 3 Indicates proposed water supply works in Raichur



The following are the proposed improvements in water Supply System in Raichur under the NKUSIP.

A. PROVIDING & FIXING OF BULK WATER METERS

i) Providing & Fixing Bulk flow meters for existing & proposed water supply system

B. HEAD WORKS, WTP & TRANSMISSION MAIN, REHABILITATION & STRENGTHENING

(ii) Electrical / mechanical works for raw water pump house at Rampur water works (2x80 hp & 2x 30 hp pumps)
(iii) Electrical / mechanical works for WTP plant-2 , Rampur water works (2x150 hp & 150x1,and 350x1 hp pumps)
(iv) Rehabilitation works for Rampur-WTP
(v) Construction of pure water pump house of size 12.00m x 10.00m at IPS for Rampur zone
(vi) Pure water pumping machinery & electrical works at pure water pump house at IPS
(vii) Providing 500mm dia DI rising main of length 3720mtr from IPS to west police station
(viii) Providing 350mm dia rising main of length 1750mtrs from IPS to Sath kacheri (replacement of existing HDPE pipe 355mm to DI 350mm)
(ix) Providing 150mm dia DI rising main of length 1670mtrs from Panchamukhi sump to OHT 3.0lakhs litre at Krishna colony
(x) Construction of circular pure water sump of size 5m. dia & 3.30m. Height at Krishna devaraya colony near Panchamukhi oht.
(xi) Construction of Hume pipe pump house at Panchamukhi sump for Krishnadevaraya colony OHT
(xii) Electrical / mechanical works for pure water pump @ Krishnadevaraya colony sump, 10 hpx 2motors
(xiii) Construction Over Head tank of capacity: 3.0 lakhs litres staging height : 9 mtr @ Krishna devaraya colony
(xiv) Providing 200mm dia DI rising main of length 1600mtrs from SBH junction sump at Satyanatha colony
(Xv) Construction of circular pure water sump of size 6m. Dia & 3.30m. Height at Satyanatha colony
(Xvi) Construction of Hume pipe pump house at Satyanatha colony sump
(xvii) Electrical / mechanical works for pure water pump @ Sathynatha colony sump (20 hp x 2 motors)
(xiii) Providing 200mm dia DI Rising main of length 320mtr from sump to GLSR at Satyanatha colony
(xix) Construction of ground level service reservoir at Satyanatha colony capacity:5.00 lakhs litres
(xx) Construction of 5.00 lakhs litres of 12mts. staging at Nijalingappa colony

C. CITY WATER SUPPLY SYSTEM DISTRIBUTION NETWORK OPTIMIZATION

(xxi) Proposed distribution network priority 1&2 (100km length of 90mm dia to 300mm dia of HDPE & DI pipe)

Table 7: Existing Water Supply salient features

A	Water Supply System		
	Quantity of Water Supply	Designed	Present Water Supply
	a)1st Stage Scheme Old Krishna river(Deosugur Head Work)	4.54 MLD	2.27 MLD
	b) 2nd Stage in MLD(Tungabhadra Left Bank canal)	18.16 MLD	10.00 MLD
	c) 3rd Stage New Krishna River	40.00 MLD	30 MLD
	Available Total Quantity of Water	62.70 MLD	42.27 MLD
	Per Capita Supply		
	a) present water supply rate(2008)	167.00 LPCD	
	b) In rainy season at consumer end	176.25 LPCD	
	Duration of Supply	Once every day for 1 hour	
	Total No. of Public Fountains	2805 Nos.	
	Reservoir / OHT (Liters)	25 No with 18.75 ML Capacity	
	Total No. of House hold connection	Domestic – 17000 Nos. Commercial – 335 Nos.	
	% of House hold connection	40.%	
	Monthly Water Tariff		
	For house Connection / Household	***Rs. 55/- Household***	
	For Commercial connection	***Rs. 100/- connection***	
B	Water supply System in slum area		
	a) Slum population (As per CDP)	49,271	
	Declared Slum	29	
	Undeclared Slum	-	
	Details of water supply		
	Through Public Fountains	Partially provided to declared slums.	
	Through Household Connections	Partially provided to declared slums.	

2.3.3 Urban Drainage

The proposal conceived in this report is to improve the existing storm water drains by transforming the discontinuous stretches into a continuous one so that the storm water is properly and adequately drained without overflows and does not lead to flooding in low lying areas. The proposal for Rs 345.00 lakhs provides for constructing 2.226 Kms of drains of sizes 1.50 m to 4.00 m wide and reconstruction of 6 existing road culverts to provide better system of Improvement as prier the study. The provision as per the NKUSIP for storm water drainage for Raichur is Rs 345.00 lakhs. Following are the works proposed under this scheme.

2..3.4 WORKS PROPOSED UNDER THIS PROJECT

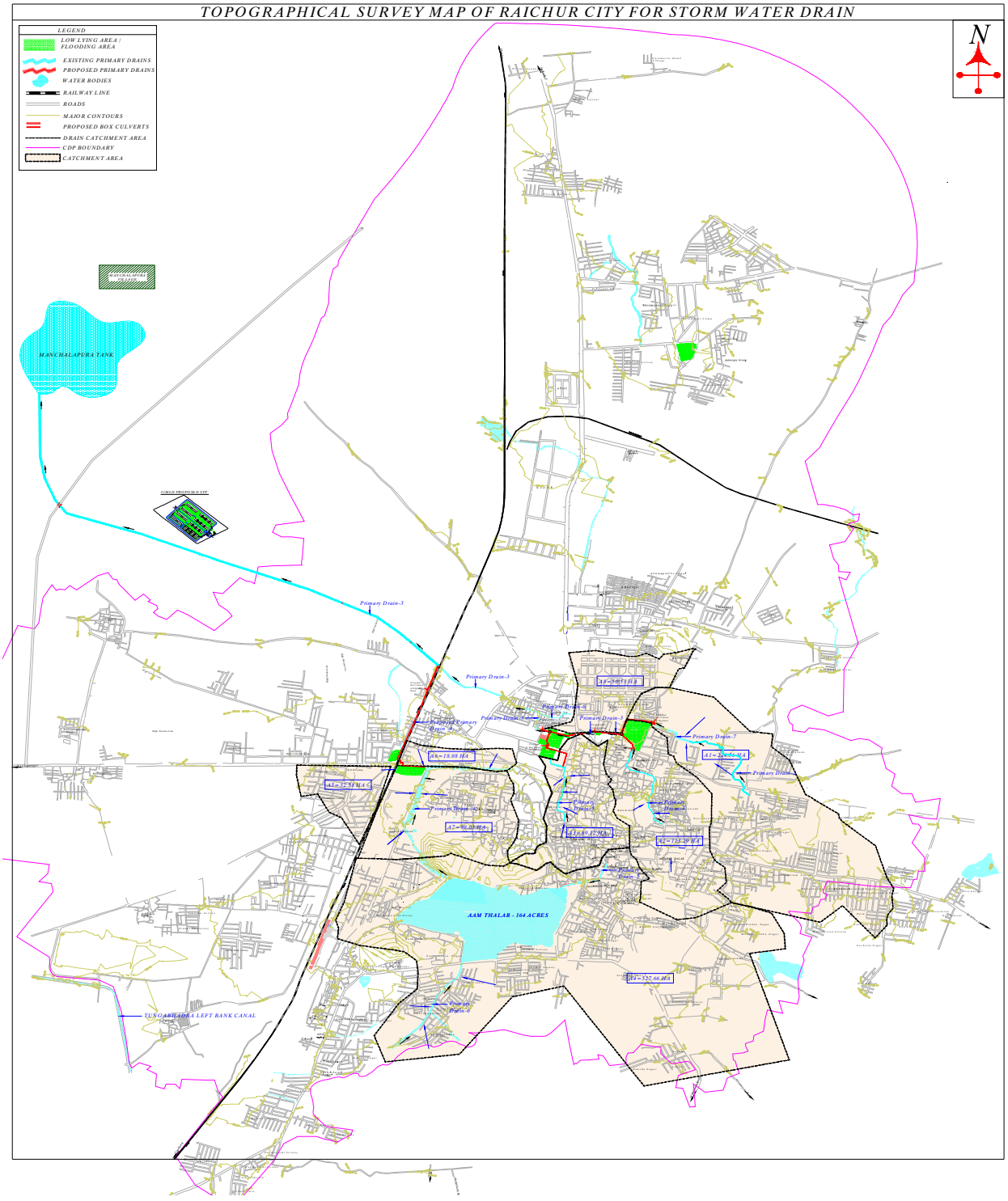
1) Nalla no 4. The existing drain from the overflow point of Aam Talab (00.00Ch) to Basaveshwara circle (Ch 1277m) is lined and needs no repairs. From Chn 1277 to Ch 1577 up to the railway culvert there is no lining and is of varying width and hence has to be provided with side walls and bed. From Chn 1577m it is proposed to divert the existing alignment to avoid passing through private land. It is proposed to construct a new drain from this point parallel to the railway track for a length of 876 m so as to connect to primary drain no 3, near the main railway culvert which finally leads to Manchalapura Tank. The total length of the proposed construction of this drain is about 1176.50 Kms.

2) Nala no 3. This is a built up drain, starting from Bombay Company and Farooque Oil mill and flowing through Harijanwada, Maddipet, Basavannabavi, Goushala road, Siya talab and terminating into Manchalapura tank. The width is 4 to 5 m and length is about 3 km. The direction of flow is from east to west. The lining from Chn 0 to Chn 1002 is found to be good. From Chn 1002 to Chn 1232m, from Chn 1232 to Chn 1445 and 1601 Chn 1888 m it is proposed to undertake lining and reconstruction works of 1.75m X 1.50m (230m long), 4.0X1.80m (500m) sections and thereby improve the entire length of this Nalla within the Town. Since Nallah no 7 flows into Nallah 3 in Neerbhavi Kunta it is proposed to have a section of 4.0x1.8 for Nallah 3 to accommodate the flow from Nalla 7.

3) Nalla No.5: This nallah starts from Amit Ali Rice Mill, flows through Bruhasthwarpet pet on Gunj road to Sukhani colony and joins Nallah No.3 in Siya Talaab (Mukthal pet). The direction of flow is from southeast to northwest. The total length of this nallah is 1037 m, out of which 737 m from Chmn0 to Chn 737 is lined and found good. From Chn 737 to 1037 it is proposed to undertake lining and bed construction and link the Nala with Nala no 3. Hence the length of construction [proposed is 276 m with a box culvert at Chn 868m.
4) Nalla No-7: This nallah starts from Devinagar Gadwal road and flows through Neerbhavi Kunta and joins the main primary drain no 3 in Neerbhavi Kunta. The length of this drain is about 1710 mts. The direction is from East to West. The entire drain is unlined. It is only proposed to take up lining for a length of 44 m, from Chn 1666 to end point at 1710m, near the junction with Nala 3 in Neerbhavi Kunta, for improving the flow at the joining point.

The above works also includes the construction of required cross drainage works.

Map 4 shows the layout of proposed storm water drain in the Raichur town.



2.4 Investment Program Implementation Schedule

The Investment Program is to be implemented over an six-year period, commencing in FY 2009-10 and civil works construction starting in FY 2009-10. Completion is scheduled by end FY 2015-16

2.5 Investment Program Benefits

In view of the lack of basic infrastructure facilities and its adverse impacts on the environment and also on socio-economic characteristics, the proposed Investment Program aims at providing infrastructure facilities such as adequate and safe water supply and sanitation facilities, to overcome negative environmental impacts. Investment Program benefits and beneficiaries in the Raichur are provided below.

2.5.1 Water Supply System Improvements

Benefits arising from improved water supply comprise of

(i) Reduced risk of water-borne diseases due to access to potable and adequate water supply;
(ii) Reduced ground water exploitation; and
(iii) Reduced time and costs in accessing alternative sources of water.

Investment Program beneficiaries will comprise households with existing connections and households with new connections who previously obtained municipal water from stand posts. Design year for the proposed water supply distribution network.

2.5.2 Sewerage System Improvements

Benefits arising from the provision of a well reticulated sewerage network and safe treatment and disposal of sewage comprise of

(i) reduced incidence of water-borne diseases;
(ii) Improvement in public health conditions;
(iii) Reduction in risks of ground water contamination;
(iv) Stoppage of sewage flow in open storm water drains and consequent health hazards resulting from stagnating sewage pools;
(v) Reduced risk of treated water supply contamination;
(vi) Reduced health risk of agricultural labourers due to usage of raw sewage for irrigation;
(vii) Reduced risk of contamination of agricultural fields; and
(viii) Availability of treated effluent for agricultural purposes.

Investment Program beneficiaries will be households getting new connections through proposed sewer lines under this Investment Program. Households who are getting new connections will gain from improved environmental sanitation conditions through properly functioning sewerage system. About 50 percent of the projected populations in 2011 in the sample towns are projected to be the beneficiaries of the proposed sewerage improvement Investment Programs, as indicated in the following table.

Table 8: *Existing* and Proposed Sewerage system

a)Salient Features: RAICHUR		
S. No.	**Item**	**Description**
1	Location	Lat: 15^0 12^{II} N Long: 77^0 21^{I} E
2	Area	50.70 Sq Km
3	Population 2001	2,05,634
4	Population 2008	2,52,000
5	Number of Households 2008	37,918
6	Projected Population for the year 2011 (Design year)	2,71,400
7	Projected Population for the year 2026 (Intermittent)	3,84,029
8	Projected Population for the year 2041 (Ultimate)	5,26,300
9	Total Road Network	476 Kms
Existing Sewerage System		
10	Existing sewerage system	Scheme commissioned in 1971
11	Area covered	40% of the town
12	Length of Network	85 Km
13	No. of Manholes	3500 no.
14	Type of Sewerage Treatment Plant	Oxidation Ponds
15	Condition of STP	Not working
16	Condition of the Existing Sewerage System	BAD
Operation and Management		
17	Cost of O& M for sewerage system (Rs.)	Rs 363 Lakhs per year
18	Cost of House connection Sewerage System (Rs.)	Not Collecting
19	Total Cost	5259.73 Lakhs
D.	**Proposed Sewerage System under this project**	
	HOSUR ZONE:	
I	Providing &Laying of sewerage network for Hosur zone for a length of 98kms	
ii	Electrical works of 11KV express feeder main of 33 KV from sub-station near K.E.B. colony (Nijalingappa colony) to wet well near sewerage treatment plant at Hosur village (12 MLD)	

iii	Providing and laying 300 mm ductile iron rising main from wet well-1 to inlet chamber of FAL 12MLD (Hosur)
iv	Providing pumping machinery & D.G set for wet well (12 MLD)
V	Construction of wet well (12 m dia) -12 MLD
Vi	Approach road to wet well (12 MLD)
vii	Construction of STP of 12.00 MLD capacity (FAL)
	EKALASPUR ZONE:
I	Providing Sewerage network of length 200.5 km
Ii	Electrical works of 11KV express feeder main of 33 KV from sub-station near K.E.B. colony (Nijalingappa colony) to wet well near sewerage treatment plant at Ekalaspur village (24-MLD)
Iii	Providing and laying 900 mm M.S. rising main from wet well to inlet chamber of FAL Ekalaspur (24 MLD)
Iv	Providing pumping machinery & D.G. set for wet well (24 MLD)
V	Construction of wet well (12 m dia)- 24 MLD
Vi	Approach road to wet well (24 MLD)
vii	Construction of STP of 24 MLD capacity (FAL)

Table 9: Sewerage Component Investment Program Beneficiaries

Details	**Value**
HHs with existing connections (2004)	
No of households	7,500
Average HH size	5.00
Total connected population	40,500
% of population covered	18%
HHs with new connections (2011)	
No of additional households	11,333
Total beneficiary HHs	18,833
Total beneficiary population	101,698
Projected population	271,390
% of Population covered	37%

2.5.3 Drainage System Improvement

Benefits arising from improvement in the drainage system comprise

(i) Reduction in blocked drains and canals and overflowing of culverts, thereby reducing adverse health impacts on residents in low-lying areas; and
(ii) Improvement in health and environmental conditions due to non-incidence of water stagnation and mosquito breeding;
(iii) Reduction in pollution risk of downstream water bodies; and
(iv) Direct benefits to households from avoided flood damage costs and work time lost.

Investment Program beneficiaries will comprise the households located within the drainage catchments areas with the improved environment and amenity provided by a proper functioning drainage system. The Socio-Economic Household Survey indicates that only core poor households are likely to benefit through this proposed improvement system

Table 10 Existing Urban Drainage

1	Open drains (Pucca)	44.00 Kms.
2	Closed drains (Pucca)	7.50 Kms.
3	Open drains (Kutcha)	3.20 Kms.
4	Primary drain channels	10.50 Kms.
Proposed Urban Drainage		
5	Construction of Urban drainage of length in 2.226km.	345.00 Lakhs
Operation and Management		
6	Existing Urban drainage	1300.00 Lakhs
7	Proposed Urban Drainage	345.00 Lakhs
8	Total	1645.00 Lakhs
9	Cost of O& M for Urban Drainage @ 1 %(Rs.)	16.45 Lakhs per Annum.

Table 11: Drainage Component Investment Program Beneficiaries (2011)

Details	Value
No. of HHs in catchment area (2011)	
Numbers	18,833
% of HHs affected by flooding	0.72%
Total beneficiary HHs	136
Average HH size	5.00
Total beneficiary population	584
Projected population	271,390
% of population covered	0.22%

2.5.4 Urban Roads Improvement

The improvements would increase the effectiveness of the road space by providing improved riding surfaces and removing impedances to the flow of traffic. This improvement reduces the effort or inconvenience of travel between the origin of the traveller and the destination offering these activities. Benefits of road improvements comprise (i) reduced dust generation due to improved road surface; and (ii) optimum fuel consumption due to improved vehicle speeds.

2.6 Investment Program Alternatives

The environmental suitability of the proposed components are judged through the selected location and proposed process/technology during both the construction and operation phases. The interaction and the level of interference with the surrounding land use determine the environmental sustainability of the Investment Program components. The following table shows environmental suitability of the selected alternatives.

Table 12 Investment Program Alternatives

Sub-Component	Suitability of Selected Alternative
Sewerage System	The best alternative for the sewerage system is to design the system based on gravity flow. The proposed gravity system will be simple in operation and require less man power and importantly does not require energy. The natural gravity is utilized to run the system. In terms of location of the treatment plants, as it is proposed to reconstruct and upgrade the existing plants, no alternative sites were identified. However, these sites are ideally located away from habitation and were selected based on the topography. There are number of options to treat the wastewater to the standards of either for river discharges or for land disposal after treatment. The options like attached growth aerobic or anaerobic systems or suspended growth systems can be adopted. However, as the existing STPs are stabilization pond based plants and hence it is proposed to upgrade these STPs with FAL technology.
Storm water drainage	Only rehabilitation of existing drains is proposed and therefore no alternatives were considered. However, the best alternative of gravity flow system is retained.
Water Supply	The best alternative for water supply is to design the system based on gravity flow. However, due to topography and required pressure at the consumer end, the system is designed as partly gravity and partly pumping. As the existing system losses are at higher side, reducing the losses and improving the efficiency of the system is identified as one of the important component under NKUSIP. Developing of a pumping station at the existing intake is proposed. This is necessitated as the existing pumping capacity is not sufficient. It is proposed to use high efficiency pumps to reduce the energy loads.
Roads up gradation	Roads considered for improvement are selected based on the traffic and its importance in connectivity and environmental and social issues involved. No acquisition of land/structure is involved in the road improvement. It involves no tree cutting.

CHAPTER - III

DESCRIPTION OF THE ENVIRONMENT

3.1 Environmental Profile of Raichur

3.1.1 Introduction

Geographically, Raichur is situated at 15^0 12' North latitude and 77^0 21' east longitudes. The two important Rivers, the Tungabhadra and the Krishna form the two boundaries of the district; these rivers flow at around 20 and 30 km respectively from the district head quarter town of Raichur. The town is an important regional centre in the state of Karnataka and is one of the important centres for production of cotton in South India. Raichur is surrounded by vast agricultural lands and is major trading centre for groundnut, paddy, rice and the other agricultural produces.

3.1.2 Physiographic

The town's general topography is plain with Rocky hills. The soil of the town is characterised by block cotton soil in the west of the railway line and the remaining area consists of red rocky soil.

3.1.3 Seismology

As per the Seismic Zoning map of India, the Raichur town falls under the Zone II, which is the lowest earth quake risk zone in India. This zone is termed as "low damage risk zone".

3.1.4 Climatic Conditions

Raichur falls under arid region of the state of Karnataka. The climate of the town is characterised by dry weather in the major parts of the year with very hot summer. The temperature level goes as high as 43^0C during May and the minimum temperature will be around 15^0C during the months of December and January. The mean maximum temperature during the months of April and May is around 39^0 C. The following table shows the mean temperature values of Raichur.

Table 13: Mean Maximum and Mean Minimum Temperature (in ^{O} C)

Month	Long term normal (30 Years) – Mean				2004 (Actual) – Mean	
	Daily Max	Daily Min	ghest in a month	west in a month	Max daily	Min Daily
Jan	29.9	18.1	32.5	14.8	31.5	15.3
Feb	33.2	20.3	36.3	17.2	34.3	17.4
Mar	36.7	23.4	39.4	19.5	39.7	21.1
April	38.9	25.9	41.3	21.3	40.9	23.0
May	39.3	25.9	42.2	21.9	37.5	22.5
June	34.9	23.7	93.6	21.4	35.8	24.0
July	31.8	22.6	35.5	21.0	32.7	23.2
Aug	31.5	22.2	34.7	20.8	32.8	22.6
Sep	31.7	22.3	34.6	20.5	32.1	22.6
Oct	31.4	22.1	34.1	19.4	32.4	21.8
Nov	29.9	19.7	32.0	16.0	31.8	19.5
Dec	28.8	17.8	31.2	14.8	31.2	16.8

Source: Meteorological Centre, Bangalore

The town receives Southwest monsoon during the period of June to September and the period between the months of October and November can be termed as post monsoon months. The town experiences scanty rainfall and the long term annual average rainfall is 755 mm. The rainfall is confined and about 70 percent of the annual rainfall is received during the months of June to September. The region is continuously experiencing below normal rainfall during the last four years. The actual rainfall received in the year 2004 is 679 mm with a departure of -10 percent from the normal. However, the year 2004 can be termed as better of considering far below normal rainfall years of 2002 and 2003.

The relative humidity varies from 25 to 80 percent, and is generally higher during the southwest monsoon season ranging from 52 to 80 percent. The following table shows the climatologically details. the wind blows predominantly from west and southwest during monsoon period of June to September while from November to March the predominant wind direction east. The winds are light in this region. Most of the winds occur in the range of 1-5 kmph; and during the monsoon, winds are in the range of 6-11 kmph also occur.

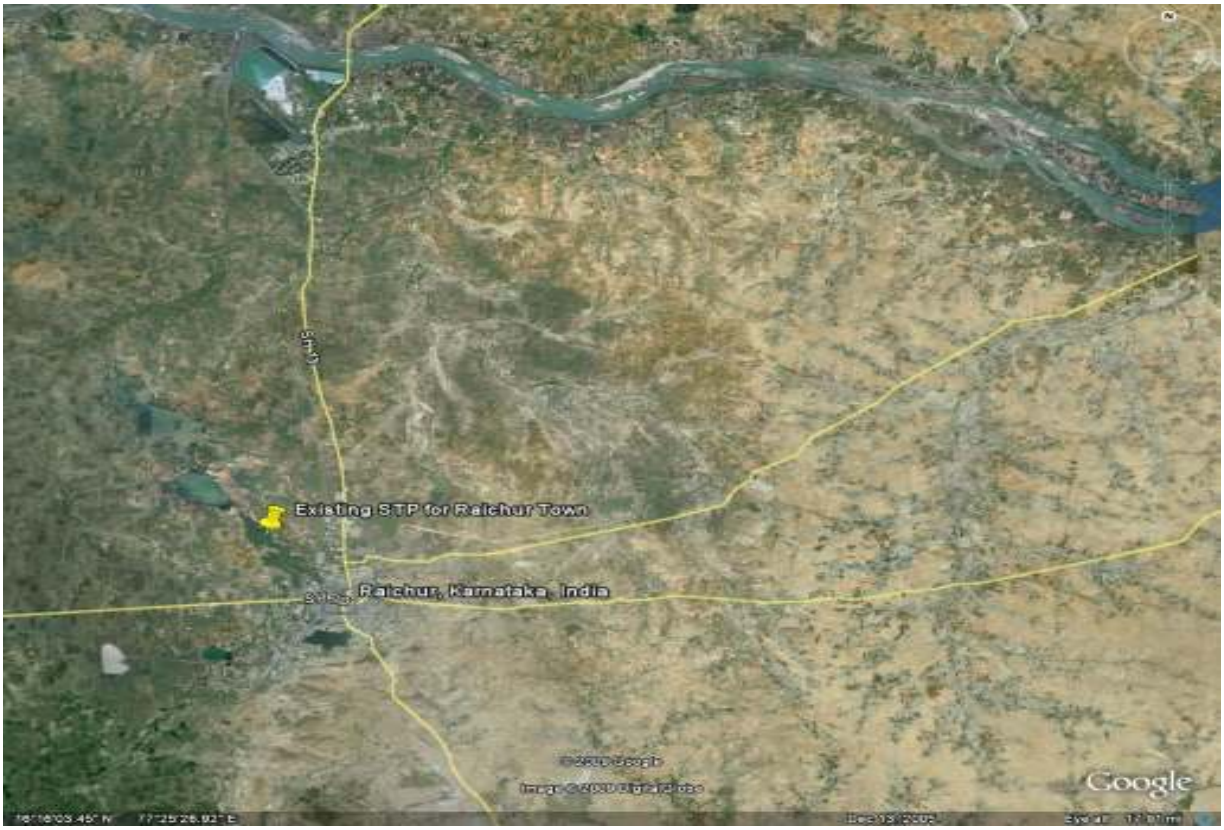
Table 14: Climatologically Characteristics of Raichur

Month	Long term normal (30 Years) – Mean				2004 – Actual		
	RH Max	RH Min	Wind Speed	Total Rainfall	Mean RH 0830 Hrs	Mean RH 1730 Hrs	Total Rainfall
	%	*%*	*Kmph*	*mm*	*%*	*%*	*mm*
Jan	62	33	9.2	0.5	50	36	4.5
Feb	52	27	9.6	1.7	38	29	0.0
Mar	47	25	10.1	4.6	34	23	0.0
April	52	27	10.4	25.8	41	27	36.1
May	59	31	13.7	41.3	57	43	127.0
June	72	49	18	86.9	59	47	37.4
July	79	59	18.4	145.6	68	59	115.1
Aug	78	57	16.5	140.8	65	49	15.3
Sep	77	55	11.9	170.7	71	63	284.4
Oct	71	50	8.7	115.7	69	59	58.8
Nov	63	41	9.2	13.6	53	41	0.0
Dec	64	37	8.8	7.4	47	34	0.0

Fig 2: Wind Rose Diagram of Raichur (0830 Hrs and 1730 Hrs**)**

3.1.5 Water Bodies

Tungabhadra flows at a distance of about 20 km from the town. Two water bodies, the Manchalapur tank and Aam talab, are located in the town. Almost 80 percent of the area drains into Manchalapur Tank and the remaining into the Aam Talab. Due to low rainfall in the area, the tanks are almost dry. As the rainfall is confined to short period of the year, these streams carry wastewater for most parts of the year and eventually pollute the Manchalapur Lake and Aam Talab. At present, these lakes are polluted and filled with wastewater. Due to lack of adequate sewerage system, the wastewater enters these streams.



3.1.6 Groundwater

In addition to the municipal water supply in the town, sizable population also depends on groundwater resources; in the extension areas and uncovered areas the groundwater is only source of water. The depth of water table is medium and is in the range of 8 m to 14 m; however, due to low yield of top aquifer, the depth of wells are generally deep i.e. more than 50 m. **Table -15** shows the fluctuation in the depth of water table at Raichur. There are no major fluctuations recorded during last three years.

Table 15:Groundwater Levels in Raichur

Month	Groundwater Depth (m)		
	2002	**2003**	**2004**
January	--	11.05	11.86
February	--	12.50	12.01
March	--	12.80	12.70
April	--	12.95	12.85
May	--	13.50	12.21
June	--	13.70	11.85
July	8.15	12.90	11.14
August	7.75	12.00	12.12
September	7.31	12.63	8.85
October	5.21	11.10	7.80
November	9.70	11.14	8.27
December	11.05	11.79	9.16

Source: Department of Mines & Geology

Table -16 shows the groundwater characteristics in the area. Most of the monitored parameters are exceeding the desirable limit specified under IS 10500, however, are under permissible limits. The Nitrate concentration is much higher than the permissible value of 100 mg/l.

Table 16: Groundwater Characteristics in Raichur

Parameter	July 2003	June 2004
pH	7.5	8.11
Total Hardness	56	316
TDS	109	1110
CO3	0	0
HCO3	48	371
Cl	25	267
SO4	11	130
NO3	12	147
Ca	88	59
Mg	85	41
Na	169.	269.5
K	10.	0.5
F	0.	0.5
Fe	0.	0.6

Source: Department of Geology and Mines

- All units are mg/l except pH

3.1.7 Ambient Air Quality

The ambient air quality status of Raichur shows that all the pollutants in ambient air are well with in the limits. **Table - 17** shows the ambient air quality parameters of Raichur.

Table 17: Ambient Air Quality of Raichur

Parameter	At KSCPB Office	Ambient Air quality standard
	Average value of air pollutant	
	$\mu g/m^3$	$\mu g/m^3$
TSPM	127.42	360
RSPM	--	120
Sox	--	80
NOx	--	80

Source: KSPCB Annual Report 2002 – 03

3.1.8 Flora and Fauna

There are no forest areas in and around the town and there are no sensitive environmental features such as National Parks, Wetlands, and Biosphere Reserves in the Raichur District. No endangered/protected species of either flora or fauna are found in the town and their surroundings.

3.1.9 Socio Economic Characteristics

Demography: Raichur has witnessed a remarkable increase in the population. It has grown from 169,488 in 1991 to 205,634 in 2001, registering a decadal growth rate of 36 percent. Extending to a total area of 41.23 sq. Km inhabiting little more than 0.2 million population, the gross density of the town is 4,987 persons per sq. km. Mukthalpet,

Maddipet, Arab Mohall, Androon Quill, Baron Quill, Mangalwarpet, Gajgaripeth and Somwarpet are thickly populated areas of the town. Due to lack infrastructure facilities such as water supply and sewerage in the fringe areas, the people prefer to remain in the central served areas rather than move to the town periphery.

The sex ratio (2001) in Raichur was 945, which is slightly lower than the district urban average of 949 and slightly more than the State urban average of 941. The town has higher and literacy rate in comparison with the district. The respective figure in 2001, for Raichur was 71.5 percent and that of district and State urban literacy was 67.6 percent and 71.4 percent.

Economic Base. Raichur is a focal point for trade and commercial activities in the region.
There are eight large and medium scale industries in the taluka. The town has a sound industrial and as well agricultural based development. Cotton and rice are the main exports of the town. Raichur town has the most prestigious and profit making power generation unit, Raichur Thermal Power Station with 6 units each of 210 MW capacity which is running almost 100 percent capacity. As the power plant is located away from the town, interference with the town air quality is not observed, which is evident from the air quality data of the town.

Poverty. Urban slum dwellers in Raichur constitute 38 percent of the town's population.

3.1.10 Cultural and Historic Places

Though the Raichur region has great mythological importance and rich history, there are no protected monuments in the town. Weapons and implements made of stone are found in villages called Maski, Karadkal and Kallur. During the 3rd century, the district was ruled by

Maura Dynasty. It is said that the great emperors, namely, 'Samarat Ashok', Chalukyas, Rashtrakutas and Hoys alas have also ruled the district.

During the time of Independence Raichur was ruled by Nizams of Hyderabad. A fort was constructed during this period.

Chapter - IV

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Environmental impacts of the proposed infrastructure components are presented in this section. Mitigation measures, to minimize/mitigate negative impacts, if any, are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended to reduce the impact.

Screening of potential environmental impacts is categorized into four categories considering Investment Program phases: location impacts and design impacts (pre construction phase), construction phase impacts and operations and maintenance phase impacts.

(i) Location impacts include impacts associated with site selection, and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.

(ii) Design impacts include impacts arising from project design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.

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

(iv) O & M impacts include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

Screening of environmental impacts has been based on the impact magnitude (negligible/moderate/severe – in the order of increasing degree) and impact duration (temporary/permanent). The following table shows the screening of impacts; N/T represents the lowest impact while S/P represents the highest impact. Numerator represents the Degree of Impact and denominator represents the Duration of impact.

Table 18: Screening of Impacts

	Magnitude (Degree of Impact)		
Duration of Impact	*Negligible(N)*	*Moderate(M)*	*Severe(S)*
Temporary(T)	N/T	M/T	S/T
Permanent (P)	N/P	M/P	S/P

The following tables show the potential Environmental Impacts and mitigation measures of all the sub-project components proposed for Raichur under NKUSIP.

Table 19: Environmental Impacts and Mitigation Measures for Sewerage System

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location impacts				
Change in land use; loss of land/lively hood due to construction of STPs at Ekalaspur and Hosur	**M/P** The site selected for construction of STP at Hosur zone is agricultural land. Only 10 acres of land to be acquired for Hosur Zone STP. No land acquisition required for Ekalaspur Zone STP. Land owners are predominantly small and marginal here are no structures situated in this land. The details of project affected people will take care in social impact assessment And R & R report separately.	Addressed in RP	ULB will prepare and implement the RP; ULB may use the services of the Investment Program Consultant and NGO.	Part of RP cost

Contamination of groundwater resources due to leaching from facultative aerated lagoons	**M/P** It has been seen that groundwater depth in Raichur is in the range of 10-15 mtr. As proposed activity is based on expansion of existing STP which will receive very low flow there will be minimum impact on ground water because of proposed activity. Further, there is no groundwater data available near the site to substantiate weather or not the oxidation ponds are leading to groundwater pollution. This is applicable for both the STPs.	A protective impervious layer shall be provided for the bottom and walls of the ponds to avoid seepage. This impervious layer is a part of the design for not only to arrest the seepage but also to provide smooth working surface for de-sludging. A groundwater test shall be conducted to know the base water quality. Open well located in the northern side of the Ekalaspur site may be taken as monitoring well.	CMC Raichur	The cost of soil testing will be part of design Groundwater sampling and laboratory costs will be part of design. .

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Loss of amenity and odour Nuisance to neighbours.	**N/P** Due to Facultative aerated lagoons based STP; the odour problem may be significant. Both the sites are located away from habitation. At Hosur site, a Railway Station is located at 1 km. The reduction in land values is not envisaged; instead, value may increase due to availability of treated water for irrigation.	Development of physical separation and visual screen around the facility will address this impact. A buffer zone in the form of landscaping and earthwork shall be created around the STP. Air dispersion modelling at detailed design stage.	CMC Raichur	Part of design costs

Design Impacts				
Discharge of partially treated sewage will have potential to pollute the Agricultural fields.	**M/P** The treated sewage is proposed to be used for irrigation. The treatment process chosen (FAL) is simple and does not involve any complexities in design, construction or operation, thus ensures the treatment efficiency with least supervision.	The sewage retention period shall be fixed Considering seasonal climatic variations. The effluent from the STP shall be confirmed to the following standards of discharge: • BOD < 30 mg/l • pH – 5.5 – 9.0 • Suspended solids < 100 mg/l	CMC Raichur	N/a.
Nuisance due to leakage/ Overflowing of sewers.	**N/P**	Regular maintenance will nullify the impact. Usage of appropriate maintenance equipment would substantially reduce the maintenance time.	CMC Raichur	N/a.

Pollution due to improper Sludge disposal methods.	**M/P** Sludge removal from the ponds may be done once for every 2 or 3 years, depending on the sludge generation Quantity of sludge generation will be considerable. Contaminated work area may cause health hazards.	Safe sludge handling methods shall be employed. Personal protection equipment such as gloves, boots, shall be provided to the workers. Sludge shall be dried in drying beds before its disposal in low-lying areas. A sludge management plan shall be prepared.	CMC Raichur	Part of O & M costs Preparation of sludge management plan (consultant time: one person week)
Construction Impacts				
Impacts to livelihood	**M/T** The laying of sewerage line will disturb the day to day activities of public such as shops, residence and also leads to un safety condition to them.	Maintain assess to business (shops) people by providing planks/ makeshift pathways, etc. While laying sewers through narrow streets and thick commercial establishments, the work will be planned to complete in short duration and care will be taken to avoid excavation of the entire road stretch in these areas.	Head Contractor/CMC Raichur	Preparation and implementation of site management plan.

Nuisance due to dust and noise; road blocking due to laying of sewer network; and, increased traffic flow due to vehicle movement for Construction activities.	**M/T** Dust generation may be significant as the dry weather condition prevails in the town. The proposed rehabilitation and laying of new sewers cover almost all the areas of the town. The impact of construction activities on the densely population areas of Mukthalpet, Maddipet, Arab Mohall, Androon Quill, Baron Quill a, Mangalwarpet, Gajgaripeth and Somwarpet area may be considerable and in the other areas it may be insignificant.	Construction material shall be stockpiled. Adequate arrangements for traffic diversions including erection of proper sign boards. Dust generation must be arrested by water spraying. Ensure usage of standard equipment to reduce the noise nuisance. Construction equipment shall be standard reputed make which itself take care of noise and will comply with standard stipulated by pollution control board. Noise level shall be reduced with increase in distance and construction activity will be restricted in day time only. In extreme case due care will be taken to minimize the noise during night time.	Head Contractor/CMC Raichur	Preparation and implementation of site management plan (preparation : consultant time: one person week; implementation:1 day per fortnight of construction management time)

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
		A construction site management plan shall be prepared. Poor performance of the contractor may potentially exacerbate these impacts and therefore qualified contractors to be appointed. The contracted work includes the implementation of construction site management plan, which will Address these issues.		
O & M Impacts				
Odour nuisance	**M/P**	Buffer zone in the form of landscaping and Earthwork shall be created and well maintained around the site.		

Potential pollution of agricultural fields	**N/P** As the STP is designed for stream discharge standards, the impact may be minimal. However, the overloading of STP may exaggerate these problems.	Implement the mitigation measures suggested in the design stage. When pond gets over-loaded, adding oxidation agents and plant foods such as sodium nitrate must simulate the algae growth. The effluent discharge shall confirm to the following standards: • BOD < 30 mg/l • pH – 5.5 – 9.0 • Suspended solids < 100 mg/l Developing landscaping around the STP site to ensure aesthetic health environment and minimising odour problem if any.	CMC Raichur	Part of O & M costs

Pollution and health hazards due to improper sludge disposal methods	**M/P** Quantity of sludge generation will be considerable. Contaminated work area may cause health hazards.	Safe sludge handling methods shall be employed. Personal protection equipment such as gloves, boots, shall be provided. Sludge shall be dried in drying beds before its disposal. This sludge may be used as manure for non- food crops or land filled. Sludge management plan shall be implemented.	CMC Raichur	Part of O & M costs
Impacts due to illegal tapping of sewage for irrigation purpose from trunk sewers:	**M/P** Trunk sewers traverse agricultural fields. Illegal tapping was observed. This is more significant in the case of Ekalaspur STP.	Illegal tapping of sewage from the sewer lines shall not be allowed. Regular maintenance and constant check would reduce the problem.	CMC Raichur	Part of O & M costs

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
	Ground water; potential hazards due to entering of contaminants into food chain. Impact on the working condition of the STP due to reduced inflow.			
Nuisance and pollution of Ground/surface water due to overflowing/choking of sewers.	**M/P** Irrigation canals traverse the town and the groundwater depth is shallow in the northern part of the town	Regular maintenance will nullify the impact	CMC Raichur	Part of O & M costs

Table 20: Environmental Impacts and Mitigation Measures for Water Supply Rehabilitation

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location impacts				
Since the location of rehabilitation Work will be at existing facilities, and the existing environment is not a sensitive environment, no location- specific impacts are envisaged.	N/a.	N/a.	N/a.	N/a.
Design Impacts				
Since the location of rehabilitation work will be at existing facilities, and the existing environment is a built environment, no design-specific impacts are envisaged.	N/a.	N/a.	N/a.	N/a.
High noise from the proposed 300 HP pumping station for Raichur. However, as the site is located far away from sensitive locations, no major impact is envisaged.	**N/P** No sensitive area has been envisaged around the site and impacts only anticipated on worker.	Workers who are working on pumping station shall be provided with all personal protective equipment. Like ear muffler etc.	CMC Raichur	Part of Design and Operation cost

Pollution and health risks due to improper handling and disposal of sludge from water treatment plants	**M/P** The sludge may contain harmful substances including the alum sludge.	Safe sludge handling methods shall be employed - Personal protection equipment such as gloves, boots, shall be provided. Sludge shall be dried in drying beds before its disposal. This sludge may be land filled. Sludge management plan shall be prepared.	CMC Raichur	Part of O & M costs Preparation of sludge management plan (time: 1 person week)
Construction Impacts				
Impacts to livelihood Road blocking due to laying of water supply network and increased traffic flow due to vehicle movement for construction activities; inconvenience to the local community.	**M/T** The laying of water line will disturb the day to day activities of public such as shops, residence and also leads to un safety condition to them. **N/T** The impact due to construction activity may not be significant as proposed network will be laid in a area which are not densely populated in the presently fringe and extension areas.	Maintain assess to business (shops) people by providing planks/ makeshift pathways, etc. While laying water line through narrow streets and thick commercial establishments, the work will be planned to complete in short duration and care will be taken to avoid excavation of the entire road stretch in these areas Construction material shall be stockpiled to minimize traffic blockages. Poor performance of the contractor may potentially exacerbate these impacts and therefore qualified contractors to be appointed. The contracted work includes the Implementation of construction site management plan, which will address these issues.	Head Contractor/CMC Raichur Head Contractor/CMC	Preparation and implementation of site management plan. Part of construction costs

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Dust and noise from construction Activities.	**M/T** Due to dry climatic condition the dust generation may be considerable. No major noise generating activities such as rock blasting and use of heavy noise generating equipment is not envisaged.	Frequent water spraying program will be employed to ensure dust suppression in maximum extend.	Head Contractor/CMC	Part of construction costs
Operation Impacts				
Recurrence of blockage and leakage Problems.	**M/T** The existing system losses are very high.	The leak detection and water auditing surveys shall be conducted. The leak restoration time shall be minimized.	CMC Raichur	Included in the project cost

Pollution and health risks due to improper handling and disposal of sludge from water treatment plant	**M/T**	Implement the mitigation measures as in the Sludge Management Plan.	CMC Raichur	Part of O & M costs

Table 21: Environmental Impacts and Mitigation Measures for Roads Up-gradation

Impact Description	Significance of the Impact	Mitigation Measures	Implementation Responsibility	Preliminary Costing
Location Impacts				
No location impacts are envisaged as the proposed activities do not encroach into any sensitive land uses nor it involves any land acquisition.	N/a.	N/a.	N/a.	N/a.
Design Impacts				
Acquisition of land/structure is not envisaged. No trees will be cut as part of the project.	N/a.	N/a.	N/a.	N/a.
Construction Impacts				

Disturbance to informal commercial activities during construction.	**N/T** No Hawkers and vendors were observed. A detailed survey will be conducted at the design stage to identify hawkers and vendors	Temporary relocation of hawkers and vendors; followed by reinstatement of original premises when the work is completed.	CMC Raichur	As part of RP costs
Disturbance due to construction activities Road block and increase in traffic on the alternative routes and traffic congestion	**N/T** Low levels of traffic was observed on the proposed roads	N/a	N/a	N/a
Nuisance due to noise.	**M/T** Proposed roads pass through residential areas.	Noise limits for construction equipments such as compactors, rollers shall not exceed 75 dB(A), as specified by CPCB. High noise generating activities, if any, shall be restricted in day time only.	Head Contractor	N/a.
Dust nuisance.	**M/T** Proposed roads pass through residential areas. Due to dry weather condition dust	Dust suppression activities such as water sprinkling shall be employed.	Head Contractor	Part of construction costs

Pollution and silt loading of water bodies	N/a.	N/a.	N/a.	N/a.
Public and worker safety	**N/T**	Provide caution and signboards.	Head Contractor/CMC	Part of construction costs

Chapter – V

INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

5.1 Institutional Requirements

Karnataka Urban Infrastructure Development & Finance Corporation (KUIDFC) is the nodal executing agency (EA) responsible for implementing NKUSIP. Investment Program implementation activities will be monitored by KUIDFC through a separate Investment Program Management Unit (IIPMU), which will be set-up within KUIDFC.

Implementing Agency (IA). Implementation Agencies (IA) will oversee sub-project component implementation at the sub-project towns, where the Investment Program ULB will implement sub-project components. The responsibilities of the IA shall include (i) carrying out detailed surveys, investigations and engineering designs of individual infrastructure components; (ii) tendering, evaluating bids and awarding works, contract administration, supervision and quality control; (iii) measuring works carried out by the contractors and certifying payments; (iv) conducting public awareness campaigns and participation programs, (v) carrying out environmental assessments; and (vi) preparing monthly reports. The Investment Program Consultants (PC) will assist the Investment Program ULB in all the aforesaid activities; in the case of other IAs, the PC shall proof check designs and quality check construction quality.

` Thus, the responsibility fulfilling environmental requirements of GoI/GoK (for the project- components of STP,) and conducting required level of environmental assessment as per ADB guidelines lies with the borrowing ULB. The Investment Program Consultants will assist the ULB in this regard. The IEE reports prepared by ULB will be reviewed by the IPMU as per the ADB's Environmental Guidelines and forwarded to ADB for review and approval. In case of IEE reports, the ADB could delegate approval of IEE reports fully to the IPMU after reviewing the first two reports. However, all the IEE reports shall be sent to ADB for approval.

The mitigation measures identified through IEE are incorporated into the project cycle.
Mitigation measures, which are implemented by the Contractor, shall form part of the Contract Documents. The other mitigation measures are undertaken by the ULB (itself or in assistance with Investment Program Consultants) as specified in the IEE.

Table 22: Institutional Roles and Responsibilities

Investment Progra	Activity	Details	Responsible Agency
Pre construction phase	Investment Program Categorization	Reviewing the REA and assigning project category (Ea/Eb/Ec) based on NKUSIP Environmental Assessment Guidelines and ADB Guidelines	IPMU
	Conducting EA	Conducting IEE/EIA based on the project categorization Conducting Public Consultation and information disclosure	Investment Program Consultants
	Investment Program	Fulfilling GoK/GoI requirement such as clearances from other Government	ULB
	Review of EIA/IEE	Reviewing the EIA/IEE and SEIA/SIEE Reports to ensure compliance of the report	IPMU
	Disclosure of SEIA/SIEE	Information disclosure -SIEE/SEIA reports should be made available to the public,	ULB
	Incorporation of mitigation measures into Investment	Incorporation of necessary mitigation measures identified in IEE/EIA in project design and in contract	Investment Program Consultants
	Review of design	Review of design and contractual documents for compliance of mitigation	IPMU
Construction	Implementation of mitigation	Implementation of necessary mitigation measures	Contractor
	Monitoring	Environmental monitoring as specified in monitoring plan during construction stage; monitoring of implementation of mitigation	Investment Program Consultants
	Preparation of progress reports	Preparation of monthly progress reports to be submitted to IPMU including a section on	ULB in assistance of
	Review of progress	IPMU to review the progress reports,	IPMU
Operation Stage	Environmental Monitoring	Conducting environmental monitoring, as specified in the environmental monitoring plan.	ULB
	Compliance Monitoring	Compliance monitoring to review the environmental performance of sub-	KSPCB

5.2 Training Needs

As described in the above table the IPMU will involve in monitoring the project implementation while the ULB will implement the Investment Program. It is therefore important that these agencies and particularly the officials involved in the Investment Program to have understanding of the ADBs environmental assessment procedures and also of environmental issues of various urban infrastructure components. As far as implementation of mitigation measures on site is concerned the Contractor will be involved. Hence, it is important to orient the contractors and supervisory staff towards the implementation of mitigation measures and their consequences. Hence, considering the existing capabilities of the agencies involved in NKUSIP, the following training program is suggested. The following table presents the suggested training program.

Table 23: Training Needs (2009 – 2015)

Description	Contents	Schedule	Participants
Program 1 Orientation Program / Workshop for and Implementing Agency and Executing Agency	**Module 1 – Orientation** • Investment Program Cycle of NKUSIP • ADBs Environmental Assessment Guidelines • EA requirements of NKUSIP Indian Environmental Laws & Regulations relating to urban infrastructure project Environmental impacts of urban infrastructure projects **Module 2 Environmental Assessment Process** Investment Program categorization as per ADB • IEE/EIA process, Formats and Reports • Identification of Environmental Impacts • Identification Mitigation Measures • Formulation of Environmental Management Plan • Implementation and Monitoring • Summary EIA/IEEs Review of EIA/IEE reports to comply with ADB requirements Incorporation of mitigating measures in the project design and contracts	2 days	IPMU officials involved in the Investment Program ULB officials involved in Investment Program implementation n.

Program - 2 Orientation Program / Workshop for Contractors and Supervisory staff	**Module 1 Implementation of Mitigation Measures** Environmental issues related urban infrastructure projects during construction Implementation of mitigation measures • Monitoring of implementation	1 day	Contractors involved in NKUSIP Supervisory staff of ULB
Program - 3 Experience Sharing	**Module – Experiences and Best Practices** Experiences on implementation in terms of environmental concerns of implemented projects • Best Practices followed	1 day (every alternative year from the start of project, i.e. 2009)	• IPMU officials • ULB officials • Local NGOs

5.3 Environmental Monitoring Plans

The following tables indicate the recommended environmental monitoring programs for sub-project components in Raichur. The monitoring program has been developed based on Suggested mitigation measures presented in the earlier subsection.

Table 24: Environmental Monitoring Plan for Sewerage Up-gradation

Mitigation Measures	Parameters to be Monitored	Location	Measurement	Frequency	Responsibility	Preliminary Costing
Preconstruction						
Preparation of the Resettlement Plan (RP) in accordance with all applicable Acts/Guidelines including ADB's IR Policy.	RP documentation and progress of implementation	N/a.	Verification of RP documentation consistent with the Resettlement Framework, GoI, GoK and the ADB Guidelines. Monitoring based on RP/RF	One-off verification of designs Once during implementation and once just after implementation	IPMU Apex NGO will assist the IPMU in monitoring	IPMU staff time as required
All location and design related mitigation measures. The measures are to mitigate the following through appropriate design of process and layout. (i) Groundwater contamination (ii) sludge disposal and (iii) air dispersion modelling.	Incorporation of mitigation measures in the design including air dispersion modeling for STP site.	N/a.	Verification of project design documentation	One-off inspection of designs	IPMU	N/a. Design checking
Construction Stage						
All construction related mitigation measures such as construction site management plan to control the dust and noise nuisance, and road blocks implementation of	Incorporation of mitigation measures in the contract documents	N/a.	Inspection of contract documents	One-off inspection before signing of the contract	IPMU	N/a. Design checking

construction site management plan: providing access to businesses during pipe lying etc. (i) noise and dust nuisance at site (ii) traffic maintenance etc.	Dust and noise nuisance, disturbance to traffic flow	at the sewer laying sites and urroundin gs	Uses of standard reputed make equipment comply with PCB stipulated standard . undertaking water sprinkling to suppress dust	Weekly	CMC Raichur with the assistance of Investment Program Consultants	

Mitigation Measures	**Parameters to be Monitored**	**Location**	**Measurement**	**Frequency**	**Responsibili ty**	**Preliminary Costing**
			inspection and interviews			
Operation Stage						
Check for contamination of groundwater/ agricultural fields due to discharge of untreated/partially treated STP effluent.	Groundwater quality	Open well located in the northern side of the site	Changes in water quality	Prior to STP operation; thereafter, Quarterly (four seasons)	CMC Raichur	Part of O & M cost

	Influent wastewater quality	Inlet of STP	Analyze the wastewater characteristics including heavy metals such as Mercury (As Hg), Lead (as Pb) Cadmium (as Cd), Total chromium (as Cr), Copper (as Cu), Zinc (as Zn) and Nickel (as Ni)	Monthly as part of plant operation	CMC Raichur	Part of O & M cost
	Treated wastewater quality at outlet discharge point of STP	Outlet of STP	Analyze the characteristics to comply with the PCB disposal standards. These include: • BOD < 30 mg/l • pH – 5.5 – 9.0 • SS < 100 mg/l	Monthly as part of plant operation Seasonal (four seasons) as third party monitoring.	CMC Raichur KSPCB	Part of O & M cost
Implementation of the Sludge Management Plan - Check for health hazards due sludge handling.	Health status of STP staff	N/a	Health check up for STP staff	Yearly once	CMC Raichur	Part of O & M cost

Table 25: Environmental Monitoring Plan for Water Supply Rehabilitation

Mitigation Measures	Parameters to be Monitored	Location	Measurement	Frequency	Responsibility	Preliminary Costing
Preconstruction Stage						
All related design and Preconstruction stage mitigation measures. The measures are to mitigate the following (i) sludge related impacts (ii) construction related impacts such as dust nuisance	Incorporation of mitigation measures in the contract documents Sludge management plan	N/a. N/a.	Verification of contract documents Verification of plan	One-off verification before signing the contract One-off inspection	IPMU IPMU	IPMU staff time as required IPMU staff time as required

	Dust nuisance	At the distribution network and transmission main replacement sites	Monitoring of air quality is not required. Ensure the implementation of mitigation measures such as spraying of water; assess the situation through visual inspection and interviews with local people	Weekly	CMC Raichur with the assistance of Investment Program Consultants	Part of construction costs
Construction Stage All construction related mitigation measures such as construction site management plan to control the dust and noise nuisance, and road block implementation of construction site management plan providing access business during pipe lying, etc. (i) noise and dust nuisance at site (ii) traffic maintenance, etc.	Incorporation of mitigation measures in the contract documents Nuisance due to generation of dust and noise and also disturbance to traffic	N/a at the water laying sites and surroundings	Verification of Contract Documents before signing the contract Monitoring of air quality and noise is not required. Ensure the implementation of mitigation measures (usage of standard equipment complying with CPCB	One-off inspection of Contract Document weekly	IPMU CMC Raichur with the assistance of Investment Program Consultants	N/a Part of consultancy cost
Operation stage						
Check for blockage and leakage problems; reducing the water losses	Effectiveness of leak detection and water auditing in reducing the losses	N/a	Percentage of water losses	Yearly twice (once during normal season and once during lean season)	CMC Raichur	Part of O & M costs

Implementation of the Sludge Management Plan - Check for health hazards due to sludge handling.	Health status of WTP staff involved in sludge handling	N/a	Health check for WTP staff	Yearly once	CMC Raichur	Part of O & M cost

Table 26: Environmental Monitoring Plan for Roads Up-gradation

Mitigation Measures	**Parameters to be Monitored**	**Location**	**Measurement**	**Frequency**	**Responsibility**	**Preliminary Costing**
Preconstruction Stage.						
No significant impacts Envisaged.	N/a.	N/a.	N/a.	N/a.	N/a.	N/a.
Construction Stage						
Check for dust nuisance	Incorporation of mitigation measures in the contract documents	N/a.	Inspection of contract documents	One-off inspection of before signing the contract	IPMU	IPMU staff time as required

	Dust and noise nuisance	Work sites of road improvements with in the town	Monitoring of air quality and noise is not required. Ensure the implementation of mitigation measures (usage of standard equipment complying to Noise levels of CPCB, spraying of water to arrest dust); assess the situation through visual inspection and interviews with local people	Weekly	CMC Raichur with the assistance of Investment Program Consultants	Part of construction costs

Chapter - VI

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

6.1 Overview

Project preparation exercise was carried out with couple of consultation meeting at every stage of project. Out comes of meeting in form of suggestion were considered and took in account in project preparation. Member presented in consultation meeting are the Commissioner, AEE, AE CMC, Raichur town. Prime importance were given to the project affected people meeting were conducted with Councillors, NGOs, local public, project affected persons at various stages of project such as project level, sub project level and component level .

During public participation, the consultant were briefed about the advantages of executing infrastructure facilities such as water system, sewerage system, storm water drainage system, slum improvement scheme, etc. and also touched the issues in the existing infrastructure facilities and need of the proposed projects. It is observed that in group discussion which involved in public consultation that people are in favour of project and willing to extend there support and co operation. People were seen in confident with project and aware about positive impacts in term of enhancing living standard and creation of aesthetic and safe environment condition.

Public had raised following points related to impacts which will be anticipated during construction and operation. The proposed mitigation measures have also been discussed in **Table – 33.**

	
Public consultation at Eklaspur STP site	**Public Consultation near Rampur Intake, Raichur.**

Table 27 Public Comments & Mitigation measures

Sl No.	Comments from local public	Proposed mitigation
(A)	**Pipe line works**	
	➢ Deep excavation leads to the collapsing of telecommunication services, water lines etc. ➢ Suggested appropriate safety aspect in a proper place during construction activity. ➢ Suggested deploying team as a part of safety measure to take care of an emergency situation. ➢ Ensure minimum impact on environment during construction and operation activities.	➢ Highly Qualified contractor will be engaged to execute the work in proper way and specific conditions shall be imposed in the contract to take safety measures. ➢ Dust generation shall be arrested by water spraying wherever required. ➢ Ensure usage of standard equipment to reduce the noise nuisance. Equipment shall comply with the noise levels of construction equipment laid out by the CPCB. High noise generating activities including material unloading shall be avoided during nights. The surrounding people shall be informed, especially in densely populated area, of nature and schedule of the high noise generating activities, if any. ➢ Adequate arrangements for traffic diversions including erection of proper sign boards. ➢ Barricading with red mark shall be fixed wherever deep excavation so that the public will not fall during day time as well as in night time.
(B)	**Sewage Treatment Plant (STP) & Pumping Station (PS)**	
	➢ Bad smell due to sludge handling & spillage of sewage. ➢ Ground water contamination & nearby surface water contamination. ➢ Noise nuisance due to operation of STP/PS.	➢ A buffer zone in the form of landscaping shall be created around the STP/PS to avoid odour nuisance. ➢ Since, the sewage Treatment plant (STP) / Pumping station (PS) are constructed with water tight Reinforced cement concrete structure including epoxy painting inside the water tank, the seepage / leakage of sewage or treated water will not be there. ➢ Ensure usage of standard equipment to

		reduce the noise nuisance. Equipment shall comply with the noise levels of construction equipment laid out by the CPCB. High noise generating activities including material unloading shall be avoided during nights. The surrounding people shall be informed, especially in densely populated area, of nature and schedule of the high noise generating activities, if any. ➢ Apart from this, it will be ensured to minimize the environmental impacts due to construction of STP/PS by following proper methods/ mitigation measures.

Chapter - VII
FINDING AND RECOMMENDATION

7.1 Findings

Based on the screening of environmental impacts, all the proposed sub-project components in Raichur are found to be environmentally acceptable and therefore able to proceed to the implementation phase. In most cases, particular environmental issues identified are those that are typical for the type of component, and a range of proven mitigation strategies exist to address them. **Table 27** indicates the environmental consideration of the proposed infrastructure components.

Table 27: Environmental Issues of Infrastructure Components

Infrastructure Component	Environmental Impact Issue	Environmental Mitigations
Sewage treatmen plant and sewera up gradation	• Air dispersion modelling for odour • Construction and operation impacts	Appropriate mitigation measu as suggested
Solid waste management	• No significant issues	N/a.
Water Supply Rehabilitation	• Sludge handling and disposal • Construction and operation impacts	Appropriate mitigation measu as suggested
Upgradation of ro and traffic system	• Disturbance to hawkers and vendors • Construction and operation impacts	Appropriate mitigation measu as suggested

As described above, most impacts are relevant to typical construction and operation. The important sets of mitigation measures, which are relevant to most of the components, include preparation of activity plans using appropriate mitigation measures identified in the earlier sections. These activity plans include:

- Sludge Management and Disposal Plan (to address sludge handling and disposal impacts at the STP)
- Health Risk Plan (to address the health related impacts of the STP workers and sanitary workers)

These activity plans should be prepared by the Investment Program Consultants as a compendium of the relevant mitigation measures identified in earlier section. They should form part of the contractual arrangements with construction contractors, or directly implemented by the CMC as facility operator, as required 'Work Practices'.

7.2 Recommendations

It is recommended that the IPMU should be involved in monitoring the implementation of those components that are critical to acceptable environmental performance of the component. Owing to the location of proposed facilities and geographical setting of the town/region as a whole, no major impacts envisaged from any of the proposed sub-components projects in Raichur. Most of the impacts could be mitigated with sound design and therefore the design stage becomes crucial. In view of this importance, the PMU is delegated with the monitoring responsibility of the design stage to ensure the environmental sustainability of the NKUSIP.

Chapter VIII

CONCLUSIONS

The proposed components should proceed through to design and implementation, subject to mitigation measures and monitoring programs identified in the IEE which will be updated detailed during detailed design stage. Owning to the nature and scale of the proposed components in Raichur it may be emphasized that the present IEE, which identifies potential impacts and suggests appropriate mitigation measures, is sufficient enough to safeguard the environment. There are no significant adverse impacts, which are irreversible or may lead to considerable loss/destruction of environment, envisaged. All the impacts are simple and moreover proven mitigation measures exists to minimize/mitigate the same. Hence, no further study such as an EIA is required.

APENDIX 1: Rapid Environmental Assessment (REA) Checklist

SEWAGE TREATMENT

Country / project Title: India / North Karnataka Urban Sector Investment Program
Sector Division Urban Development

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Screening Questions	Yes	No	Remarks
B. Project Siting Is the project area			
Densely populated		√	
Heavy with development activities	√		
Adjacent to or within any e nvironmentally sensitive area			
Cultural heritage site		√	
Protected area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
Potential Environmental ImpactWill the project cause…..		`	
Impairment of historical / cultural monuments / areas and loss/ damage to the sites?		√	
Interference with other utilities and blockage of access to buildings nuisance to neighboring areas due to noise, smell and influx of insects rodents etc?	√		During construction stage traffic and human activities may affected temporarily due to generation of dust and noise from mechanical equipments. Adequate measure will be taken by skirling of water to minimize dust and traffic management plan with sign board. Machinery with standard reputed make adopted that will itself taker care of noise.
Dislocation or involuntary resettlement of people?		√	No any dislocation or involuntary resettlement envisaged in a project.

Impairment of downstream water quality due to in a dequate sewage treatment or release of untreated sewage?	√		The proposed activated sludge process system is designed to meet the discharge norms of inland surface water as suggested by Central Pollution Control Board. It is suggested that proposed system will be properly maintained to ensure efficiency of treatment.
Overflows and flooding of neighboring properties with raw sewage. ?	√		Periodic maintenance of sewer lines has been suggested in the EMP to avoid overflowing and flooding of neighbouring properties.
Environmental pollution due to inadequate sludge disposal or industrial waste discharge illegally disposed in sewer.?	√		Sludge disposal will be carried out in frequently say once in a 2 to 3 years. Sludge disposal will be restricted in a confined space to avoid surface and soil pollution.
Noise and vibration due to blasting and other civil works?	√		Construction machineries used in a construction will be standard reputed made comply with noise level standard prescribed by pollution control board.
Discharge of hazardous material into sewers, resulting in damage to sewer system and danger to workers ?	√		It is suggested in EMP that Raichur CMC has to ensure that no hazardous waste will be illegally discharged in to sewer lines.
Inadequate buffer zone around pumping and treatment plats to alleviate noise and other possible nuisances, and protect facilities?	√		Buffer zone with screen and landscaping is suggested to provide proper shielding such that operation of STP will not have nuisance to surrounding.
Social conflicts between construction workers from other areas and community workers?		√	The local labour force will be utilized by the contractor for construction activities and hence there are no possibilities for social conflict regarding employment opportunities during construction phase.
Road blocking and temporary flooding due to land excavation during the rainy season?	√		Road blocking and traffic re routing has been envisaged during construction stage of sewer lines. Temporary flooding is not anticipated as there is no deep excavation or filling of low laying area envisaged in the project.
Noise and dust construction activities?	√		Construction machineries will be reputed make which will itself take care of noise moreover these machineries will be comply with standards

			stipulated by Central pollution Control board. Water sprinkling program will be suggested to ensure minimize of dust generated.
Traffic disturbances due to construction material transport and waste?	√		Traffic management with re routine of traffic during construction period is required to avoid conflict of public transport with construction material.
Temporary silt runoff due to construction?	√		The construction waste water will be channelled such that it will have sufficient time to settle the solid and do not deteriorate water quality of discharging courses.
Hazards to public health due to overflow flooding and ground water pollution due to failure of sewage system?	√		Regular maintenance of sewer line has been suggested to avoid overflow of sewer line and related impact on public health due to pollution. Chances of failure sewage system will be less and in extreme case care will be taker by diverting sewage in nearby nalas and rectified defects quickly to take system in working.
Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	√		Sludge from sludge drying bed will be removed at regular interval to avoid re – suspension in t he treated water and there by deteriorating treate water quality. Direct discharge of untreated sewage water is not anticipated.
Contamination of surface and ground water due t o sludge disposal on land?	√		Sludge will be disposed of in a confined area the sludge disposal area will should be properly lined with geosynthetic lining such that it will no t leach to the nearby water courses / and and pollute environment.
Health and safety hazards to workers from toxic gases a nd hazardous material which may be contained in sewage flow and exposures to pathogens in sewage and sludge?	√		Mixing of hazardous / industrial effluent with sewage may result in sewer and STP which should be avoided through proper law and enforcement. The sewer cleaning and STP workers should be provided protective measures such as boots masks etc. to avoid exposure to pathogens in sewage and sludge.

Country / project Title: India / North Karnataka Urban Sector Investment Program.
Sector Division Urban Development

……

Screening Questions	Yes	No	Remarks
B. Project Siting Is the project area			
Densely populated		√	
Heavy with development activities	√		
Adjacent to or within any environmentally sensitive area			
Cultural heritage site		√	
Protected area		√	
Wetland		√	
Mangrove		√	
Estuarine		√	
Buffer zone of protected area		√	
Special area for protecting biodiversity		√	
Bay		√	
Potential Environmental Impact Will the project cause…..		`	
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture and soil erosion runoff.		√	No such communities, industries discharge envisage near the intake point.
Impairment of historical / cultural monuments / areas and loss / damage to the site		√	
Hazard of land subsidence caused by excessive ground water pumping		√	There is no ground water exploitation for proposed water supply improvements for Raichur CMC
Social conflict arising from displacement of communities		√	

Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		√	Since the water is drawing from tungabathra sub canals, there will not be any water scarcity at any point of time.
Unsatisfactory raw water sup[ply (e.g. excessive pathogens or mineral constituents ?		√	The existing raw water supply is supposed to continue.
Delivery of unsafe water to distribution system		√	
Inadequate protection of intake works or wells leading to pollution of water supply?		√	The exiting intake well along the down stream canal of tungabadra is in good condition, so there is no possibility of pollution due to inadequate protection of intake works or wells.
Over pumping of ground water, l eading to Stalinization and ground subsidence?		√	There is no ground water exploitation required for the proposed improvements in water supply.
Excessive algal growth in storage reservoir?	√		Raichur CMC has to ensure that the storage reservoir will be cleaned regularly to avoid excessive algal growth.
Increase in production of sewage beyond capabilities of community facilities?		√	The proposal involves ensuring regular supply of 100 lpcd for the public which neither will nor result in excess sewage production. The proposed STP for the city is designed to meet the sewage generated with 100 lpcd.
Inadequate disposal of sludge from water treatment plants?		√	There is no such proposal of altering design and facilities in water treatment plant. It is prime duty of Raichur CMC to ensure that the sludge is removed from water treatment plants regularly to meet standard of treated water.
Inadequate buffer zone around pumping	√		Sufficient buffer zone / noise barrier is to be developed around

and treatment plants to alleviate noise and other possible nuisance and protect facilities			pumping station to alleviate noise.
Impairments associated with transmission lines and access roads?	√		Temporary impairments are anticipated along the new transmission lines routes during construction stage . no new access are proposed.
Health Hazard arising from inadequate design of facilitate for receiving , storing, and handling of chlorine and other hazardous chemicals		√	Proposed project seen to be not have any proposal for altering design / facilities in water treatment plant.
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		√	Raichur CMC has to ensure t hat proper safety practices are ensured for workers in water treatment plant.
Dislocation or involuntary resettlement of people		√	There is no resettlement of people for project implementation.
Social conflict between construction workers from other areas and community workers?		√	Local labour will be utilized in maximum number by contractor so possibility of social conflict regarding employment opportunities will be less during construction stage
Noise and dust from construction activities	√		Measures will be taken in initial stage of project by deploying standard reputed make machinery with comply of stipulated noise standard to ensure noise with in limit and practice of frequent water spraying will be adopted to minimize dust.
Increased road traffic due to interference of construction activities?	√		The construction material transport will increase traffic within city. Proper traffic management will have to be implemented to avoid

			conflict between public transport and construction material transport.
Continuing soil erosion / silt runoff from construction operation	√		Construction debris and excess soil generated at construction site should be properly disposed to avoid erosion.
Delivery of unsafe water due to poor o & m treatment process (especially mud accumulation in filter) and inadequate chlorination due to lack of adequate monitoring of chlorine residual in distribution system		√	Hospet CMC has to ensure efficiency of operation of water treatment plant.
Accidental leakage of chlorine gas?		√	
Excess abstraction of water affecting downstream water users		√	
Competing uses of water		√	
Increased sewage flow due to increased water supply	√		The proposal is for ensuring regular water supply of 100 lpcd for the public which will result in increased sewage generation. The propose STP for the city is designed too meet the sewage generated with 100 lpcd.
Increased volume of sullage (wastewater from cooking and washing) and sludge from waste water treatment plant	√		The proposed STP for the city is designed to meet the sullage generated due to project. Raichur CMC has to ensure that the sludge generated in STP is disposed off with safe disposal practices.