KARNATAKA NEERAVARI NIGAM LIMITED

(A Government of Karnataka Undertaking)

"Survey, Investigation, Design, Supply, Installation, Testing and Commissioning of Lift Irrigation System (Head Works consisting of Jack well cum pump house, Power supply including terminal bays, substations, laying of 11 KV transmission lines, Extension and upgrading of Substations, Rising Main, Delivery Chamber and Gravity main, etc) and Construction of Distribution System including structure for providing water for Irrigation, Drinking and Ground Water Recharging by Filling Tanks of Kadagarni & Ulavi villages by lifting water from Kaneri River near Amboli village in Joida taluka of Uttarkannada district including Operation and Maintenance for a period of 5 years after successful completion of work for **ULAVI TANK FILLING SCHEME** on Turn-Key Basis".

REVISED DETAILED PROJECT REPORT
FOR
ULAVI TANK FILLING SCHEME

Owner: **Karnataka Neeravari Nigam Limited**

Chief Engineer
Malaprabha Project Zone
Dharawad

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SALIENT FEATURES

No.	Particulars		Details		
1	Name of the Project		Ulavi Tank Filling Scheme.		
2	Type of Project (Irrigation or Multipurpose)		Tank filling scheme		
3	Location		Intake point from Kaneri River near Amboli village		
3.1	River Basin	a) Name	East flowing River		
		b) Located in c) State(s) d)Country	Uttar Kannada Karnataka India		
3.2	River /Tributary		Kaneri River is one of the tributaries of Kali River		
3.3	State(s)/District(s) Taluk(s) or Tehsils in which the following are Located.		State	District	Taluk
	a) Headwork		Karnataka	Uttara kannada	Joida
	b) Command Area		Karnataka	Uttara kannada	Uttara kannada
3.4	Name of the village near the Headwork		Amboli Village of Joida Taluk		
3.5	Location of Head Works	a) Longitude	74° 27’ 50.28’’ E		
		b) Latitude	15° 01’ 24.57’’ N		
3.6	a) Degree Sheets		48 I 12,08 & 48 J 05, 09		
3.7	b) Index Plan		Enclosed **(Drawings)**		
3.8	**Access to the Project**		**Name**	**Distance from project site**	
	a) Airport		Hubli	122.0 km	
	b) Rail head		Alnavar	65.0 km	
	c) Road head		NH-No.4A - 45 Km Taluk headquarters 65KM		
4	**Gross Annual Utilization**		**0.007 TMC** (January to February)		
5	**Tank Filling Scheme**				
5.1	Source		**Kaneri River**		
5.2	**Rising Main**		Internal Dia 265.1 mm (ERW pipe) Fe-410 grade		

No.	Particulars	Details	
	Length of the Rising Main (m)	5.150 Km	
	Peak Discharge (Cumecs)	0.06	
	Design Discharge (Cumecs)	0.06	
	Intake Level (m)	478.60	
	Delivery Level (m)	647.5	
	Static Head (m)	168.90	
	Friction Losses in Rising Main + Pump House Losses + RH (m)	28.093 (25.776+1.117+1.2)	
	Pump Head (m)	168.90+28.093=196.993 say 197.00	
	Velocity considered (m/sec)	1.088	
	Internal Coating (Epoxy Lining in mm)	0.406	ERW Pipe
	External Coating (Guniting in mm)	25	

Chapter 1
Introduction

1.1 Project Introduction and Background

Kaneri River is one of the tributaries of Kali River. This River originates in Amboli Village of Joida Taluk, Uttarkannada district. The river flows for a length of 58.50 Km and joins Kali River near Shivalli of Joida Taluka on left flank.

Kaneri River has a total catchment area of **165.36 Sq. Kms**. Catchment area up to lifting point is **165.36 Sq. Kms**. The river receives good rainfall.

Existing tanks i.e., Vyangin Kere, Veereabhadreshwara Kere and Shivatirth Kere in Kadagarni & Ulavi Villages of Joida Taluk of Uttarakannada District are not filled regularly every year since yield from catchment is less, hence it is proposed to utilize the available water of Kaneri River by lifting the water from river during rainy season. It is proposed to lift water by installing Vertical Turbine Pumps in proposed jackwell near Amboli village. Existing tanks and Nala bed is silted up heavily, hence it is necessary to propose de-silting of tank to increase the capacity and strengthen the bund. But this work is not taken up in the estimate and which can be taken up in the future.

There are three MI tanks which are the source of water for tourists as well as animals. There tanks does not receive sufficient water since the catchment area for these tanks are less.

There is a representation from temple authorities and local elected representatives to provide a sustainable scheme for filling these tanks. The nearest dependable source being Kaneri River is selected as source to pump the water and fill these tanks.

Based on the request of temple authorities Hon'ble Minister Water Resources, Govt. of Karnataka has instructed KNNL to take up the work of filling of tank filling scheme.

1.2 Details of the scheme

The proposed lifting point for filling up of 3 number of tanks are from the upstream of proposed Weir constructed across Kaneri River near Amboli Village.

The scheme comprises of following components:

- Construction of Jack well cum pump house for lifting water to accommodate 2 No's of Vertical turbine pumps (1 Working + 1 Standby).

- Supply, Installation, testing and commissioning of pumping machinery and pump house electrical works.
- Erection of 11 KV/0.433 KV electrical substations and power line.
- Supply, jointing, laying, testing and commissioning of MS Rising Main for conveying water.
- Construction of Delivery Chamber at the end of Rising Main.
- Gravity Pipe Distribution Network System for filling the Tanks.

It is proposed to lift the water for two months, which will augment the drinking and Irrigation requirement of existing command area planned under these tanks.

In view of above requirements, it is proposed to take up the scheme of lifting water from Kaneri River.

1.3 Project Location

The proposed Project Area is situated in the Joida Taluk. The proposed project covers parts of Joida Taluk. The Tapping point is from right bank of Kaneri River near Amboli village. The intake points. The geographical location of the proposed lift point is 15° 01' 24.57'' N and 74° 27' 50.28'' E.

1.4 Project Objective

The objective of the project that the farmers of the area have been insisting for taking up the tank filling for the Vyanginkere, Veerebhadreshwarakere and Shivatirthkere in the Joida Taluka by considering 100% of live capacity of tanks and 10% evaporation losses works out to be 7.34Mcft (0.007TMC)

1.5 Owner

The Owner for the project is **Karnataka Neeravari Nigam Limited (KNNL)**, having registered office at the following address:

MANAGING DIRECTOR,

KARNATAKA NEERAVARI NIGAM LIMITED (KNNL)

Coffee Board Building,

No-1 Dr. Ambedkar Veedhi,

Bangalore-560001.

1.6 Turnkey Agency

Karnataka Neeravari Nigam Limited has awarded this work to **M/s. B.R Patil Engineers and Contractors** to carry out "Survey, Investigation, Design, Supply, Installation, Testing and Commissioning of Lift Irrigation system (Head Works consisting of Intake Canal, Forebay, Jack well cum pump house, Power supply including substations and Transmission lines, Rising Main etc.,) and Construction of Rising Main and Gravity Distribution System including structure to fill 3 tanks.

1.7 Details of scheme

The Scheme involves drawing water from Kaneri River by lifting water through a raising main and fill the tanks through Pressure and Gravity distribution network in Joida taluk, Uttarakannada District.

The scheme compromises the following components: -

- Construction of Jack well cum Pump House at end of intake forebay to accommodate Vertical turbine pumps.
- Construction of approach road for Jack well cum pump house.
- Supply, Installation, testing and commissioning of pumping machinery and pump house electrical works.
- Construction of 11KV/0433KV electrical substation near Jack well cum pump house, Terminal Bay and power line.
- Supply, jointing, laying, testing and commissioning of MS rising main for conveying water.
- Supply, jointing, laying, testing and commissioning of HDPE pipe gravity distribution network for conveying water and feeding tanks.
- Construction of delivery chamber at the end of Rising min
- O & M for a period of five years from the date of completion of the scheme.

1.8 Present Proposal

The present proposal is to prepare a revised Detailed Project Report for the construction of Tank filling scheme . The report covers the brief Introduction of the project, components of the scheme,

survey and investigations, design of Rising Main. The details are enumerated in the ensuing chapters.

As per the water availability study and as per the enquiry it is observed that flow is available at lifting point during the lifting period. As sufficient flow is there in the river, as per the directions KNNL officials,

i.e In order to meet the objectives of the scheme, namely to ensure storage and availability of the water in these tanks during the summer period, to the extent possible and their capacities permit, pumping can be continued and tanks are maintained full upto FRL as long as flows are available in the river, even if partially, and up to February as per the observations. Once full storage is achieved by February, the tanks can meet the requirements of summer periods and Ulavi fair.

In this regard the following points can be

a) supply to veerabhadraeshwara tank at Ulavi can be prioritized, which is the main requirement, and kept full as long as flows are available in the river.
b) Drawl of water from the tanks after December for irrigation of summer crops is not to be permitted.
c) The feasibility of increasing the capacities of the tanks by local authorities can be considered, which will extend the period of availability of water.

Also, as per decision taken in the 200th TSC meeting held on 04.10.2024 the scheme is proposed to design as a runoff river scheme without diversion structure. Therefore, it is planned to drop diversion structure (Weir).

Accordingly, the Detailed Project Report is revised by excluding the Diversion structure (weir).

Chapter 2
Water availability and Demand

2.1 Water requirement

Total storage capacity of identified Vyangin Kere, Veereabhadreshwara Kere and Shivatirth Kere. Proposed average filling @ 100% of the live capacity in Mcft = 7.34 Mcft (0.007 TMC, 0.06 Mcum).

It is clear from the table that the requirement of 0.007 TMC for the project can be met at 75% dependability.

The farmers of the area have been insisting for taking up the tank filling work of Tanks.

Tank No.	Name	FRL of tank (m) (Above MSL)	Storage Capacity (Mcft) (As per tank register)	Approximate inflow in to the tank @100% dependable yield @ 0.01 Mcft per sqkm of local catchment
1	Vyangin Kere	548.500	3.68	4.048
2	Veerabhadreshwara Kere	578.725	1.80	1.98
3	Shivatirth Kere	585.800	1.19	1.309
		Total	**6.67 Mcft**	**7.34 Mcft**

The total water requirement for filling the Vyangin Kere, Veereabhadreshwara Kere and Shivatirth Kere in the Joida taluka by considering 100% of live capacity of tanks and 10% evaporation losses works out to be 7.34 Mcft (0.007TMC).

2.2Water Availability

Preliminary yield studies have been conducted based on the rain gauge data (Gauge Station SUPA) considered from 1981 to 2014. Total catchment area is 165.36 Sq.Kms and Independent Catchment area for this scheme is 85.70 Sq.Kms.

The water availability at lifting point based on preliminary hydrology study is as under:

No.	Dependability	CA= 165.36 (Km2)	
		MCM	TMC
1	50%	15.125	0.534
2	75%	12.803	0.452
3	90%	9.715	0.343
4	100%	4.192	0.148

Thus, it is prudent to plan for a utilization of 7.34 Mcft of water from this point for tank filling purpose is available.

2.3 Duration of pumping

It is proposed to pump the required quantity of 0.007 TMC of water during the monsoon period. It is proposed to 7.34 Mcft of water in 60 days period with 16 Hrs pumping in a day. Hence the pumping requirement will be 0.06 cumecs

Chapter 3
Detailed Survey and Investigation

A detailed Reconnaissance survey has been carried out along with KNNL engineers to examine the proposed location of Intake point, Jack well cum pump house, rising main alignment, location of Delivery Chamber, location of tanks identified for filling.

3.1 Lift point

It is proposed to lift the water from Kaneri River on Right flank, near Amboli village.

3.1.1 Tanks

All the 3 no's of tanks are identified on ground and its salient details are collected.

3.2 Site Photos

Figure 3 1: Proposed Jack well location

Figure 3 2: Proposed Jack well location

Figure 3 3:Channabasaveswara Temple

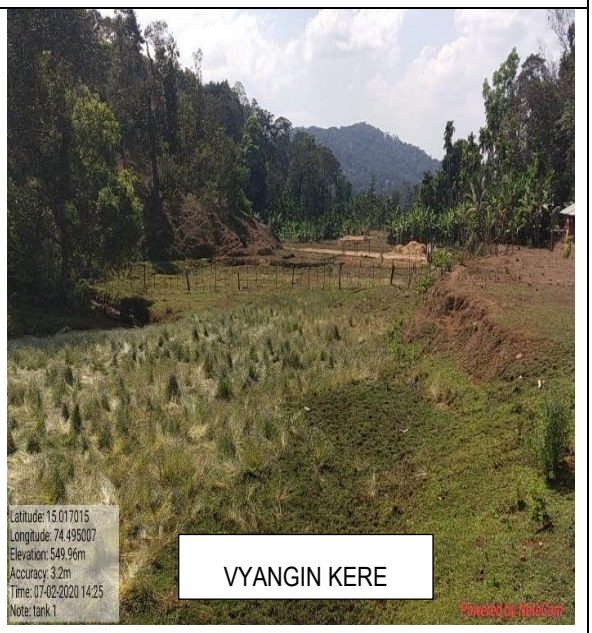

Figure 3 4:Tanks Photos

3.3 Survey and Investigations

3.3.1 Establishment of GPS control points

Control points are established near intake point, delivery point and at all the tanks bunds are established using DGPS instrument.

3.3.2 Reference bench mark(TB)

There is no GTS bench mark is available in the vicinity of the project. Hence Supa Dam top level i.e 567.500m has been considered as a reference Bench Mark.

Figure 3 5: Reference bench mark considered is Supa Dam top level.

By utilising this reference bench mark, levels are established at all the control points which are utilised for detailed survey.

3.3.3 Topographical Survey

Carrying out detailed topographic survey of proposed pipeline alignment by establishing Total station control points.

The topographic survey consists of the following activities:

Establishing the Ground Control Points using DGPS & Total Station instruments with respect to reference Benchmark.

Refere Annexure-1 for list of TBM and GPS points.

3.3.4 Rising main

The proposed lift from the lift point, the alignment of rising main is planned along the right side of the existing Anshi- Ulavi road for a length of 5150 m till it reaches Delivery Chamber located in Kadagarni Village.

Strip survey has been carried out along the rising main alignment clearly indicating the village roads, cart tracks, canals, nalas etc

3.3.5 Gravity Distribution Network

Gravity Main are proposed to take off from Delivery Chambers. Gravity Main and Gravity Sub Main are proposed to feed water to 3 Nos tanks. Gravity Main & Sub Mains of varying diameter to meet the discharge requirement of the tank. The pipeline is proposed to lay below ground and adjacent to existing road to the extent possible. Wherever it is not possible, the alignments have been proposed to align as a cross country.

Strip survey has been carried out along the gravity distribution network alignment clearly indicating the village roads, cart tracks, canals, nalas etc

Refer index map and schematic diagrams enclosed for details regarding planning of the scheme.

Chapter 4
Hydraulic Designs

4.1 Intake arrangements

The Intake arrangement comprises of Jack well cum pump house to accommodate pumps and motors. Intake structure is proposed to be located on the Right bank.
It is proposed to construct rectangular shape RCC jack well cum pump house. The pump house will accommodate Vertical Turbine pumps.

4.2 Intake point location Fixing Intake level for lift

Based on the topography, proposed lift Intake point i.e Jack Well cum Pump House location has been proposed near right flank of the Kaneri River near Amboli village. The Geographical location of the takeoff point will be Lat: 15º 01’ 24.3’’ N and Long: 74º 27’ 53.6’’ E.

4.3 Duration of pumping

It is proposed to pump the required quantity of 0.007 TMC of water during the month of January & February. It is proposed to lift 7.34 Mcft of water in 60 days period with 16 Hrs pumping in a day. Hence the pumping requirement will be 0.06 cumecs.

Based on the approved Hydraulic Design report of Rising Main & Pipe Distribution network the following parameters have been freeze.

Discharge = 0.06 Cumecs

Diameter of Rising Main (ID) = 265.10 mm

Minimum drawdown level = 478.60 m

Delivery Level = 647.50 m

Static Head =168.90 m

Pump Head = 197.00 m

As the total water required to be lifted is 0.06 Cumecs, which is small in quantity, the space available between the riverbank and existing road is less. Hence it is planned to have the Jack Well directly inside the river and on the right flank without any other intake structure.

So, rectangular shape RCC Jack Well is proposed for accommodating Vertical Turbine pumps up to Motor Floor Level. Above Motor floor level rectangular shaped RCC framed structure is

proposed for accommodating HT board panels, starters, EOT crane, Service Bay, control room, battery room, and switchgear room and Watchman quarters.

Based on the flood discharge in the past year and safety point of view Motor Floor Level has been kept 1.50 m above the afflux level.

Proposed Motor Floor Level is 483.20m and the existing road level is 482.65m. In order to have a proper approach to the Motor Floor Level to existing road level approach road has been proposed with a ramp slope as 1 in 18, for movements of vehicles and placing of machineries during maintenance.

Table 2-2: Salient details of proposed Jack well cum Pump House

No	Particulars	Details
1.	Shape of Jack Well structure	Rectangular
2.	Minimum water level/ Intake level	478.60m
3.	High Flood Level (Afflux over crest)	481.700 m
4.	Ground level	480.939 m
5.	Sump Bottom Level	476.50 m
6.	Motor Floor Level/ Pump Floor Level	483.200 m
7.	Gantry level	489.200 m
8.	Roof level	482.200 m
9.	Overall size of the pump house	7.70m x 14.00m
10.	Unloading / Service bay	5.07 m x 7.24m

4.4 Pumps

Vertical Turbine Pumps proposed to lift the required water of this project. Pumps are proposed to be designed for design discharge and one standby pump is proposed for ease of maintenance.

Peak discharge of 0.060Cumecs is proposed to be considered for design of pumps.

Peak Discharge = 0.0060Cumecs

Considering 2 numbers (1 working +1 standby) of pumps for Peak discharge.

Discharge per pump = 0.060/1 = 0.060Cumecs.

Hence it is proposed to provide 2 numbers of VT pumps with discharge capacity 0.060Cumecs (1working + 1 stand by).

Table 2.3: Design details of Pumping Machinery

No	Particulars	Details
1.	Type of Pump	Vertical Turbine Pumps
2.	Efficiency of Pump	74 %
3.	Intake Level	478.60 m
4.	Delivery Level	647.50 m
5.	Static Head (m)	168.90
6.	Friction Losses in Rising Main + Pump House Losses + RH (m)	28.093 (25.776+1.117+1.2)
7.	Pump Head (m)	168.90+28.093=196.993 say 197.00
8.	Peak Discharge	0.060 Cumecs
9.	Sump size	3.00m x 4.60m
10.	Number of Pumps	1 working + 1 Standby
11.	Discharge for each Pump	0.060 Cumecs, 216 m3/ hr
12.	Capacity of each Pump	250.00 HP (186.56 KW)
13.	Total Installed Capacity	500.00 HP (373.14KW)
14.	Total Power Requirement	0.63 MVA
15.	Electrical Sub-station	11 KV/0.433 KV outdoor type with 2 No's of 0.63 MVA Power transformer (1 Working + 1 Standby)

4.5 Delivery Pipes and Manifold

The total discharge to be pumped from the source is 0.060cumecs, it is planned to pump by using 1 VT pumps plus one stand by VT pumps, the discharge for each pump will be 0.060cumecs.

The delivery pipes from each pump is connected to manifold. The diameter of each delivery pipe to carry the discharge of 0.060cumecs is 200 mm with a limiting velocity of 2m/sec. Suitable valves such as Non-return Valve, MDJ valve &Butterfly valves etc. are provided for protecting the pump from surge pressure.

The manifold is designed for a diameter of 300mm.

Manifold is provided with air relief valve. The outlet transition connects the manifold with rising main pipe of diameter 273.10 mm (Outer Dia)

4.6 Pipeline Alignment

Based on the topography and tank locations, technically feasible pipeline routes for the Rising Main has been planned up to a Delivery Chamber at suitable location, from there Gravity Pipe Distribution network has been proposed to offtake to feed the three existing MI/ZP tanks.

4.7 Rising Main

The proposed alignment of Rising Main takes off from the lift point and crosses the Anshi-Ulavi Road, then alignment of rising main is planned to align along the right side of the existing Anshi-Ulavi road for a length of 5150 m till it reaches Delivery Chamber.

The Rising main shall be designed based on the following considerations:

- The design velocity shall not be less than 0.6 m/sec to avoid deposition in the pipe and shall be not more than. 1.75 m per sec in order to avoid abrasion of the pipe material.
- The material shall be decided on friction offered by the pipe material and its increase with age, strength of the pipe to resist internal pressure and external loads, resistance to corrosion, resistance to cracking and disintegration, ease of transportation, laying and jointing, expertise required for laying and jointing.
- Cost of the pipe material and its durability or design life.
- Capacity of the pipe to resist water hammer or increase in internal pressure caused by a sudden reduction in velocity of water, temperature induced pressures and external loads.

MS pipes with inner lining and outer guniting are considered for design of rising mains.

i. Velocity of flow shall be as far as possible, limited to 1.75 m/sec.

ii. Stress calculations

   a. Check for Hoop Stress.

   b. Check for Deflection & Stress

   c. Check for Buckling

   d. Check for Collapse Pressure

For M.S pipes, fixing of thickness of pipe and stresses computations has been carried out as per AWWA, IWWA, IS-1916-1989, IS-5822 -1994.

Table 4.1: Details of Rising Main

SL. No.	Particulars	Length (m)	Pipe Material considered ERW/MS	
			Diameter (ID)	Thickness (mm)
1	Rising Main	5150	265.10 mm	4.00

4.8 Gravity Pipe Distribution Network

Gravity Main is proposed take off from Delivery chamber, which is planned to align the right side of the Anshi-Ulavi road, near Ulavi village it is proposed align outside the Ulavi habituation and tailed off to Shivateerth kere. Proposed length of Gravity Main is 3675m.

Gravity Sub Main No.1/1 is proposed to offtake from Gravity Main at Ch: 623 m, which is proposed to run parallel to the existing Mud road leading from Anshi-Ulavi road to Kadagarni village and tailed off to Vyagin Kere. Proposed length of Gravity Sub Main No.1/1 is 750m.

Gravity Sub Main No.1/2 is proposed to offtake from Gravity Main at Ch: 3123 m, which is proposed to run parallel to the existing Ulavi village roads and tailed off to Veerbhadreshwara Kere. Proposed length of Gravity Sub Main No.1/1 is 566m.

Refer Index map and Schematic Diagrams enclosed for details regarding planning of the scheme.

Gravity Main & Sub Mains of varying diameter has been proposed to meet the discharge requirement of the tank.

Design guidelines as per CPHEEO manual and other relevant IS codes are considered for the design of the pipe distribution system. The details of the gravity pipe distribution network system are as under:

Table 4.2: Details of Gravity Main-1, Gravity Sub Main-1/1 and Gravity Sub Main-1/2

SL.No.	Particulars	Length (m)	Pipe Material Considered HDPE
			Outer Diameter
1	Gravity Main	3675	250 mm to160 mm (PE-100, PN-6)
2	Gravity Sub-Main 1/1	750	200 mm (PE-100, PN-8)
3	Gravity Sub-Main 1/2	566	160 mm (PE-100, PN-6)
Total Length of Gravity Distribution Network		**4991**	

Hydraulic particulars (Cut off statement) of Rising Main and Gravity distribution networks are enclosed as **Annexure-2**.

4.9 Valves and Appurtenances

Air valves are provided at all summit points and at plain locations at every 500m interval. Sluice valves are proposed at all valley portion to remove the silt at such locations.

Air valves of diameter varying from 80mm to 100mm, Sluice valves of diameter varying from 100mm to 150mm and Control valves of diameter varying from 200mm to 300mm provided in the proposed pipe network systems as mentioned above. Refer Table below for number of valves provided:

Table 4.3: Details of Air Valves, Sluice Valves and Control Valves

Mains/Pipe	No of Air Valve	No of Sluice Valve	No. of Control Valves		
	80mm dia	100mm dia	200 mm dia	250 mm dia	300 mm dia
Rising Main	18	7	-	-	1
Gravity Main	16	4	-	1	-
Gravity Sub Main-1/1	3	-	1	-	-

Mains/Pipe	No of Air Valve	No of Sluice Valve	No. of Control Valves		
	80mm dia	100mm dia	200 mm dia	250 mm dia	300 mm dia
Gravity Sub Main-1/2	4	1	1	-	-

The plan and profile for pressure& Gravity distribution network is prepared and submitted Km wise duly incorporating the valves, outlet points and crossings.

4.10 Delivery Chamber

Delivery Chamber is located at a latitude of 15° 01' 12.14'' N and 74° 29' 51.91'' E on right hand side of Anshi – Ulavi Road and it is at the end of Rising main near Kadagarni village. From this chamber, Gravity Main is proposed to fill the water for existing MI/ZP Tanks. The required discharge to fill the above said tanks is 0.060Cumecs, considering the retention period as 90 seconds, the capacity of the chamber has been worked out and finalized its internal size as 4.00m x 1.50m x 1.80m.

No	Particulars	DC
1	Ground level at Delivery chamber	EL 647.450m
2	Bed level	EL 646.000 m
3	Capacity of sump with 90 Seconds retention capacity	5.40 m^3
4	Depth of water considered	1.00 m
5	Free board considered	0.50 m
6	Water cushion considered	0.30 m
7	Size	4.00 x 1.50 x 1.80m
8	Height	1.800m

No	Particulars	DC
9	Delivery level	EL 647.500 m

Input data considered for the Structural design

Coefficient of internal friction /angle of repose, $\varnothing = 30^0$

Υ = Density of soil = $18kN/m^3$

Grade of concrete, f_{ck}= M30 (For Base Slab and Side walls)

Grade of steel, f_y = Fe 500

Safe baring capacity of soil (assumed) =$200kN/m^2$

Unit Weight of Concrete = $25.00\ kN/m^3$

Unit Weight of Water = $10.00\ kN/m^3$

Unit Weight of Steel = $78.50\ kN/m^3$

For cracked section

$\sigma cbc = 10.0\ N/mm^2$; $\sigma st = 130\ N/mm^2$

Maximum shear stress for M30 grade of concrete

m =9.333; n = 0.4179; j = 0.8607; Q=1.798

Rectangular shape RCC water tank has been proposed as a delivery chamber with grade of concrete as M30. Ground elevation level of delivery chamber is EL 647.450m, bed level of the chamber is at EL 646.000m. The height of proposed water tank is 1.800m.

The diameter (ID) of Rising main (ERW pipe) is 265.10 mm and 4 mm pipe thickness, which will feed this chamber. Gravity Main is proposed to take off from this chamber and the water flows by gravity. The Inner diameter of Gravity Main is 217.40 mm with 16.30mm pipe (HDPE) thickness.

Accommodating the above said components, the chamber dimensions have been finalized and detailed calculations in spread sheet have been done. Based on the design output required reinforcements are proposed for the slab and walls.

Chapter 5
Conclusion

5.1 Source

The total water requirement for filling the Vyangin Kere, Veereabhadreshwara Kere and Shivatirth Kere in the Joida taluka by considering 100% of live capacity of tanks and 10% evaporation losses works out to be 7.34 Mcft (0.007TMC) with discharge of 0.06cumces.It is very much essential for long term sustainability of the livelihood of the area. The project being planned by KNNL can be met by sourcing water from Kaneri River.

Drawing water from the Kaneri River to fill the minor irrigation tanks is considered to be feasible due to the following reasons:

i. The source is dependable and required discharge and volume is assured
ii. Future expansion and dependability is possible

5.2 Type of intake structure and pumping station

It is proposed to construct rectangular shape RCC jack well cum pump house to draw water from Kaneri River and pump to delivery chamber. The pump house will accommodate Vertical Turbine pumps.

5.3 Material of pumping main and distribution system.

It is proposed to use Mild steel(MS) material with suitable corrosion protection mechanism. And for distribution network it is proposed to use HDPE

5.4 Conclusion

Providing sustainable and dependable water supply to these suffering areas is utmost priority for overall development of Ulavi temple near Amboli Village in Joida Taluk of Uttar Kannada District.

As sufficient flow is there in the river, the proposed lift scheme can be designed as runoff river scheme without diversion structure considering following points,

a) supply to veerabhadraeshwara tank at Ulavi can be prioritized, which is the main requirement, and kept full as long as flows are available in the river.

b) Drawl of water from the tanks after December for irrigation of summer crops is not to be permitted.

c) The feasibility of increasing the capacities of the tanks by local authorities can be considered, which will extend the period of availability of water.

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