കേരള ജല അതോറിറ്റി

മദ്ധ്യമേഖല ചീഫ് എഞ്ചിനീയറുടെ കാര്യാലയം,
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നമ്പർ. KWA/CE/CR/KTA/KIIFB/1469-B/2019 തീയതി: 25.05.2022

പ്രേഷകൻ

ചീഫ് എഞ്ചിനീയർ

സ്വീകർത്താവ്

ചീഫ് എഞ്ചിനീയർ (സിവിൽ ഡാം സേഫ്റ്റി & DRIP),
ഡാം സേഫ്റ്റി ഓർഗനൈസേഷൻ ബിൽഡിംഗ്,ഒന്നാം നില,
പള്ളം, കോട്ടയം- 685 007

സർ

വിഷയം:- കിഫ്ബി -അയ്യപ്പൻകോവിൽ പഞ്ചായത്ത്-പെരിയാർ നദിക്കു കുറുകെ ചെക്ക് ഡാം നിർമ്മിക്കുന്ന പ്രവൃത്തിക്ക് ഡാം സേഫ്റ്റി അതോറിറ്റിയിൽ നിന്നും അനുമതി ലഭ്യമാക്കുന്നത് സംബന്ധിച്ച്

സൂചന:- 1) A S No.WRD025-06-PA-01 Dated 13.11.2018 of CEO, KIIFB, TVM for Rs.46.424 Crores.
2) Agreement No.01/2022-23/SE/PHC/MVPA Dated 11.04.2022
3) കേരള ജല അതോറിറ്റി മൂവാറ്റുപുഴ പി എച്ച് സർക്കിൾ സൂപ്രണ്ടിംഗ് എഞ്ചിനീയറുടെ 11.05.2022 ലെ SE/PHC/MVPA/DB/T-26/2021-22 നമ്പർ കത്ത്.
4) ഈ ഓഫീസിൽ നിന്നുള്ള 11.05.2022 തീയതിയിലെ ഇതേ നമ്പർ കത്ത്.
5) അങ്ങയുടെ ഓഫീസിൽ നിന്നുള്ള 13.05.2022 ലെ ഇമെയിൽ സന്ദേശം.

കട്ടപ്പന- അയ്യപ്പൻ കോവിൽ വില്ലേജുകൾക്കു വേണ്ടിയുള്ള കുടിവെള്ള പദ്ധതിക്കു വേണ്ടി ചെക്ക് ഡാം നിർമ്മിക്കുന്നതിന് അയ്യപ്പൻ കോവിൽ പഞ്ചായത്തിലെ തോണിത്തടിയിൽ പെരിയാർ നദിക്കു കുറുകെ ചെക്ക് ഡാം നിർമിക്കുന്ന പ്രവൃത്തി നടപ്പാക്കുന്നതിനായി അനുമതിതേടിയുള്ള കത്തിന് മറുപടിയായി അങ്ങയുടെ ഓഫീസിൽ നിന്നും ലഭിച്ച സൂചന (5) പ്രകാരമുള്ള ഇമെയിൽ സന്ദേശത്തിൽ ആവശ്യപ്പെട്ട താഴെ പറയുന്ന രേഖകൾ ഇതോടൊപ്പം ഉള്ളടക്കം ചെയ്തയക്കുന്നു.

1. Project Proposal
2. Location of the proposed weir/ structure.
3. Salient features of the structures

വിശ്വസ്തതയോടെ,
Sudheer T.S
ചീഫ് എഞ്ചിനീയർ

പകർപ്പ്

മൂവാറ്റുപുഴ പി എച്ച് സർക്കിൾ സൂപ്രണ്ടിംഗ് എഞ്ചിനീയർക്ക് അറിവിലേക്കും തുടർ നടപടികൾക്കും.

ഉള്ളടക്കം:

Name Of Work :- **KIIFB-Assisted Water supply scheme to AyyappankovilPanchayath-Construction of check dam across Periyar river at Thonithady in Ayyappankovil Panchayath**

DESIGN CONSIDERATIONS

The weir is proposed to be constructed at a location approximately 300m the d/s of the existing intake well at Thonithadi near Upputhara for creating an impoundment for meeting the peak-summer requirements. The width of river at this location is about 150m. The location is about 500m off to the north along a branch road from Elappara -Kattappana road. This branch road is passing along the right bank of the river and the bank is at a height of about 6m at this point and is dropping steeply. The left bank is at a lower level and sloping gradually. This stretch of Periyar is on the d/s of the Mullapperiyar dam discharging to Idukki reservoir.

As the release from Mullapperiyar dam is limited and highly regulated, the main source of flow in this stretch for the most part is a few streams in the locality. Unlike the other unregulated rivers in the state, the recorded maximum discharge every year occurs in the last months of the south-west monsoon as the result of the release of the surplus water from the Mullapperiyar. Because of this, the river in this stretch seldom flows full. The observed maximum flood discharge of 1050cumecs is quite low when compared to the width. The High Flood Level is reported as 734.30.

The height of impoundment adopted is 1.8m which is very moderate.

The bed is rocky all through and so, the design is for impervious foundations and so the safety of the weir structure against sliding and overturning only are governing.

The weir has to be constructed for this length with abutments and retaining walls on either side. On the right bank, the abutments and retaining walls are proposed to retain the bank up to a level of HFL plus AFFLUX ie. 734.500 as the bank here looks a little vulnerable and unstable and also has the road up above. On the left bank, abutments will be raised to a level of 733.50 as the bank is stable.

An average bed level of 730.00 is observed at the location. The total height of the weir is proposed to be 1.80m and that the FTL is 731.80. The weir sill level will be 730.90.

Available data as given in bidding documents

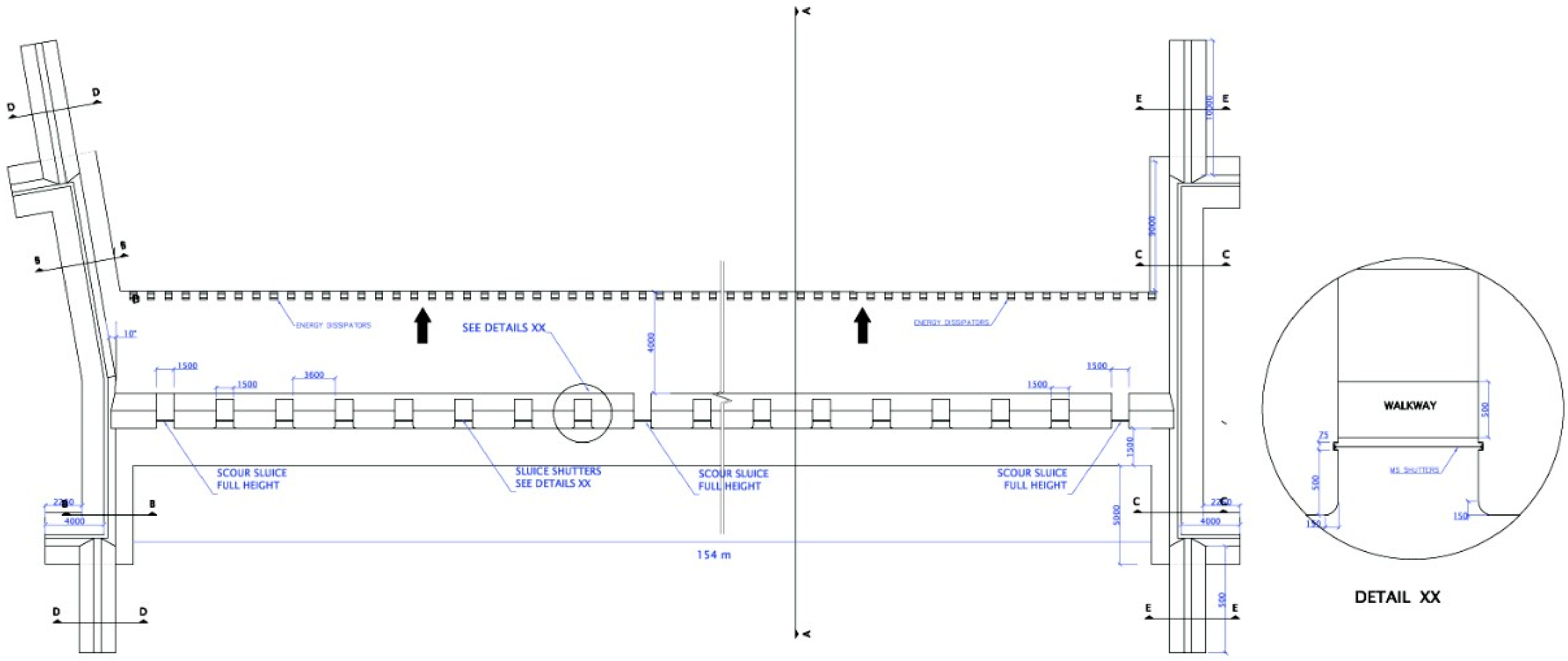
The design is based on the maximum flood discharge in 20 years.

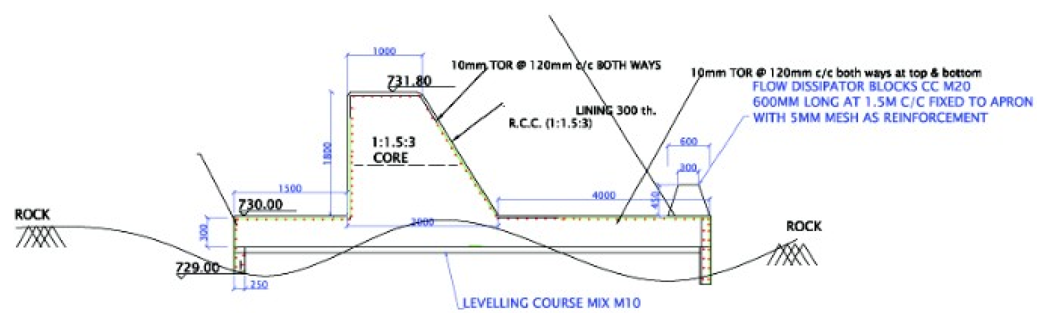
Flood discharge	1050m3/s
Period/frequency	Once in 20 years
HFL	734.30m
Average Bed level	730.00m
Width of river	155.0m
Type of soil	rock ; SBC > 75 t/sqm
Height of impoundment	1.8.0m
Height of weir	0.9m
Height of shutters 0.9m	
Type of shutters	MS plates with edges stiffened.

The flood discharge value of 900m3/s looks to be on a lower side. Therefore considering the conditions of Kadalundi river and referring an earlier design prepared by NIT Calicut for a weir at Edaipalam d/s of this one, a discharge of 1800m3/s is assumed. The width of channel adopted for design is 60m. The other data are also altered slightly as mentioned above to suite the site.

References:

1. IS 6966(Part 1) :1989 Hydraulic design of barrages and weirs-Guidelines
2. IS 456: 2000. Code of practice for reinforced concrete structures.
3. IS 1893: 2002
4. SatyanarayanaMoorthy, Water Resources Engineering.
5. Manual on barrages and weirs on permeable foundation, Publication No. 179, Volume I. Central Board of Irrigation and Power.
6. Design of RCC weir across Kadalundi river at Edaippalam. Report by NIT, Kozhikkode.
7. Design of RCC weir across Kadalundiriver at Kallkkayam. Report by WASCON, KWA, Thiruvananthapuram.



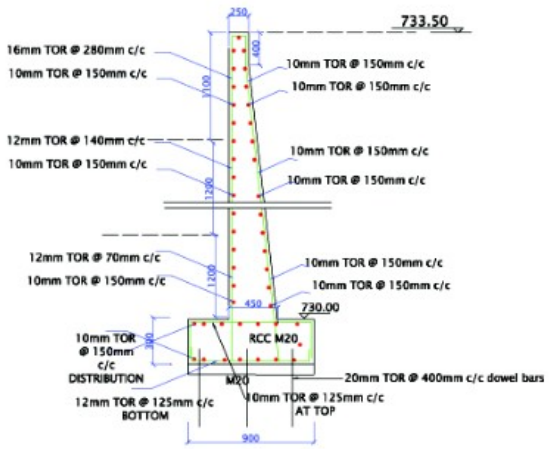


Note:
Orientation/alignment of retaining walls will have to be altered slightly during execution to suit the river bank pattern

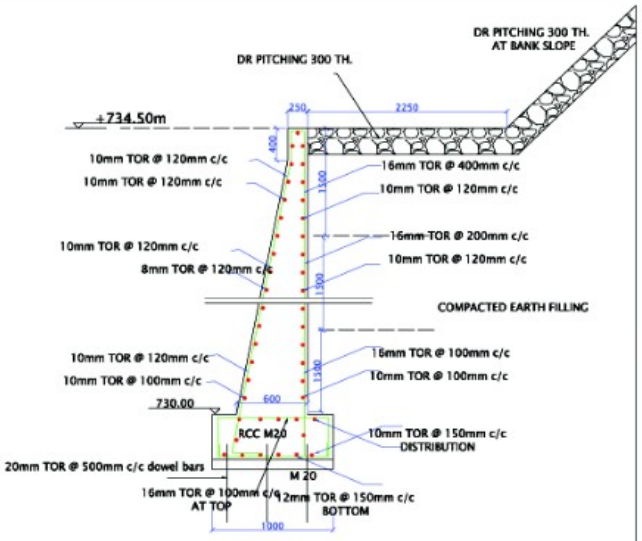
SECTION A–A

GENERAL PROFILE OF THE WIEIR

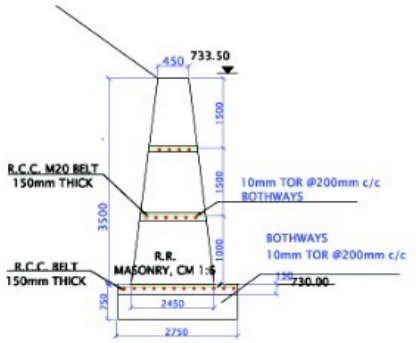
CLIENT	KERALA WATER AUTHORITY	
PROJECT	KIIFB-Assisted Water supply scheme to Ayyappankovil Panchayath-Construction of check dam across Periyar river at Thonithady in Ayyappankovil panchayath	
CONTRACTOR	MUHAMMED SAFVAN. MK ,MALAPPURAM	
TITLE	GENERAL ARRANGEMENT OF WEIR AND APRONS	
JOB NO.		REVISIONS
DRG NO.	I/GA	Prepared by :
SCALE	AS SHOWN	



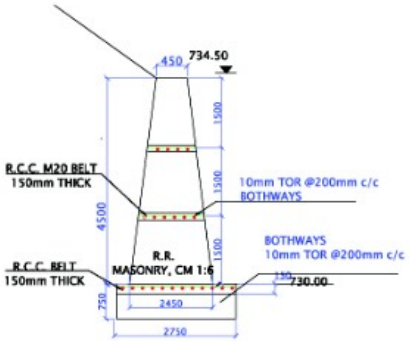
SECTION B–B
DETAILS OF ABUTTMENT AND U/S RETAINING WALL ON LEFT BANK



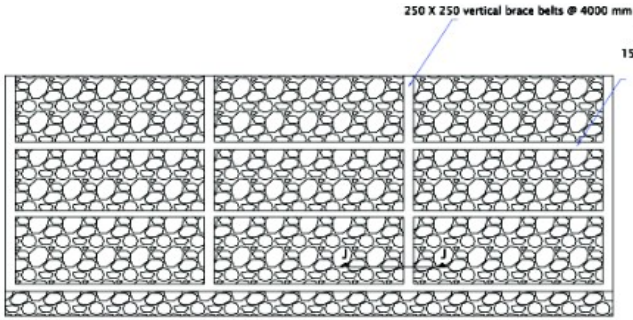
SECTION C–C
DETAILS OF RETAINING WALL ON EITHER SIDE OF ABUTTMENT AT THE RIGHT BANK



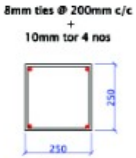
SECTION D–D
DETAILS OF R.R. RETAINING WALL AT THE LEFT BANK



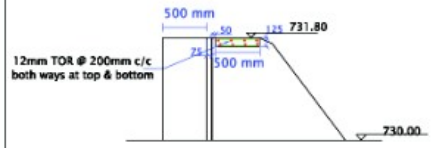
SECTION E–E
DETAILS OF R.R. RETAINING WALL AT THE RIGHT BANK



SIDE ELEVATION OF DR RETAINING WALL ON THE D/S



SECTION J–J
DETAILS OF VERTICAL BELT



WALK WAY OVER WEIR
RCC M20

DETAIL OF SLUICE SHUTTER

SPECIAL NOTES

1. Cover and development length as per IS 456 : 2000
2. All dimension are in millimetres and the drawings are not to scale
3. RCC Retaining walls shall be of Mix M25

CLIENT	KERALA WATER AUTHORITY	
PROJECT	KIIFB-Assisted Water supply scheme to Ayyappankovil Panchayath-Construction of check dam across Periyar river at Thonithady in Ayyappankovil panchayath	
CONTRACTOR	MUHAMMED SAFVAN. MK ,MALAPPURAM	
TITLE	STRUCTURAL DETAILS OF RETAINING WALLS	
JOB NO.	13/13	REVISIONS
DRG NO.	1/STR	Prepared by :
SCALE	AS SHOWN	

KERALAWATERAUTHORITY

DETAILEDENGINEERINGREPORT

PROJECTDIVISION, KATTAPPANA, P.H.CIRCLE, MuVATTUPUZHA

MAY–2021-2022

SALIENTFEATURES		
1	Titleoftheproject	***WSS to Ayyappankovil panchayath in Idukki district***
2	Detailsofprojectlocation	
	i.District	***Idukki***
	ii.Taluks	***Peermade,Idukki***
	iii.Corporation/Municipality/ Panchayaths	***Ayyappankovil, Kanchiyar panchayaths and Kattappanamunicipality***
	iv.AssemblyConstituencies	***Peermadeand Idukki***
3	Implementingagency/SPV	***KeralaWaterAuthority***
4	DPRprepared by	***ProjectDivision, KWA,Kattappana***
5	Projectoutlay	***Rs. 4750.00lakhs***
6	Budgetprovision	***2500 lakhs***
7	Budgetspeechreference	***2016-17***
8	Administrativesanction	***4642400000.00*** *(TRAN 10: WRD025-06)*
9	Natureofproject (Newscheme/extension,relaying)	***Extension of pipelines to uncovered area in ayyappan kovil panchayath, Balance work for commissioning ongoing CWSS to Ayyappankovil and Kattappana villages.***
10	PresentstatusofWSS, if any	***Most of the components of ongoing water spply scheme CWSS to Ayyappankovil and Kattappana villages except electromechanical works have been completed. Even though the work of electromechanical and laying gravity main and pumping main are sanctioned/arranged under NRDWP/ARP , the same could not becompleted due to paucity of fund. Hence the back logs are considered in the present proposal.***
11	Needfortheproject	***The ongoing water supply covers only few wards of theAyyappaankovil panchayath with its limited distribution system of 27 Km against the road capacity of 180 km.The highly deserving habitations in the elevated areas are notcovered by the above scheme and hence distribution systemhas to be extended to the uncovered areas of Ayyappankovil panchayath. Also the backlogs of ongoingCWSS toAyyappankovil and Kattappana villages hav etobe covered which will benefit Kanchiyar and Kattappana panhayths in Idukki District***
12	Detailsofproposedscheme	
	i.Lengthofpipelines	***Part I-extensionof pipeline Pumping mains-10094 m, Distribution-88 Km in two zones.Part II – balance work to be rearranged- Pumping andgravitymains16607m***

	ii.Diameterofpipes	***(1) DI K9 - 350mm to 150mm, (2) PVC - 160mm to 90mm,GI pipe125to 80mm***
	iii.Otherdetails	***Part I- Extension of pipe line to uncovered area– construction of2 nos. sump cum booster pump houses 1.5LL capacity, 2 nos. Glsr 8.0 LL and , 7.0 LL,clear waterpumpsets 4 sets,*** ***Part II – Balance work of ongoing WSS -Construction ofcheck dam , construction of 1 no booster pump houses 1.0LLcapacity, Providing raw water pumpsets-1 set, Clear water pump sets 4 sets, Transformers and allied works, pipelinebridgeetc***
13	Detailsofinvestigations/ surveysconducted	***Detailed survey has been conducted in the entire project area, levels have been taken and location sketch/contour maps have been prepared***

14	Totalestimatedcostanditemwiseco st breakup and as per whichscheduleofrates(Year)	***Totalestimatedcost- 4750lakhs*** ***Part I, Extensionof water supply to uncovered areas*** ***i) Construction of GLSR 8.0LLatAlady -97Lakhs*** ***ii) Construction of 7.00 LL GLSR at Udayagiri- 88.50 lakhs*** ***iii) Construction of sump cum Booster pump houses at Kavanthy-58.60lakhs*** ***iv) Construction of sump cum Booster pump houses at Edappookkalam–54.00lakhs*** ***v) Providing pumping mains from TP sump to Edapookkalam,-241.00 lakhs*** ***vi) Providing Pumping Main from Edapookkalam toKavanthy,-62.00*** ***vii) Providing pumping main from Kavanthyto Udayagiri - 103.50 lakhs*** ***viii) Providing pumping main from TPsump to Alady Kurissumla-5.11lakhs*** ***ix) Providing distributioninzoneVIII -779 laks*** ***x) Providing distribution in zone IX-580 lakhs.*** ***xi) Providing-pumpsetsatT.Psump2sets-23.00Lakhs*** ***xii) Providing pump set at Edapookkalam booster- 22.75lakhs*** ***xiii) Providing Pumpset at Kavanthy-17.50 lakhs*** ***xiv) Energization–Transformers-100.00lakhs*** ***xv) Road restoration charges -225 lakhs*** ***xvi) Cost of land-16.00*** ***xvii) Investigation and surveys-12.00*** ***Part II-Balance workfor completing CWSS toAyyappankovilandKattappana villages*** ***i) Raw water pump sets-137.00lakhs*** ***ii) Clear water pumpsets at TP sump-111lakhs*** ***iii) Clear water pump set at Kalthotty booster-20.lakhs*** ***iv) Clear water pump set at Intermediate booster2 sets- 44.50 Lakhs*** ***v) Transformers at Raw water pump house , clear water pump houses-260lakhs*** ***vi) Energization-50lakhs*** ***vii) Providing substation, control rooms at Raw water pump house and TPsump, Kalthottyincluding Various civil works--179.20 lakhs***

		viii) Construction of intermediate boosterand pumphouse at Nariyampara-34.80lakhs *ix) Pipe line bridge near kattappana-17.10 lakhs* *x) Checkdam near source-300.30 lakhs* *xi) Pumping maintowards Nariyamparatop-13.80lakhs* *xii) Rearrangements of Pumping mainand gravity mains- 823.8Lakhs* *xiii) Wash water disposals interconnections- 38.20 Lakhs* *xiv) Line charging and stabilization works.-80lakhs* *xv) Roadrestoration-60lakhs.* ***Estimate of the project is based on DSR-2018, with acost index of 1.5496, and KWA PRICE software.***
15	Whetherdetailedestimateattached	***Yes***
16	Detailsofrevenuestreams	***As per the existing norms source of revenue is the watercharges from consumers and cost of water supplied through street taps to be remitted by benefitted LSGDs. Proper maintenance of the scheme and accurate metering and timely collection of charges shall enhance the economic feasibility of the scheme.***
17	Details of cost benefit analysis (CBRvalue)	***CBR-0.164***
18	Detailsofprojectrisks	***NIL***
19	Details of project implementation schedule & WBS (Proposed duration to complete theproject)	***18months from the date of Administrative sanction***
20	Details of project managementorganizationstrategy	***KIIFB projects are executed by the project division which isthe specialized project management unit of Kerala WaterAuthority. Project Division is a centralized unit headed by theExecutive Engineer. Three Assistant Executive Engineersand Five Assistant Engineers are working under theExecutive Engineer. For the work supervision 6 overseersare available.Office staff includes Divisional Accountant,JuniorSuperintendentetc.Thisteam can handlemajor works effortlessly.***
21	Detailsofcontractmanagementstrategy	***KeralaWaterAuthorityfollowsstandardcontractmanagement procedures established b PWD manual, other established government norms and CPWD norms. Every work is executed by a competitive bidding through e-tendering for increased transparency.Estimates are prepared using CPWDrates***
22	Detailsofstatutoryclearances	***Bridge/culvert crossing and tar/berm cut sanction from PWDand local self governing bodies***
23	Quality control infrastructure andmechanism	***Factory testing and field testing of pipes andpumps bycompetent personnel of KWA, Design & testing of mixdesigns for Concrete structures & soil investigation withhelp of local Engineering college(MBC college ofEngineering,Peermade).Testing of electrical components by electrical inspectorate Idukki. Third party inspection***

		bycompetitive consultants appointed byKWA.
24	Operation and maintenance (O&M)arrangements of the project aftercompletion	***Maintenance period of one year to the contractor and thenthe maintenance shall be done by KWA maintenancedivision.***
25	Detailsofattacheddrawings	***Schematic diagrams, Nodal diagrams and layout ofpipelines, Longitudinal sections of Pumping mains, location maps of proposed GLSR and boosterstations,structural details of GLSRs, Pump houses, Control rooms, Footbridges,Pipeline bridge etc.***
26	Otherattachments	***Details of Panchayath resolutions and List of members of Panchayath level implementation committee.***

KIIFB ASSISTED WATER SUPPLY SCHEMES TO KATTAPPANA MUNICIPALITY, AYYAPPANKOVIL ANDKANCHIYARPANCHAYATHIN IDUKKI DISTRICT.

INTRODUCTION

"Water Supply Scheme to Ayyappankovil panchayath in Idukki district"envisage the extension ofdistribution system to the uncovered areas of Ayyappankovil panchayath. The proposed extension isfrom the ongoing water supply scheme "CWSS to Ayyappankovil and Kattappana villages" intendedto provide water supply to entire area of Ayyappankovil, Kattappana and Kanchiyar panchayaths.Most of the components of the scheme have completed except providing electromechanical workssuch as providing pumpsets, transformers and allied works for which sanction was accorded in SLSC-2016 but could not take up due to paucity of fund.Even though the works of laying common gravity mainfor Kanchiyar and Kattappana panchayaths, Gravity main and pumping main to provide water supply to Kattappana panchayath were arranged under ARP; the same could only be partly completedduetopaucityof funds andthe balance workto berearranged.

Hence the present project proposal **(Part I)** is mainly intended for solving the drinking waterproblems of the uncoveredareas of Ayyappankovil panchayath ,especially theseverely affectedelevated areas coming under Anavilasom village with adequate drinking water facility by extensionof distribution system and thus it is possible to cover entire 13 wards of the panchayath with protectedwater supply.For achieving this great impetus in the water supply, the remaining components of"CWSStoAyyappankovilandKattappanavillages"have to becompleted.

Certain modifications in somecomponents of"CWSS to Ayyappankovil and Kattappana" are required for addressing the technical issues faced during the execution of various components which were not envisaged during the preparation of the project. Thevarious technical as well as geographical barriers are overcame by suitable incorporation of additional components and redesign of existing components to make the project economically feasible and technically viable. Also the provisions made for the Pump sets, substations and energization of pumphouses were not sufficient to meet the present estimated cost and also control rooms and modern control systems and surge arrestors in pumping main were not envisaged earlier. The above components are mandatory for the proper fulfillment of the scheme. Hence this project proposal **(Part-II)** also covers the back logsof earlier projects andforsuccessful commissioningofthescheme.

The report includes design and estimate of the proposal for meeting the water demand of Ayyappankovil panchayath at the rate of 100 liters per capita per day in the design year 2049 and thebalanceworkfor completionof CWSSto Ayyappankovil andKattappana Villages.
The total estimated cost of the project comes to **4750.00**lakhs.

KIIFB ASSISTED WATER SUPPLY SCHEMES TO AYYAPPANKOVILPANCHAYATH IN IDUKKI DISTRICT.

PROJECTATAGLANCE

1. NameofScheme	:	KIIFBassisted Water Supply Scheme toAyyappankovil Panchayath in Idukki District
2. NameofDistrict	:	Idukki
3. NameState	:	Kerala
4. NameofPanchayathsproposed tobecovered	:	Kattappana, Kanchiyar, Ayyappankovil
5. Taluk	:	Idukki.
6. Projectarea	:	160.025 sq.km
7. Population(as per2011 census)	:	Ayyappankovil-15611,Kattapana-42646, Kanchiyar-22878
8. Ultimatewaterdemand	:	7MLD
9. Designnorms	:	KIIFB
10. Percapitarate ofwater Supplyproposed	:	100 lpcd(AyyappanKovil)
11. Source	:	PeriyarRiver
12. Intakepoint	:	Near Thonithady
13. Existingcomponents		
i) Intakewell	:	6.0 m dia20 m depth
ii) Rawwaterpumpingmain	:	350mmDI(K9)1370m,1455m 355.60mmsteelpipe. Completed (ARP)
iii) Treatmentplant atAladyKurisumala	:	7 MLDcompleted(ARP)

iv) Capacityof reservoirs.

a. Sumpat T.P. site : 5.55 LL

b. Kalthottysumpcumbooster : 1.84LL

c. G.L.Tank atNariyamparatop : 1.00 LL

d. G.L.TankatMeppara : 2.46LL

e. G.L.Tank atLabbakkada : 2.46LL

f. G.L.Tank atMulakaramedu : 4.37 LL

g. G.L.TankatKochuthovala : 3.14LL

h. G.L.TankatNariyamparabottom: 2.27LL

i. G.LTankatAlady : 2.28LL(CompletedARP)

v) ClearwaterPumpingmains

a. TP sump toKalthottysump and

Intermediatesumpat Nariyampara : (350mm DIK(9), 305 m,

355.6MS207 m) Completed

(balance 7081m to be rearranged)

b. FromKalthottytoNariyampara : *300 mmDIK(9)-6007 m*

(To be rearranged)

c. Sump at Kalthottyto

GLtank atLabbakkada : 150 mm DIK93115m

d. SumpatKalthottytoMepparaGLSR : 150mmDIK93378m

e. SumpatNariyampara toMulakaraMedu: 250 mm DIK(9)4448m

AndKochuthovalaGLSR **(balance-2342m to be rearranged)**

125 mm GI pipe 3250 m

200mm DIK(9)pipe-5030m

14. ClearWatergravitymains

a. SumpatNariyamparato NariyamparaBottom GLSR : 150 mm DIK(9), 1250m

b. TPSump toExistingTankat Marikulam : 65 mm GI3352 m

15. Distributionsystem. : Zone IAyyappankovil/KanchiyarZoneII Kanchiyar Panchayat

ZoneIII-Kanchiyar PanchayathZoneIV-Ayyappankovil Panchayath

Zone V- Kattappana Panchayath Part-

ZoneVI-Kattappana Panchayath

ZoneVII- Kattappana Panchayath

16. Proposedcomponents **: PART I** (Extension of distribution system to uncovered areas of Ayyappankovil panchayath)

i) Clearwater pumpingmains

FromTPsump toEdapookkalam :200 mm DI 6034

MFromEdapookkalam to Kavanthy :200 mm DI1200

MFromKavanthytoUdayagiri :200 mmDI2550M

FromTP sump to AladyGlsr	: 80 mm GI, 310 m
ii) Distributionsystem	:ZoneVIII-51558m& ZoneIX36545m
iii) Clearwaterpumpsets	
a. SumpatTreatmentplant	: 2Nos. of 50 Hp, 2 nos 10 Hp CF
b. Sumpat Edapookkalam	: 2Nos 60 HP Centrifugal Pumpset
c. Sumpat Kavanthy	: 2 Nos 45 HP CF
iv) Constructionofreservoirs	:8.00LL at Treatment plant Site
	:7.00 LL at Udayagiri
v) Constructionofbooster pumphouse	:1.50LL at Edapookkalam
	:1.5LLat Kavanthy
Proposedcomponents	:**PartII(Balance work of CWSS to Ayyappankovil and Kattappana panchayath)**
i) Checkdam	:180m length,1.80 height.
ii) Rawwaterpumpset	: 2 Nos 275 HP TurbinePump set(On eas stand bye)
iii) Clearwaterpumpsets	
a. SumpatTreatmentplant	: 2Nos. of 160 Hp, 10HpCFpump set
b. Sump at Kalthotty	: 2 Nos.40 Hp C.FPump set
c. IntermediateSumpatNariyampara	: 2 Nos. 50 Hp, 12,5 HP
C.Fiv).Intermediatesumpcumbooster	: 1.00LL at Nariyampara
v) Pumpingmain	
(FromsumptoNariyamparatop)	: 1177 m, 80mm GI
vi) TransformersandControl rooms	: 750KVA at T.Pand, Thonithady, 250 KVA at Nariayampara
	booster.160 KVAat Kalthotty

vi)Rearrangementofgravitymains
andPumpingmains :350 mm DI K(9) 5570 m
300 mmDI(K9) 1833m
300 mmDIK(9)6007m
250mm DIK(9)-2342m

vii. Civil works :Construction of protection works
Approach roads, Pipeline bridge,
Interconnections, Washwaterdisposal
.

17. Scheduleofrate : DSR 2016 with Cost index-54.9

18. ProjectCost : Rs.4750lakhs.

ChiefEngineer SuperintendingEngineer ExecutiveEngineer

DETAILSOFONGOINGPROJECT

A Comprehensive Water Supply Scheme covering Kattappana, Ayyappancovil andKanchiyar Panchayaths was sanctioned under ARP is under execution. The AS was issued inthe year 2002 vide AS No. WS/174/2002 dated 26.11.2002.for an Amount of Rs.2314 Lakhs.Due to delay in handing over site for various components of the scheme and also due tovarious rate revisions the project cost has exceeded the estimated cost. Within the sanctionedamount, most of the components of the scheme were completed or arranged.For arrangingbalanceworkofpumpingmainsanddistributionindependentproposalsaresubmittedfore ach panchayath under NRDWP and were completed. Even though proposals for providingElectro mechanical components are submitted and sanctioned under SLSC 2016, the samecould not be taken up due to paucity of fund. The works of laying common gravity mainforKanchiyar and Kattappana panchayaths, Gravity main and pumping main to provide watersupply to Kattappana panchayath were arranged under ARP; the same could only be partlycompleteddueto paucityof funds andthe balancework to be rearranged.

BRIEFDESCRIPTIONOFSCHEME

A 6.0 m diawell-constructed at Thonithady on the bank of Periyar river is the sourceof scheme.The water is then treated conventionally in a Treatment Plant of capacity 7 MLDat Alady Kurisumala. The raw water pumping main using 355.60 mm M.S pipe and 350 mmDI K9 for a total length of 2850m using 260 HP VT pump set. After treatment, water iscollected in an underground sump at TP site and distributed in zone I.From the T.P sumpwateristhenpumpedusing310m, 350 mmDI pipe and stored in GLtank at Alady Kurissumala using 120 HP pump sets and then distributed in zone IV of AyyappankovilPanchayath.Fromtheabovetankwaterflowsbygravitytosumpcumboosterofcapac ity

1.84 LL at Kalthotty. For distribution of water in Kanchiyar Panchayath , the water thenpumped by 45 HP pump set to GLSR at Meppara using 150 mm DI K(9) pipe and distributedinzoneIII.Thewaterfrom Kalthottysumpisthenpumpedby7.5HPpumpsettoa

reservoir of capacity 2.46 LL using 150 mm DI K9 pipe at Labbakkada and distributed tozone II of Kanchiyar Panchayath. For distribution arrangements in Kattappana Panchayath,the water from Kalthotty sump is pumped to Nariyampara top GLSR using 300 mm DIpumping main for a length of 6007 m using 290 HP pump sets and then water flows bygravity to 3 NosGLSR located at, Mulakaramedu(5000 m), Kochuthovala (6000 m) and

Nariyampara bottom(7000m), then distributed in zoneV,ZoneVI and ZoneVII respectively.

The detailed description of various components are described below.

A. Intakeworks:

It is proposed to collect surface water from river through 6.0 m dia well cum pump house constructed at Thonithady. The work of the intake structure wascomplete

Intake well cum Pump house at Thonithady

B. Treatment:

The construction of 7MLD conventional type treatment plant is completed at Alady Kurisumala in Ayyappankovil Panchayath for the comprehensive scheme.

7 MLD Treatment plant at Alady

C. Rawwaterpumping main

Raw water is to be pumped from the intake well to treatment plant using1455m 355.60 mm steel pipe and1370m of 350mm DIK9 pipe was completed.

D. Pumpsets

At intake pump house 2 Nos. of 260 HP Vertical Turbine pump sets, one beingstandby is proposed. The hours of pumping is taken as 16 hours. 2 Nos. 120 HP Centrifugalpump sets are proposed for pumping water collected in the sump after treatment to the servicereservoir at Alady Kurisumala. From Kalthotty sump pumping is carried out to GLSR atLabbakkada, Meppara and Nariyamparatop using 7.5 Hp, 45 HP and 290 HP C.F pump setsrespectively.These could not be taken up for execution due to lackof A.S amount.

E. ClearWaterPumpingmainsandGravitymains

From sump at TP site Clear water is pumped to GLSR at Alady Kurisumala through 310 m of 350mm DI K9 pipe.

Water then flows by gravity to Sump cum booster at Kalthotty through5875m of 350mm DIK9, 207m of 355.60 mm Steel pipeand 1833m of 300mm DIK9 pipe. Clear water is also conveyed from sump at TP by gravity to GLSR at Marykulam by laying 3352m of 65 mm GI(M)pipe.

Water is pumped from booster at Kalthotty to three reservoirs viz GLSR at Nariyampara top, GLSR at Meppara and GLSR at Labbakkada through 6007 m of 300 mmDIpipe, 3192m of 150mm DIK9 pipeand 3115m of 150mm DIPipe respectively.

From the GLSR at Nariampara top, water flows by gravity to Idukki Kavala by layingcommon line of 6830 m of 250 mm DI K9 Pipe and separate lines of 5030 m of 200 mm DIK9 and 3050 m of 125mm GI pipe from Idukki Kavala feeds reservoirs at Mulakarameduand Kochuthovala. It also proposed to convey water by gravity from Nariyamparatop GLSRto Nariyamparabottom bylaying1250m, 150 mm DIK9 pipe.

F. ServiceReservoirsandsumps

Thereare9Nos. Service reservoirs and2 nos booster pump house and are completed.

G. Distributionsystem

The whole project area is divided into seven zones. Laying distribution lines in threezone were completed in the original scheme. The projects under for laying of distributionlinesin Zone III,IV,V (part)and VIIwere arranged andcompleted under NRDWP.

The following table 2. Shows the status of various components of CWSS to Ayyappankovil and Kattappana panchayath

TABLE2.DETAILSANDPRESENTSTATUSOFWORKSUNDERTAKENUNDER ARPANDNRDWP

SLNo	Componentsof thescheme	PresentStatus
1	Well cum RawWater pump House at Thonithady(6.0m dia, 16 m Deep)	Completed(ARP)
2	Raw water pumping main-355.6mmMS 1455 m and 350 mmDIK9 1370 m	Completed(ARP)
3	Treatment plant at Alady kurissumala.7MLD capacity	Completed(ARP)
4	**GROUNDLEVEL RESERVOIR AND SUMP CUMBOOSTERPUMPHOUSES**	
	1)Sump at T-plant 5.55LLcapacity	Completed(ARP)
	2)GLSR at AladyKurissumala	Completed(ARP)

	3)Kalthotty boosterP.H- 1.84LL	Completed(ARP)

	4)GLSR at Labbakkada-2.46LL	Completed(ARP)
	5)GLSR at Meppara -2.46LL	Completed(ARP)
	6)GLSR at Nariyampara top-1.00LL	Completed(ARP)
	7)GLSR –Nariyampara bottom-2.27LL	Completed(ARP)
	8)GLSR atMulakaramedu-4.37LL	Completed(ARP)
	9)GLSR at Kochuthovala-3.14 LL	Completed(ARP)
5	CLEARWATERPUMPINGMAINS	
	1)TP to GL tankat Alady:350 mm DI-K(9),310m	Completed(ARP)
	2)Sump at Kalthotty to GLtank at Labbakkada-150mm DIK9 3115 m	Completed (ARP)
	3)Sump at Kalthotty to Meppara GLSR: 150mm DIK9-3192m	Completed– NRDWP Kanchiyar
	4)Sump at Kalthotty to Nariyampara Top 300 mm DIK9-6007m	***To be rearranged dueto Paucity of fund***
6	CLEARWATERGRVITYMAINS	
	1)GLSR at Alady to KalthottySump	
	a) (350mm DIK9 , 305 m, 355.6 MS 207m)	Part-Completedunder ARP
	b) 350 mm DI-K9,5570m.300 mmDIK(9) ,1833m(balance)	***To be rearranged dueto Paucity of fund***
	1) GL tank at Nariyamparatop to IdukkiKavala: 250 mm DIK(9) 6830 m	***Completed partly balance 2342m to be rearranged due To paucity of fund.***
	3) Idukki Kavala to Kochuthovala GLSR. 125 mm GIpipe 3250 m	Completed (ARP)
	2) IdukkiKavalato MulakaramedGLSR200mmDIK(9)pipe-5030 m	Completed-NRDWP - Kattappana
	3)GLSR at Nariyampara top to Nariyampara Bottom GLSR:150mmDK(9),1250m	Completed under NRDWP-Kattappana

	4)TP Sump to Existing Tank at Marykulam:65mmGI3352m	Completed (ARP)
7	DISTRIBUTIONSYSTEM	
	1)ZoneI Ayyappankovil Panchayath	(CompletedARP)
	2)ZoneII Kanchiyar Panchayath	(CompletedARP)
	3)Zone III-Kanchiyar Panchayath	(Completed-NRDWP Kanchiyar)
	4)Zone IV-AyyappankovilPanchayath	(Completed-NRDWP Ayyappankovil
	5)Zone V-Kattappana Panchayath-Part	(Tendered-NRDWP Kattappana)
	6)ZoneVI-Kattappana Panchayath	(CompletedARP)
	7)ZoneVII-Kattappana Panchayath	Completedunder NRDWP-Kattappana

MajorBottlenecks

Most of the civil components of theprojects completed andall the network ofpipelines were completed or arranged. The various bottlenecks to be solved for satisfactory completion of the ongoing“CWSS to Kattappanaand Ayyappankovil Panchayaths” are described below.

1) The location of the water treatment plant is at a higher elevation and the site for the same was varied during the actual execution of thework, as the Panchayath authorities could not hand over the proposed site mentioned in the original project report.
2) The locations of Ground level reservoirs at Mulakaramedu(5000),Kochuthovala (6000) and Nariyamparabottom (7000) were changed during the actual execution of the work.

The above change in locations have resulted in revised design of raw water and clearwater pump sets. Hence detailed survey work has again conducted to ascertain theexistingelevation profileof thecompleted components.

3) As per the original proposal, the clear water from the Kalthotty sump is directly lifted to the Nariyamparatop GLSR by using 290HP centrifugal pump sets with a discharge of 41.32 lps against a head of 314m.On market enquiry such a high headpumpset is not available.
4) At the Kalthotty sump only limited extent of land is available (5 cents private land). Moreover two more pumping is required for feeding GLSR located at Meppara and Labbakkada using 45 HP and 7.5 Hp pumpsets besides the above mentioned 290 HP.Hence there is limitation of space to enhouse 3Nos of pumpsets in the above pump house.
5) The installation of 290 HP Pump set at the above pump house, requires 1000 KVATransformers and substation buildings and control rooms for which the land was amajorconstraint

6) There is a chance of public protest in locating a 290 HP HT motor at Kalthotty sump due th eproximity of near by residence shardly within a distance of 10to 15m and also affect functioning of nearby L.P school due to noise pollution.

7) The location of the Nariyampara top GLSR is at the top of a hillock with remoteaccess. Nearly 20 number of abrupt bends and turns with elevation difference ofmore than 150 m for the 1.Km stretch near the reservoir makes the alignment more treacherous.Nearly 70 nos of bends are required for laying the pumping main of size300 mm DIK(9) towards the above GLSR andthe same condition exists forlayinggravity mainofsize 250 mm DI K(9) also towards Idukki Kavala . The alignment ofabove pipelines through narrow winding mud road is of difficult proportion and also not feasible considering the future maintenance due to umpteen number of bends.

Hence the above issues are tried to solve by making following changes.

THESCOPEOF PROJECTPROPOSED.

It is obvious that the drinking water needs of the Ayyppankovil panchayathincreases day by day and panchayath authorities demand the need of a well organized watersupplyschemecoveringtheentireareaofthepanchayath.Certain habitations in the Ayyappankovil panchayath are quality affected with the iron content level is more than thepermissible levels. The water from bore well also shows the TDS and iron content abovepermissiblelevels. Even though a comprehensive scheme is ongoing in Ayyappankovil panchayath, the distribution system of which covers only four wards partly in the lowerparts and the length is limited to only 27 Kms (zone -1 and zone- 4). Considering the road capacity of the Panchayath of more than 180 Km ,the above quantity is meager and emphasize the need for the expansion of distribution to the elevated area. The need for early completion of the ongoing scheme is demanded from public as well as various administrativelevels

The main aim of the project "KIIFB assisted WSS to Ayyappankovil" are

i) To provide water supply facilities to the uncovered area of Ayyappankovil Panchayath especially the elevated areas.

ii) To make functioning of ongoing CWSS to Ayyappankovil panchayath by completing the balance works.

Hencetheobjectivesof theprojectincludes

i) To extend the distribution system of the Ongoing scheme to the Elevated areas of Ayyappankovil Panchayath.

ii) To complete the balance work of CWSS to Ayyappankovil and Kattappanavillagesfor commissioningand properfunctioningof thescheme.

The project is prepared in two parts for descriptive and execution convenience.Scopeof Part ***I*** of the proposal is for extending the distribution system of the ongoing water supplyto the uncovered area of Ayyappankovil panchayath and includes collection of treated water, storage and distribution in the uncovered area in the intermediate zone and for water supplyarrangements in the elevated areas, pumping in multiple levels, storage in the reservoir anddistributionin the elevated zone

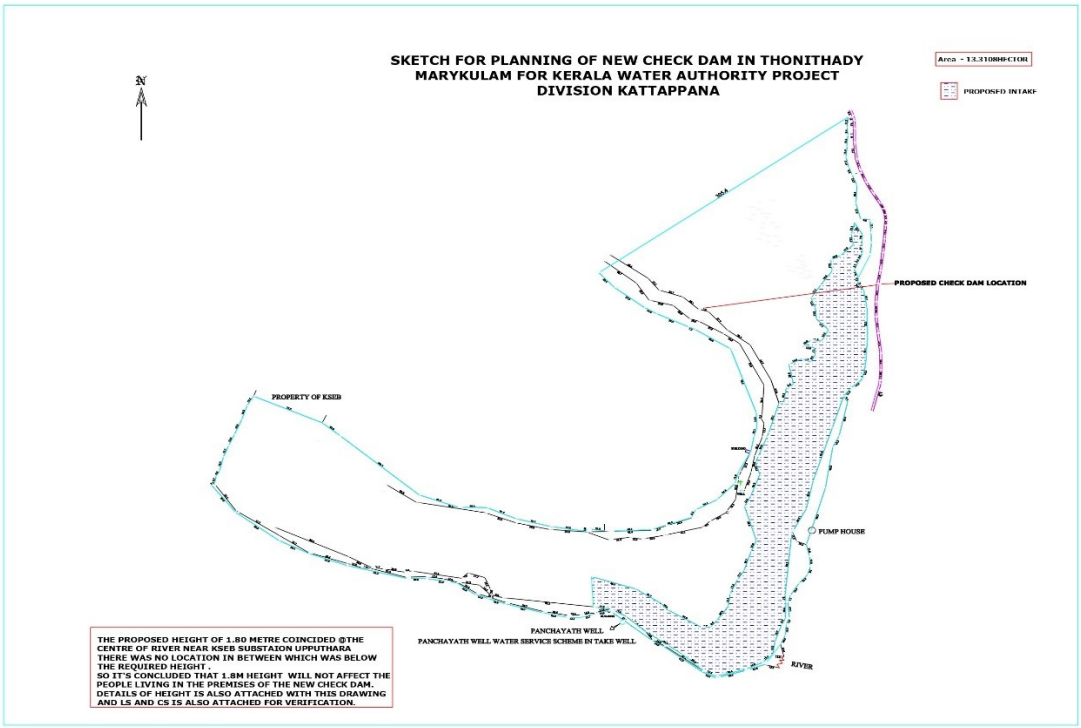
The *Part II* of the present proposalintendedfor covering the balance works to be implemented for the completion and commissioning of the CARWSS to Kattappana andAyyappankovil villages in Idukki district This mainly includes the Electro mechanical works atraw water pump house, Clear water pump uses at treatment plant and Kalthotty sump. Thevarious works envisaged under this category are

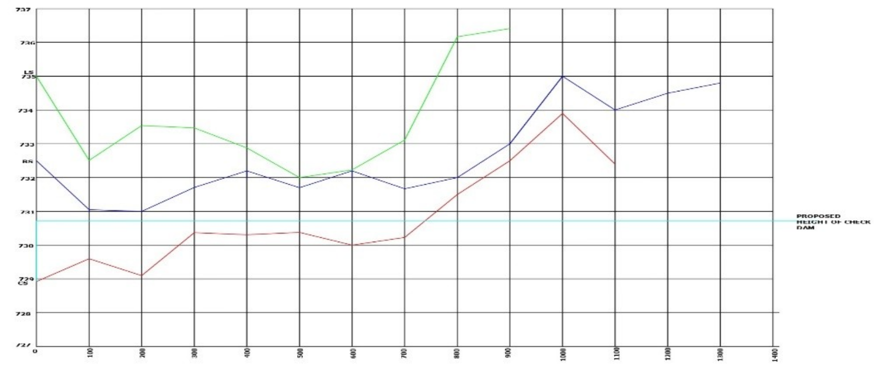
providing suitable capacity Pump sets, Startermechanisms, Transformers, substation buildings, control panel rooms, and energization of pumphouses by 11 KV line extensions and including providing surge arrestors in pumping mains. Alsowash water disposal arrangements in the T.P and providing inter connection with raw water, clearwater pumping mains at TP and allied works are also needed for completion of the scheme. It isalso envisaged ,the rearrangement of laying gravity mains and pumping mains for which thework was already arranged under ARP and could not be completed due to paucity of fund. A check dam is highly essential to improve the sustainability of the source is also proposed near the raw water pump house .The project also includes the requirement of site specific works such asfootbridges, Pipeline bridges,site protectionworksetc.whichare notincludedearlier areenvisagedfor proper completion ofthe scheme

Checkdam

A check dam of height 1.8m and 180 mlengthisproposedat70mfromthedownstream side of the Intake well for creating an impounded reservoir for storage of water nears ource. Considering,the climatic variations,the above check dam isn ecessary for sustainability of the source. There is considerable demand for the check dam from public aswell as peoples representatives and is highly essential for improving the sustainability of the source. This proposal was not included in the earlierproposal.

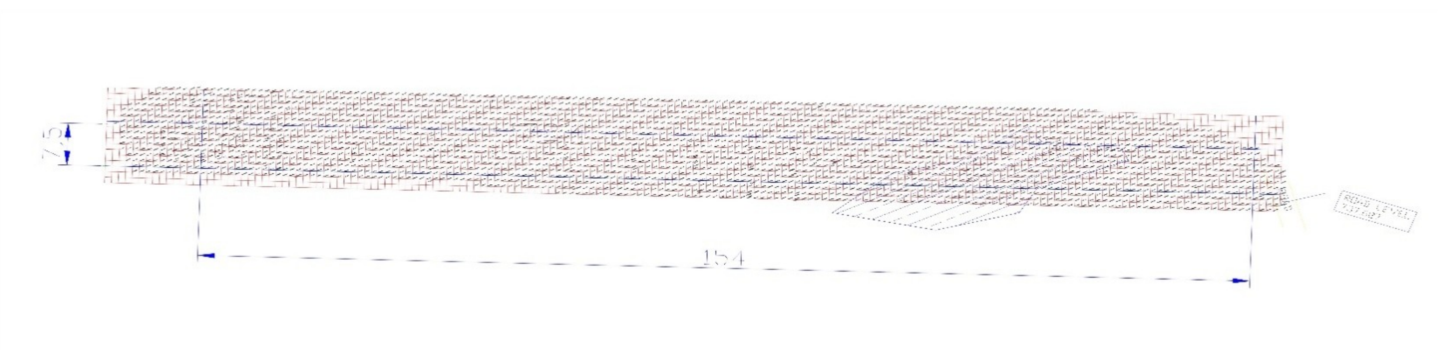
PROPOSED CHECKDAM SURVEY DETAILS AND LEVEL





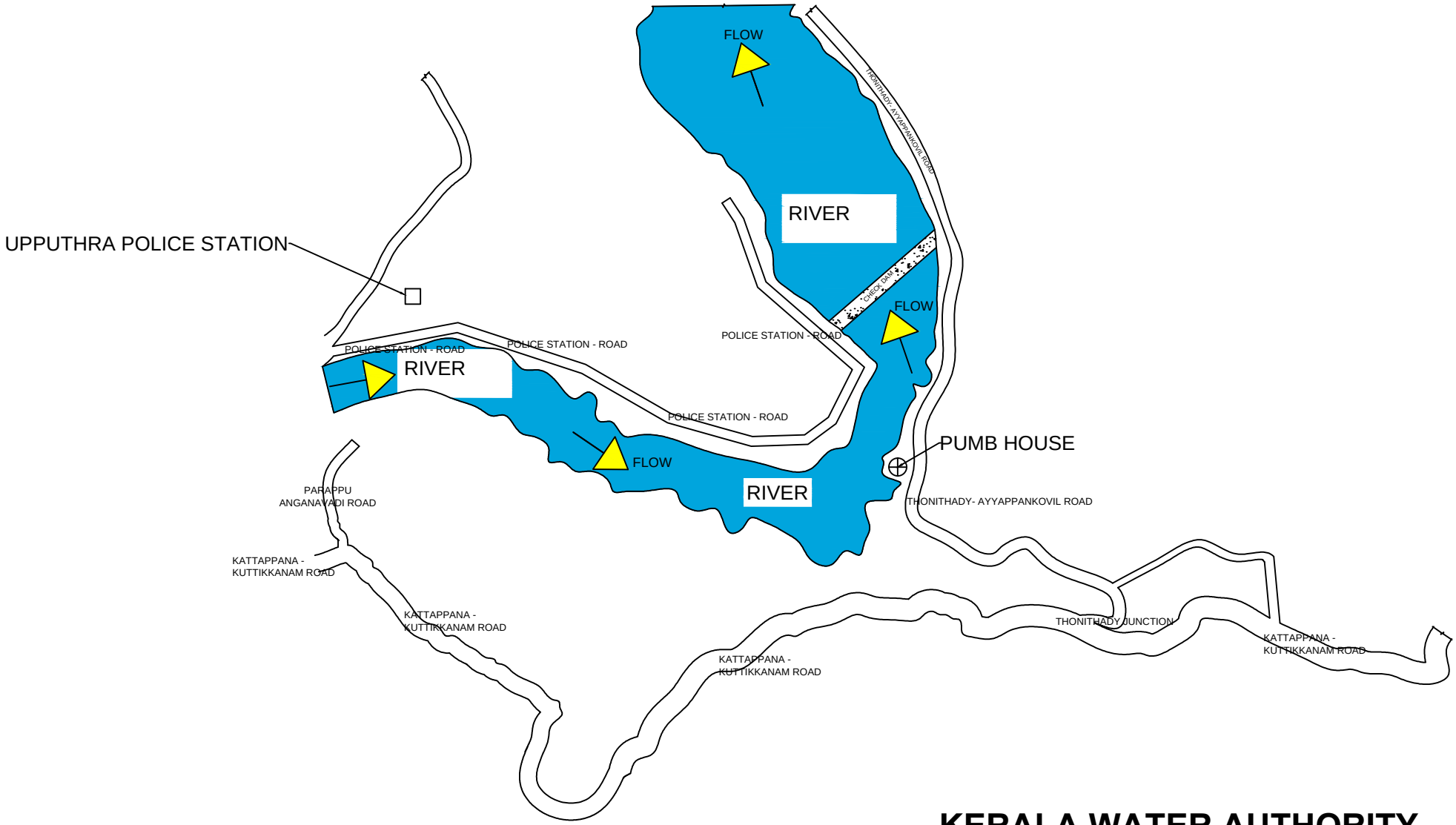
CHAINAGE	0.0	0.100	0.200	0.300	0.400	0.500	0.600	0.700	0.800	0.900	1000	1100	1200	1300
LS (LEFT SIDE)	735.052	732.516	733.546	734.774	732.884	732.012	732.237	733.115	736.175	736.416 866 M				
CS (CENTRE)	728.900	729.612	729.190	730.371	730.315	730.282	730.083	730.232	731.528	732.584	733.946	732.469 1053 M		
RS (RIGHT SIDE)	732.516	731.058	729.198	731.712	732.260	731.780	732.221	731.741	732.639	733.521	735.088	732.052	735.520	735.822 1300 M

CHECK DAM SURVEY DETAILS



CHECK DAM LEVELS

LOCATION PLAN



KERALA WATER AUTHORITY
PROJECT DIVISION KATTAPPANA