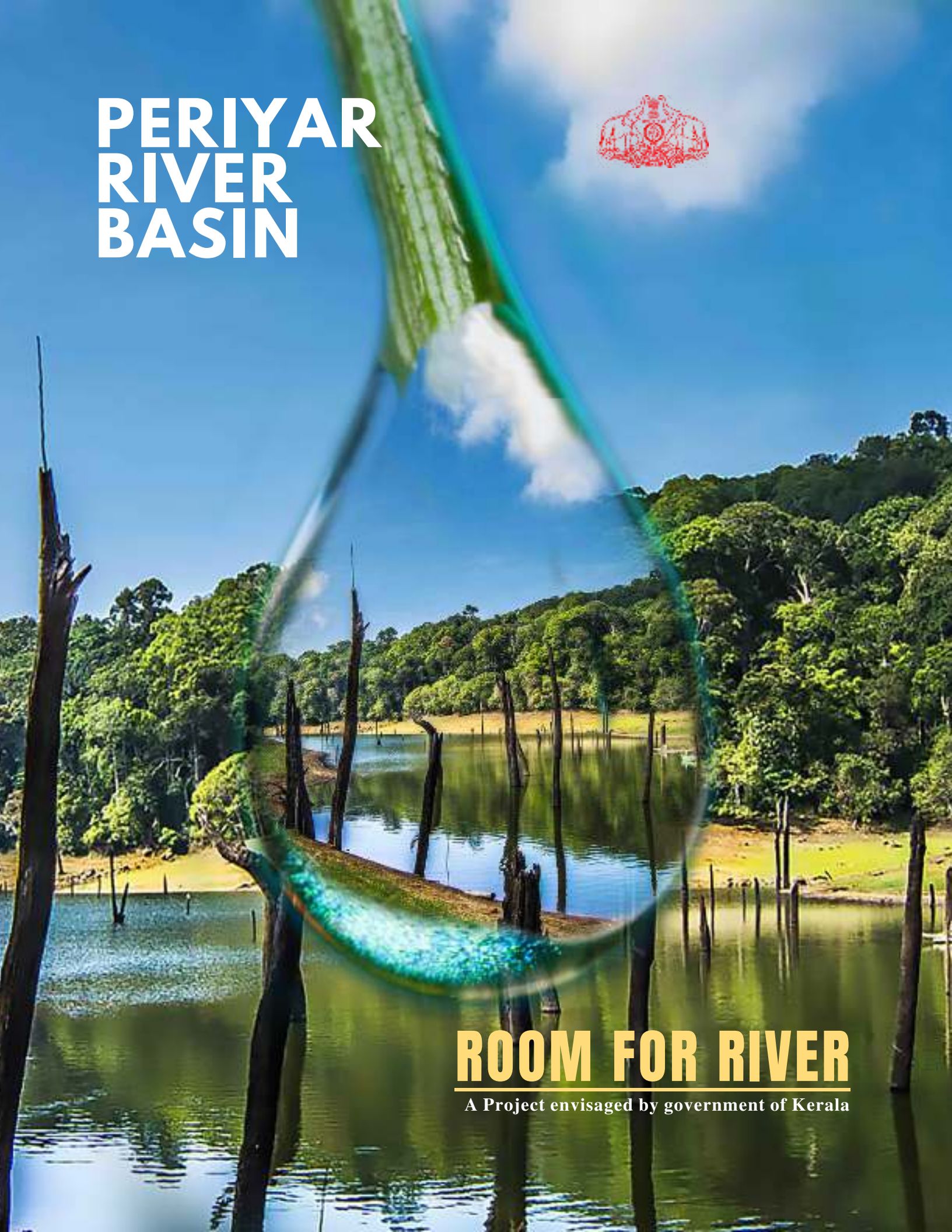
PERIYAR RIVER BASIN



ROOM FOR RIVER

A Project envisaged by government of Kerala

ACKNOWLEDGEMENT

I respectfully appreciate and thank Sri. Roshy Augustine , Minister of Water Resources, Kerala, for the leadership and valuable suggestions given throughout this project work.

I sincerely express deep sense of gratitude to Sri. TK Jose (IAS) Additional Chief Secretary (Home & Water Resources) as the success and outcome of this project were possible by his leadership, guidance and support which also included interactive weekly reviews. Our team is incredibly privileged to have got this all along the project preparation. It required a lot of effort from each individual involved in this project with me and I would like to thank them.

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I also deeply appreciate and thank District Collector Ernakulam Jafar Malik IAS presenting such excellent support and guidance, despite having a busy schedule.
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I would like to give special thanks to KSEB and KWA officials for sharing the data with us which helped us in successful completion of project report.

I am thankful to get consistent encouragement and constant support from all my team members for their unwavering dedication which helped to complete the project work. I submit this project with great humility and utmost regard.

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Ernakulam

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EXECUTIVE SUMMARY

Introduction of River

Periyar is the longest river and the river with the largest discharge potential in the Indian state of Kerala. It is one of the few perennial rivers in the region and provides drinking water for several major towns. The Periyar is of utmost significance to the economy of Kerala. It generates a significant proportion of Kerala's electrical power via the Idukki Dam and flows along a region of industrial and commercial activities. The Periyar basin spreads over an area of 5,398 square kilometres (2,084 sq mi), most of it in central Kerala.

Periyar, meaning big river, is the longest river in Kerala having a length of 269.90km and the second largest river basin of Kerala with a catchment area of 5398 sq.km and drains part of Idukki and Ernakulam District. The Periyar river basin has a total drainage area of 5398 km2 out of which 5284 km2 lies in Kerala and 114 km2 lies in Tamil Nadu. Rising from the remote forest of Periyar Tiger Reserve known as Sivagiri group of hills at an elevation of +1830m, the river traversing the hilly terrains of Idukki district and At Karimanal, Periyar crosses the district boundary and enters into Eranakulam District.

Methodology of study

The entire Periyar basin was taken as six reaches with Reach I – From origin to Karimanal bridge (form 0m to 154.4km), Reach II – From Karimanal bridge to Bhoothathankettu barrage (ch: 154.40km to 179.55km), Reach III – From Bhoothathankett u barrage to Kalady Bridge (ch: 179.55km to 209.55km), Reach IV – From Kalady bridge to Marthandavarma bridge (ch: 209.55km to 230.13km), Reach V –From Marthandavarma bridge to Vaduthala and Reach VI – From Marthandavarma bridge to Munambam beach (Mangalappuzha branch). Each team did individual survey and gathered data from field which became an essential part in developing QGIS maps and schematic drawings. This project is majorly based on the data collected by each team from field. The total length of Left bank tributaries is 518.26 km and Right bank tributaries come to 399.26 km.

Maps and Schematic Drawings

Maps and schematic drawings were prepared using QGIS software and AUTO CAD based on the field data collected by each team.

District and Local Bodies

Periyar basin is spread over Idukki and Ernakulam Districts. The length of Periyar river in Idukki district is 154.40 km and 110.50 km in Ernakulam district.The local bodies involved are Kumily, Vandiperiyar GP, Vazhathoppu GP, Munnar GP, Kanjikkuzhy GP, Bysonvally GP, Rajakkad GP, Senapathy GP, Vellathooval GP, Konnathady GP, Nedungadam GP, Karunapuram GP, Erattayar

GP, Kanchiyar GP, Kattappana GP, Elapparara GP, Ayyappankovil GP, Upputhara GP, Kuttampuzha GP, Mankulam GP, Vathykudy GP, Ayyampuzha GP, Manjappara GP, Kalady GP, Pindimana GP, Vengoor GP, Moodakkuzha GP, Koovappady GP, Mayalattoor and Neeleswaram GP, Vazhakulam GP, Rayamangalam GP, Okkal GP, Keezhmad GP, Kanjoor GP, Aluva Municipality, Sreemoolanagaram GP, Chengamanad GP, Kadungalloor GP, Eloor GP, Varappuzha GP, Angadikkadavu GP, Perumbavoor Municipality , Alangad GP, Kalamassery Municipality, Edathala GP, Kadamakudy GP, Cheranallor GP, Kunnukara GP, Puthenvelikkara GP, Karumalloor GP, Ezhikkara GP, Paravur Municipality, Chendamangalam GP, Vadakkekara GP, Vellangalloor GP, Kottuvally GP, Kodungalloor Municiplaity.

Main Structures

The Periyar river basin consists of 17 dams of which 15 are under the control of KSEB and 2 dams are maintained by Irrigation Department . The main ones being Mullaperiyar, Idukki, Bhoothathankettu and Edamalayar. The dams under KSEB in Periyar river basin besides producing 1264.85 MW electricity also helps to maintain flow in rivers during dry seasons and also in flood control. The total storage capacity of all dams on Periyar river comes to 3278.70Mm3. Total quantity of water used to generate power is 436.47m3/sec.

Lift Irrigation Schemes / Watersupply

Ernakulam district has 136 lift irrigation schemes and is the life line of the agricultural activities in the district. Total length of canal network comes to 335 kms and ayacut 12552 Hectares. Out of that 33nos of lift irrigation schemes are effectively functioning from chainage 190.75 Km to chainage 239.30Km of Periyar River and 9 Nos of lift irrigation schemes functioning from Ch. 0.70Km to 10.07Km of Mangalappuzha branch of Periyar River. These schemes were envisaged for irrigating 5878.50 hectares of ayacut area.

Sedimentation on main Stream

From the data collected by each team, the approximate quantity of silt deposit comes to 1,21,76,912.36 m3 for a total length of 264.90 km of Periyar river. Removal of this can improve the water carrying capacity of the main stream to a great extent.

Sedimentation on Tributaries

The approximate quantity of silt deposit comes to 9,26,926.60 m3 for a total length of 518.26 km of the Left bank tributaries and 47,57,973.29 m3 for a length of 399.26 km of the Right bank tributaries.

Domestic Waste Deposit

There are a total of 106 waste deposit points identified in Periyar river and its Tributaries, details of which are clearly marked in the excel sheets attached with this report.

Industrial Waste deposit

There are a total of 15 Industrial waste deposit points identified in Periyar river and its tributaries. The first point is in ward no: 17 of Munnar grama panchayath. Waste is from Nallathanni Tea factory Industrial unit. Second point is in Vengoor grama panchayath and the waste is from a nearby milk industry in the upstream side. Third point is in Vazhakkulam grama panchayath and waste is from a plywood company. There are multiple waste deposit points in ward no:s 9,17 and 18 of Kadungalloor garama panchayath, ward no: 6 of Eloor grama panchayath and ward no:12 of Kalamassery municipality. The wastes are from FACT, BINANI, SUDCHEMI, CMRL outlet, IRE and dumping yard. Details are clearly marked in the excel sheets attached with this report.

Flood Plain areas

The total number of flood plain areas identified in Periyar basin are 14 in the main stream and 6 in the Right bank tributaries. Out of the 14 flood plain areas 12 comes in the Vth reach ie. From Marthandavarma bridge to Vaduthala and 2 comes in the Ist reach ie. From origin to Karimanal bridge.

E-Flow

As per the NGT norms the E flow requirement is 30% in Monsoon, 20% in lean months and 25% in other months of the year. The Monsoon period of Periyar River is from June to November and the lean month is from December to April. Based on the available data computed above such as the flow as well as the NGT norms the E flow calculations are done and the results are shown in table above. The additional requirement is not needed with reference to the NGT norms. From this it can be observed that the discharge from the major structures (dams on Periyar basin) is above the norms as specified by the NGT. From these calculations it is clear that there is no new structures needed to maintain the Eflow of Periyar. However as there is no discharge from Mullaperiyar dam, Eflow is not maintained in the Mullaperiyar – Idukki stretch. Bhoothathankettu barrage is the last water retaining structure on Periyar basin@ ch179.550, the discharge from this barrage is above the 20% flow in lean months.

Recommendations

The goal of this project is to improve the water quality by clearing off the waste deposits and to increase the Water carrying capacity by removing silt deposit and thus maintain the scope of Room for River.

PROJECT TEAM - PERIYAR BASIN STUDY	
PROJECT COORDINATOR - Er. BAJI CHANDRAN , SE, MICC EKM	
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km	
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	Sajikumar K, AE
	Beena P.S, AE
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REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km	
Team Leader - Biji NN Assistant Executive Engineer, PVIP Perumbavoor	
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	Rajesh ,overseer
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	Sindulekha S, overseer
	Nisha, overseer
	Jisha Jose M overseer
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	Asha PR , Overseer
	Prasad TR, Overseer
	Mathew Paul, Overseer
	Hemanth Sasi, Overseer
	Abu Sulaiman, Overseer

REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km	
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	Santhoshkumar A. V.
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	Hameeda TA, AE
	Silpa S Indran, AE
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	Joshy Cyriac, AE
	Bini AR, Overseer
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	Thameena VA, Overseer
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA	
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Kumari Sindhu. S,AEE,M.I. Aluva	Sreekumar PP, Overseer
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HISTORY

Periyar is the longest river in Kerala (244km length) and the second largest river basin of Kerala with catchment area of 5398 sq.km and drains part of Idukki and Ernakulam District.Among the catchment area, 5284 sq.km in Kerala state and the remaining 114sq.km spread in Tamilnadu State. The basin has an inverted L shape with maximum width at intersection. Rising from the Sivagiri group of hills in the forest clad Sundaramalai at an elevation of +1830m about 35 km South of Kumily, the river traversing the hilly terrains for about 49km after its origin, receivesMullayar, a major tributary from its right, at Mullakudy. During this journey the Periyar traverses through the Periyar Tiger Reserve, flowing across or forming the boundaries between various sections of the reserve. The Mullaperiyar dam is constructed at 13 km west ofMullakudy to collect and divert water tocater the irrigation needs of Theni, Madurai, Sivagangai, Dindigal and Ramanathapuram districts of Tamil Nadu. Thekkadylakeis the result of Mullaperiyar Dam. Downstream of the Mullaperiyar dam, the Periyarcontinues to flow northwestward, exiting the Periyar Tiger Reserve and passing through Vandiperiyar and is joint by Kattapanayar, CheruthonIyar, Perinjamkuttyar, Muthirapuzhayar successively. After the confluence of Muthirapuzha the main river run through Thattekanni, Karimanal and joint by the Thottiyar, and flows through proper village of Neriamangalam. Further it joins with Pooyamkuttiyar and Idamalayar about 1.5km upstream of Bhoothathankettu barrage at a place known as Kootticakal.

2.1 History of Idukki District

Idukki District came into existence on the 26th January, 1972 as per the notification No. 54131/C2/71/RD dated the 24th January, 1972, carving out Devikulam, Udumbanchola and PeerumadeTaluks from erstwhile Kottayam District and ThodupuzhaTaluk (excluding Kalloorkad Village and portion of ManjalloorVillage included in Kalloorkad and ManjalloorPanchayats) of erstwhile Ernakulam District. The jurisdiction was slightly altered by a subsequent notification No.7754/C2/72/RD dated the 14th February, 1972. The name Idukki was derived from the word ‘Idukku’ which means a gorge.

As per G.O.(MS)/No.1026/82/RD dated 29.10.1982, North Pamba Valley area and the area around SabarimalaSannidhanam in Mlappara Village of PeerumadeTaluk were transferred to Pathanamthitta District. At present, the District consists of 5 Taluks viz., Devikulam, Udumbanchola, Thodupuzha, Peerumade and Idukki.The area of the district is 5105.22 sq. Km. There are 52 GramaPanchayts, 8 Block Panchayats and 2 Municipalities in Idukki District.

The pre-history of the District is shrouded in obscurity. We have no clear evidence about the Palaeolithic period. The uruburiah, the vaults called pandukuzhies, menhirs, dolmens and graves found in high ranges and hills date back to the Megalithic period. The excavation of the State Archaeology Department in Marayoor in the Anchunad Valley of DevikulamTaluk, Thengakkal near Vandiperiyar, Bison Valley and Thondermalai show distinct characteristics of pre-historic civilization. The dolmens and menhirs discovered from these places show the cultural and well developed civilization of inhabitants of the Megalithic period. It is worth mentioning that, this District had an important role in the spice trade of ancient period as spices such as pepper, cardamom, etc., grow more in abundance in this District than elsewhere in the State.

Some historians believed that Kuzhumur, the capital of early Chera Empire, is the present Kumily in PeerumadeTaluk of the District. During the age of Kulasekharas, Nanthuzainad inclusive of Devikulam, Udumbanchola and PeerumadeTaluks, Vempolinad and Manjunad of Kottayam District and Kuzhumelainad inclusive of ThodupuzhaTaluk formed part of Kulasekhara Empire. By about 1100 AD, Vempolinad was split up into Vadakkumkur and Thekkumkur and Karikkode in ThodupuzhaTaluk became the capital of Vadakkumkur Rajas. The Vadakkumkur was subordinate to the PerumpadappuSwaroopam for a long period. The Thekkumkur was the most powerful Kingdom in those days and occasionally they had quarrels between Cochin and Vadakkumkur Kingdoms.

The Dutch East India Company was attracted by the enormous growth of pepper in high ranges. According to the formal treaty signed on June 16, 1664, Dutch East India Company had trade contracts with Thekkumkur Rajas on spices, cinnamon, opium, etc. ManavikramakulasekharaPerumal, the Pandya King with his family had to imigrate to Kerala and were settled in Vadakkumkur as refugees. With the help of Vadakkumkur Rajas, the Pandya King purchased the land lying to the West of the Western Ghats known as Poonjar from Thekkumkur Rajas. The territory of Poonjar was transferred to the Pandya King with all its rights and dignitaries and the coronation of the Raja was performed at Poonjar in the presence of the Thekkumkur Rajas. In the 15th Century, Poonjar Raja acquired the extensive areas in the high ranges from Peerumade to Devikulam which form part of Idukki District. Immediately after the annexation of Thekkumkur and Vadakkumkur, Poonjar Principality was also annexed to Travancore in 1749-50 and afterwards its history was associated with that of Travancore. The participation in the freedom struggle by the people of this District is less as compared to other parts of the State.

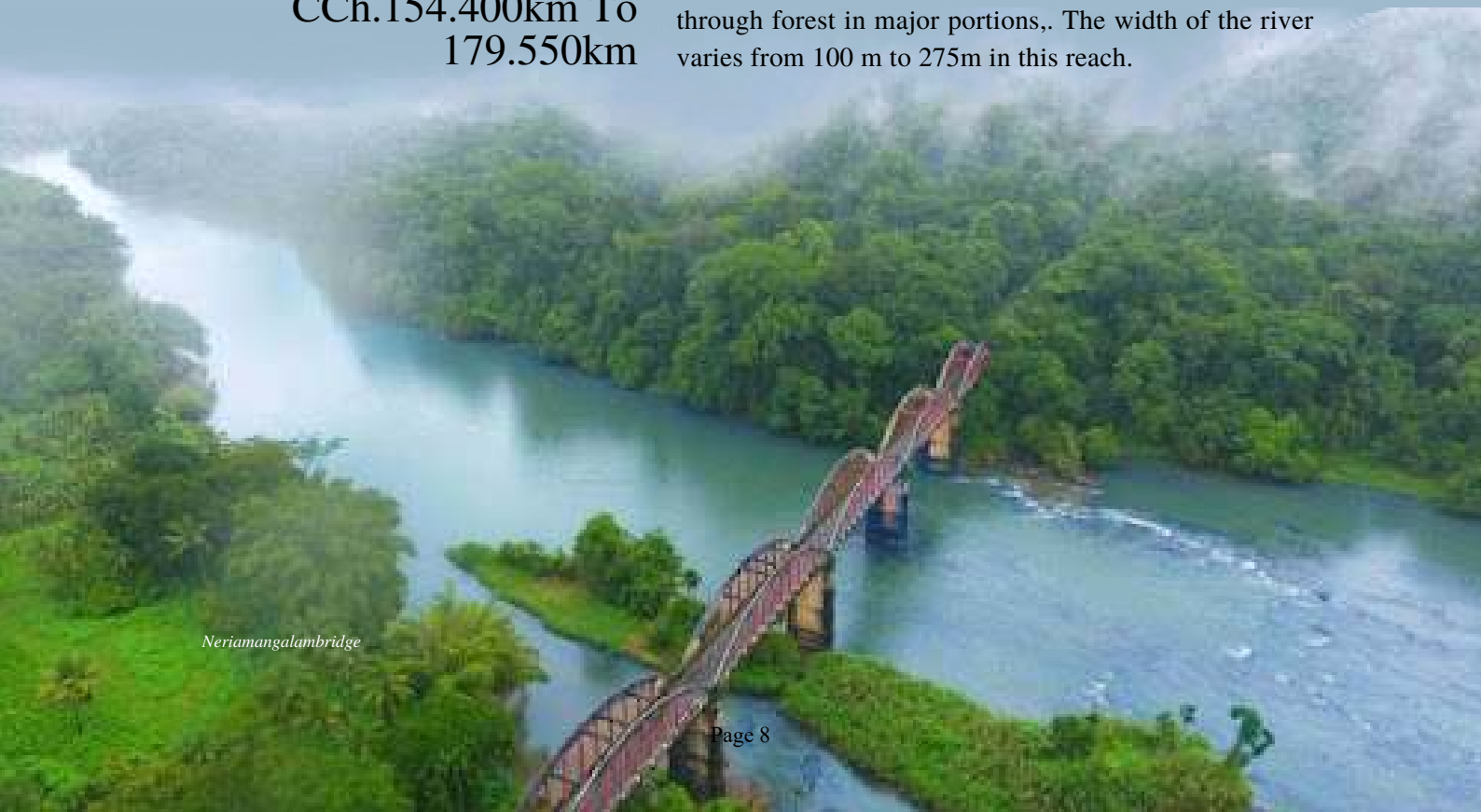
At the turn of the Century, there were four Revenue Divisions in Travancore State. Though not a revenue unit, Cardamom Hill was treated as a separate Division for magisterial, general, planning and census purposes. In 1909, a fifth Division in the State viz., Devikulam was newly carved out taking regions of adjoining Taluks of Kottayam Division and pruned Devikulam was renamed as High Range Division. In the next decade, there were no changes in jurisdiction. However, during the period 1931-41, the High Range Division was amalgamated with the Northern Division.There was no major change in jurisdiction till September 1956. On the 1st October 1956, Udumbancholataluk was newly constituted taking two villages from Devikulamtaluk and one village from Peerumadetaluk.

The history of the present population is very recent. It is a history of colonisation braving inclement weather, wild animals and epidemics. It is also a history of the exploitation of labour and labour struggles. Settling in the district began with seriousness during the ministry of Sri. T.K. NarayanaPillai as a sequence to the grow-more food campaign in the State. These migrants who constituted a few planters and a cross section of the people became the nucleus of the present population. During the ministry of Sri.PattomThanuPillai systematic colonisation started. KallarPattom Colony in the Udumbancholataluk bears the imprint of his name. The earliest human habitation of the district which started from Tamil Nadu in the first two decades of the present century can be gauged from the story that while Maharaja SreeMoolamThirunal was personally supervising the construction of the Dam on Mullaperiyar river he felt thirsty and a shepherd called AnkurRauther gave him milk from Udder of the sheep. The delighted Maharaja gave him title over extensive forest lands which his descendants sold to land owner's in Tamil Nadu and with the help of cheap labour these were converted into Cardamom or Tea plantation. The area around Munnar was developed from time to time when British made it their summer resort. As the immediate accessible population was from Tamil Nadu, Munnar became a Tamil pocket in Kerala.

PERIYAR FROM KARIMANAL TO BHOOTHATHANKETTU BARRAGE -

CCh.154.400km To 179.550km

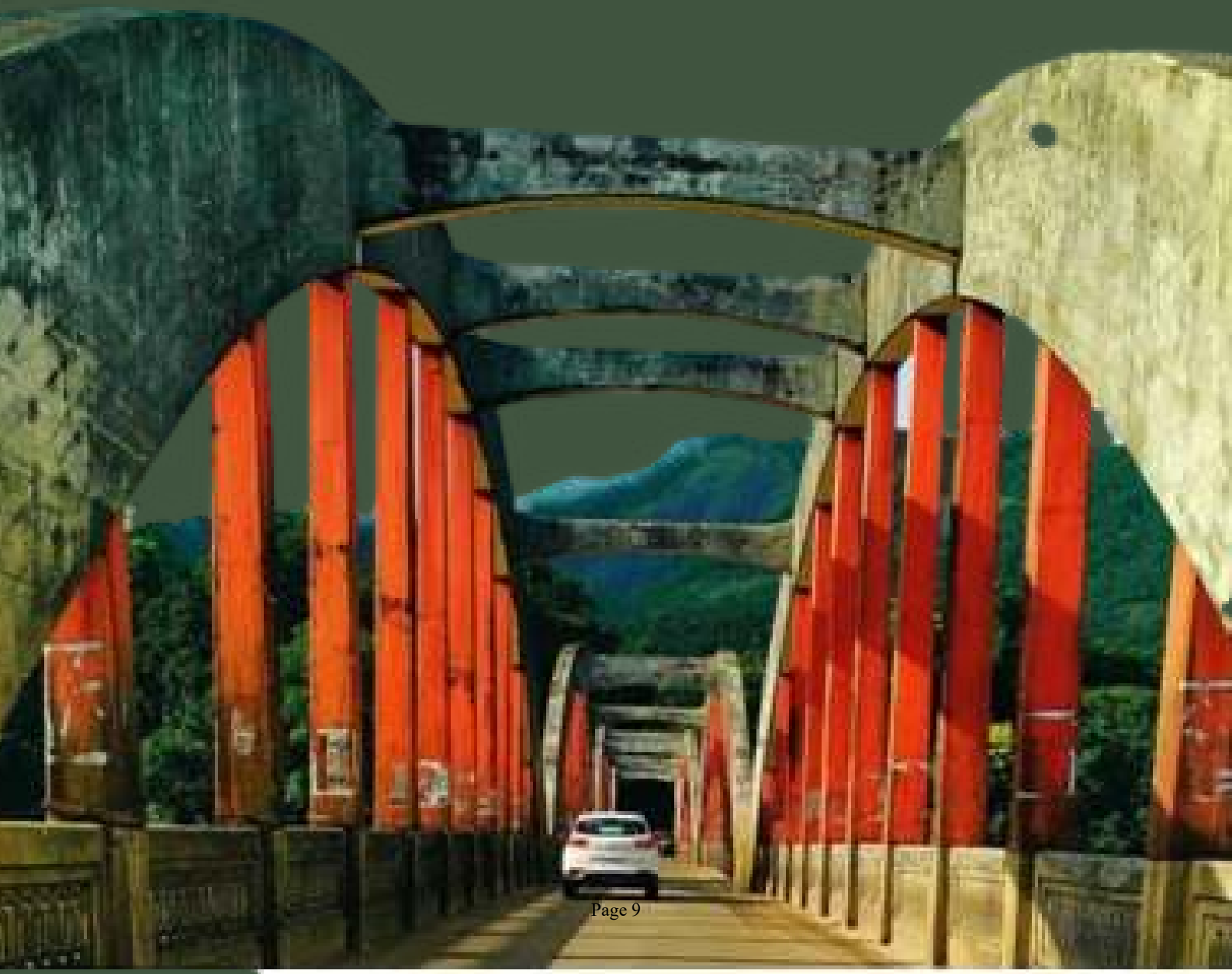
The Periyar river enter in to Ernakulam district at Karimanal near Ch: 153.600 km.Periyar from Karimanalto Bhoothathankettu barrage covers 25.15km.It shares the boundary of Kavalangadu , Keerampara and PindimanaGramaPanchayathsin the left side and Adimaly, Kuttampuzha in the right side and through forest in major portions,. The width of the river varies from 100 m to 275m in this reach.



Neriamangalambridge

The Karimanalbridge atCh: 154.400 km is constructed by KSEBL under Thottiyar Hydroelectric Power Project, for access to Power House site at Karimanal. The major portion of water at Karimanal is the tail race release of the Lower Periyar Hydro-electric Project Power House at Karimanal. During rainy season occasionally the Lower Periyar dam spill water also enrich the flow.

Neriamangalambridge is the first arch bridge in South India which is constructed across Periyar at Ch: 163.200 km. This bridge often referred as “The Gateway to the High Ranges”.The bridge was built in 1935 during the time of Travancore Maharaja. The construction of the bridge started in 1924 during the reign of Sethu Lakshmi Bhai, the ruler of Travancore. Sri ChithiraThirunal Rama Varma opened the bridge for public on 2nd march of 1935. At present, the bridge is part of National Highway 85, which leads to Thondi in Tamil Nadu.



Periyar

Thattekkad Bird Sanctuary, covering an area of barely 25 km2, was the first bird sanctuary in Kerala located on the right bank of Periyar near Thattekkad bridge at chainage 176.13 km. Salim Ali, one of the best known ornithologist described this sanctuary as the richest bird habitat on peninsular India comparable only with the Eastern Himalayas. Thattekkad literally means flat forest, and the region is an evergreen low-land forest located between the branches of Periyar River.

Thattekkad Bird Sanctuary

Idamalayar is one of the main tributary of Periyar river in this area having length 178.33 km and width ranges from 90 to 100m.Idamalayar originates in the Anamalahills of Kerala's Idukki district, and flows into Tamil Nadu. It re-enters Kerala near Malakkappara and flows 6 km to reach Idamalayaar reservoir catchment. From the downstream of Idamalayaardam it flows through Kuttampuzhapanchayat and through dense forest and finally joins with Periyar river at ch.178.33 km .

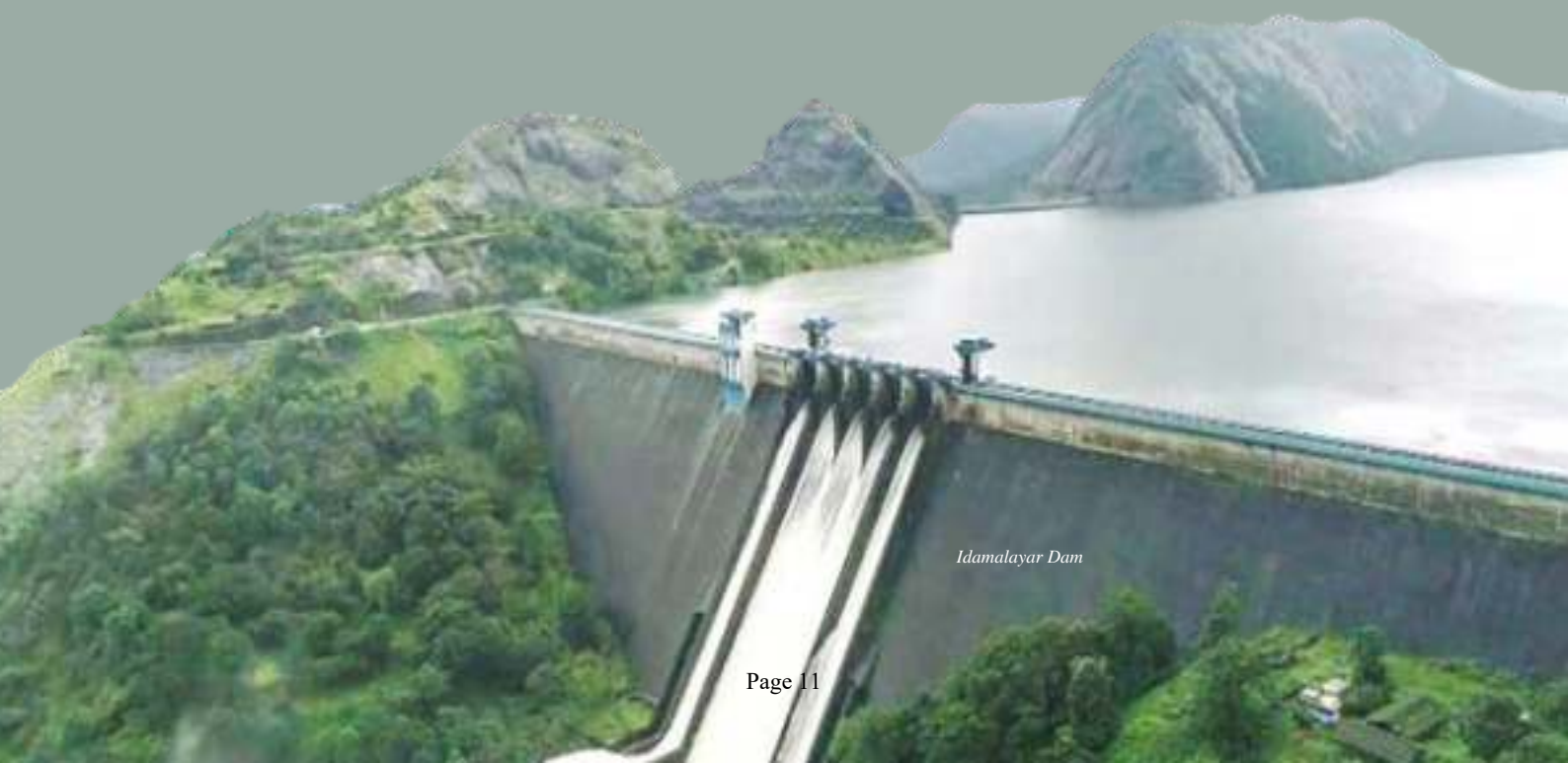
Thattekkad Bridge

Idamalayar Dam is a multipurpose concrete gravity dam constructed across Idamalayar at Ennakkal and is operated by the Kerala State Electricity Board to augment its peak power generation requirements. The construction activities of the project were started during 1976 and then project completed in 1987. The reservoir storage is utilized by a hydroelectric power station which has an installed capacity of 75 MW with two units of 37.5 MW capacity.The reservoir covers 28.3 km2 in the scenic hills of the Anamalais.The large reservoir created by the Idamalayar Dam will benefit the Idamalayar Irrigation Development Project by diverting water released from the tail race channel of the Idamalayar power station. The project envisages utilization of the water from 381 km2 of the catchment of the Idamalayar in addition to the releases from the Nirar weir/dam proposed in the upper Idamalayar catchment under the ParambikulamAliyar Project.

Periyar valley irrigation project, Idamalayar irrigation project, are the major irrigation projects which draw water from Bhoothathankettu Barrage. Bhoothathankettu barrage is situated in PindimanaPanchayath at Ch: 179.55 km of Periyar. Large blocks of unshaped stones are placed on both sides of the Periyar River to form the dam, making it look like a natural dam built by super humans. The name BhoothathanKettu, means "Monster fort"; past generations believed it was built by a Bhootham. The original natural dam has been supplemented by a new barrage upstream of it impounding the Bhoothathankettu Reservoir.

The story goes that, ages ago demons set out to submerge the Trikkariyoor temple, whose presiding deity is Lord Shiva, by damming the Periyarriver and flooding the area. But, Lord Shiva, suspecting trickery, came up with a plan to deter them. He made it appear that dawn was approaching by making a sound like the crowing of the rooster. The demons fearing the arrival of light fled from their task. But there remains to this day the visible proof of their effort – the huge stones the demons were supposed to have rolled onto the riverbed, the “Old Bhoothathankettu”, as seen in figure 1.1. The Periyarriver flows on through the narrow space which the demons did not quite manage to dam up.

The actual cause for the formation of the Old Bhoothathankettu remains a conjecture. It's been attributed to two great floods – one in the 4th century and the other in 1341, which threw open the port of Kochi. The massive landslides during the flood are believed to have caused gigantic rocks to roll down from the mountain and become entrenched in the Old Bhoothathankettu



Idamalayar Dam

Periyar

Bhoothathankettu has the potential of becoming one of the must-visit places in Kerala.Periyarriver flows like a waist chain in the lush green valley that spreads over several acres. The rocks here are hindering the smooth flow of the river, which continues its journey through the big gap between the rocks. Lower down, at Malayatoor the river takes a meandering course and flows calmly and majestically through Kalady. The length of the Periyar river from Bhoothathankettu barrage to Kaladybridge is estimated as 30 km. During this course, the river touches Pindimana, Vengoor, Koovappady and Okkalgrama-panchayats on left bank and Malayatoor and Kaladygrama-panchayats on right bank. On right bank, from Bhoothathankettu to Mulamkuzhy is the Malayatoor reserve forest.

The Periyar valley Irrigation project is one of the major irrigation projects in Kerala which utilizes the tail race discharge from the Idamalayar Power house and river Periyar together run off from the uncontrolled catchment (938 sq km) of Periyar river, for irrigating an area of 32,800 hectares (81,000 acres) of land lying on the left bank of Periyar through a network of canal system and controlling devices. The scheme consists of a Barrage at Bhoothathankettu with a catchment area of 3,048 square kilometres (1,177 sq miles) along with a network of canals.

Idamalayar Irrigation Project draw water from Bhoothathankettu Barrage through right bank of Periyar. Under this Project, the tail race discharge from the Idamalayar power house is picked up at the barrage constructed across the Periyar River at Bhoothathankettu and is diverted through a canal system on the right bank of the barrage. The irrigation benefits envisaged covers an area of 14,394 hectares(35,570 acres) of wet and dry agricultural lands, out of which the cultivable command area is 13,209 hectares(32,640 acres). The project is under implementation since 1981.

BhoothathankettuSmall Hydro Electric Project is an ongoing project of KSEB with an installed capacity of 24MW (3 x 8 MW - Horizontal Bulb turbines) and expected annual generation of 83.5 Mu. The proposed power house site is very close to the Periyar Valley Irrigation Project Barrage. This Project proposes to utilize the water from Bhoothathankettu irrigation barrage, which is the part of Periyar Valley Irrigation Project. The inflow to the reservoir is the controlled release from the power stations upstream and water from its own free catchment. The scheme is planned as a run off the river scheme utilizing the storage of the existing reservoir of the Periyar Valley Irrigation Project less its irrigation releases. The total catchment area of the scheme is 2122 km2.

Bhoothathankettu Barrage

The construction ofanother Hydro Electric project by the KSEB is in progress, namely Thottiyar Hydro Electric Project. The project is envisaged for generating 70MW by constructing an over flowing weir of 100 m long and 7.5 m height across Thottiyar at Ch: 16.150 km, upstream of Valara Waterfalls and a power house near Karimanal, in the right side of Periyar at Ch: 154.400 km. Water from the check dam brought in to the power house through penstock to run three Pelton wheel type turbines to generatea total power of 70 MW. The gross capacity of the reservoir planned is 0.394Mm3. The total area sunken due to the project is 0.1323 km2 (13.23 ha) at FRL. The project is envisaged to generate power during the Monsoon and keeping the normal flow to downstream of Thottiyar during all seasons.

Thottiyar HEP - Check dam (under construction) downstream view

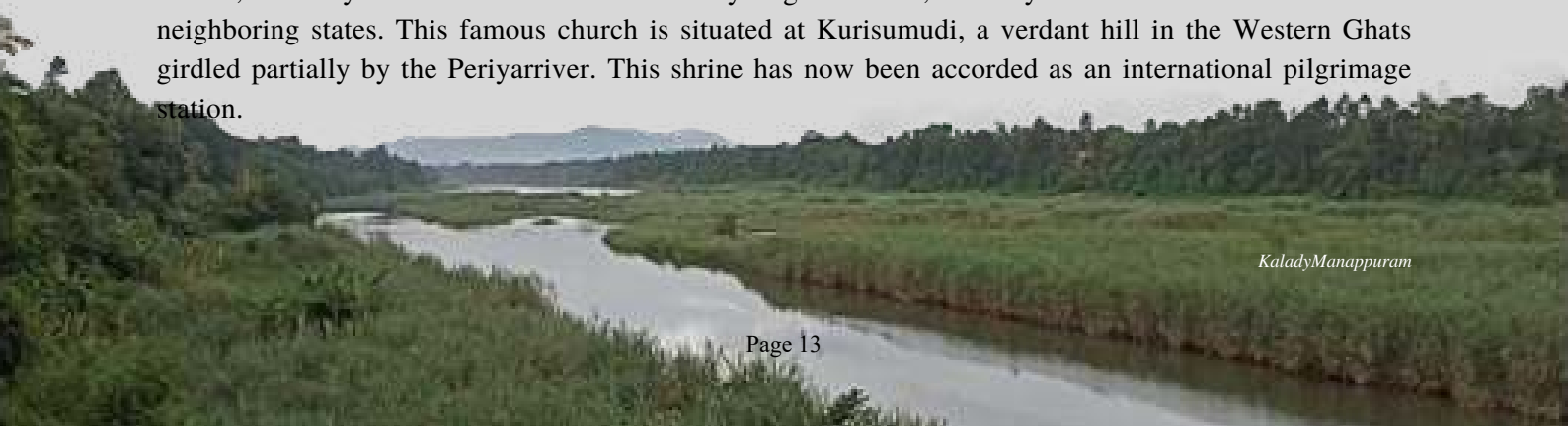
PERIYAR FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE

Ch. 179.550 Km to Ch. 209.550 Km

Religious and cultural significance

There are several places of religious significance along the banks of the Periyarriver. Kalady is a town located on the banks of the Periyar river. It is the birthplace of Sri. AdiShankara, the Hindu philosopher who consolidated the doctrine of Advaita Vedanta.The KaladyKadavu is the place where the river took its turn, and where Kalady was born. It was also the place where Shankara had first performed Aarattu (a river bath of an idol) for his ancestral deity before installing it at its current location. For centuries, during the festival at Sree Krishna temple, the Aarattu has been carried out at this ghat. The "MuthalaKadavu" or Crocodile Ghat, is where Shankara's life turned to sannyasa .

The Malayatoor church is situated atop the Malayatoor hill. The church is dedicated to St. Thomas, who is believed to have prayed at this shrine. Being one of the most important Christian pilgrim centers in Kerala, this holy shrine attracts devotees in very large numbers, not only from Kerala but also from the neighboring states. This famous church is situated at Kurisumudi, a verdant hill in the Western Ghats girdled partially by the Periyarriver. This shrine has now been accorded as an international pilgrimage station.



KaladyManappuram

PERIYAR FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE (ALUVA)

Ch. 209.55 km to 230.13 km

The Periyarbranch from Kalady flows down through Kalady Bridge forming many small isles or silt deposits and diverts as Marthandavarma Branch (Periyar) and Mangalappuzha Branch. The neighboring local body institutions at right side bank from Kalady Bridge to AluvaMarthandaVarma Bridge are KaladyPanchayat, KanjoorPanchayat, SreemoolanagaramPanchayat, NedubasseryPanchayat, ChengamanaadPanchayat and Aluva Municipality. The local body institutions at left side bank of Periyar are OkkalPanchayat, VazhakulamPanchayat, Perumbavoor Municipality, KeezhmadPanchayat, and Aluva Municipality. The Periyar reach between Kalady and Aluva is most affected area due to flood in 2018 and 2019. Almost all the wards of Kalady, Kanjoor, NedumbasseryPanchayats, Aluva Municipality were severely affected and Sreemoolanagaram, Okkal, Vazhakulam, KeezhmadPanchayats were also affected by flood partially.The population dwelling nearPeriyar has come under numerous pressures due to river diversion and severe flood during 1924, 2018 and 2019 floods.

There are several places of religious significance along the banks of the Periyar. The famous is celebrated AluvaSivarathri festivalon the banks of the Periyar River in Aluva. The temple festival is conducted every year on Sivarathri day of the Kumbhammonth of Malayalam calendar. The Siva temple on the sand bank of Periyar River throngs with devotees every year on MahaShivaratri day.

The etymology of the name of the town of Aluva has been the subject of speculation for centuries. One of the more accepted versions relates to the story of Hindu god Shiva drinking theKalakoodam poison to save the world. It is said that Shiva with the poison 'Alam' in his mouth 'Vaa' was made into a deity which was then rested in a temple in Aluva.The Sivarathri festival for which the town is famous for is celebrated in the honour of Shiva. In the twentieth century, when there was a community of Jews in Cochin, some used to have holiday homes in Aluva on the banks of the River Periyar.It also has a name "gate way to east".Before Indian independence, Aluva was part of the Kingdom of Travancore and was the official summer residence of the royal family.

The Mahadeva Temple is situated at a distance of 1 km from the MarthandaVarmabridge in NH-47. Periyarriver splits into two near Aluva railway bridge and after the splitting one part is called Mangalappuzha. AluvaMahadeva Temple is located on the sand bank in between the Mangalppuzha and Periyarriver. AluvaMahadeva Temple is managed by Travancore Devaswom Board.

Mahadeva Temple

The unique feature of AluvaMahadeva Temple is that the Shivalinga is not enshrined in a Sreekovil. The SwayambhooShivalinga installed by Lord Parasurama and worshipped by Lord Sree Rama rises out of the sand banks of the Periyarriver. This place is called the AluvaManalPuram (land with sand).

There are many legends associated with this temple. After installing the Lingam,Parasurama built a temple here but was destroyed by a flood. Lord Shiva told him that no temple structure will exist at that place because he does not want a temple structure for protecting the Lingam.

ALUVA PALACE

Historical reports suggested that the Palace was once used as residence by the royal family of Travancore. The monument also served as a guest house for the people who used to visit the royal family. The monument is positioned on te banks of the beautiful Periyar River and depicts a silent witness of its long historical and eventful past.The palace is known to be built in the year around 1900s during the reign of the Chera kings of Travancore. The chief of the royal family SreePadmanabhaswamy was deemed to be the creator of the idea for the palace. The royal family including members such as KupakaSwaroopam, ThripappurSwaroopam and VenadSwaroopam used the monument for residential purpose and served as the summer residency of the Travancore Royalty. Apart from all, the palace has witnessed profuse battles and successions over the years and now it stands here depicting the glorious past, which keeps the history of the era alive amid the modern generation. After the death of King ChithiraThirunalBalaramaVarma in 1991, the palace was taken over by the state government of Kerala and is taken care of by the government which now serves as a hospitality centre.

• MARTHANDA VARMA BRIDGE

Marthandavarma Bridge lies on the NH 47 Highway and connects the banks of thePeriyarriver in Aluva. This bridge was opened on 14th June 1940. Bridge across the Periyarriver built in memory of His Highness MarthandaVarma Maharaja of Travancore, MarthandaVarmaIlayaraja submitted to the land. But the bridge was built by ChithirathirunalBalaramaVarma. There is an insignia of the Travancore kingdom on the top of this bridge. Historically, the bridge served as a connection route between nearby kingdoms.A new bridge was built parallel to the old bridge to increase the traffic capabilities to four lanes in 2002, and opened to the public on 23rd June 2002.

·KALADY RAILWAY BRIDGE

The 111-km railway line from Angamaly in Ernakulam district to Erumeli in Kottayam district, which is around 40 kms from Sabarimala, was announced by the Centre in 1998. Along with connecting Sabarimala to lakhs of pilgrims, the project will also connect the high-range district of Idukki and suburbs of Kottayam and Ernakulam in the initial phase and Pathanamthitta district in the second, giving a boost to the economic development of the region.

Aluva Palace On The Bank Of Periyar, Aluva

Marathandavarma Old Bridge Foundation Stone

Original Marathandavarma Bridge On Right (Built On 1940). New Bridge On Left (Built On 2002)

COCHIN INTERNATION AIRPORT

In the year 1994, the foundation stone for the construction of the Airport was laid on by Hon'ble Chief Minister of Keralaand in 1999, His Excellency, Hon'ble President of India, announced the historic opening of Cochin International Airport. The airport was built on a paddy field in NedumbasseryPanchayat obstructing the flow of chengalthodu a major tributary of Periyarriver. The chengalthodu is blocked near runway outside at Ch: 5.05km from Periyar. A small diversion canal was built parallel to the runway to connect the remaining part of the Chengal Tributary. Before the construction of Idukki reservoir, one fourth of the water flowing through Periyarriver was flowing through Chengal Tributary. This tributary was used for navigation as this route is shorter than Periyar river basin. Now the Chengalthodu is full of stagnated water during normal season.

After flood in 2018 and 2019 the studies found that the chengal diversion canal size and depth is not sufficient to carry flood water from Periyar towards the Chengal downstream continuation after the blockage. Hence increasing depth and size of diversion canal is proposed by Cochin International Airport Limited (CIAL) and work is undergoing. It is also proposed to construct a regulator cum bridge at the mouth of ChengalThodu near Kalady to control flood water from Periyar during heavy rain season. There

Cochin International Airport During Flood 2018

Cochin International Airport

were many shallow Chappath type culverts blocking the flow of the flood water in chengalthodu. The CIAL constructed four new bridges after demolished these Chappaths after the flood in 2018 and 2019. There are few more chappath need to be demolished and new bridges to be constructed to complete the project to avoid flood water in this area

The Cochin International Airport Ltd also launched 'Operation Paravaah', a multifaceted infrastructure development programme aimed at integrating the flood mitigation projects of CIAL and local self-government bodies.

Operation Paravaah aims to integrate projects already initiated by CIAL with that of the District Administration and various Local Self Government bodies to prevent flooding of airport facilities and nearby panchayats, on one platform. CIAL has undertaken works at an outlay of around Rs 130 crore for flood mitigation in and around the airport.

"The renovation work of the diversion canal, constructed for altering the course of the floodwater outside the southern side of the peripheral wall of the operational area had been divided into five reaches. It also incorporates major construction activities including the construction of a regulator-cum-bridge (RCB) on the mouth of the Chengal Canal.

PERIYAR FROM MARTHANADA VARMA BRIDGE TO VADUTHALA Ch.230.13km to 247.42km

The Periyar branch from Aluva goes down through Marthandavarma Bridge encircling the island Uliyannur. This island is connected with the great legendary architect Perumthachan who is believed to have constructed the historic UliyannurMahadeva temple. From Choornikara a small diversion flows down through Manjummel (Edamula branch) joins with the main stream near Varapuzha. The other branch Varattarmoves down via Pathalam and reaches Eloor-Udyogamandal area. Morethan 25% of the total industries in Kerala are situated in this region. From Eloor the river flows down and join with the other branch via Manjummel at Varappuzha. Then the river attains estuarine character and creating good number of islets like Kadamakkudy, Mulavukad, Kothad etc. Finally, the river enters the Kochin Corporation area at Chittur and confluences with the Vembanadu Lake through the Cochin estuary. It is believed that the formation of a cluster of islets at the end of the river is as a result of the deposits of silts due to the massive flood, which occurred in 2018. The Vembanad Lake that we see now was also might have been shaped at that time. The formation of the present Kochi Port was incidental to this flood, when the historic port of Muziris (Kodungallur) at the confluence of Periyar was destroyed.

River Periyar is widely recognized as the cradle of civilization of central Kerala. But with the growth of civilization and with the explosion of population, Periyar has come under numerous pressures. The chemical industries are discharging their effluents into the river; widespread encroachments of the banks of the river and deforestation in the high land have taken place. Frequent uncontrolled and unscrupulous sand mining, salinity intrusion etc. Made this great river at present a shade of what she had been once. The flow of water has been woefully reduced and even the drinking water scarcity has become a serious problem. During summer season there is scarcity of water in Periyar even to maintain the minimum flow required to arrest the salinity intrusion. To prevent the salt water intrusion from estuaries, regulator cum bridge is constructed at Pathalam and Manjummel locations as pointed out. The closing of regulators leads to stagnation of water in the upstream side.

Edayar-Eloor belt is one among the early industrialised areas, with the first industrial manufacturing unit – the Indian Aluminium Company which was set up here in 1934. Just a decade later, the first chemical industry, Fertilizers and Chemical Travancore (FACT) was setup to manufacture fertilizers like ammonium phosphate, ammonium sulphate, soda ash and so on. Private industry wasn't far behind, with the Cominco Binani zinc plant coming up in 1950. The following are the major industries now in EdayarEloor belt.

Industries in the Eloor industrial zone discharge waste into the river. Greenpeace India describes the lower Periyar as "a cesspool of toxins, which have alarming levels of deadly poisons like DDT, endosulfan, hexa and trivalent chromium, lead, cyanide, BHC. Several studies have pointed out that the river bed has deposits of heavy metals like lead, cadmium, mercury, chromium, nickel, cobalt and zinc and the ecosystem of the river has many dead zones,

The lower reaches of the periyar are heavily polluted. Nestled between Periyarriver and its tributary Muttar river in Ernakulam district of Kerala, the island municipality of Eloor has often been in the news for the massive fish deaths along the river stretch. It is only around Eloor, an industrial hotspot with about 247 chemical industries that the periyar river has shown visible effects of pollution, including fish deaths and change in water colour. In fact, the Muttarriver witnessed another major fish death in 2020.

MANGALAPUZHA BRANCH ALUVA MANAPPURAM TO MUNAMBAM

Periyar, one of the few perennial rivers in the region, provides drinking water for several major towns. The Periyar is of utmost significance to the economy of Kerala. At Aluva, the river bifurcates into the Marthandavarma and the Mangalapuzha branches. The Chalakudy river also joins to this branch of the Periyar 10 kilometres (6 mi) south-east of Kodungalloor which expands to its maximum width at Munambam. The Mangalapuzha branch joins Chalakudy River and empties into the Lakshadweep Sea at Munambam, and the Marthandavarma branch flows southwards, again dividing into two near Kunjunnikkara island, going through the Udhyogamandal area and finally draining into the Cochin backwater system (part of Vembanad Lake) at Varappuzha. The Vembanad backwaters are connected to the Lakshadweep Sea at Cochin and Kodungallur. The reach of Periyar from Aluva Manappuram to Puthenvelikkara is of much historical importance. Aluva is the industrial epicentre of Ernakulam. The river also provides water for irrigation and domestic use throughout its course besides supporting a rich fishery. Due to these reasons, the river has been named the " Lifeline of Kerala". Kochi city, in the vicinity of the river mouth draws its water supply from Aluva, an upstream site sufficiently free of seawater intrusion.

After Aluva Municipality, Periyar flows along the northern boundary of Karumallur Panchayat. Thevillage consists oflarge tracts ofpaddyfields. Karumallur isbounded by distributaries of the river Periyar. Vast cultivation is observed along the banks of Periyar. It is also aharmonious Panchayat with many mosques, temples, churches etc. situated near banks of Periyar. Approximately8 km length of Periyar l ies adjacent to KarumallurPanchayat boundary. Beyond Karumallur, there l ies Chendamangalam Panchayat to the north.

Along right bank of Periyar l ies the PuthenvelikkaraPanchayat. Puthenvelikkara is confluencepoint of Periyar and Chalakudyrivers. The ancient belief is that, Puthenvelikkara area got formed a result of high tide (Veliyettam in Malayalam) andthis belief is proven by the existenceof fossil of aquatic beings found in the area. Puthenvelikkara is surroundedby water bodies. It resulted in the formation of

fertile lands suited for cultivation. Theprimary source of income for the people of thevillage is agriculture. There aremanyrice paddy fieldsin this area. The provinces or wards such as Kurisingal, Kurumbathuruth, Thuruthipuram, Thuruthur, Panjipalla, Manancheri Kunnu, Karottukara, Vattekattu Kunnu, Keezhuppadam, Kodikuthiyakunnu, Elanthikara, Kanakkankadav, Cherukadappuram, Thelathuruth, Kozhithuruth, Chowkakadav, Malavana, Stationkadavu and some small islands, together form the Puthenvelikkara Pancahayat area. Puthenvelikkara and Kunnukkara, located at the confluence of the Periyar and Chalakudy rivers, togetherconstitute around 8 % of the total river catchment area in the State. Kunnukarapanchayat is situated ontheright bank of Periyar to the south side of Puthenvelikkara. Kunnukara is surrounded by Periyar river in south, Chalakudy river innorthand Manjaly Canal inits centre and west, Kunnukarais the part of Kerala back waters. The main source of income in the panchayat comes from agriculture. Different types of cultivations are being donehere. Brick construction is also a major industryin the panchayat. To the south of Kunnukara,l ies the ChengamanadPanchayat along the right bank of Periyar river

KERAL FLOOD 2018

Kerala State has an average annual precipitation of about 3000 mm. The rainfall in the State is controlled by the South-west and North-east monsoons. About 90% of the rainfall occurs during six monsoon months. The high intensity storms prevailing during the monsoon months result in heavy discharges in all the rivers. The continuous and heavy precipitation that occurs in the steep and undulating terrain finds its way into the main rivers through innumerable streams and water courses.

Kerala experienced an abnormally high rainfall from 1 June 2018 to 19 August 2018. This resulted in severe flooding in 13 out of 14 districts in the State.Kerala received heavy monsoon rainfall, which was about 116% more than the usual rain fall in Kerala, on the mid-evening of 8 August, resulting in dams filling to their maximum capacities; in the first 48 hours of rainfall the state received 310 mm of rain. Almost all dams had been opened since the water level had risen close to overflow level due to heavy rainfall, flooding local low-lying areas. As per IMD data, Kerala received 2346.6 mm of rainfall from 1 June 2018 to 19 August 2018 in contrast to an expected 1649.5 mm of rainfall. This rainfall was about 42% above the normal. Further, the rainfall over Kerala during June, July and 1st to 19th of August was 15%, 18% and 164% respectively, above normal.

On 16 August 2018, severe floods affected the south Indian state Kerala, due to unusually high rainfall during the season. It was the worst flood in Kerala in nearly a century.According to a study by the Central Water Commission, the average cumulative rainfall of 3 days from 15 to 17 August 2018 was about 414 mm. This was almost of the same order as that of rainfall of Devikulam which occurred during 16–18 July 1924. Assuming a runoff coefficient of 0.75, the runoff generated by 3 days of intense rainfall was estimated to be 12057 MCM for the entire state of Kerala. This huge runoff was beyond the carrying capacity of most of the rivers in Kerala, resulting in bank overflows from most of the rivers. During the time period of 3 days from 15 to 17 August 2018, the rainfall depth realized in the Periyar basin was 588 mm. The rise in water level in Periyar had a major impact on the flood situation of the district.

The impact of the heavy rain and the resultant flooding was mostly felt in the eastern parts of the district. Flood waters marooned many houses and commercial establishments in Aluva, and Paravoor Many families were trapped in their homes in places like Kadunagalloor, Thottakattukara, Karumalloor, Thuruthu, Desom, Kalady, Companypady, Manjali, Veliyathunad, Malikampeedika, ParavoorKavala, Chowara, Eloor North Paravur, etc.

With its close proximity to the Periyar, many areas in Aluva municipality have been isolated from the mainland owing to continuous rainfall.The water level in the Periyarincreased at an alarming rate, adding Aluva's crisis. The plain areas of Aluva and its suburbs, areas along the banks of Periyar such as Alangad, Kadungalloor, Kunnukara, Karumaloor, Chengamanad, Chengamangalam, Chittattukara, Puthenvelikkara and Paravoor were completely flooded, which resulted in heavy loss to the people and their valuable records, certificates, vehicles, livelihood, etc. The extent of destruction caused by the massive floods in Aluva and nearby regions was revealed ay as it left thousands homeless, destroyed property and infrastructure in its aftermath. Aluva town and promimate areas was full of vivid images of roads lined with empty foundations, cars flipped upside down, trees uprooted, iron roofs torn off buildings, snapped power and phone lines, impassable roads, flooded toilets and overflowing sewers.Traders in and around Aluva had to start building from scratch. All the shops in the area got drowned in the flash floods and they had to pick up damaged properties from the dirty water. About 50,000 flood-hit people had been housed in over 200 relief camps in these areas.

The majority of the people in Kunnukara depend on agriculture for a living. They grow paddy, banana and vegetables and sell the produce at the Aluva town market, about 15 km away. Most of the people are subsistence farmers and poor. Flooding has broken their back.

Chendamangalam which is famous for its centuries-old handloom textiles industry was completely flooded the showrooms, dyeing units and factories of the five co-operative societies which employ approximately 600 weavers, it destroyed any flicker of hope for a fruitful Onam season, when their sales are the highest.For an industry already competing with mechanized textiles, the loss of Rs 21 lakh worth of stock including sarees, shirts and dhotis is too much to take. The total loss to the handloom industry in Chendamangalam is approximately Rs 15 crore.

Periyar from Orgin to Karimanal Bridge

From Ch: 0.00 to 154.40km

Brief Overview-

Reach from Origin to Karimanal bridge (Chainage 0 km to 154.4km - *Refer Page 1252*).

The 244 km long river Periyar originates from the Sivagiri group of hillsin the forest clad Sundaramalai at an elevation of +1830m about 35 km south of Kumily. The reach of Periyar for the initial 154.4 km upto Karimanal bridge mostly passes through dense forest area in Idukki district. Periyar Tiger reserve and Idukki wild life sanctuary comes under this stretch.The major tributaries of Periyar in this reach upto Karimanal bridge are Mullayar, Ladram thodu, Chinnar, Kattapanayar, Kallar, Erattayar, Cheruthoniyar, Perinjamkuttiyar and Muthirapuzhayar . The river caters many hydro electric projects in this reach. Mullaperiyar dam, Idukki dam, Cheruthoni dam and lower Periyar dam falls in this stretch. The local bodies along the banks of Periyar in Idukki district are Kumily,Vandiperiyar, Peerumedu, Elappara, Upputhara, Ayyanppankovil, Kanchiyar, Vazhathoppu, Mariyapuram, Kanjikuzhi, Vathikudi, Konnathadi and Adimali. At Karimanal bridge , Periyar crosses Idukki district boundary and enters into Ernakulam District. The detailed report on various structures across the river and the general features and identified problems associated with Periyar in this reach is as follows.

PERIYAR STRETCHES FROM ORIGIN TO KARIMANAL BRIDGE

Periyar, meaning big river, is the longest river in Kerala having a length of 244km and the second largest river basin of Kerala with a catchment area of 5398 sq.km and drains part of Idukki and Ernakulam District. Among the catchment area, 5284 sq.km in Kerala state and the remaining 114sq.km spread in Tamil Nadu State. Rising from the remote forest of Periyar Tiger Reserve known as Sivagiri group of hills at an elevation of +1830m, the river traversing the hilly terrains for about 49km after its origin, the river receives its first tributary, Mullayar, from its right. The river then turns West and continue to flow in the direction for 13km before which it passes through narrow gorge, where the Mulla Periyar Dam is constructed. This dam is one of the oldest dam in the world and is the first surki – concrete gravity dam constructed in 1895.Downstream of the Mullaperiyar dam, the Periyar continues to flow northwestward for 38 km exiting the Periyar Tiger Reserve and passing through Vallakadavu, Karuppupalam, Vandiperiyar, Pasumala, Chandravanam, Keerikkara, Mlamala, Santhipalam, Moonattumukku, Chappath,Alady, Upputhara ,Ayyappankovil and to Idukki reservoir.Idukki wild life Sanctuary is situated on the left bank of reservoir. Right bank having mountains like Kalyanathandu, Kalvarimount etc. Idukki reservoir is formed by constructing three dams. One across Periyar river between two rocky hills known as ‘ kuravan and kurathi mala’,. This dam is a double curvature parabolic thin arch dam and is the first of this kind and the highest in Asia. The second is Cheruthoni dam across the Cheruthoniyar which is a straight concrete gravity dam. The third one, Kulamavu dam, a masonry gravity dam which is across Kilivally thodu which is in Muvattupuzha river basin .

Since the Idukki arch dam has no spillways, the course of Periyar downstream of arch dam become defunct.. Now the course of Periyar river is through the down stream of Cheruthoni dam since, only this dam has spillway openings. This new course of Periyar is the original course of Cheruthoniyar. The old river course and the new river course meets at Vellakayam, 2.8 km down stream of Cheruthoni Dam. From Ayyappankovil to Cheruthony dam the river traverse through a length of 21km. The river course then passes through Cheruthoni town, Thadiyampad, Karimpan, Keerithodu, and Panamkutty. At Panamkutty, Muthirapuzhayar , a major tributary from Munnar side joins the Periyar. After the confluence of Muthirapuzha, the main river takes a western course. and runs through Thattekanni, Karimanal. At Karimanal, Periyar crosses the district boundary and enters into Eranakulam District. During its traverse from Mullaperiyar to Karimanal, Periyar is enriched by major tributaries like Mullayar, Ladram thodu, Chinnar, Kattapanayar, Kallar, Erattayar, Cheruthoniyar, Perinjamkuttiyar and Muthirapuzhayar successively. The water from Kallarpuzha and Erattayar river is diverted to Idukki reservoir through Anjuruli Tunnel by constructing Kallar dam across Kallarpuzha and Erattayar dam across Erattayar riverin the upper reaches of Perinjamkuttyiyar.

The total drainage area of thebasin is5389 sq.kmout of which nearly 98 % lies in the Kerala State. The State wise distribution of the drainage area is given

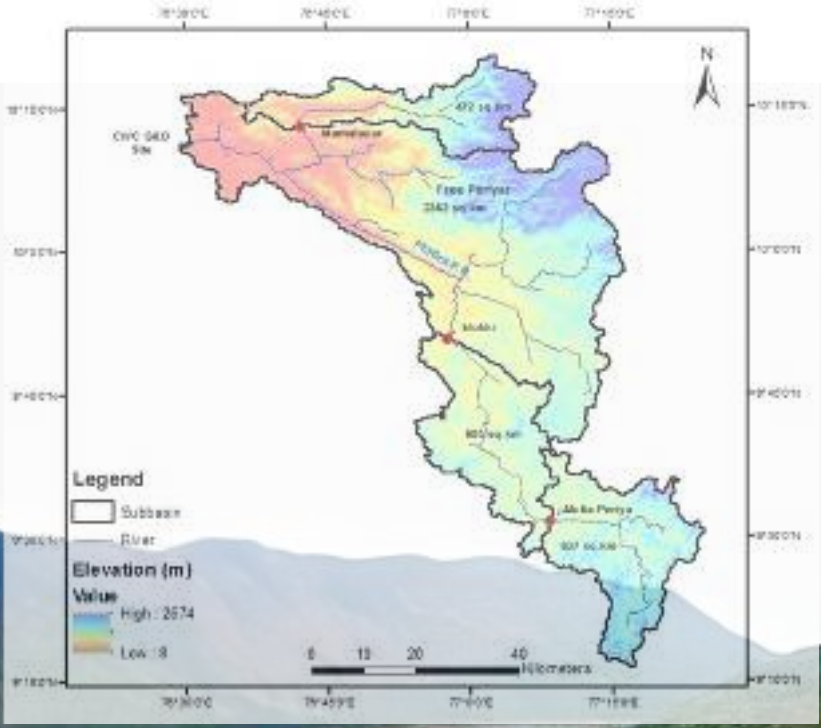
State wise area distribution of Periyar Basin

Name of State	Drainage area (Sq Km)	Percentage of Total drainage area
Tamil Nadu	114	**2**
Kerala	5284	**98**
Total	5398	**100**

Drainage area distribution of Periyar basin upto Neeleswaram ,Kalady CWC site

Catchment	Drainage area (Sq Km)
Free Periyar (Up to CWC gauging station, Kalady)	2362
Between Idukki and Mullaperiyar	605
Mullaperiyar upstream	637
Idamalayar	472
Total	4076

BASIN MAP PERIYAR

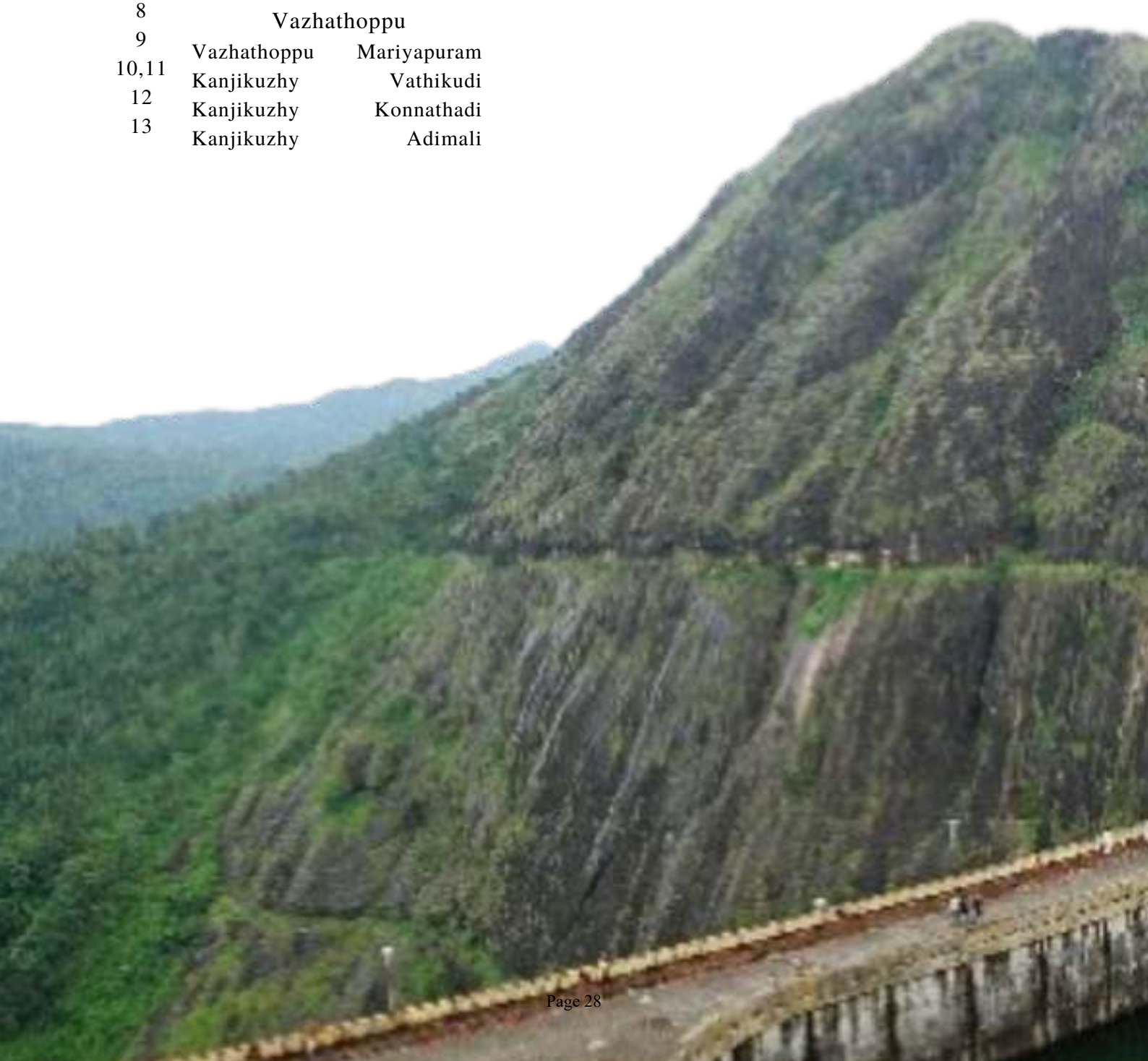


DRAINAGE AREA MAP OF PERIYAR RIVER UP TO NEELESWAR AM CWC G&D SITE

LENGTH: Origin to Karimanal Bridge – 154.40KM
Origin to Mullaperiyar – 62 KM
Mullaperiyar to Vandiperiyar – 13 KM
Vandiperiyar to Ayyappankovil – 7.50 KM
Ayyappankovil to Cheruthoni Dam – 19.40 KM
Cheruthoni Dam to Panamkutty – 16.40 KM
Panamkutty to Karimanal Bridge – 18 KM

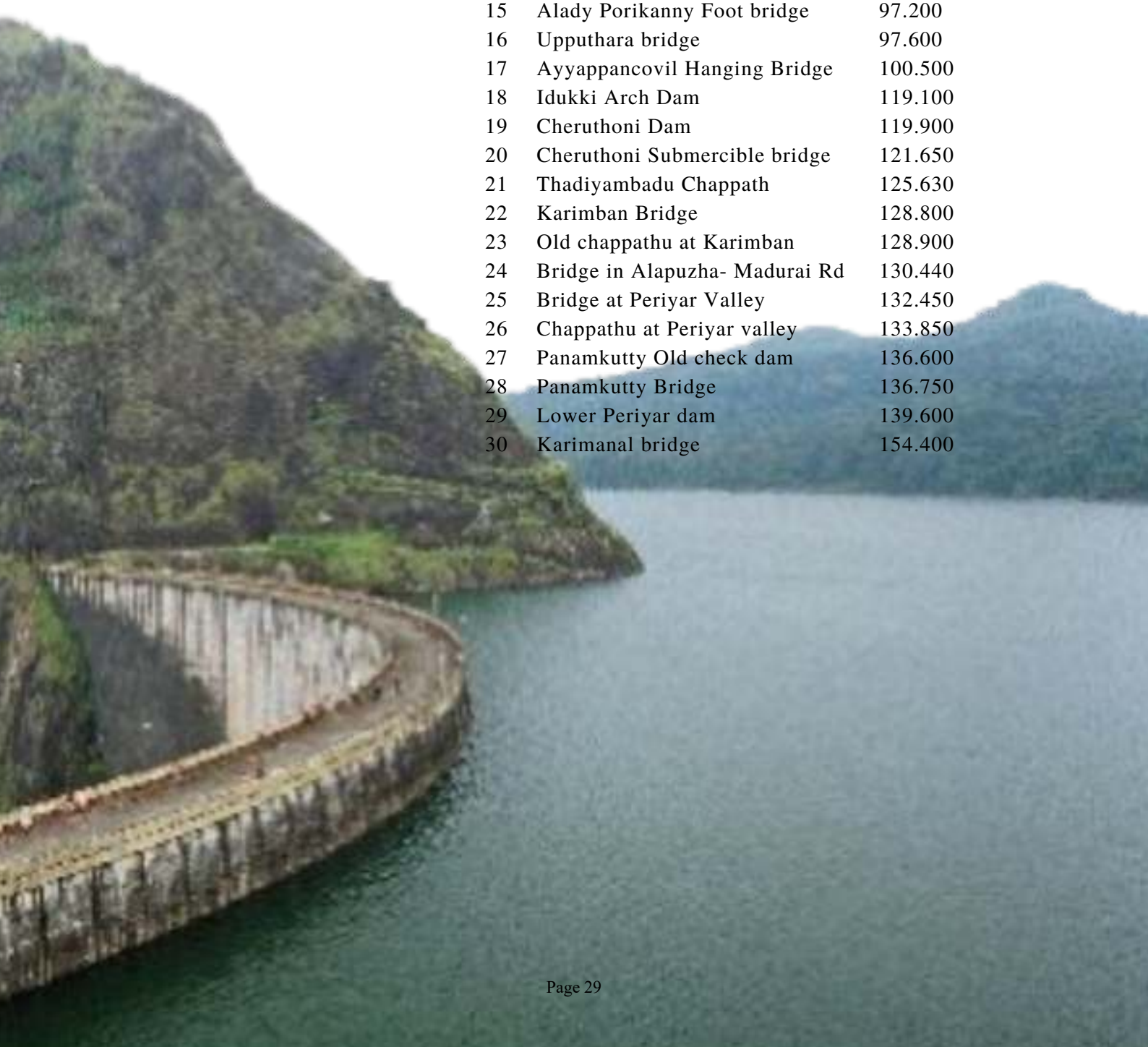
LIST OF PANCHAYATHS (grazing)

	Left	Right
1	Kumily	
2	Vandiperiyar	Kumily
3	Peerumedu	Kumily
4	Elappara	Kumily
5,6	Upputhara	Ayyappankovil
7	Upputhara	Kanchiyar
8	Vazhathoppu	Kanchiyar
8	Vazhathoppu	
9	Vazhathoppu	Mariyapuram
10,11	Kanjikuzhy	Vathikudi
12	Kanjikuzhy	Konnathadi
13	Kanjikuzhy	Adimali



4. MAIN STRUCTURES ACROSS PERIYAR

Sl No	Name of Structures	Chainage in KM
1	Mullaperiyar Dam	62.000
2	Chappath near Forest Quarters	65.185
3	VallakadavuChappath	69.980
4	KaruppuPalam	71.830
5	Check dam	74.050
6	Vandiperiyar Bridge	75.000
7	Chandravanam bridge	80.230
8	Keerikkara bridge	81.450
9	Mlamala bridge	83.650
10	Foot bridge	85.400
11	Santhipalam bridge	87.090
12	Elappara Vallakadavu bridge	92.627
13	Malankara Tea Factory check dam	93.925
14	Karinthiri Chappath Bridge	95.190
15	Alady Porikanny Foot bridge	97.200
16	Upputhara bridge	97.600
17	Ayyappancovil Hanging Bridge	100.500
18	Idukki Arch Dam	119.100
19	Cheruthoni Dam	119.900
20	Cheruthoni Submercible bridge	121.650
21	Thadiyambadu Chappath	125.630
22	Karimban Bridge	128.800
23	Old chappathu at Karimban	128.900
24	Bridge in Alapuzha- Madurai Rd	130.440
25	Bridge at Periyar Valley	132.450
26	Chappathu at Periyar valley	133.850
27	Panamkutty Old check dam	136.600
28	Panamkutty Bridge	136.750
29	Lower Periyar dam	139.600
30	Karimanal bridge	154.400



MULLAPERIYAR DAM (Ch : 62.00 Km)

The Mullaperiyar Dam is a composite gravity structure having a height of 47.24m above the river bed level (datum) and a length of 366m. Thefront and rear faces of the dam are built with uncoursed rubble masonry in lime surkhi combination mortar. The hearing, which accounts for more than 60% of the volume of the dam is constructed of lime surkhi concrete. During 1980s further strengthening measures like cable anchoring, adding weight at top by reinforced concrete capping, plain cement concrete backing, etc were carried out in the old dam to apparently improve the structural stability of the old dam. In the meantime, the spillway capacity was increased to negotiate the floods. The Full Reservoir Level (FRL) was also reduced to +136 ft in 1979 to reduce the load on the dam as well as for giving more room for flood storage. Later, as per the Hon'ble Supreme Court judgement dated 7-5-2014, the maximum storage level is increased to +142 ft.

Location

Latitude: 9.52500N

Longitude: 77.145833E

Reservoir

Cachment Area- 624 Sqkm

Designed FRL : +152 ft

Designed MWL : +155 ft

Gross capacity at +152 ft : 15.662 TMC

Live Storage capacity at + 152 ft : 10.570 TMC

Gross Storage capacity at +142 ft: 12.758 TMC

Live Storage capacity at + 142 ft : 7.666 TMC

Length of main dam : 365.80m (1200 ft)

Length of Baby Dam : 73.15m (240 ft)

Length of Earth Dam : 73.15m (240 ft)

Mullaperiyar Dam (Ch : 62.00 Km)

Chappath near Forest Quarters

CHAPPATH NEAR FOREST QUARTERS (Ch: 74.05 km)

This submergible bridge is located near Vallakkadavu Forest Quarters inside Periyar Tiger Reserve. 3.5m wide bridge havinglength of 90 m and a height of 5 m. Side protection is not found on both the upstream and downstream of the bridge. Both the sides of the bridge are forest land. During 2018 flood this chappath and surrounding area was submerged with flood water.

Latitude: 9.52732,Longitude: 77.11293

Vallakadavu Chappath

VALLAKADAVU CHAPPATH - Ch: 69.980 km

This submergible bridge is located at Vallakkadavu 4m wide bridge having length of 105 m and a height of 4m. Side protection is not found on both the upstream and downstream of the .During 2018 flood this chappath and surrounding area was submerged with flood water. Latitude: 9.551446, Longitude: 77.092234

KARUPPUPALAM - Ch: 71.83 km

This small bridge is located near Ganapathi Temple, Karuppupalam. 2m wide bridge having length of 58 m and a height of 4m. Side protection is not found on both the upstream and downstream of the bridge. During 2018 flood this chappath and surrounding area was submerged with flood water. Latitude: 9.562861, Longitude: 77.094621

CHECK DAM - Ch: 74.05 km

This check dam is located at ManjumalaAttoram. Check dam having length of 65m and a height of 1.5m. Side protection is not found on both the upstream and downstream of the checkdam. Latitude: 9.56708, Longitude: 77.08577. This is source location of KWA pump house.

Vandiperiyar Bridge

VANDIPERIYAR BRIDGE – Ch: 75.00 km

There are two bridges across Periyar at Vandiperiyar on the National Highway between Kollam and Theni. The 108 years old bridge having a width of 3.5m. The bridge was constructed by the British as the area had large tea plantations. It is the only century-old bridge on the National Highway. Built in British architectural style, Vandiperiyarbridge is the oldest bridge in district. Constructed in 1903, the 96.20 m longbridge connects the banks of Periyar.

While the new bridge has 7m wide and 98m length. Latitude: 9.57272, Longitude: 77.0915

CHANDRAVANAM BRIDGE @ Ch 80.23Km.

Chandravanam Bridge is an old pedestrian bridge of 63.00 m length, supported on 15 concrete pillars of size 75cm width and height 3.00m. This bridge connects Chandravanam and Moogalar in Vandiperiyar Panchayath. The total river width in this location is 68.50 m. The bridge is not creating much obstruction to the flow of water. The left and right banks are private properties. The type of soil on the bed of the river at the location is rock.

Keerikkara Bridge

KEERIKKARA BRIDGE @ Ch 81.45 Km

The above bridge is located across periyar river at Ch.81.45. The bridge is connecting Keerikara and Moogalar of vandiperiyar panchayat.The location of the bridge is Latitude 9°61'26.48"N and Longitude 77°06'96"E. It has approximate length 40.00m, width2.5m and height 3.00m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. This may cause obstructions tothe smooth flow of water. Due to 2018 flood the hand rails of the bridge were damaged. The type of soil on bed of the thodu at this location is silt. Large amount of silt is deposited upstream and downstream of this bridge. The ownership of land on upstream and downstream of bridge is private.

Mlamala palam

MLAMALA PALAM @ Ch 83.65Km

The above bridge is located at Periyar river at ch83.65km. The bridge is connecting Mlamala and Moogalar in Vandiperiyar panchayat. The location of the bridge is Latitude 9°62'11" N, Longitude 77°05'9" E. It has approximate length 59.00m, width 3.0m and height 3.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. This may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu atthis location is silt. The ownership of land on upstream and downstream of bridge is private.

FOOT BRIDGE @ Ch 85.4Km

The bridge is connecting Pathimukku and Moogalar in Vandiperiyar panchayat. The location of the bridge is Latitude 9˚63’15” N, Longitude 77˚05’10” E. It has approximate length 70m, width 1.20m and height 2.00 m. the height of bridge is less the river may flood. In 2018 flood the half portion of bridge is collapse. The damaged portions of bridge are still present at the downstream of the bridge. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. This may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of bridge is private.

SANTHIPALAM BRIDGE @ Ch 87.09 km

Santhipalam Bridge is connecting Ayyappankovil and Vandiperiyar panchayath. The location of the bridge is Latitude 9.640564 N, Longitude 77.043426 E. The upstream and downstream of this bridge river bed is rocky and width of River at this portion is 70m, but the width of vent way is 25.70m. The bridge abutments are constructed inside the River. The width of vent way of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. Hence the bridge may cause obstructions to the smooth flow of water. The upstream and downstream of the bridge have a large delta formation, it may obstruct the smooth flow of river. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private.

ELAPPARA VALLAKKADAVU BHAGAM BRIDGE @ Ch: 92.627 km

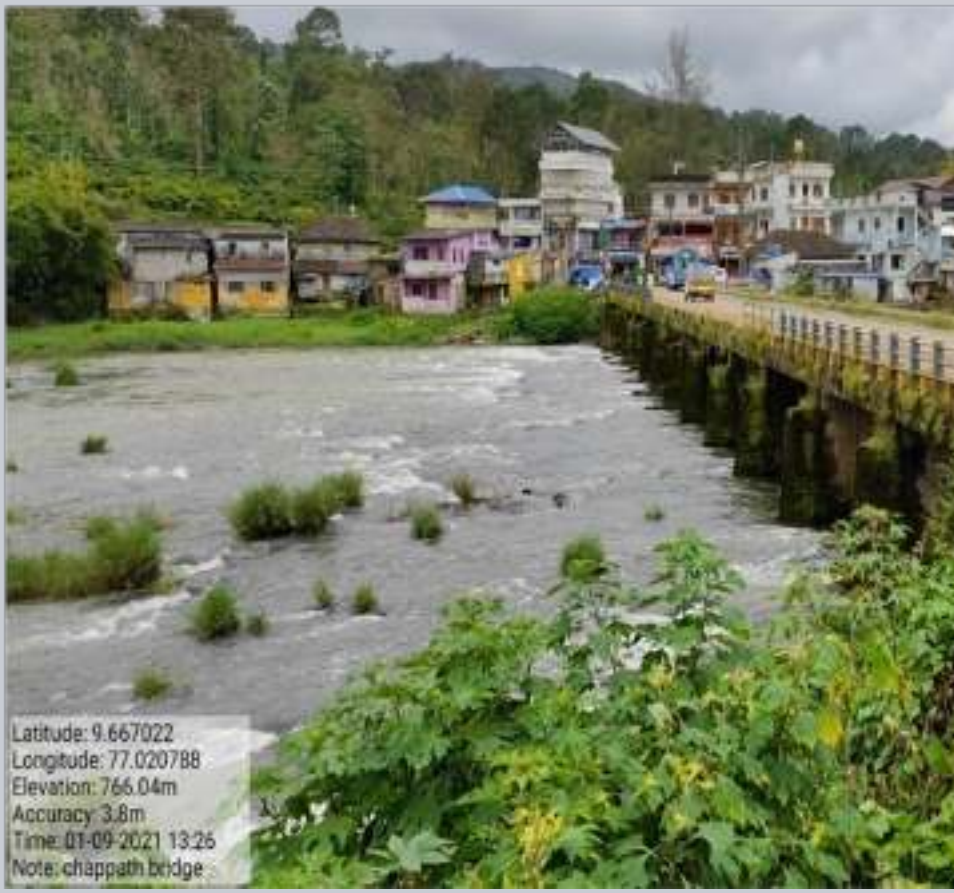
The above bridge is located across Periyar River at chainage 92.627 km. The bridge is connecting with Elappara and Ayyappankovil panchayath. The location of the bridge is Latitude 9.653653 N, Longitude 77.019076 E. It has an approximate length 35.00 m, width 4.00m and height 3.50m. The height of ventway of this bridge is 3.50m. The height of vent way of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the river at this location is rock. The ownership of land on left and right side of bridge is Tea Company. Damaged old parapet of the bridge are still present at the upstream of the river. The delta formation at this portion of the river is, (1). R/B, Length - 210m, breadth - 15m, depth – 1.50 m, (2). R/B, Length = 255m, Average breadth = 10m, depth =1.50m, (3). L/B, Length = 350m, Average breadth = 15m, depth =2.00m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay.

MALANKARA TEA FACTORY CHECKDAM @ Ch : 93.925 km

The above checkam is located across Periyar River at chainage 93.925 km. The location of the checkdam is Latitude 9.658379 N, Longitude 77.016685 E. It has an approximate length 90.00 m. The type of soil on bed of the river at this location is rock. The ownership of land on left bank is Malankara Tea Estate and right bank is Private.

CHAPPATH BRIDGE @ Ch 95.19 km.

The above bridge is located across Periyar River at chainage 95.19 km. The bridge is connecting with Upputhara and Ayyappankovil panchayath.It was constructed on 1999. Kottayam- Kattapana Road is passing through the bridge. The location of the bridge is Latitude 9.666696 N, Longitude 77.022044 E. It has an approximate length 100.00 m, width 10.50m and height 3.00m. The height of ventway of this bridge is 3.00m. The height vent way of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. The Chappath bridge was severely affected during the 2018 floods. The type of soil on bed of the river at this location is rock. The ownership of land on left side of the bridge is Tea Company and right side of bridge is Private. The delta formation at this portion of the river is, (1). L/B, Length - 450m, breadth - 10m, depth – 2.00 m, (2). L/B, Length = 170m, Average breadth = 23.00m, depth =2.00m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay.

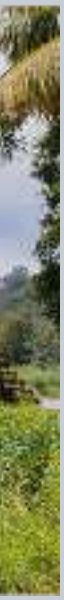


Chappath Bridge

Aalady Porikanni Foot Bridge (Collapsed)

UPPUTHARA BRIDGE @ Ch. 97.60m.

The Upputhara bridge is located across Periyar @ chainage 97.60 Km. It connects Ayyapankovil Panchayath to Upputhara Panchayath. The Kattapana – Upputhara road runs on the bridge. Its construction started in 1978 and completed in 1980. Its abutments lie in 1st ward of Ayyapankovil GP and 5th ward of Upputhara panchayathThe length of bridge is 150 m and width 6.5 m. The height of water level from bottom of slab is about 5m.The Upputhara bridge was severely affected during the 2018 floods. The bed of river is fully rocky and no or less sand deposition is found. During the flood the water was overflowing on the bridge.Vegetation islands are found in the river near the bridge and encroachments to the river is also noted. Pollution is also seen in the stretch near upputhara bridge. These are not industrial waste. Domestic waste from house near the banks are dumped directly to the river which causes river pollution.



AALADY PORIKANI FOOT BRIDGE@ Ch. 97.2Km

It is constructed across Periyar near near the joining place of Alady thodu to Periyar.. This bridge is located at chainage 94.72 Km. This bridge was used to connect Alady to Porikanny hence the name. It was open to public on 17-06-2005. But it is completely destroyed during the 2018 floods and its deck is taken away. Now only one of its pier is existing along with 2 abutments on either side of the bank. The existing pier is having a perimeter of about 3.30 m and height of about 4 m from bed.

AYYAPPANKOVIL SLAB BRIDGE (SUBMERGED) @ chainage 100.300 Km

It is an old bridge constructed besides the suspension bridge. This bridge is located @ chainage 100.300 Km. It was the Bus route to Idukki from Kattapana before the reservoir formation. The present condition of bridge is that it is completely Submerged in reservoir water during high water levels and it is not easily visible. It is about 110 m long

AYYAPPANKOVIL HANGING BRIDGE @ Ch 100.50 Km

Ayyappancoil hanging (Suspension) bridge is built across the Periyar River, connecting the Ayyappancoil Grama panchayath and Kanchiyar Grama Panchayath in Idukki district, Kerala. The new hanging bridge gave a new hope to the villagers as the can connect easier. The bridge is open to public on 2010. This bridge is the longest hanging suspension bridge in the district. The suspension bridge draws a lot of tourists owing to its picturesque scenery. It is a suspension bridge with a length of 160 meters and the old historic Sastha temple on the banks of Periyar river.

IDUKKI ARCH DAM @ 119.10km

Idukki arch dam constructed between Kuravanmala and Kurathimala across periyar on 1975 in Mariyapram Panchayath.It is one of the highest arch dam in Asia and third tallest arch dam. The type of dam is concrete double curvature parabolic, thin arch dam with a height of 169.16m and length 365.85m. This dam has constructed along with two other dams at Cheruthoni and Kulamavu having reservoir area of 60 km2.Catchment area is 649.30 km2.Location as Latitude : 9.842896, Longitude: 76.976680

CHERUTHONI DAM @119.9 km

This dam constructed as a part of the Idukki Hydro Electric Project. This dam is constructed across cheruthoni river , at Cheruthoni in Idukki, this is the largest Straight gravity concrete dam in Kerala with a height of 138.2m and length 650.90m. The spillway of Idukki reservoir is in the Cheruthoni dam (5 radial floodgates , 2 vertical floodgates at river bed level) Location as Latitude : 9.846044, Longitude: 76.967491

CHERUTHONI SUBMERCIBLE BRIDGE @ 121.65

Cheruthoni SubmersibleBridge was constructed early around 1960s to transportconstruction materials and equipments for construction of Idukki arch dam. It is a 46.2 meters long-(6.6x7 spans) and 8 meter-wide submersible bridge. Designed to carry two-third discharge from the Cheruthoni dam, it is capable of handling water even when the five shutters are opened. The bridge is strong as sheetrock is used to anchor the bridge. Construction of New bridge in Cherthony is in progress. The location of this bridge is 9°51'27.52" N, 76°57'48.7" E. The upstream side bridge is protected, but downstream side is not protected. The bed of river is rock. The type of soil on bed of the river at this location is silt, sand , clay and boulders is also found

Cheruthoni Bridge during 2018 Flood

Cheruthoni Bridge during 2021

Cheruthoni New Bridge construction

Thadiyampadu Chappath

THADIYAMPADU CHAPPATH@ Ch. 125.63 km

Thadiyampadu Chappath is constructed across Periyar in Thadiyampadu which connects Thadiyampadu and Mariyapuram. This chappath consist of three box culverts of approximate size 5.00 x 3.00 x 2.00 m. The length of chappath is 170m and width is 9.00m with an average height of 2.5m. During normal monsoon, water flows through the three vents without submerging this chappath. But when Cheruthoni dam shutters are opened and the spill exceeds 250 cumecs, this chappath will be submerged. This chappath was damagedduring the flood of August 2018 and the same was restored after the flood.The location of this bridge is 9°52'43.95" N, 76°58'13.51" E. The upstream side and downstream side is not protected. The bed of river is rock. Silt and clay are seen deposited over the rocky river bed.

KARIMBAN BRIDGE @Ch. 128.80 km

Karimban Bridge is on Karimban - Murichassery road, across Periyar, connecting Vazhathoppe and Mariyapuram Gramapanchayaths.The bridge was opened to public in the year 2015. This bridge is 210.00m long with a width of 10.5m. Clearence given for river by this bridge is satisfactory.During 2018 flood, when Cheruthoni dam was opened, this was the only bridge which provided access to the both bank of Periyar.The location of this bridge is 9°53'55.86" N, 76°58'27.56" E. The upstream side and downstream side is not protected. The bed of river is rock.The type of soil on bed of the river at this location is silt, sand, clay and boulders is also found.

Karimban Bridge

Old chappath across PERIYAR river at Karimban

OLD CHAPPATHU AT KARIMBAN@ ch.128.9 km

Old chappathu across periyar river at Karimban which is used for crossing river at this location before constructing Karimban bridge . Built using concrete and flow is obstructed. Currently not being used so need to be dismantled.Both sides unprotected.The bed of river is rock.The type of soil on bed of the river at this location is silt, sand, clay and boulders is also found.

Bridge across PERIYAR River at Karimban

BRIDGE IN ALAPUZHA-MADURAI Rd @ ch.130.44

Newly constructed bridge across periyar river for Alapuzha – Madurai road. Built on tall pillars, so flow is not obstructed. Rocky river bed in the vicinity of the bridge. Both banks unprotected.

Bridge across PERIYAR river in alappuzha- Madurai Rd

BRIDGE AT PERIYAR VALLEY@CH132.45KM

Old bridge across periyar river at Periyar valley. Built on Short pillars and abutments are in river channel, so flow is partially obstructed. The bed of river is rock.The type of soil on bed of the river at this location is silt, sand, clay and boulders is also found.Banks unprotected and small vegetation .

Bridge across PERIYAR River at Periyar valley

Chappathu across PERIYAR River at Periyar valley

CHAPPATHU AT PERIYAR VALLEY @ 133.85km

Old chappathu across periyar river at Periyar valley. Built on Short pillars and abutments are in river channel, so flow is partially obstructed. The bed of river is rock.The type of soil on bed of the river at this location is silt, sand, clay and boulders . Silt deposited with vegetation is also fond.

Check Dam Near Panamkutty Bridge - 9°57'07.8"N 76°58'51.0"E

PANAMKUTTY OLD CHECK DAM CHAINAGE @136.6 km

This check dam is located at upstream of Panamkutty bridge, across Periyar river. This is a RR Masonry check dam which is partially damaged. In this location the river bed is almost rocky with a width of 100m. Both banks are unprotected. It doesnot createany obstruction to flow. Both banks are unprotected private land. (Latitude: 9.961480, Longitude: 76.980765)

PANAMKUTTY BRIDGE @ Ch. 136.75 km

This bridge is across Periyar River in Kallarkutti road. The width of river at this location is about 100m. Both banks of the river is unprotected private land. This is located at 9°57'08.2"North and 76°58'50.3"East.

LOWER PERIYAR DAM @ Ch 139.600

The Lower Periyar Dam (Pambla Dam) is a dam built on the Periyar River as part of the Lower Periyar Hydroelectric Project in Kanjikuzhi Panchayat, Idukki District, Kerala. The lower Periyar dam is at Pambla, five kilometres downstream from where Muthirapuzha merges with main river. This 32.36-metre-high dam made of concrete has a width of 284 meters. The powerhouse is at Karimanal, near Neriamangalam, where three generators are installed with a power production capacity of 60 MW each, or a cumulative 180 MW. The Dam was completed in the year 1998. The maximum water level is 256 m and full reservoir level is 253 m. Spillway is of ogee type (5 numbers , radial, each size 13.5 X 15.65).

Lower periyar is so placed that it is set to receive a huge volume of water. The dam is raised at such a point that it can check the waters from idukki and cheruthoni reservoirs, besides the water from Neriamangalam electricity project. The water level at the reservoir is regulated by raising its shutter at the start of annual rainy season.(latitude: 9.961480, longitude: 76.9567799)

KARIMANAL BRIDGE @ Ch 154.40

Karimanal Bridge is constructed by KSEBL under Thottiyar Hydro Electric Power Project to access the Power House site at Karimanal.Total length of the bridge is 110m. The upstream and downstream sides are not protected.

MAIN TRIBUTOROES

There are 53main tributaries joining Periyar along the stretch from Origin to Karimanal bridge. The details of tributaries are following.
(Refer , Pg:1253)

Sl No	Name of Tributories	Chainage in KM	Length in M
1	Mullayar	49.000	27.00
2	KumilyThodu	Thekkady Lake	3.80
3	Gavithodu	65.915	4.35
4	VallakkadavuPoabs Estate thodu	66.185	1.96
5	KocokkadThodu	70.661	0.10
6	HPC Thodu	71.195	3.07
7	InjakkaduThodu	71.966	0.69
8	Aranakkal Estate Thodu	72.450	3.87
9	Vandiperiyar-SathramThodu	73.300	3.85
10	ChottuparaThodu	75.010	8.30
11	AnakkuzhiThodu	79.410	2.60
12	ChandravanamThodu	80.110	0.68
13	Keerikkara thodu	81.640	4.80
14	Vellaramkunnu Anakuzhi thodu	82.430	8.60
15	Manjumala Thodu	84.150	3.70
16	Ladrum thodu	83.090	6.30
17	Sastanada Moogalar thodu	85.790	13.20
18	Chinnar Thodu	91.400	15.55
19	Karimthiri Thodu	93.096	1.58
20	Old Post Office Thodu	93.500	0.50
21	Alady Thodu	94.700	0.50
22	Akkupallam Thodu	96.630	1.60
23	Kallukadu – Illippalam Thodu	97.100	1.78
24	Ooramana Thodu	98.350	4.20
25	Eettakkanam Thodu	97.800	2.55
26	Ayyappankovil Thodu	100.300	1.10
27	Vellilamkandam thodu	100.500	2.61
28	Mattapilly Thodu	100.500	2.36
29	Murikkattukudi Thodu	100.500	3.51
30	Kozhimala Thodu	104.600	1.70
31	Palakada thodu	109.800	5.75
32	Kattappanayar	110.500	12.87
33	Erattayar river	Anchuruly tunnel	5.35
34	Thankamany thodu	Anchuruly tunnel	8.90
35	Narakakanam thodu	Narakakkanam tunnel	2.10
36	Idinjamala thodu	Erattayar reservior	4.85
37	Cheruthoni- jilla Asupathri thodu	121.680	2.00
38	Nayarupara Thodu	122.700	6.00
39	Mariyapuram Thodu	122.875	7.00
40	Peppara Thodu	123.900	9.00
41	Vazhathoppe Pallithazham thodu	124.850	3.00
42	Palkulamedu- Asoka jn, thodu	126.490	7.20
43	Vimalagirithodu	127.130	10.00
44	Upputhara thodu	130.100	4.00
45	Churuli Thodu	130.840	5.00
46	Keerithodu Thodu	133.700	2.00
47	Perijamkuttyaar	134.800	26.00
48	Pakuthippalam Thodu	135.250	1.00
49	Kallar River	Kallar Dam	32.00
50	Muthirappuzha	136.400	40.60
51	Pamblathodu	140.900	9.50
52	Pazhayarikandom Thattekkanni	144.700	2.00
53	Vanchikkachal Thattekkanni	146.600	2.50

Mullayar

MULLAYAR

Mullayar is a major tributary of Periyar. It originates from the eastern boundary of Periyar Tiger Reserve and flows entirely through the forest. It has a length of 27 km and joins periyar at Mullakudy

KUMILY THODU

This tributary which originates from northwest side of Thekkady Lake and flows through Kumily town and Periyar Tiger Reserve. After flowing around 3.86 km it meets the channel leading to the diversion tunnel to Tamil Nadu. Details of main structures along this tributary are shown below.

Sl. No	Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
1	Culvert near Chelimada	5.0	4.5	2.5	0.000	9.61559	77.15458
2	Culvert	4.5	3.0	2.5	0.50	9.6135	77.15709
3	Culvert	5.0	3.5	3.0	0.90	9.61079	77.15866
4	Culvert	4.5	3.5	2.5	1.22	9.60924	77.16097
5	Culvert backside of KSRTC Depo	4.5	3.0	2.5	1.64	9.60735	77.16381
6	Kulathupalm Bridge	15.0	7.5	4.5	1.84	9.60638	77.16518
7	Anavachal Bridge	9.0	6.0	3.5	2.26	9.603483	77.167135
8	Checkdam inside PTR	25.0	-	1.5	3.33	9.595937	77.171214

Culvert near ChelimadaLatitude : 9.61559, Longitude: 77.15458

Culvert @1.22km Latitude: 9.60924, Longitude: 77.16097

Culvert @0.50km Latitude: 9.6135, Longitude: 77.15709

Culvert @0.90km Latitude: 9.61079, Longitude: 77.15866

Culvert @1.64km Latitude: 9.60735, Longitude: 77.16381

Kulathupalam Bridge Latitude : 9.60638, Longitude: 77.16518

Anavachal Bridge Latitude : 9.603483, Longitude: 77.167135

Check dam inside PTR Latitude : 9.595937, Longitude: 77.171214

Confluence Point Latitude: 9.52741, Longitude: 77.11305

GAVITHODU

This tributary is originates from southeast of Periyar and flows through Periyar Tiger Reserve and almost parallel to Gavi road. This has almost 4.35km length. This is confluence with Periyar at 65.915 km chainage. There is a bridge across this tributary at chainage 4.00km from its origin. Side protection is not found on both the upstream and downstream of the bridge.Details of the bridge are shown below.

Type of structure Length	Bridge 12	
(m) Width	3	
(m) Height	5	
(m) Chainage	4.00	9.52419
(km) Latitude Longitude	77.11247	

Bridge Latitude: 9.52419, Longitude: 77.11247

Confluence Point Latitude: 9.52864, Longitude: 77.1111

VALLAKKADAVUPOABS ESTATE THODU

This tributary is originates from west side of Periyar and flows through Poabs Estate at Vallakkadavu. This reaches left bank of Periyar after flowing around 1.955 km.This is confluence with Periyar at 66.185 km chainage. Details of main structures along this tributary are shown below.

Sl. No	Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
1	Checkdam	15.0	-	1.8	0.256	9.527975	77.098232
2	Foot bridge	12.0	1.0	1.5	0.598	9.527975	77.098232
4	Culvert	4.0	3.5	2.0	1.545	9.528905	77.108367
4	Culvert	12.0	4.0	3.8	1.950	9.528672	77.111038

Checkdam Latitude: 9.527975, Longitude: 77.098232

Culvert Latitude: 9.528905, Longitude: 77.108367

Culvert Latitude: 9.528672, Longitude: 77.111038

Foot bridge Latitude: 9.527975, Longitude: 77.098232

KOCOKKADTHODU

This is a small tributary which originates from west side of Periyar and flows through Kocokkad Estate at Vallakkadavu. This reaches left bank of Periyar after flowing around 0.104 km. This is confluence with Periyar at 71.061 km chainage. Details of main structures along this tributary are shown below.

Sl. No	Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
1	Checkdam	30	-	3.5	0.000	9.550025	77.09117
2	Culvert	3.5	2.8	2.2	0.09	9.550833	77.091578

Confluence point, Latitude : 9.550826, Longitude: 77.091579

Check dam in Kokkokad Estate, Latitude : 9.550025, Longitude: 77.09117

Culvert, Latitude : 9.550833, Longitude: 77.091578

HPC Thodu

This tributary is originates from east side of Periyar and flows through HPC Estate near Vallakkadavu Chappath. This reaches right bank of Periyar after flowing around 0..067 km. This is confluence with Periyar at 71.195 km chainage. There is a culvert across this tributary at chainage 2.997 km from its origin. Details of structure is shown below

Sl. No	Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
1	Culvert	5.0	3.0	4.0	2.997	9.55682	77.09471

Confluence point Latitude : 9.55744, Longitude: 77.09489

Culvert at HPC Latitude : 9.55682, Longitude: 77.09471

Injakkaduthodu

Thisis a small tributary which originates from east side of Periyar and flows through Injakkadu Estate near Karuppupalm. This reaches right bank of Periyar after flowing around 0.689 km. This is confluence with Periyar at a chainage of 71.966 km. There are two culverts across this tributary at chainages 0.08 km and 0.689 km from its origin.Details of main structures along this tributary are shown below.

Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
Culvert	5.0	3.0	4.0	2.997	9.55682	77.09471

Culvert Latitude : 9.564629, Longitude: 77.094206

Confluence point Latitude : 9.56405, Longitude: 77.093705

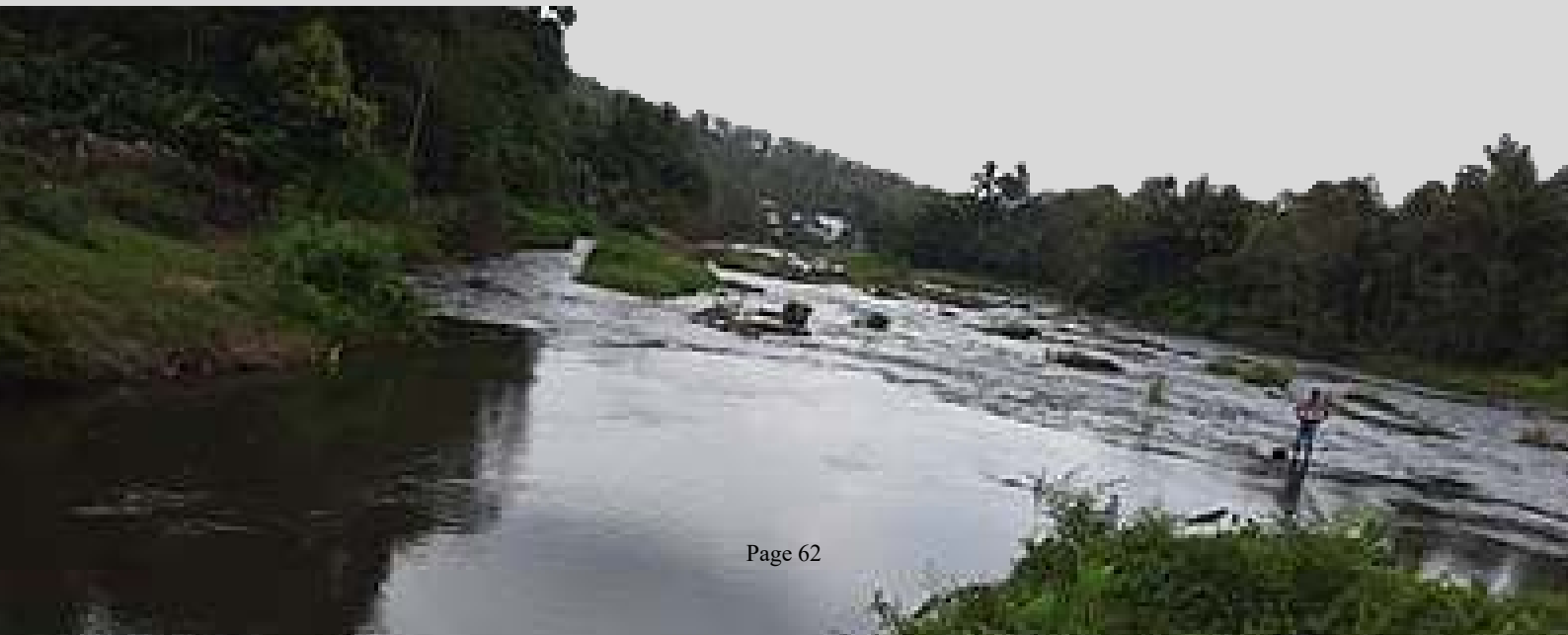
Culvert near Injikkadu estate Latitude : 9.568382, Longitude: 77.096106

Confluence point Latitude : 9.560099, Longitude: 77.088567 Aranakkal Estate Check dam Latitude : 9.555492, Longitude: 77.084353

Arannakkal Estate thodu

Thistributary which originates from west side of Periyar and flows throughAranakkal Estate at Karuppupalam. This reaches left bank of Periyarafter flowing around 3.867 km. This is confluence with Periyar at a chainageof 72.45 km. There are two checkdams across this tributary. One at its origin point and other at chainage 2.9920 km.Details of main structures along this tributary are shown below.

Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
Checkdam	40.0	-	4.5	0.000	9.537850	77.072697
Checkdam	40.0	-	5.0	2.992	9.555492	77.084353



Culvert @Ch: 3.099 Latitude: 9.56185, Longitude: 77.0769

VandiperiyarSathramthodu

Thistributary which originates from west side of Periyar and flows through Sathram and Vandiperiyar area. This reaches left bank of Periyar after flowing around 3.867 km. This is confluence with Periyar at a chainage of 73.30 km. Another small tributary is confluence with this main tributary at chainage 3.300km.Details of main structures along this tributary are shown below.

Structures along Main tributary

Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
Check dam	35.0	-	3.0	0.000	9.54339	77.06607
Culvert	5.0	3.0	3.0	3.099	9.56185	77.0769
Bridge	18.0	7.5	5.5	3.345	9.56349	77.07812

Check dam near Sathram - Latitude : 9.54339, Longitude: 77.06607

Bridge @ branch thodu Ch: 1.144 Latitude: 9.56562, Longitude: 77.07813

Type of structure	Length (m)	Width (m)	Height (m)	Chainage (km)	Latitude	Longitude
Bridge	12.0	3.0	3.1	1.144	9.56562	77.07813

Bridge @ Ch: 3.345 Latitude: 9.56349, Longitude: 77.07812

Chottuparathodu @ Ch 75.010km

The thodu joins the Periyarriver at Periyar river Ch 75.010 km. This is one of thelargest tributary in this reach and has a length of 8.730km. This thodu originates from theeastern side of the road at Chottupaara and flows parallel to Kottayam-Kumily road, andflows towards Vandiperiyar town. This is one of the most polluted tributary of Periyarriver.

Confluence of Chottupara Thodu near Vandiperiyar Bridge

Chottupara Thodu meets Periyar river at Ch 75.010 Km, near to Vandiperiyar Bridge. The confluence is in the town and many bridges are constructed across the stretch. All commercial establishments are polluting this thodu by directly connecting the waste line to this Thodu.

Encroachment and waste disposal near V K Tyres

Many small houses and shops are constructed on the left bank of the thodu by overhanging the structure to the thodu and depositingall household waste in to the thodu. The location is near to VK Tyres at Ch. 0.600 km.

Bridge Near BP Petrol pump
This RCC single span bridge is at Ch.0.800 km near BP Petrol pump Vandiperiyar. Inadequate height creates obstruction to the flow and creates flood during rainy season. This may be reconstructed with adequate clearance for the free flow of water.

Encroachment near Muhideen Mosque
Many small houses and shops are constructed on the left bank of the thodu by abutting the structure to the line of flow and depositing all household waste in to the thodu. The location is near the Vandiperiyar town and encroachment is seen through out this stretch.

Encroachment and waste disposal near Veterinary Hospital

Many small houses and shops are constructed abutting left bank of the thodu by and depositing all household waste in the thodu. The location is near to Veterinary hospitalat Ch. 1.100 km.

Bridge to Govt Hospital

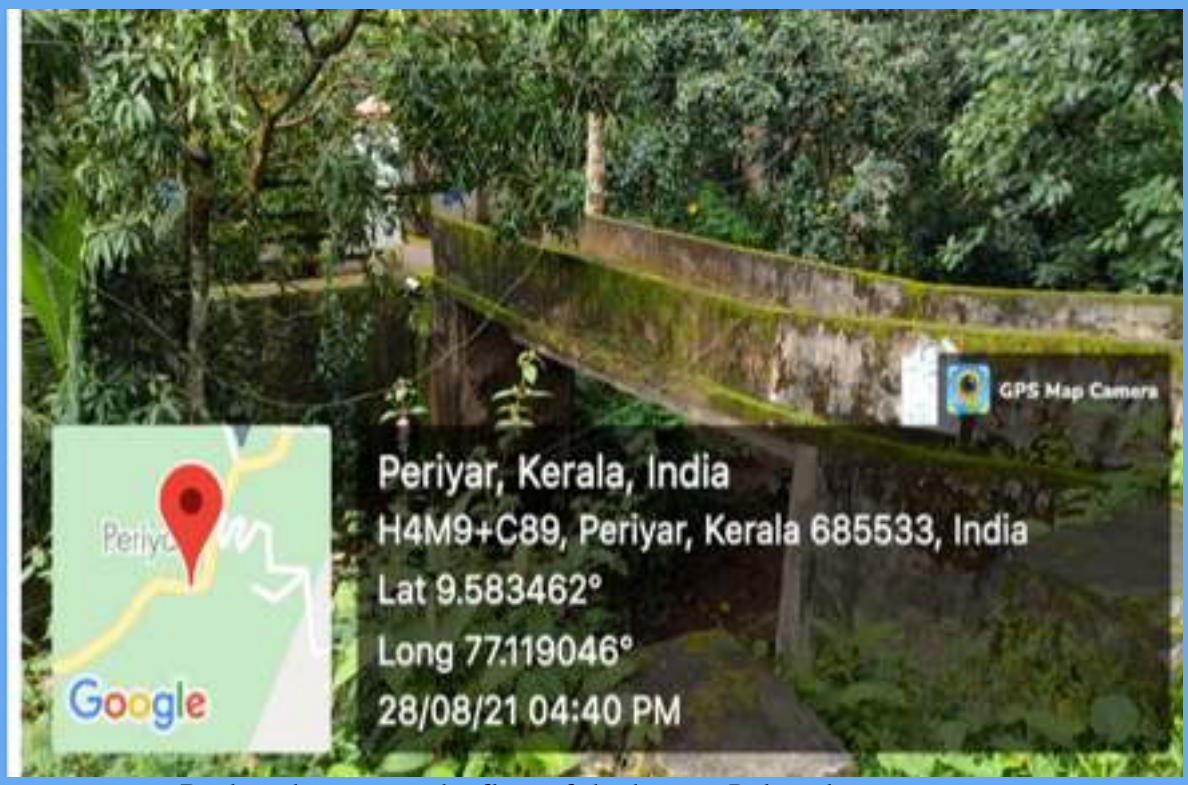
This RCC single span bridge is at Ch.1.400 km near Govt. Hospital Vandiperiyar. The inadequate height creates obstruction to the flow and creates flood during rainy season. This may be reconstructed with adequate height for the free flow of water.

Encroachment near Tourist Information Centre

Many small houses and shops are constructed on the left bank of the thodu by abutting the structure to the bank and depositing all household waste in thethodu. The location is near to Vandiperiyar and encroachment is very common in this stretch.

Encroachment near Walardy Junction

Many small houses and shops are constructed on the left bank of the thodu by overhanging the structure to the thodu and depositing all household waste in to the thodu. The location is near to Walardy Junction.



Bridge obstructing the flow of thodu near Polytechnic

RCC single span bridge is at Ch.4.200 km near Poly technic. Inadequate width creates obstruction to the flow and creates flood during rainy season. There are many bridges in this thodu, which reducesthe original width of the thodu.

Anakkuzhythodu

Anakkuzhy thodu having a length 2.60km originates from the hills of Harrison Malayalam TeaEstate at Mepparaattu and joins the Periyar river at Ch. 79.410km Anothervery small stream is also joining thisthodu from the west side of the estate. Confluence of Anakkuzhy Thodu.

Anakkuzhy thodu joins the Periyar river at Periyrar River Ch. 79.410km, near Chandravanam Bridge. Vegetation growth on silt deposit over rocky bed is visible in this location.

Anakkuzhy Checkdam

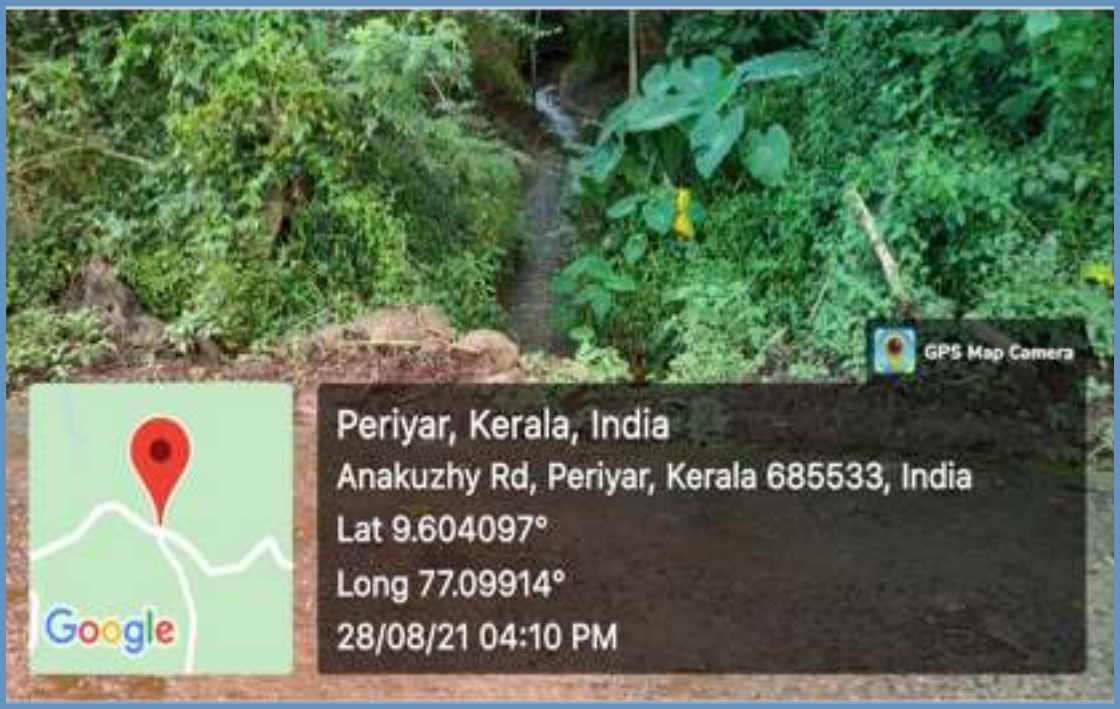
The Checkdam at Ch. 0.900km is 15.00m length of RCC with single vent and there is not much damagesto the structure. Water is abstracted from the checkdam for irrigating tea plantation.

Amman Kovil Bridge

The bridge at Ch. 1.600 km is on the Vellaradi-Chenkkara road of 3.60m length, adjacent to Ammankovil. The sidewall of the bridge is in damaged condition. The left and right bank in the upstream and downstream of the bridge is protected for as short distance.

Solid Waste disposal near Amman Kovil Bridge

Solid waste disposal point is noticed near Ammankovil bridge at Ch 1.600 km. It can be stopped by giving notice to the temple authorities and creating awareness among the local people.



Origin of Anakkuzhy Thodu

Anakkuzhy Thodu originates from the hills of Harrison Malayalam Tea Estate at Mepparaattu in Ch. 2.600 km and joins the Periyar river at Periyrar river Ch. 79.410km.

Chandravanamthodu

Thethodu originates from Pekkanamcheckdam and joins the Periyar River nearKeerikkraChappathbridge at Periyar River Ch. 80.110km. It is the smallest tributary in thisreach of just 0.670 m length.

Confluence of Chandravanam Thodu.

Chandravanam thodu joins the Periyar river at Periyrar River Ch. 79.410km, adjacent to Chandravanam Bridge. Vegetation growth on silt deposit over rocky bed is visible in this location.

Chandravanam bridge at Vandiperiyar – Mlamala Road.

The bridge is 4.30m length, single pier RCC bridge in goodcondition.Vandiperiyar –Mlamala road is passing parallelly and closely to the Peiyar river, at this location. The bridge is just 30.00m away from the Peiyar River.

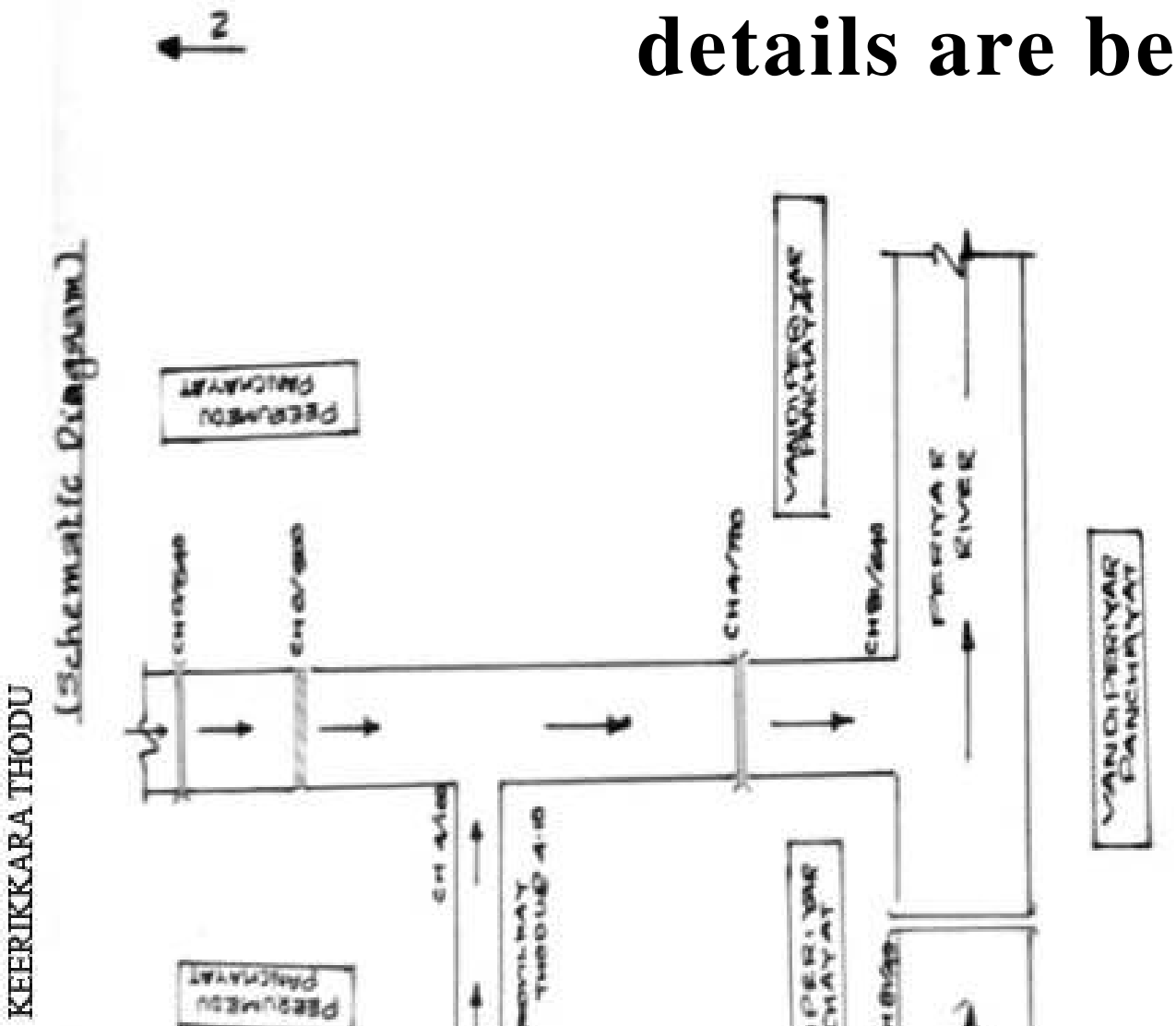
Chandravanam Check dam

It is very small checkdam located just 350.00m away from the Vandiperiyar –Manjumala road. It is a masonry Checkdam with 9.00m length and depth 3.360m, which is owned by Chandravanam estate. Presently, the checkdam is in damaged condition and the east side wing wall is damaged during the flood in 2018.

Pekkanam Check dam

Pekkanam Checkdam is a well-maintained moderate size check dam of length 40.00m and height 4.00m, having single vent of 3.30m. The check dam is recently renovated and is owned by AVT, Pekkanam Division. Around 6 streams from various points of the estate, feeds the check dam. Even though, the depth of storage is low, the water spreads over a large area and holds a large quantity of water.

The various Cross structures on different chainages explained in details are below



Ch.0/00 Confluence of Keerikarathodu to Periyar River

Keerikara thodu is one of major tributary of Periyar River.The Tributary flows through Perrumedu, Vandiperiyar panchayat. The tributary originates from Ranikovil estate. The total length of this Thodu is around 4.80 KM.and average width of this Thodu is 5.0 mts This is the major source drinking water for this area . Ranikovil estate kaythodu is the major subtributary

Ch.0/00 Confluence of Keerikarathodu to Periyar River

Ch 0.90Km - RanikovilKai Thodu (Subtributory)

The Ranikovil kai thodu is the sub tributary was originating from ranikovil estateand its reaches in Keerikara thodu at ch. 0/900. The total length of this kaythodu is 1.72km and average width of this kay thodu is 3.00mts.

Ch 0.07Km – Culvert

The major cross structure in the Ranikovil kaithodu is a stone culvert at ch 0/072. This culvert is located 9°59’7”N and 77°04’59’’E in Ranikovilkaythodu. Theculvert has length 2.80m and height 2.0m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is estate.

Ch.0/300- Culvert1

Ch.0/300- Culvert1

The culvert is located at Keerikkara thodu at ch.0/300. This culvert connects the both sides of Keerikarabhagam in Vandiperiyar panchayat. The location of the culvert is 9°61'25"N, 77°06'43"E. It has approximate length 5.60m, width4 m and height 3.0m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

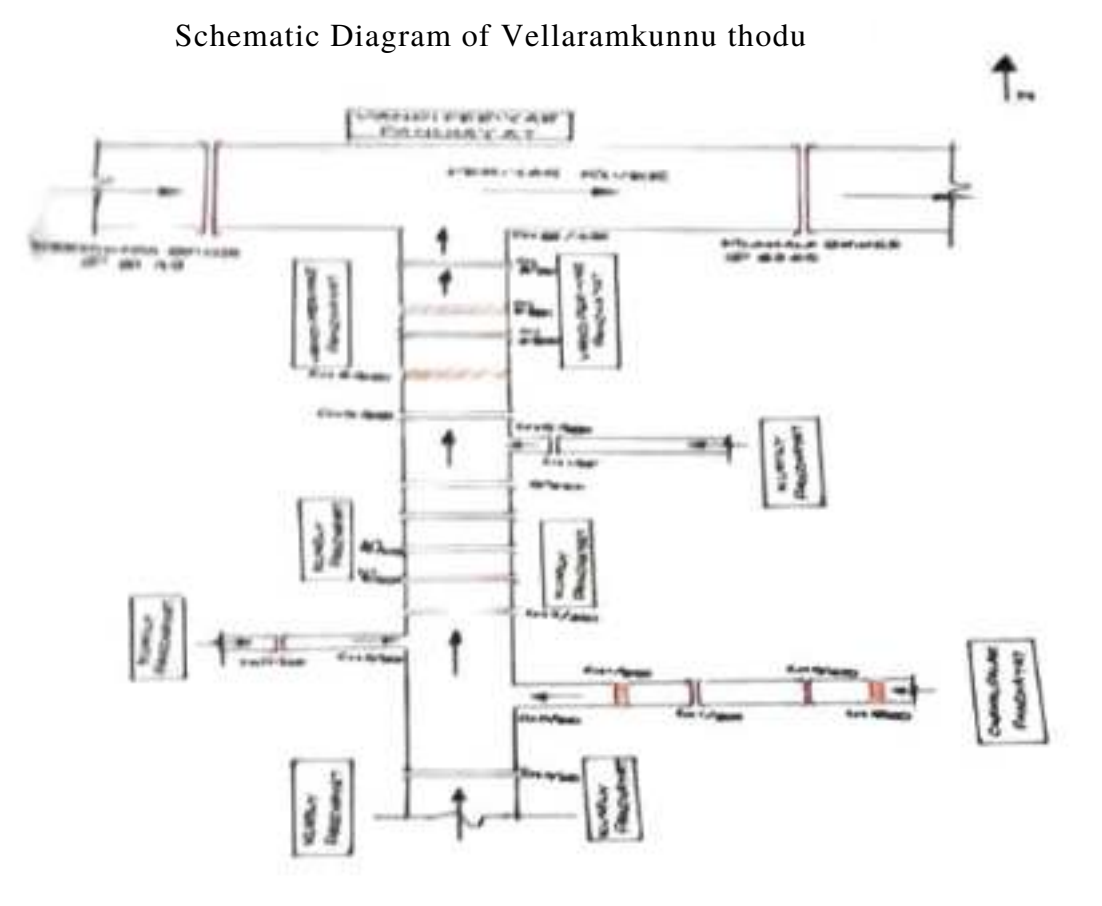
Ch.4/100 - Ranikovil checkdam

This checkdam is across Keerikkara thodu at ch.4/400 in Peerumade panchayat. Storage capacity of the checkdam is reduced due to silting and leakages are seen. Now this checkdam requires maintenance. Supplying water to nearby areas for drinking purposes. The downstream side apron is damaged. The checkdam is located at 9°58'49"N, 77°03'71"E. It has length28.0mts, top width 2.3m and height 3.00m. The maintenance and desilting work is proposed by Irrigation department.

Ch.4/460- Culvert 2

The above culvert is located at Keerikkara thodu at ch.4/46. This culvert connects the both sides of the estate. The location of the culvert is 9°58'54"N, 77°03'17"E. It has approximate length4 m, width2.5m and height 2.00m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is clay. The ownership of land on upstream and downstream of culvert is estate.

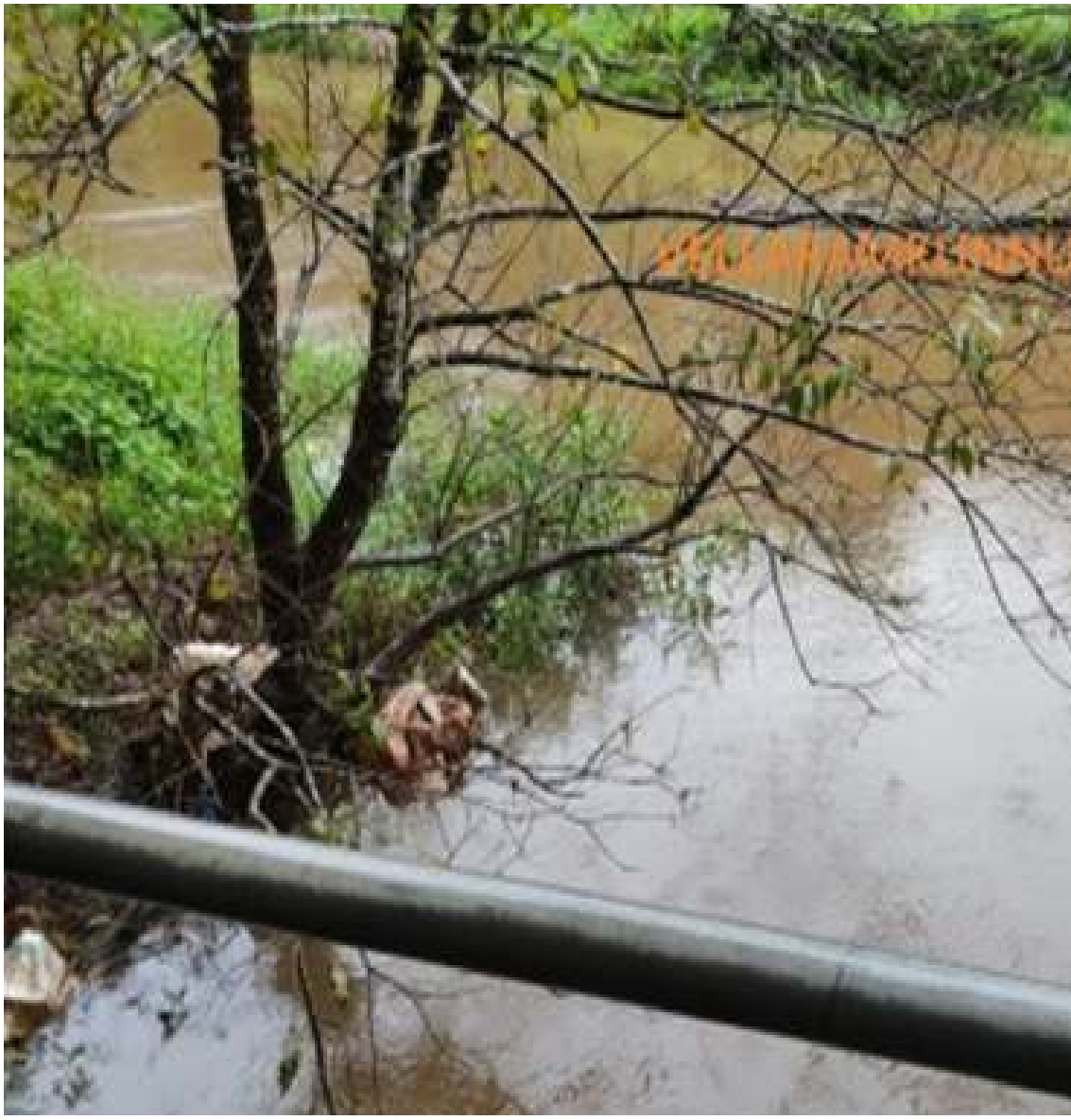
Schematic Diagram of Vellaramkunnu thodu



VellaramkunnuAnakuzhi Thodu

VellaramkunnuAnakuzhithodu originates from Vellaramkunnubhagom, and the thodu joins the Periyar river at ch.82/43km.The total length of this thodu is around 8.60KM.and average width of this Thodu is 5.0 mts This is the major source drinking water for this area. The major sub tributaries are MathakanamKuttikalliserithodu, Sankunnipalamthodu and Chenkarakurisumalathodu.

Ch.0/00Km - Confluence of Vellaramkunnu thodu with Periyar



Ch.0/090Km – Foot Bridge

The culvert is located near to the joining point of Vellaramkunnu thodu in Periyar River at ch.82.43km The location of the culvert is 9°61’49”N, 77°06’49”E. It has approximate length 6m, and height 2.5m. The upstream and downstream banks are not protected.The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil onbed of the thodu at this location is silt. The ownership of land on upstream of culvert is private.

Ch.1/750Km - 60Adipalam

The 60 Adipalam is located in Moogalar. This bridge connecting both the sides of Moogalar area. The location of the culvert is 9°62'67N, 77°07'06"E. It has approximate length 15m, and height 3.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

Ch.1/720Km – Checkdam No.1

The checkdam is located downstream side of 60Adipalam. in Vandiperiyar panchayat. This checkdam is good condition. Silt deposited Upstearm side of checkdam, so desilting required. The location of the checkdam is 9°62'67"N, 77°07'07"E. It has approximate length 15m, and height 2m

Ch.1/950Km – Checkdam No.2

The checkdam is located near Moogalar SivanTemple in Vandiperiyar panchayat. This checkdam were constructed Jillapanchayat. The location of the checkdam is 9°63'16" N, 77°07'25" E. It has approximate length 10m, and height 1.5m. Wing walls did not have enough height due to this bank of the thodu will erode it will affect strength of checkdam

ACh 2.63Km of Vellarmkunnu Anakuzhi thodu - Chenkara thodu

The subtributary orginates from Kurisumala area in Kumily panchayat and the thodu joins the Vellaramkunnu thoduat ch.2.63km. The total Length of thodu is around 1.50km and average width if this thodu is 4.0mts.

A.1Ch.1/00Culvert

This culvert connecting chenkara and moogalar area.The location of the culvert is 9°61’49”N, 77°06’49”E. It has approximate length 2.0m, and height 2.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Ch.2/650Km - Tavarna palam

The foot bridge is located in Vellaramkunnu thodu and connecting both the sides of Moogalar estate. The location of the culvert is 9°63’35” N, 77°07’23” E. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Ch.3/350Km - Anakuzhi VGM hospital bridge

This bridge is located in Vellaramkunnu thodu at ch.3/350 This bridge connecting both the sides of Anakuzhi estate. The location of the culvert is 9°37'52" N, 77°4'41" E. It has approximate length 6.0m, width 2.50m and height 3.5m. The upstream and downstream banks are not protected.The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Ch. 5/250Km – Anakuzhi bridge

The Anakuzhi bridge is located in Anakuzhi and connecting the Anakuzhi area. The location of the culvert is 9°37'55" N, 77°55'73" E. It has approximate length 4.0m, width 2.50m and height 3.0m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Anakuzhi VGM hospital bridge

Ch.6/240Km - Vannampalam culvert

The Vannampalam culvert is located in Vellaramkunnu thodu at ch.6/240. This culvert connects the Anakkuzhi area. The location of the culvert is 9°62'90" N, 77°09'08" E. It has approximate length 4.0m, width 2.50m and height 2.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is estate.

Ch 7.90 Km of Vellaramkunnu Anakuzhythodu Methakanam Kuthukalsseri thodu

The subtributary orginates from Mathakanam bhagom in Chakkupallam panchayat and the thodu joins the Vellaramkunnu thoduat ch.7/900. The total Length of thodu is around 2.10 km and average width if this thodu is 4 mts. This is the major source of water in this area.

The various Cross structures on different chain ages in this sub tributary explained in details are below.

Ch.0/150 – Buds school checkdam

The above checkdam is located at ch. 1/950 of this thodu. Now this checkdam requires maintenance. This checkdam is used for irrigation of nearby farmers mostly cash crops. The location of the checkdam is 9°63'22" N, 77°10'30" E. The maintenance work is proposed by Irrigation department.

Ch 0/200 – Culvert

The culvert is located near buds school. The location of the culvert is 9°63'27"N, 77°10'31"E. It has approximate length 2.0m, and height 2.0m. The upstream and downstream banks are not protected.The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is private.

Kallarakkal palam

Ch. 1/630- Kallarakkal palam

The bridge is located in Kallarakkal bhagom and connecting Mathakanam and Vellaramkunnu. The location of the bridge is 9°64'32"N, 77°10'33"E. It has approximate length 7.5m, and height 2.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

Ch.1/98- Kallarakkal checkdam

The checkdam is located at starting point of this thodu .This checkdam is good condition and constructed by Irrigation Department. The checkdam is used for irrigation of nearby area mostly of cash crops. The location of the checkdam is 9°64'51" N, 77°10'52" E. It has approximate length 43m, and height 7m

Ch 8.0Km of Vellaramkunnu Anakuzhythodu Sankunnipalam thodu

This thodu originating from Sankunnibhagom and reaches the thodu in Vellaramkunnu thodu at ch 8/000. The average width of the thodu is 3.0 m the approximate length of the thodu is 500 mts.

6.13.C.1 Ch. 0/400 - Sankunnipalam culvert

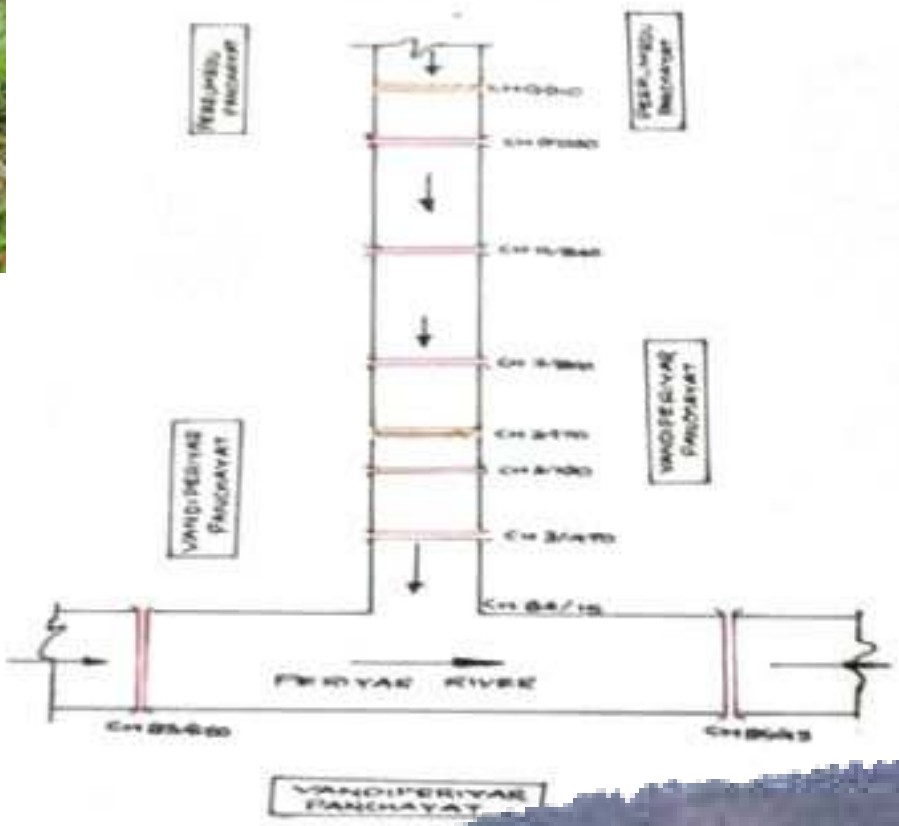
This culvert connecting Valadi and Vellaramkunnu . The location of the culvert is 9°63'03"N, 77°10'58"E. It has approximate length 3.0m, and height 2.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

Ch. 8/500Km - Vellaramkunnu culvert

The Vellaramkunnu culvert is located at Vellaramkunnu thodu at ch.8/500 .This culvert connecting the Anavilasam and Kumily in Kumily panchayat. The location of the culvert is 9°63'44" N, 77°10'78" E. It has approximate length 5.0m, width 4.0m and height 3.0m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

MANJUMALATHODU

Manjumalathodu or Thengakkalthodu is one of major tributary of Periyar River. The Tributary flows through Perrumedu, Vandiperiyarpanchayat. The tributary originate from Thengakkal estate checkdam . The total length of this Thodu is around 3.70 KM and average width of this Thodu is 4.0mts. This is the major source drinking water for this area.



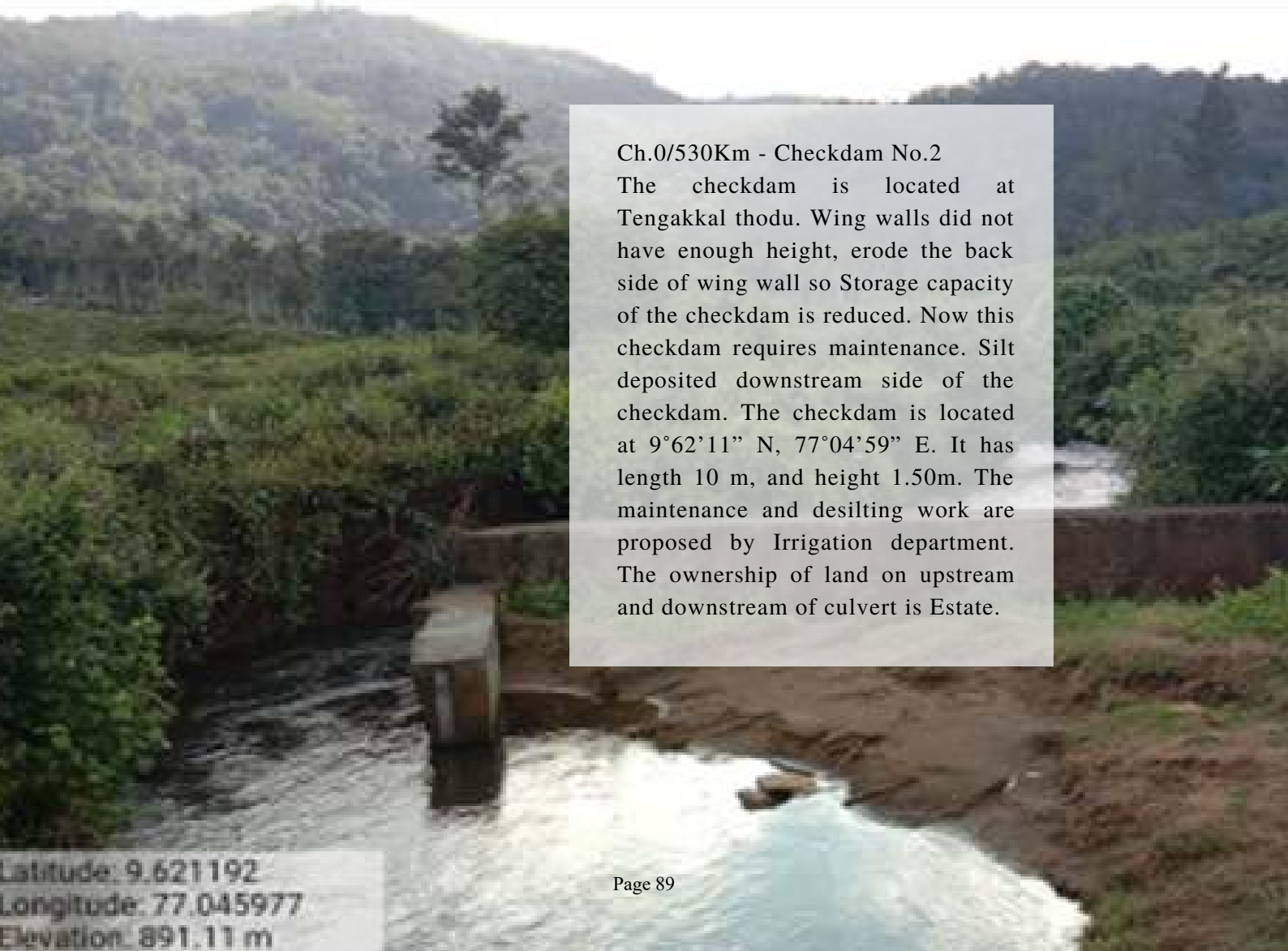
The various Cross structures on different chainages explained in details are below

Ch 0/230Km - Culvert No.3

This culvert is located at Thenggakkal thodu at ch.0.23km.This culvert connecting the both sides of Mlamala in Vandiperiyar panchayat. The location of the culvert is 9°62'26" N, 77°04'69" E. It has approximate length 3.30m, width 3.00 m and height 3.8m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream is estate and downstream of culvert is private.

Ch 0/510Km - Foot bridge

The above bridge is located at Thenggakkal thodu at ch.0.51km.This culvert connecting the both sides of Mlamala estate in Vandiperiyar panchayat. The location of the culvert is 9°62'11" N, 77°04'59" E. It has approximate length 7m, width1.5 m and height 2.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. This may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is Estate.



Ch.0/530Km - Checkdam No.2

The checkdam is located at Tengakkal thodu. Wing walls did not have enough height, erode the back side of wing wall so Storage capacity of the checkdam is reduced. Now this checkdam requires maintenance. Silt deposited downstream side of the checkdam. The checkdam is located at 9°62'11" N, 77°04'59" E. It has length 10 m, and height 1.50m. The maintenance and desilting work are proposed by Irrigation department. The ownership of land on upstream and downstream of culvert is Estate.

6.14.5 Ch.0/90 - Kannadimadam bridge

The above bridge is located at Kannadimadam bhagom in Thenggakkal thodu at ch. 2/800. This bridge connecting the both sides of Kannadimadam in Vandiperiyar panchayat. The location of the bridge is 9°62'04" N, 77°04'33" E. It has approximate length 7.00m, width3 m and height 2.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is Estate.

Ch. 2/860- Culvert No.1

The culvert is located at Thenggakkal thodu at ch2.86km. This culvert connecting the both sides of Thengakkal estate in Vandiperiyar panchayat. The location of the culvert is 9°62'51"N, 77°03'11"E. It has approximate length 4.40m, width3 m and height 2.0m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu.

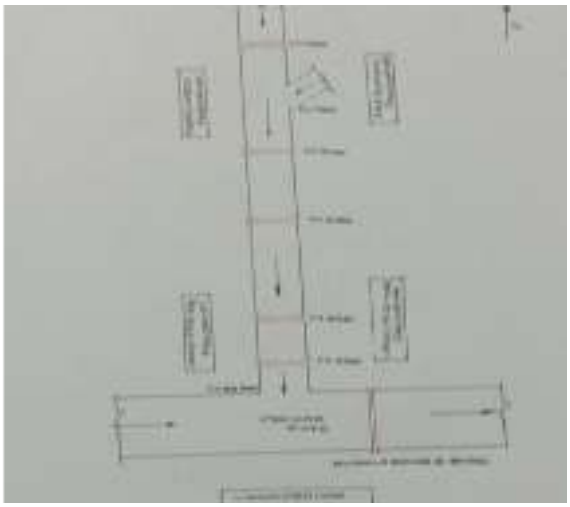
The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is Estate.

6.14.7 Ch. 3/680 - Culvert No.2

The above culvert is located atThenggakkal thodu at ch 3.68km. This culvert connecting the both sideds of Thengakkal estate in Vandiperiyar panchayat. The location of the culvert is 9˚62’65” N, 77˚02’58” E. It has approximate length 3.60m, width3 m and height 3.0m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is Estate.

6.14.8 Ch. 3/700 - Checkdam No.1

The checkdam is the starting point of Thengakkal thodu in Peerumade panchayat . Storage capacity of the checkdam is reduced due to large amount of silt deposited. Now the checkdam in good condition. The checkdam is located at 9°02’64” N, 77°02’56” E. It has top length 10 m, bottam length 3.00m, top width1.0m and height 3.50m. This checkdam requires desilting. The maintenance and desilting work is proposed by Irrigation department.



LADRUMTHODU @ Ch 83.09Km

Ladrumthodu is one of the major tributary of Periyar River. The Tributary flows throughPerumedu and Vandiperiyarpanchayats. The tributary orginates from Ladrum estate.The total length of this thodu is around 6.30 KM with an average width of 7.0m.This is the major source of drinking water for this area. The discharge through KSEB Tunnel from Azhutha diversion reaches Periyar river through Ladramthodu. Initial portions of Ladrumthodu is also known as Koduvakkaranam thodu

Irrigation Department

6.15.2 Ch.0/700Km - Nooradi palam

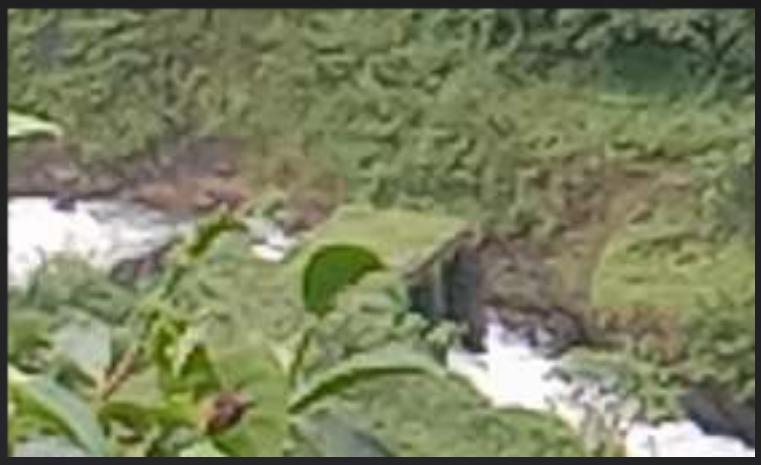
The bridge is located at Ladrum thodu at ch.0.70km .This bridge connects Kerikkara and Mlamala area in Vandiperiyar panchayat. The location of the culvert is 9°61'58" N, 77°05'55" E. It has approximate length 34.0m, width 4.00 m and height 5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. In the 2018 flood the bridge was collapsed. The damaged portions of the old bridge are still at the down stream of the new bridge. This may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land in the upstream and downstream of bridge is private (estate).

6.15.3 Ch. 1/070Km - Checkdam No.1

The checkdam is located at Ladrum thodu in ch.1.07km . Now the checkdam is in good condition. The checkdam is located at 9.6136N, 77.0553E . The ownership of land on upstream and downstream of check dam is Estate.

6.15.4 Ch.2/740Km - Mlamala bridge.

The bridge is located at Ladrum thodu at ch.2.74km. This bridge connecting the Ladrum estate and Mlamala area in Peerumedu panchayat. The location of the culvert is 9°59'95" N, 77°03'67" E. It has approximate length 18.0m, width 3.00 m and height 4.5m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.



Ch. 4/160- Culvert

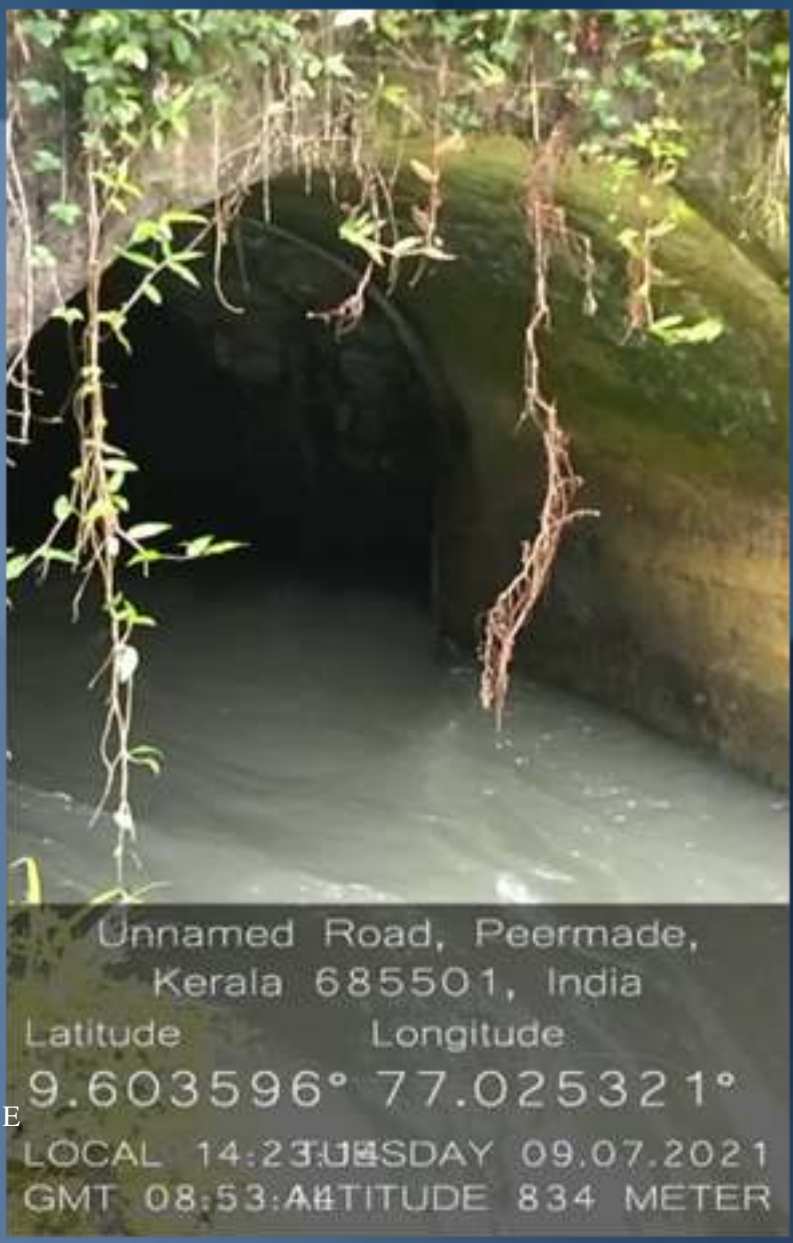
The culvert is located at Ladrum thodu at ch.2/14. This culvert connecting the both sides of Ladrum estate in Peerumedu panchayat. The location of the culvert is 9°60'00" N, 77°02'75" E. It has approximate length 5.0m, width 1.5.00 m and height 2.5m. The upstream and downstream banks are not protected. Left bank abutment is in damaged condition. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate

6.15.6 Ch. 5/050– Checkdam No.2

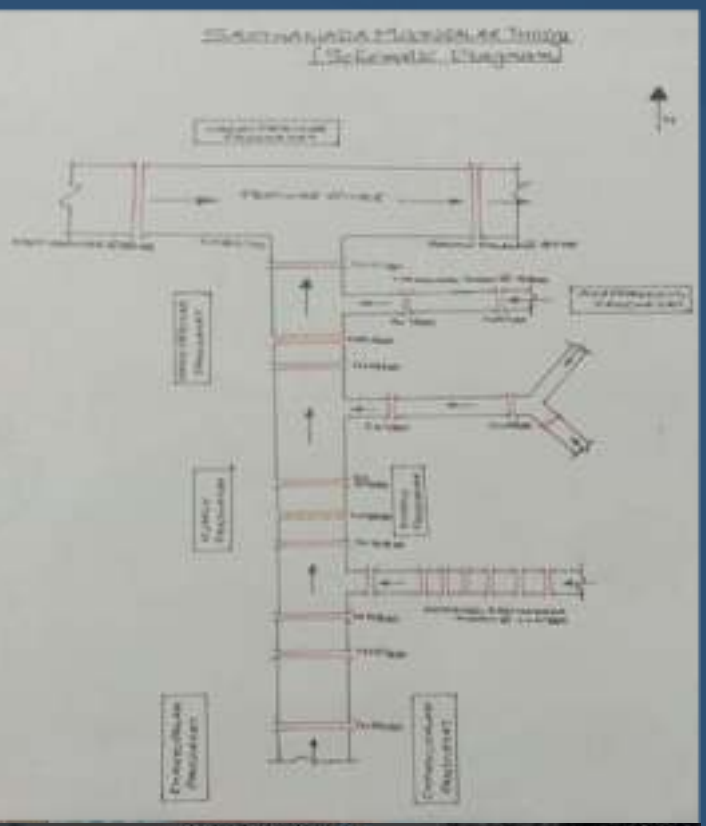
The check dam is located at Koduvakanam thodu in ch1/25. Now the check dam is in good condition. The check dam is located at 9°59'97" N, 77°02'11" E. It has length 10m, and height 1.50m. The ownership of land on upstream and downstream of check dam is Private

6.15.7 Ch.4/950 - Mouth of KSEB Tunnel from Azhutha diversion dam

The stream originated from Peerumedu area in Azutha river .It's a tributary of Pumba River. Water is impounded on the Azhutha weir. Azhutha weir is constructed as an agumentation weir for the 'Idukki Hydro Electric Project'. Azhutha diversion scheme is envisages diversion of water to Idukki reservoir from a catchment area of 16.83sq.kmin the upper reaches of Azhuthaar, a major tributary Pambaar for increasing the power potential of Idukki power station. The sailent features of the project are



State : -	Kerala
District : -	Idukki
Thaluk : -	Peerumedu
Panchayat : -	Peerumedu
River : -	Azhutha
River Basin : -	Pumba
Latitude, Longitude : -	9°60'35" N, 77°02'53" E
Catchment area : -	16.83sq.km
Reservior :-	Azhutha river



SASTHANADA MOONGALARTHODU @ Ch 85/79 KM

The SasthanadaMoogalarthodu originates from Chakkupallam area inChakkupallampanchayat and the thodu joins the Periyar River at ch.85/79. The 60% of thisthodu is flowing through the HML plantation.The total Length of thodu is around 13.20km andaverage width if this thodu is 6.0 mts.

i. Confluence of Sasthanada Moogalar thodu to Periyar

ii. Ch.00/020Km - Pathimukku culvert

The culvert is located at Sasthanada moogalar thodu and joins to Periyar River. The culvert connects Pathimukku and chittimala estate in Vandiperiyar panchayat. The location of the bridge is 9°63'91"N, 77°05'19"E. It has approximate length 10.50m, and height 2.50m. The upstream and downstream banks are not protected. The thodu has an approximate width 15m. The abutments are constructed inside the thodu. This may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is HMLestate.

Ch 2.93Km - Kannikkal thodu (Subtributory)

The subtributary orginates from Kannikal area in Ayyappankovil panchayat and the thodu joins the Sasthanada Moogalar thodu at ch2.93km. The total Length of thodu is around 2.0km and average width if this thodu is 4 mts. The various Cross structures on different chainages explained in details are below.

Ch.0/340Km - Culvert 1

The culvert is located at Chittimala estate bhagom and its location is 9°64'92"N, 77°06'32"E. It has approximate length 2, and height 1.50m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate

Ch.1/900Km - Culvert .No.1

The culvert is located at Kannikkal area.The location of culvert is 9°65’54”N, 77°05’02”E. It has approximate length 2, and height 1.50m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is private.

Chittimala checkdam

Ch.2/960Km - Chittimala checkdam

The checkdam is located at downstream side of Chittimala bridge in Vandiperiyar panchayat. The location of the checkdam is 9°64'82"N, 77°06'54"E. It has approximate length 10.40m, and height 1.5m. Wing walls did not have enough height due to this banks of the thodu will erode it will affect strength of checkdam.

Ch 3/00Km - Chittimala thdou (Subtributory)

The subtributary orginates from Sangaragiri thodu in Vandiperiyar panchayat and the thodu joins the Sasthanada Moogalar thodu at ch3.00km. The total Length of thodu is around 1.5km and average width if this thodu is 4.0 mts. The various Cross structures on different chainages explained in details are below.

Ch.0/090 - Chittimala culvert

This culvert is located at Chittimala estate bhagom and its location is 9°39’10”N, 77°4’2”E. It has approximate length 3.00m, and height 2.0m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Chittimala culvert

Ch 1/470Km - Sangaragiri Culvert

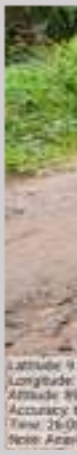
This culvert is located at Sangaragiri and its location is 9°65’85”N, 77°06’11”E. It has approximate length 4.00m, and height 3.0m. The upstream and downstream banks areprotected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this locationis rock . The ownership of land on upstream and downstream ofculvert is private.

Ch.3/100Km - Chittimala Bridge

The bridge is located at Sasthanada moogalar thodu and connecting Sangaragiri and chittimala estate in Vandiperiyar panchayat. The location of the bridge is 9°64’92”N, 77°06’44”E. It has approximate length 14.00m, width 3.0m and height 4.0m. The upstream and downstream banks are not protected. The abutments are constructed inside the thodu. This may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt . The ownership of land on upstream and down stram of culvert is HMLestate.

Ch 5/065Km - Kannimala chappath culvert

This culvert is located at Kannimala chappath bhagom. The location of the culvert is 9°66’66” N, 77°08’93” E. It has approximate length 4.00m, and height 1.50m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is private



6.16.8 Ch 8/150Km - Checkdam

The checkdam is located at upstream side of Kannimala chappath bridge Kumily panchayat. This checkdam is good condition. Silt deposited Upstearm side of checkdam, so desilting required. The location of the checkdam is 9°66'73"N, 77°08'87"E. It has approximate length 10m, and height 1.5m

6.16.9 Ch 9/60Km – Culvert No. 1

This culvert is located at Anavilasam jun. The location of culvert is 9°67'77"N, 77°10'97"E. It has approximate length 2.50m, and height 2.0m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is private.

Ch.0/840Km - Culvert No. 2

This culvert is located at NMR estate bhagom and the location of the culvert is 9°67’77” N, 77°10’97” E. It has approximate length 2.50m, and height 2.0m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Ch 12.34Km - Korangusasthanada thodu (Subtributory)

The subtributary orginates from Korangusasthanada thodu in Chakkupallam panchayat and the thodu joins the Sasthanada Moogalar thodu at ch.12.34km . The total Length of thodu is around 1km and average width if this thodu is 4.0 mts. This is the major source of water in this area. Obstructions in Kurangu sasthanada thodu are as below

Ch.12/400 - Culvert No.3

This culvert is located at NMR estate and its location is 9°67’77” N, 77°10’97” E. It has approximate length 2.50m, and height 2.0m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

Ch. 13/000- Culvert No.4

This culvert is located at Kannamunda estate.The location of the culvert is 9°67'35"N, 77°11'44"E. It has approximate length 2.50m, and height 2.5m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate.

CHINNARTHODU @ Ch 91.407Km

It is a tributary of Periyar River and it begins from VagamonNallathannybhagam hills in Elapparapanchayath and joins Chinnarthodu near Moonattumukkubhagam. The location of the joining portion of this thodu is Latitude 9.659232 N, Longitude 77.012394 E. Both banks are not protected. The ownership of land on left bank is Tea Company and right bank of the thodu at this portion is private.

6.17.1 Ch: 0 Km: Moonnaattumukku Bhagom

It is a tributary of Periyar River and it begins from Vagamon Nallathanny bhagam hills in Elappara panchayath and joins Chinnar thodu near Moonattumukku bhagam. The location of the joining portion of this thodu is Latitude 9.659232 N, Longitude 77.012394 E. Both banks are not protected. The ownership of land on left bank is Tea Company and right bank of the thodu at this portion is private

Ch: 0.271 Km:Near Moonnaattumukku Bhagom

The location of this portion of the thodu is Latitude 9.660765N, Longitude 77.010648E. Both banks are not protected. The ownership of land on left bank is Tea Company and right bank of the thodu at this portion is private.

Ch: 0.271 Km: Malankara Tea Estate Pump House

The location of this portion of the thodu is Latitude 9.662001N, Longitude 77.010363E. Both banks are not protected. The ownership of land on left bank is Tea Company and right bank of the thodu at this portion is private.

During the summer season, water is pumped from the thodu for the needs of the Tea Company.

Confluence of Pasuppara Thodu and Chinnar Thodu

The location of the joining portion of this thodu is Latitude 9.659232 N, Longitude 77.012394 E. Both banks are not protected. The ownership of land on left bank of the thodu is Malankara Tea Company and right bank of the thodu at this portion is private.

Ch: 0.43 Km: Karimthiri New Bridge

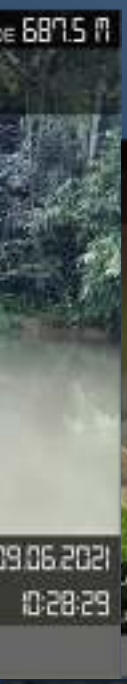
The above bridge is located across Pasupara thodu at chainage 0.430 km. The bridge is connecting with Elappara, Upputhara and Ayyappankovil panchayath. The location of the bridge is Latitude 9.665428 N, Longitude 77.004454 E. Both banks are not protected. It has an approximate length 75.00 m, width 11.00m and height 13m. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left and right side of bridge is Tea Company.

Ch: 0.605 Km: Karimthiri Old Bridge

The above bridge is located across Pasupara thodu at chainage 0.605 km. The location of the bridge is Latitude 9.665776 N, Longitude 77.003187 E. Both banks are not protected. It has an approximate length 34.00 m, width 4.50m and height 10m. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of bridge is Private.

Ch: 0.89 Km : Cross bar Near Karimthiri Bridge

The above cross bar is located across Pasupara thodu at chainage 0.890 km. The location of the bridge is Latitude 9.666133 N, Longitude 77.002999 E. Both banks are not protected. It has an approximate length 22.00 m. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left side is Tea Company and right side is Private.



Ch: 3.09 Km : Cheenthalar Bhagom

The location of this portion is Latitude 9.676788 N, Longitude 76.986561 E. Both banks are not protected. The ownership of land on right bank of the thodu is private and left bank of the thodu is Tea Company.

Ch: 3.17 Km : Cheenthalar Bridge

The above bridge is located across Pasupara thodu at chainage 3.17 km. The location of the bridge is Latitude 9.676788 N, Longitude 76.986561 E. Both banks are not protected. It has an approximate length 14.00 m, width 4.50m and height 5m. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left and right side of bridge is Private.

Ch: 5.04 Km : Pasuppara AVT Estate Bhagom Bridge

The above bridge is located across Pasupara thodu at chainage 5.04 km. The location of the bridge is Latitude 9.686872 N, Longitude 76.977891 E. Both banks are not protected. It has an approximate length 28.00 m, width 4.00m and height 5m. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of bridge is Tea Company

Ch: 6.062 Km: Cross bar Near Aalampally Pump House

The above cross bar is located across Pasupara thodu at chainage 6.062 km. The location of the crossbar is Latitude 9.695423 N, Longitude 77.014257 E. Both banks are not protected. It has an approximate length 14.00 m. The width of thodu is around 20m at this point, but the length of cross bar is less than that of thodu. Hence the cross bar may cause obstructions to the smooth flow of water. During the monsoon season, water flows through the sides of the cross bar and floods nearby houses. The type of soil on bed of the river at this location is rock. The ownership of land on left side is private and right side is Tea Company.

Ch: 6.153 Km: Foot Bridge Near Aalampally Pump House

The above bridge is located across Pasupara thodu at chainage 6.153 km. The location of the bridge is Latitude 9.693244 N, Longitude 76.970675 E. Both banks are not protected. It has an approximate length 20.00 m. The type of soil on bed of the river at this location is Rock and Silt. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water. The ownership of land on left bank is Tea Company and right side of bridge is private.

Ch: 7.26 Km: Confluence of Plamood Thodu and Pasuppara Thodu

. The location of the joining portion of this thodu is Latitude 9.693137 N, Longitude 76.971047 E. Both banks are not protected. The ownership of land on left and right bank of the thodu is Tea Company.

Ch: 7.335 Km: Bridge at Pasuppara Estate Bhagom

The above bridge is located across Pasupara thodu at chainage 7.335 km. The location of the bridge is Latitude 9.6953 N, Longitude 76.961795 E. Both banks are not protected. It has an approximate length 8.00 m. The type of soil on bed of the thodu at this location is Silt. The ownership of land on left bank is Tea Company and right side of bridge is private.

Ch: 7.97 Km: Bridge at 8th Number Bhagom

The above bridge is located across Pasupara thodu at chainage 7.97 km. The location of the bridge is Latitude 9.698155 N, Longitude 76.95816 E. Both banks are not protected. It has an approximate length 12.00 m. The type of soil on bed of the thodu at this location is Rock and silt. The ownership of land on left and right bank is Tea Company.

Ch: 8.696 Km: Bridge at 7th Number Bhagom

The above bridge is located across Pasupara thodu at chainage 8.696 km. The location of the bridge is Latitude 9.701491 N, Longitude 76.95421 E. Both banks are not protected. It has an approximate length 11.00 m. The type of soil on bed of the thodu at this location is Rock and silt. The ownership of land on left and right bank is Private.

Ch: 9.546 Km : At 7th Number Bhagom

The location of this portion is Latitude 9.705139 N, Longitude 76.946784 E. Both banks are not protected. The type of soil on bed of the thodu at this location is Rock. The ownership of land on left and right bank of the thodu is Private.

Ch: 11.712 Km : Bridge at Meenmutty Bhagom

The above bridge is located across Pasupara thodu at chainage 11.712 km. The location of the bridge is Latitude 9.701491 N, Longitude 76.95421 E. Both banks are not protected. It has an approximate length 11.00 m. The type of soil on bed of the thodu at this location is Rock. The ownership of land on left and right bank is Private.

Ch: 13.212 Km : At Vattappathaal Waiting Shed Bhagom

The location of this portion is Latitude 9.708084 N, Longitude 76.932209 E. Both banks are not protected. The type of soil on bed of the thodu at this location is Rock. The ownership of land on left and right bank of the river is Private.

Ch: 1.00 Km: Bridge Near Karimthiri School

The above bridge is located across Chinnar thodu at chainage 1.00 km. The location of the bridge is Latitude 9.662987 N, Longitude 77.004291 E. It has an approximate length 20.00 m, width 5.00m and height 6m. The type of soil on bed of the thodu at this location is rock and silt. Damaged old structure of the bridge are still present at the upstream of the thodu. The silt deposited at this portion of the thodu is, Length - 100m, breadth - 15m, depth - 2m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left side is Tea Company and right side of bridge is Private.

Ch: 1.950 Km: At Erambadam Bhagom

The location of this point is Latitude 9.66193 N, Longitude 76.996906 E. Both banks are not protected. The large delta formation and silt deposited at this portion of the thodu is, Length - 300m, breadth - 30m, depth - 2m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right bank of the thodu at this portion is private.

Ch.2.55Km: Elappara Thodu

6.17.7.1 Ch: 0 Km: Kottadimakkal Bhagom

The location of the joining portion of this thodu is Latitude 9.657792 N, Longitude 76.997903 E. Both banks are not protected. The large silt deposited at this portion of the thodu is, Length - 180m, breadth - 15m, depth - 2m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right bank of the thodu at this portion is private.

Ch: 0.176 Km: Bridge at Vadakkekkara Bhagom

The above bridge is located across Elappara thodu at chainage 0.176 km. The location of the bridge is Latitude 9.656592 N, Longitude 76.997837 E. Both banks are not protected. It has an approximate length 10.00 m, width 3.00m and height 8m. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water, now the bridge is partially damaged. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left and right side of bridge is Private.

Ch: 0.350 Km: Eettichuvadu Bhagom Bridge

The above bridge is located across Elappara thodu at chainage 0.350 km. The location of the bridge is Latitude 9.655825 N, Longitude 76.997683E. Both banks are not protected. It has an approximate length 8.00 m, width 3.00m and height 5m. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock and silt. The silt deposited at this portion of the thodu is, Length - 100m, breadth - 10m, depth - 2m, it may obstruct the smooth flow of thodu. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right side of bridge is Private.

Ch: 0.419 Km: Cherthalakkuzhiyil Bhagom

The location of the bridge is Latitude 9.655583 N, Longitude 76.996493 E. Both banks are not protected. The large delta formation at this portion of the thodu is, Length - 100m, breadth - 25m, depth - 2m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right bank of the thodu at this portion is private.

Ch: 4.310 Km: Near Muslimpalli Bhagom

The location of the bridge is Latitude 9.653029 N, Longitude 76.994212 E. Both banks are not protected. The ownership of land on left and right bank of the thodu at this portion is private. The type of soil on bed of the thodu at this location is rock

Ch: 4.500 Km: Bridge at Elappara Town

The above bridge is located across Elappara thodu at chainage 4.50 km. The location of the bridge is Latitude 9.632497 N, Longitude 76.978982 E. Both banks are protected. It has an approximate length 12.00 m, width 5.00m and height 5m. The bridge abutments are constructed inside the thodu and old piller portion are in the left side of the thodu. Hence the bridge and old piller portions may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of bridge is Private. Thodu encroachments are visible at this location. Commercial and residential buildings are constructed by encroaching the banks of the thodu

Ch: 4.740 Km: Foot Bridge Near Elappara Temple

The above Foot bridge is located across Elappara thodu at chainage 4.740 km. The location of the bridge is Latitude 9.632396 N, Longitude 76.977152 E. Both banks are protected. It has an approximate length 14.00 m, width 1.50m and height 3m. The type of soil on bed of the thodu at this location is silt. The silt deposited at this portion of the thodu is, Length - 50m, breadth - 10m, depth – 1.50m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right side of bridge is Private.

Ch: 4.800 Km: Bridge Near Elappara Temple

The above Bridge is located across Elappara thodu at chainage 4.800 km. The location of the bridge is Latitude 9.632057 N, Longitude 76.97722 E. Both banks are protected. It has an approximate length 14.00 m, width 5.00m and height 3m. The type of soil on bed of the thodu at this location is silt. The ownership of land on left and right side of bridge is Private.

Ch: 4.810 Km: Cross bar Near Elappara Temple

The above cross bar is located across Elappara thodu at chainage 4.810 km. The location of the bridge is Latitude 9.631965N, Longitude 76.977305 E. Both banks are protected. It has an approximate length 14.00 m, width 5.00m and height 3m. The type of soil on bed of the thodu at this location is silt. The large delta formation at this portion of the thodu is, Length - 250m, breadth - 8m, depth – 1.50m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right side of crossbar is Private.

Ch: 5.700 Km: Bridge Near Wayside Aminity Centre

The above bridge is located across Elappara thodu at chainage 5.70 km. The location of the bridge is Latitude 9.625779 N, Longitude 76.97482 E. Both banks are protected. It has an approximate length 8.00 m, width 8.00m and height 3.50m. The type of soil on bed of the thodu at this location is silt and rock. The ownership of land on left and right side of bridge is Tea Company.

5.700 Km: Cross bar Near Wayside Aminity Centre

The above Cross bar is located across Elappara thodu at chainage 5.70 km. The location of the bridge is Latitude 9.625822 N, Longitude 76.975028 E. Both banks are protected. It has an approximate length 7.00 m. The type of soil on bed of the thodu at this location is silt and rock. The ownership of land on left and right side is Tea Company.

Ch: 7.84 Km: Bridge At Tyford Estate

The above bridge is located across Elappara thodu at chainage 7.84 km. The location of the bridge is Latitude 9.623077 N, Longitude 76.959705 E. Both banks are not protected. It has an approximate length 6.00 m, width 3.00m and height 3.00m. The type of soil on bed of the thodu at this location is silt and rock. The ownership of land on left and right side of bridge is Tea Company.

Ch: 8.220 Km: Cross bar At Tyford Estate

The above crossbar is located across Elappara thodu at chainage 8.22 km. The location of the crossbar is Latitude 9.623058 N, Longitude 76.959693 E. Both banks are protected. It has an approximate length 6.00 m. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of crossbar is Tea Company.

Ch: 8.220 Km: Bridge Near Cross bar At Tyfoid Estate

The above bridge is located across Elappara thodu at chainage 8.22 km. The location of the bridge is Latitude 9.620253 N, Longitude 76.959672 E. Both banks are protected. It has an approximate length 6.00 m. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of bridge is Tea Company.

Ch: 8.430 Km: Bridge Near Cross bar At Tyfod Estate Hospital

The above bridge is located across Elappara thodu at chainage 8.43 km. The location of the bridge is Latitude 9.620057 N, Longitude 76.959584 E. Both banks are protected. It has an approximate length 6.00 m. The type of soil on bed of the thodu at this location is rock. Small quantity of waste deposited near the bridge.The ownership of land on left and right side of bridge is Tea Company.

Ch: 2.660 Km: 4th Mile bhagam

The location of this point is Latitude 9.658315 N, Longitude 76.997483 E. Both banks are not protected. The ownership of land on left and right bank of the thodu at this portion is private. The type of soil on bed of the thodu at this location is rock.

Ch: 3.050 Km: 4th Mile bridge

The above bridge is located across Chinnar thodu at chainage 3.05 km. The location of the bridge is Latitude 9.659593 N, Longitude 76.994152 E. It has an approximate length 18.00 m, width 8.00m and height 6m. The type of soil on bed of the thodu at this location is rock. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water. The silt deposited at this portion of the thodu is, Length - 100m, breadth - 15m, depth - 2m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left side and right side of bridge is private.

Ch: 3.060 Km: 4th Mile Foot Bridge

The above Foot Bridge is located across Chinnar thodu at chainage 3.06 km. The location of the foot bridge is Latitude 9.659595 N, Longitude 76.99416 E. It has an approximate length 7.00 m, width 2.00m and height 6m. The type of soil on bed of the thodu at this location is rock. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water. The silt deposited at this portion of the thodu is, Length - 100m, breadth - 15m, depth - 2m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left side and right side of bridge is Private.

Ch: 3.750 Km: Kodaikalnal Bridge

The above bridge is located across Chinnar thodu at chainage 3.75 km. The location of the bridge is Latitude 9.659616 N, Longitude 76.988466 E. It has an approximate length 20.00 m, width 8.00m and height 4m. The type of soil on bed of the thodu at this location is rock. The height of the vent way of the bridge is 4m.The height of vent way of the bridge is less so that the thodu may get flooded due to materials struck at the bridge pillars. Hence the bridge may cause obstructions to the smooth flow of water. Now the bridge is in damaged condition. The ownership of land on left side and right side of bridge is Private.

Ch: 5.650 Kh: Bridge at Karimkuttickal Bhagom

The above bridge is located across Chinnar thodu at chainage 5.65 km. The location of the bridge is Latitude 9.665888N, Longitude 76.972796E. It has an approximate length 20.00 m, width 8.00m and height 4m. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left side and right side of bridge is Private.

Ch: 6.234 Km: Steel Foot Bridge Near Elampadam

The above Foot Bridge is located across Chinnar thodu at chainage 6.234 km. The location of the bridge is Latitude 9.665821N, Longitude 76.968929E. It has an approximate length 18.00 m, width 2.00m and height 6m. The type of soil on bed of the thodu at this location is rock. The bridge steel pillers are fixed inside the thodu, it may get flooded due to materials struck at the bridge pillars.The ownership of land on left side and right side of bridge is Private.

Ch: 6.940 Km: Eettathodu bridge

The above bridge is located across Chinnar thodu at chainage 6.94 km. The location of the bridge is Latitude 9.665859N, Longitude 76.968962E. It has an approximate length 15.00 m, width 4.00m and height 3m. The height of vent way of the bridge is less so that the thodu may get flooded due to materials struck at the bridge pillars. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left side and right side of bridge is Private.

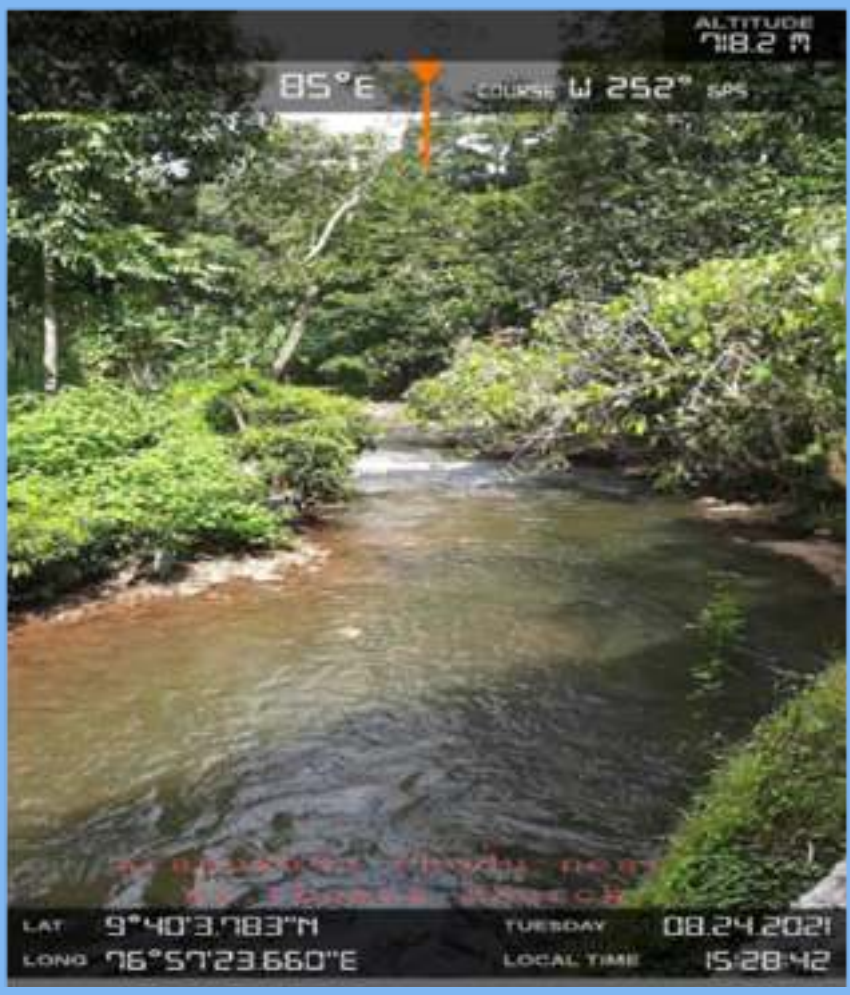
Ch: 7.840 Km: Near ST. Thomas Church

The location of this portion of the thodu is Latitude 9.667889 N, Longitude 76.957126 E. Both banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on left bank and right bank of the thodu at this portion is private.

Ch 7.84Km - Arappukadu Thodu

6.17.16.1 Ch: 0 Km: Confluence of Arappukadu Thodu to Chinnar Thodu

It is a sub tributary of Periyar River and it begins from Vagamon Vazhikkadavu diversion scheme in Meenachal River and joins Chinnar thodu near Kochukarimthiri ST. Thomas Church bhagam. The location of the joining portion of this thodu is Latitude 9.667718 N, Longitude 76.956572E. Both banks arenot protected. The large silt deposited at this portion of the thodu is, Length - 80m, breadth - 8m, depth –1.50m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right bank of the thodu at this portion is private.



Ch: 0.08 Km: Kochukarimthiri Cheenthalaar Bridge Near St Thomas Church

The above bridge is located across Arappukadu thodu at chainage 0.080 km. The location of the bridge is Latitude 9.668164 N, Longitude 76.957185 E. Both banks are protected. It has an approximate length 9.00 m, width 6.00m and height 5m. The type of soil on bed of the river at this location is rock and silt. The large silt deposited at this portion of the thodu is, Length - 60m, breadth - 15m, depth – 2.00m, it may obstruct the smooth flow of water. Approximate composition of soil is 80% silt and 20% clay. The ownership of land on left and right side of bridge is Private.

Ch: 8 Km: Vagamon Vazhikkadavu Diversion Scheme

The above weir is located across Arappukadu thodu at chainage 8 km. The location of the bridge is Latitude 9.683188N, Longitude 76.897943E. Both banks are protected. It constructed across the Meenachal River. It has an approximate length 45.00 m. The type of soil on bed of the river at this location is rock. The ownership of land on left bank is road and right side is KSEB.

Ch: 7.990 Kh: Nellikkunnel Bhagom Bridge

The above bridge is located across Chinnar thodu at chainage 7.99 km. The location of the bridge is Latitude 9.666344 N, Longitude 76.956908 E. It has an approximate length 17.00 m, width 5.00m and height 7m. The type of soil on bed of the thodu at this location is rock. The ownership of land on left side and right side of bridge is Private.

Ch: 8.830 Km: Apakadappalam Bridge

The above bridge is located across Chinnar thodu at chainage 8.83 km. The location of the bridge is Latitude 9.6597N, Longitude 76.9576E. It has an approximate length 12.00 m, width 5.00m and height 5m. The type of soil on bed of the thodu at this location is rock andsilt. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water. The ownership of land on left side and right side of bridge is Tea Company.

Ch: 9.190 Km: Hanging Bridge at Kochukarimthiri

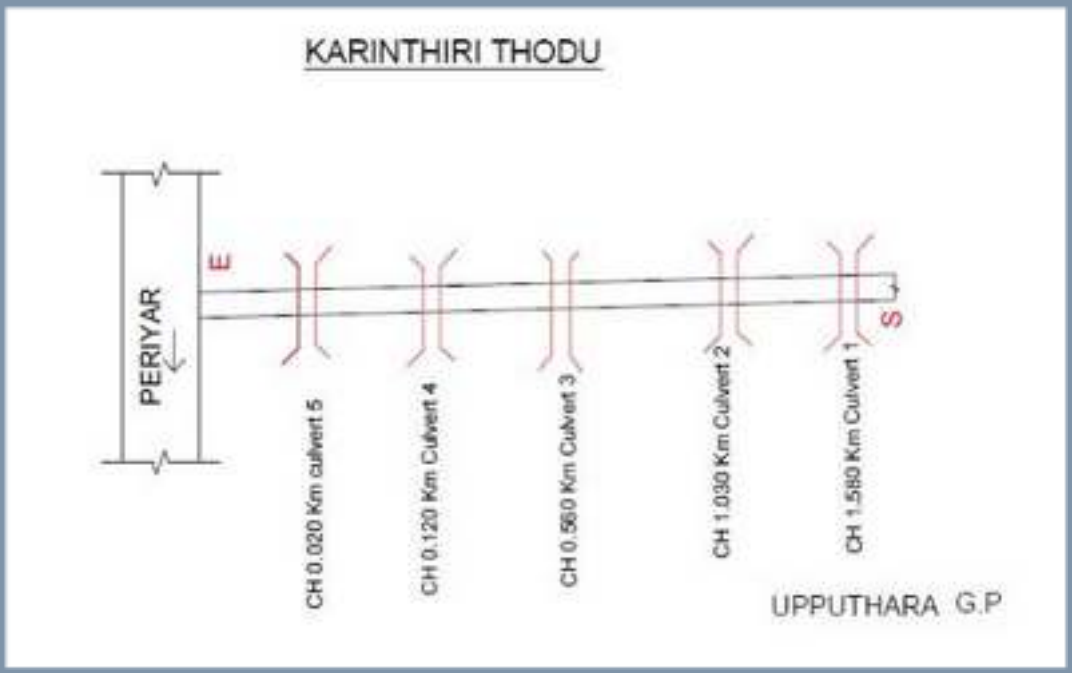
The above Hanging Bridge is located across Chinnar thodu at chainage 9.190 km. The location of the bridge is Latitude 9.661082N, Longitude 76.955739E. It has an approximate length 30.00 m. The type of soil on bed of the thodu at this location is silt. Both sides are not protected. The ownership of land on left side and right side of bridge is Tea Company.

Ch: 9.943 Km: Kochukarimthiri Bridge

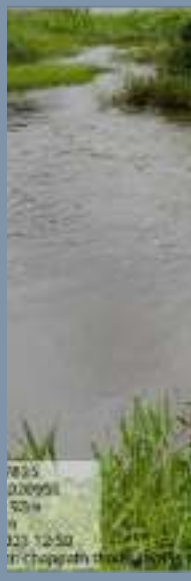
The above bridge is located across Chinnar thodu at chainage 9.943 km. The location of the bridge is Latitude 9.663013 N, Longitude 76.950543 E. Both banks are not protected. It has an approximate length 10.00 m, width 3.00m and height 3m. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water, now the bridge is damaged. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on left and right side of bridge is Private.

Ch: 11.32 Km: Paalozhukumpaara Bhagom Bridge
The above bridge is located across Chinnar thodu at chainage 11.32 km. The location of the bridge is Latitude 9.658596 N, Longitude 76.940103 E. Both banks are not protected. It has an approximate length 10.00 m, width 3.00m and height 3m. The bridge abutments are constructed inside the thodu. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of bridge is Private.

Ch: 11.35 Km: Paalozhukumpaara Bhagom
The location of this portion of the thodu is Latitude 9.650009 N, Longitude 76.947416 E. Both banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on left bank and right bank of the thodu at this portion is private.



SCHEMATIC SKETCH OF KARINTHIRI THODU



Ch: 15.546 Km: Nallathanni Bhagom Bridge
The above bridge is located across Chinnar thodu at chainage 15.546 km. The location of the bridge is Latitude 9.637765 N, Longitude 76.933706 E. Both banks are not protected. It has an approximate length 3.00 m, width 4.00m and height 2.50m. The type of soil on bed of the thodu at this location is rock. The ownership of land on left and right side of bridge is Private.

KARINTHIRI THODU JOINING PERIYAR

Karimthiri thodu
Karinthirithodu joins Periyar near chappath bridge on its left bank @ chainage 93.096 km. It originates from Karinthiri estate or 27-acre estate. It flows through estate of Malankara tea plantation and reaches Periyar just besides the ChappathDharmasasthatemple.It is also referred asKarinthiri- ChappathThodu. It flows in the UpputharaPanchayath during its entire course. Five culverts are observed across the thodu. No other major structures like check dams or VCB s are found. The length of 1.580 Km.

Ch . 0/020 Km Culvert

The culvert is located at Chappath Dharma shastha temple padi at ch 0/020 km. The location of the bridge is 9.66777 N, 77.02094 E. It has approximate length 4.40m, width 4.60 m and height 1.6 m. The upstream is protected and downstream banks is not protected. There may be some obstruction to smotth flow of water s the Abutments are slightly located into the thodu. The type of soil on bed of the thodu at this location is sand and silt. The ownership of land on upstream and downstream are Government land.

Ch . 0/120 Km Culvert

The above culvert is located at Chappath – Upputhra road at ch 0/120 km. The location of the bridge is 9.668159N, 77.019484E. It has approximate length 8.75m, width 3.8 m and height 1.8m. The upstream and downstream banks are not protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is sand,clay and silt. The ownership of land on upstream and downstream are Estate Property.

END POINT OF KARINTHIRI THODU

Ch . 0/560 Km Culvert

The above culvert is located at inside Malanakara tea Estate ch 0/560 km. The location of the bridge is 9.669081, 77.019484E. It has approximate length 2.6m, width 5 m and height 1.8m. The width of thodu is 3 m. The upstream and downstream banks are protected. There may be some obstruction to smotth flow of water since the Abutments are slightly located into the thodu. The type of soil on bed of the thodu at this location is clay and silt. The ownership of land on upstream and downstream are Estate Property.

Ch . 1/580 Km Culvert

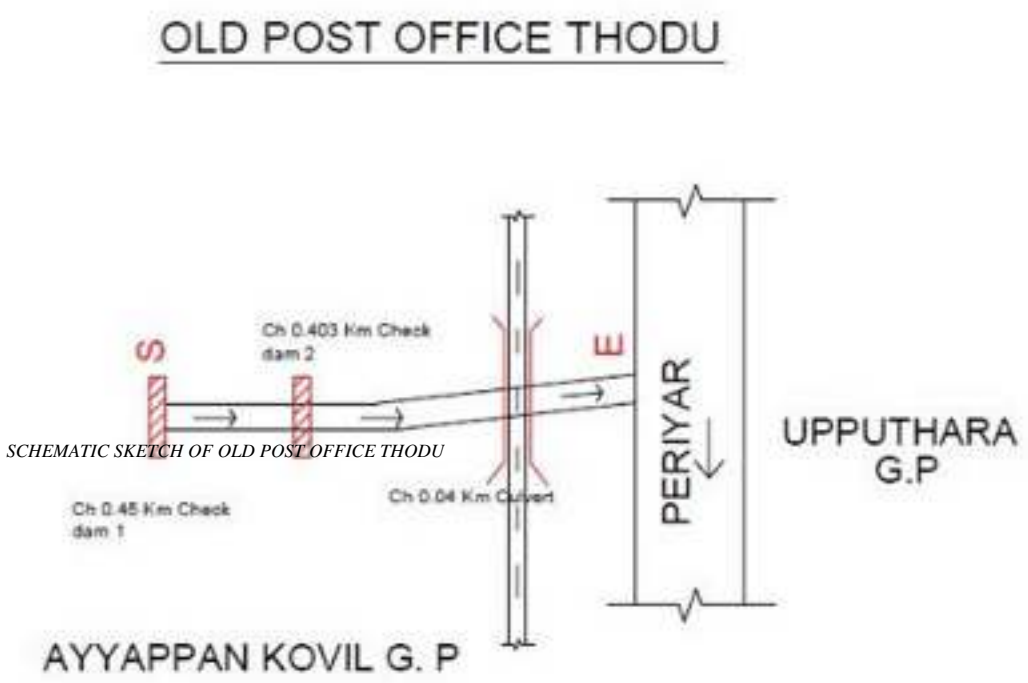
The above culvert is located at inside Malanakara tea Estate ch 1/580 km. The location of the bridge is 9.671719N, 77.008218 E. It has approximate length 3m, width 6 m and height 2 m. The upstream and downstream banks are protected. There may be no obstruction to smooth flow of water. The type of soil on bed of the thodu at this location is rock and silt. The ownership of land on upstream and downstream are Estate Property.

Ch . 1/030 Km Culvert

The above culvert is located at inside Malanakara tea Estate ch 1/030 km. The location of the bridge is 9.671753N, 7.01314 E. It has approximate length 3m, width 3 m and height 2 m. The width of thodu is 3 m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are slightly located into the thodu. The type of soil on bed of the thodu at this location is clay and silt. The ownership of land on upstream and downstream are Estate Property.

Ch 93.5 km - OLD POST OFFICE THODU

Old post office thodu joins Periyar on its right bank near old post office, Chappath @ chainage 93.5 km. It is originating from Poomala estate as kaithodu and flows down through Malabar Agricultural Coffee estate in AyyappankovilPanchayath where 2 checkdams are built across the thodu. It flows under the culvert on Kattapana-Kottayam Road before joining Periyar. There are 2 Checkdams constructed on the thodu inside the private property of Malabar Agricultural Coffee Estate. These both Checkdams are about 20 years' age and are fully covered in vegetation and climbers. Both check das are made of concrete masonry. Checkdam 1 is around 11 m long and 2 m height. It is having a top width of 80 cm. It is covered with vegetation. Check dam 2 is around 15 long and height of 2 m. It is fully covered in vegetation. There is a culvert constructed across thodu on the Kattapana- Kuttikanam Road. The size of culvert is 4.10 m long and 8 m wide. The bed of thodu is clay and the depth of water is 1.8 m. Both the sides are covered in vegetation and DR masonry protection wall is done upto the culvert. No pollution or direct dumping of waste is observed in this thodu.



SCHEMATIC SKETCH OF OLD POST OFFICE THODU

Ch 0.040 Km Culvert

The above bridge is located at olf post office bhagom at ch 0/040km.. The location of the bridge is9.670303N,77.024057E.It has approximate length 8.00m, width 4.10 m and height 2.5m. The upstream and downstream banks are protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is clay ad silt. The ownership of land on upstream and downstream of culvert is govt land.

Ch 0/403 Checkdam 2

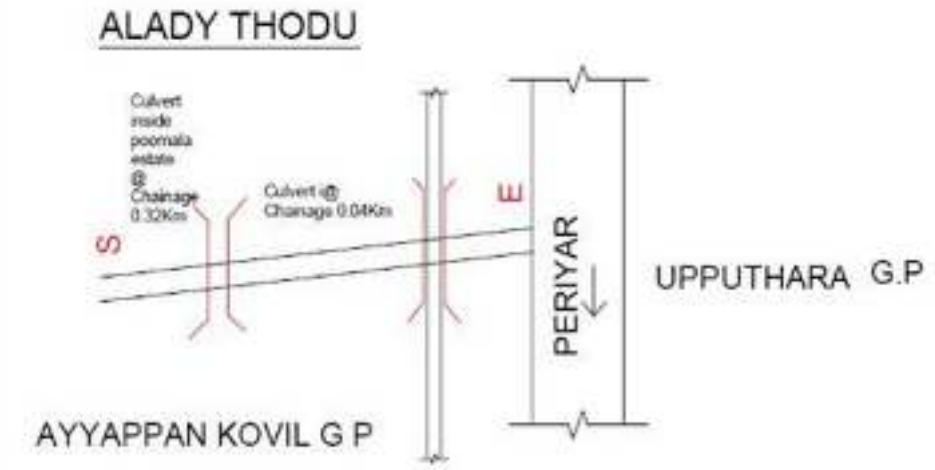
The location of the checkdam is 9.66984 N, 77.07135 E. It is constructed on the thodu inside the private property of Malabar Agricultural Coffee Estate. These both Checkdams are about 20 years' age and are fully covered in vegetation and climbers. Both check das are made of concrete masonry. Check dam 2 is around 11 long and height of 2 m. It is fully covered in vegetation.

Ch 0/450 Checkdam 1

The location of the checkdam is 9.669734N, 77.027629 E. It is constructed on the thodu inside the private property of Malabar Agricultural Coffee Estate. These both Checkdams are about 20 years' age and are fully covered in vegetation and climbers. Both check das are made of concrete masonry. Check dam 1 is around 15 long and height of 2 m. It is fully covered in vegetation.

Ch 94.70 Km - ALADY THODU

AladyThodu Joins Periyar on its right bank near the AladyPorikanni pedestrian Bridge which was collapsed during the 2018 flood.It Joins Periyar @Chainge 94.70 Km It Orginates from Poovanthikudi and flows through Poomala estate in AyyapankovilPanchayath as kaithodu and flows inAyyappankovil GP on its 70 percent length of flow before joining Periyar. No major structures are found across the thodu other than culverts. The depth is around 2 m on reaching Periyar and the starting point is having depth of 1.2 m Deposits of sand, clay and gravel are observed in the thodu. Side protection walls of DR masonry are also given in locations near culverts. The width of thodu near joining Periyar is about 6 m. No major pollution sources are found in the thodu.



Ch 0/040 Km Culvert

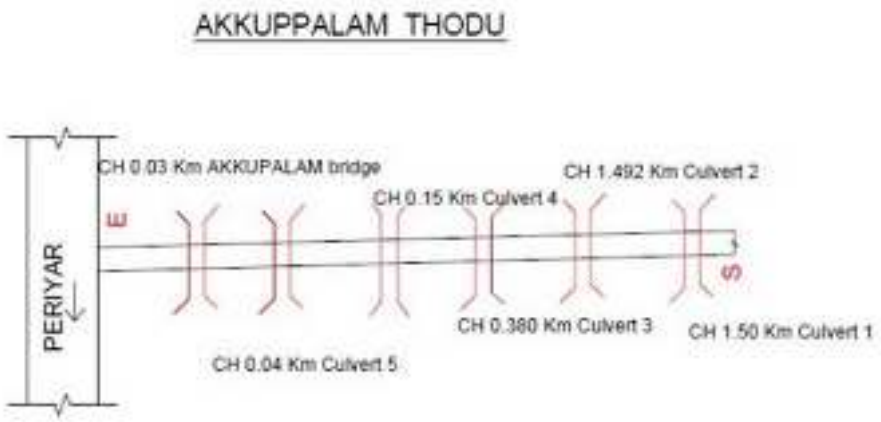
The above bridge is located on alady thodu near alady porikanni bridge at ch 0/040km.. The location of the bridge is9.677948N,77.027498 E.It has approximate length 8.5m, width of slab 6.7 m and height 2m. The upstream and downstream banks are protected. Width of thodu is 6 m .The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow ofwater. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is govt land.

Ch 0/320 Km Culvert

The above culvert is located on alady thodu inside poomalai estate at ch 0/320km.. The location of the bridge is9.676136 N,77.037908 E.It has approximate length 4 m, width of slab 3 m and height 1m. The upstream and downstream banks are protected.It allows smooth flow of water. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is estate property.

Ch 96/630 Km AKKUPALAM THODU

Akkuppalamthodu joins Periyar on its right bank near Akkupalam Bridge @ Chainage 96.63 Km. It is orginted from the LakshamVeedLauntry and flows in the UpputharaPanchayath till it reaches Periyar. There are several Culverts and Akkuppalam Bridge across the thodu. No other structures are observed obstructing the flow of water. The thodu banks are protected by DR masonry for almost 75 % of its flow under the study. One bridge named Akkupalam is built across it hence the name. The bridge is 4.15 m in length and 4 m wide. Depth of thodu is 1.2m and width od span is 3.3 m. Sediments like gravel, boulder, silt are found near end of thodu. Vegetation is found on both banks in some areas. No pollution is observed.



UPPUTHARA G.P

AKKUPPALAM THODU JOINING PERIYAR

Ch 0/030 Km Akkuppalam Bridge

Akkuppalam Bridge is located at ch 0/030 km. The location of the bridge is 9.692774 N, 77.024155 E. The bridge is 4.15 m in length and 4 m wide. Depth of thodu is 1.2m and width, span is 3.3 m. The upstream and downstream banks are protected. There may be

some obstruction to smooth flow of water since the Abutments are slightly located into the thodu. The type of soil on bed of the thodu at this location is clay and silt. The ownership of land on upstream and downstream are Govt land.

Ch 0/040 Km Culvert

The above culvert is located at ch 0/040 km. The location of the bridge is 9.69275 N, 77.02415 E. It has approximate length 3.70m, width 3.30 m and height 1m. The upstream and downstream banks are not protected. There

may be some obstruction to smooth flow of water since the Abutments and pier are located into the thodu. The type of soil on bed of the thodu at this location is sand, clay and silt. The ownership of land on upstream and downstream are government land

Ch . 0/150 Km Culvert

The above culvert is located at ch 0/150 km. The location of the bridge is 9.692077 N, 77.023522 E. It has approximate length 3.m, width 3.30 m and height 1.2m. The upstream and downstream banks are not protected. There may be some obstruction to smooth

flow of water since the Abutments and pier are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Private land

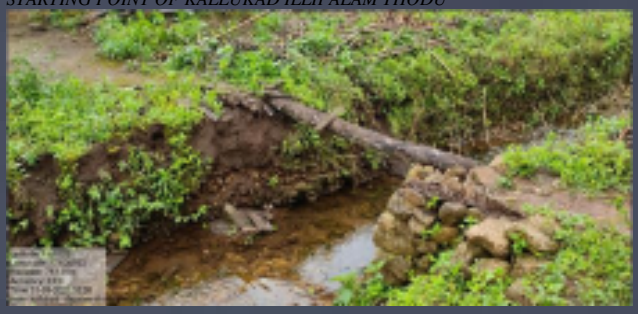
Ch . 0/380 Km Culvert

The above culvert is located on Anganavadi Junction to Perukanni Road at ch 0/380 km. The location of the bridge is 9.691515N, 77.021516E. It has approximate length 5.m, width 3.30 m and height 1.5m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments and pier are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Private land

Ch1/492 Km Culvert

The above culvert is located at ch 1/492 km. The location of the bridge is 9.687953N, 77.013464E. It has approximate length 5.m, width 3.30 m and height 1.5m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments and pier are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Private land.

STARTING POINT OF KALLUKAD ILLIPALAM THODU



Ch 97/100 Km - KALLUKAD- ILLIPPALAM THODU

Kallukad – Illippalamthodu joins Periyar on its Left bank near Illippalam bridge @ chainage 97.10 Km. It orginates from Kallukad and flows through ward 12 of Upputharapanchayath till it Joins Periyar. Various culverts are built across thodu which flows parallel to Upputhara- Pasuppara Road. Sediments like gravel, boulder, silt are found near end of thodu. Vegetation is found on both banks in some areas. No pollution is observed in thodu .

KALLUKAD THODU JOINING PERIYAR

Ch . 0/050 Km - Illippalam Bridge

The Bridge is located at ch 0/050 km. The location of the bridge is 9.6955781N, 77.021354E. It has approximate length 7.7.m, width 4.90 m and height 2 m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is, clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Governement land.

Ch . 0/190 Km Culvert

The culvert is located at ch 0/190 km. The location of the bridge is 9.694913N, 77.020326E. It has approximate length 6.20m, width 2.8 m and height 1.25 m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Government land.

Ch . 0/290 Km Culvert

The culvert is located at ch 0/290 km. The location of the bridge is 9.694982 N, 77.019521E. It has approximate length 4.m, width 2.1 m and height 1.8 m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Government land.

Ch . 0/400 Km Culvert

The culvert is located at ch 0/400 km. The location of the bridge 9.695142 N, 77.018498 E.It has approximate length 4.7.m, width 2.4 m and height 1.5 m. The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on upstream and downstream are Government land.

Ch . 0/420 Km Culvert

The culvert is located on st peters believers' church bhagom at ch 0/420 km. The location of the bridge 9.695183N, 77.01828 E.It has approximate length 4.6 m, width 3.5 m and height 1.5 m. Width of thodu is 4.5m The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is ,clay and silt. Both banks are covered with vegetation.The ownership of land on right bank is private land and left side is Public road.

Ch . 0/450 Km Steel Culvert

The steel culvert to private building is located besides st peters believers' church bhagom at ch 0/450 km. The location of the bridge 9.695233N, 77.018097E.It has approximate length 5 m, width 2.9 m and height 1.5 m. Width of thodu is 4.5m The upstream and downstream banks are protected. There is no obstruction to smooth flow of water since the Abutments are not located into the thodu. The type of soil on bed of the thodu at this location is, clay and silt. Both banks are covered with vegetation. The ownership of land on right bank is private land and left side is Public road.

Ch . 0/470 Km Culvert

The culvert is located on Aerathu Communications bhagom at ch 0/470 km. The location of the bridge 9.695118 N, 77.017769 E.It has approximate length 4.5 m, width 3.5 m and height 1.5 m. Width of thodu is 4.5m The upstream and downstream banks are partially protected. There may be some obstruction to smooth flow of water since the Abutmentsare located into the thodu. The type of soil on bed of the thodu at this location is, clay and silt. Both banks are covered with vegetation.The ownership of land on right bank is private land and left side is Public road.

Ch . 0/510 Km Culvert

The culvert to private property is located at ch 0/510 km. The location of the bridge 9.695121 N, 77.017553 E.It has approximate length 3.7 m, width 3.10 m and height 1.2 m. Width of thodu is 4.5m The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is, clay and silt. Both banks are covered with few vegetation. The ownership of land on right bank is private land and left side is Public road.

Ch . 1/030 Km Culvert

The culvert to private property is located at ch 1/030 km. The location of the 9.692594 N, 77.014134 E.It has approximate length 3.4 m, width 3.10 m and height 1.2 m. Width of thodu is 4.5m The upstream and downstream banks are protected. There may be some obstruction to smooth flow of water since

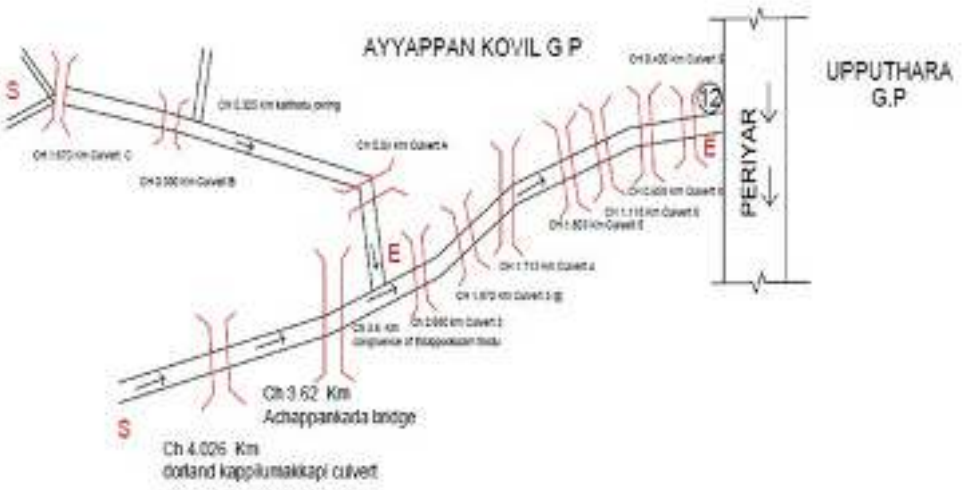
the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is rocky and silt. Both banks are covered with few vegetation. The ownership of land on right bank is private land and left side is Public road.

Ch 1/378 Km Thavarna Bridge

The Bridge is located on Upputhara- Pasuppara Road at ch 1/378 km. The location is the 9.691076 N, 77.011805 E. It has approximate length 5.3 m, width 7.3 m and height 2.5 m. Width of thodu is 4.5m The upstream and downstream banks are not protected. There may be some obstruction to smooth flow of water since the Abutments are located into the thodu. The type of soil on bed of the thodu at this location is rocky and silt. Both banks are covered with vegetation. The land on upstream and downstream are government land.

Ch . 1/753 Km Launtry Estate Bridge

The Bridge is located inside laundry estate at ch 1/753 km. The location of the point is 9.690871 N, 77.009232 E. It has approximate length 4.2 m, width 3.4 m and height 3 m. Width of thodu is 3.m The upstream and downstream banks are not protected. There is no obstruction to flow.The type of soil on bed of the thodu at this location is clay and silt. Both banks are covered with few vegetation. The of land on upstream and downstream are Estate land



Confluence point

Ch 98.35 Km - OORAMPARA THODU

Ooramparathodu Joins Periyar on its right bank at Thonithadi @ chainage 98.35 Km.Theorgin of thodu is from Ayyarupara in Chekuthan mala as kaithodu and flows on Left Bank and Nedumpally estate on Right Bank.It flows over various culverts and Achappankada Bribetween two Estates ie. Sulthaniya estate dge on Anavilasam-Marykulam Road. A tributary named Edappookulamthodu Joins OoramparaThodu on its left Bank at Thundathilpadi just in front of Achappankada Bridge @ chainage 1.570 Km of Tributary The width of thodu on reaching Periyar is 8 m and depth is 1.5 m. Both banks of thodu are private property. Many obstructions to flow like fallen tree trunks, rocks, boulder deposits are observed in the thodu. Bed of thodu was found to be rocky for some stretch and clayey and silty on the end stretch. It is not protected on sides in many locations. However, DR masonry is also provided in many locations to prevent sliding of banks. Sediments are found in many locations. But they are not severe. Many locations are having boulder deposits. However, thodu does not causes much flood problems as it flows a majority portion of it in un utilized areas and estate properties.

Ch 0/658 Km Culvert

The above culvert is located on oorampara thodu near Thonithady at ch 0/658km. The location of the bridge is 9.69651 N, 77.035508 E. It has approximate length 7.6 m, width of slab 15 m and height 2 m. The upstream and downstream banks are protected. It allows smooth flow of water. The type of soil on bed of the thodu at this location is clay, sand and silt. The ownership of land on upstream and downstream of culvert is Government Property.

Ch 0/400 Km Culvert

The above culvert is located on oorampara thodu near Thonithady at ch 0/400km. The location of the bridge is 9696666 N, 77.033493 E. It has approximate length 5.3 m, width of slab 5.1 m and height 1.8m. The upstream and downstream banks are not protected.It allows smooth flow of water. The type of soil on bed of the thodu at this location is clay and silt. The ownership of land on upstream and dow nstream of culvert is private land.

Ch 1/158 Km Culvert

The above culvert is located on Kattappana-Kuttikanam road at ch 1/158 km. The location of the bridge is 9.693629 N, 77.03881E. It has approximate length 7 m, width of slab 4.10 m and height 1.5 m. The upstream and downstream banks are protected. It allows smooth flow of water. The type of soil on bed of the thodu at this location is clay, sand and silt. The ownership of land on upstream and downstream of culvert is Government Property.

Ch 1/603 Km - Culvert

The above culvert is located parallel to 6 acre road at ch 1/603 km. The location of the bridge is 9.690425N, 77.040232E. It has approximate length 5 m, width 4.50 m and height 1 m. The upstream and downstream banks are protected. It allows smooth flow of water. The type of soil on bed of the thodu at this location is clay, sand and silt. The ownership of land Government Property on right side and private property on left side

Ch 1/713 Km Culvert

The above culvert is located parallel to 6 acre road at ch 1/713 km. The location of the bridge is 9.690059 N, 77.04023 E. It has approximate length 5m, width 3.10 m and height 2 m. The upstream and downstream banks are protected. It allows smooth flow of water. The type of soil on bed of the thodu at this location is clay, sand and silt. The ownership of land is Government Property on right side and private property on left side

Ch 1/970 Km - Culvert

The above culvert is located parallel to 6 acre road at ch 1/970 km. The location of the bridge is 9.688773 N, 77.041969 E. It has approximate length 4m, width 3.60 m and height 1.5 m. The upstream and downstream banks are protected. There is vegetation growth on both banks. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water. The type of soil on bed of the thodu at this location is clay, sand and silt. The ownership is Government Property on right side and private property on left side.

Ch . 2/680 Km Culvert

The above culvert is located parallel to 6 acre road at ch 2/680 km. The location of the bridge is 9.68366 N, 77.04242 E. It has approximate length 5m, width 7.50 m and height 2 m. The upstream and downstream banks are protected. There is no obstruction to flow of water The type of soil on bed of the thodu at this location is clay, and silt. The ownership of land on upstream and downstream ofprivate property.

Ch . 3/620 Km Achappankada Bridge

Achappankada Bridge is located on Marykulam-Anavilasam road at ch 3/620 km. The location of the bridge is 9.68755 N, 77.04853E. It has approximate length 11m, width 6.30 m and height 2.5 m. The upstream side is protected partly and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water.The type of soil on bed of the thodu at this location is clay, and silt. The ownership of land on upstream and downstream sides are government land.

Ch 4/026 Km - Culvert at Dorland Kappilumakkapadi

The above culvert is located at Dorland padi at ch 4/026 km. The location of the bridge is 9.688185 N, 77.05204 E. It has approximate length 5m, width 2.70 m and height 1.5 m. The upstream and downstream banks are protected. There is no obstruction to flow of water The type of soil on bed of the thodu at this location is clay, and silt. The ownership of land on upstream and downstream are private property

EDAPOOKULAM THODU JOINING OORAMPARA THODU chainage 3/600 Km

END POINT OF EDAPOOKULAM THODU

Ch . 0/072 Km Collapsed foot Bridge

The above Collapsed foot bridge near Thonithady located at ch 0/072 km. The location of the bridge is9.697511 N, 77.030411 E. It has approximate length 6 m, width 1.5 m and height 1.8 m. The upstream side is protected partly and downstream banks are not protected. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water.The type of soil on bed of the thodu at this location is sand,clay, and silt. The ownership of land on upstream and downstream sides are Private land

Ch . 0/040 Km Culvert

The above culvert is located at thundathil padi at ch 0/040 km. The location of the bridge is 9.68734 N, 77.048435 E. It has approximate length 3.2m, width 3.60 m and height 1.8 m. The upstream and downstream banks are protected. There may be obstruction to smooth flow of water as abutments are slightly located inside thodu. The type of soil on bed of the thodu at this location is clay, and silt. The ownership of land on upstream and downstream of private property

The above culvert is located on Marykulam- Anavilsam road at ch .0/330 km. The location of the bridge is 9.68503N, 77.049425E. It has approximate length 4 m, width 3.60 m and height 1.8 m. The upstream and downstream banks are protected. There may be obstruction to smooth flow of water as abutments are slightly located inside thodu. The type of soil on bed of the thodu at this location is sand, and silt. The ownership of land on upstream and downstream of Government land.

Ch 0/330 Km - Culvert

The above culvert is located on Marykulam- Anavilsam road at ch .0/330 km. The location of the bridge is 9.68503N, 77.049425E. It has approximate length 4 m, width 3.60 m and height 1.8 m. The upstream and downstream banks are protected. There may be obstruction to smooth flow of water as abutments are slightly located inside thodu. The type of soil on bed of the thodu at this location is sand, and silt. The

ownership of land on upstream and downstream of Government land

Ch .1/670 Km Culvert

The above culvert is located on Marykulam- Anavilsam road near Lourdh Matha Grotto at ch 1/670 km. The location of the bridge is 9.674417N, 77.050274 E. It has approximate length 4 m, width 3.60 m and height 1.8 m. The upstream and downstream banks are not protected. There may be obstruction to smooth flow of water as abutments are slightly located inside thodu. The type of soil on bed of the thodu at this location is sand, clay, and silt. The ownership of land on upstream and downstream of Government land

6.23.11.4 Ch . 4/526 Km fallen tree obstruction

The above obstruction is inside private estate land located at ch 4/526 km. The location of the bridge is 9.689766 N, 77.05647 E. It may cause obstructions to the

smooth flow of water. The two banks are not protected. The type of soil on bed of the thodu at this location is rocky, and silt. The ownership of land on upstream and downstream sides are Private land

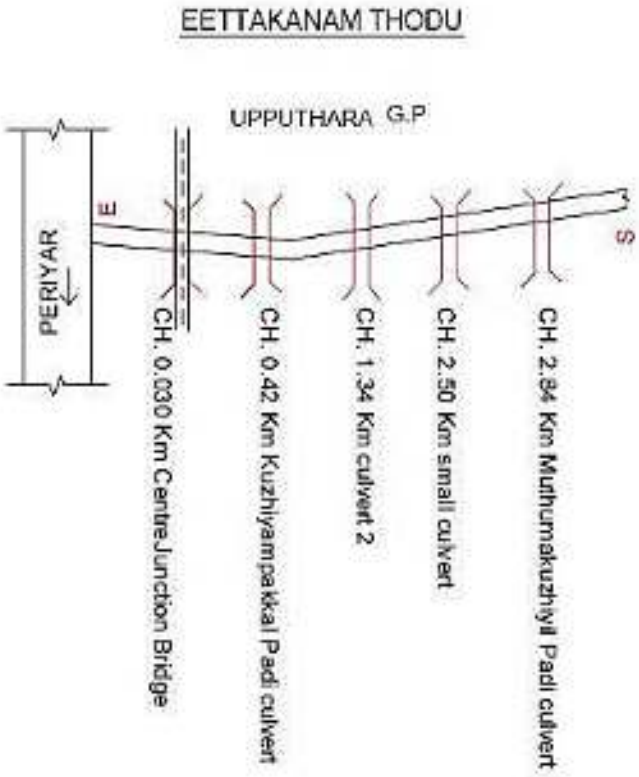
Ch 5/100 Km Boulder deposits

The above boulder deposits is inside private estate land located at ch 5/526 km. The location of the bridge is 9.688551 N, 77.059994 E. It may cause obstructions to the smooth flow of water. The two banks are not protected and there is vegetation growth. The type of soil on bed of the thodu at this location is rocky, and silt. The ownership of land on upstream and downstream sides are Private land.

EETTAKANAM THODU JOINING PERIYAR

Ch 97/800 Km - EETTAKANAM THODU

Eettakanamthodu reaches Periyar on its Left Bank Near the Upputhara Central junction @ chainage 97.80 Km. It originates from a hill in Ettakanam and flows down through various private land and flows parallel to Ettakanam-Mathayipara road until it flows under the Upputhara Central Bridge till it reaches Periyar. The entire flow of thodu is in Upputhara GP. No major structures like weirs or checkdams are found on the thodu. No sedimentation was found which obstructs the flow and no industrial waste is found in the entire length of thodu. But various culverts are located which are not obstructing the flow ofwater A major bridge on the thodu is Upputhara Central Bridge which is about 5 m long and 9.9 m wide. Height of bottom of slab from water level is 3.60m



SCHEMATIC SKETCH OF EETTAKANAM THODU

ORIGIN POINT OF EETTAKANAM THODU

Ch . 0/030 Km Central Junction Bridge

The Bridge is located on Upputhara Central Junction at ch 0/030 km. The location of the site is 9.700245N, 77.022035 E. It has approximate length 5 m, width 9.9 m and height 3.6 m. Width of thodu is 5.m The upstream and downstream banks are protected. There is obstruction to flow as the abutments are inside thodu and span is less than thodu width. The type of soil on bed of the thodu at this location is clay and silt. Both banks are covered with few vegetation. The of land on upstream and downstream are Government land

Ch . 0/420 Km kuzhiyamppakal padi culvert

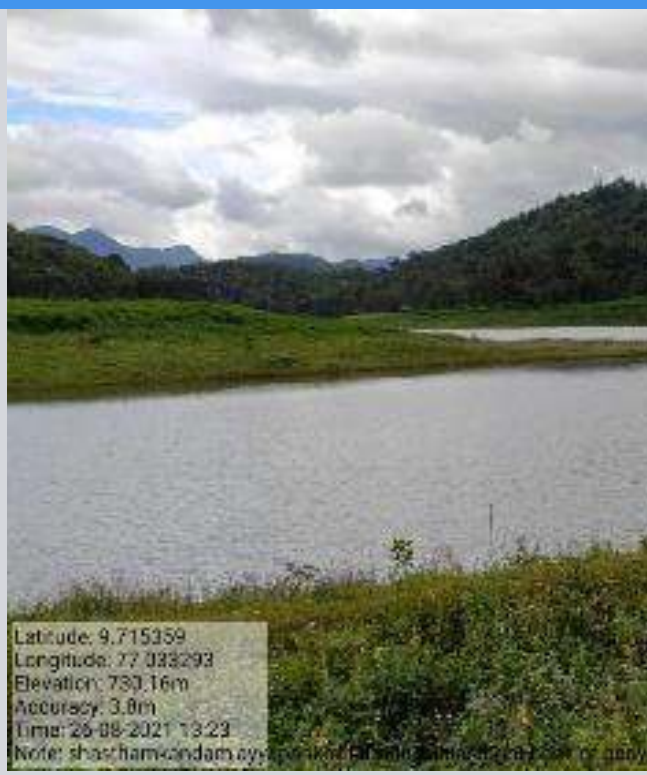
The culvert is located on kuzhiyamppakal padi bhagom at ch 0/420 km. The location of the site is 9.701641 N, 77.022035 E. It has approximate length 4 m, width 7.5 m and height 4.4 m. Width of thodu is 4.5.m The upstream is protected and downstream banks are not protected. There is obstruction to flow as the abutments are inside thodu and span is less than thodu width. The type of soil on bed of the thodu at this location is clay , gravel and silt. Both banks are covered with few vegetation. The of land on upstream and downstream are Government land

Ch . 1/340 Km culvert

The culvert is located at ch 1/340 km. The location of the 9.702914 N, 77.011502 E.It has approximate length 5.2 m, width 4 m and height 4.4 m. Width of thodu is 3.6.m The upstream is protected and downstream banks are not protected. There is obstruction to flow as the abutments are inside thodu and span is less than thodu width. The type of soil on bed of the thodu at this location is clay , gravel and silt. Both banks are covered with few vegetation. The of land on upstream and downstream are Government land

Ch . 2/840 Km culvert

The culvert is located on muthumakuzhiyil padi on eettakanam mathaipara road at ch 2/840 km. The location of the 9.706721 N, 76.999306 E.It has approximate length 3.7 m, width 3.80 m and height 2.45 m. Width of thodu is 3m .The upstream and downstream banks are not protected. There is no obstruction to flow. The type of soil on bed of the thodu at this location is clay and silt. Both banks are covered with few vegetation. The of land on upstream and downstream are Private land



AYYAPPANKOVIL THODU JOINING PERIYAR

Ayyappankovil thodu

AyyappanKovilThodu Joins Periyar on its rightk ban near Ayyapankovil Bridge @chainage 100.300 Km. It is also called Ayyappankovil – Sasthamkandamthodu. It is a small thoduand it was not fully visible since it was fully drowned in the reservoir water. It flows through fields asa small thodu before Reaching Periyar. It orginates as Kaithodu from water from fields through whichit flows.

Vellilamkandam thodu

This tributary starts from a pady field at about 750m from Labbakada to Vellilamkandam road, has a length about 2.61 km and joins with Idukki reservoir at Vellilamkandam .This flows through Kanchiyar Panchayath

Culvert at Vellilamkandam – Labbakada road - Ch.0/250

Span of Culvert is less than actual width of thodu. Silt deposited with small vegetation. So.flow of water obstructed.The bed of thodu is rock with both banks unprotected

Culvert at Mannarmattompady – Ch.0/935

Span of Culvert is less than actual width of thodu.Span of culvert to be increased for smooth flow of water.Silt deposited with small vegetation. So.flow of water obstructed.The bed of thodu is rock with both banks unprotected

Bridge at Kattappana- Kuttikanam road – Ch.1/890

The bridge constructed in Kattappana – Kuttikanam road across Vellilamkandam thodu at Vellilamkandam .The abutment of bridge constructed in rubble and slab in concrete.The span and vertical clearance of bridge is sufficient. There is no obstruction of flow,vegetation and sedimention.The bed of thodu at this portion is rock

Mattapillythodu@ Ch.100.50km

This tributary originates by joining two small streams near Arayathinalpady Irrigation pond, has a length about 2.36 km and joins with Idukki reservoir. This flows through KanchiyarPanchayath

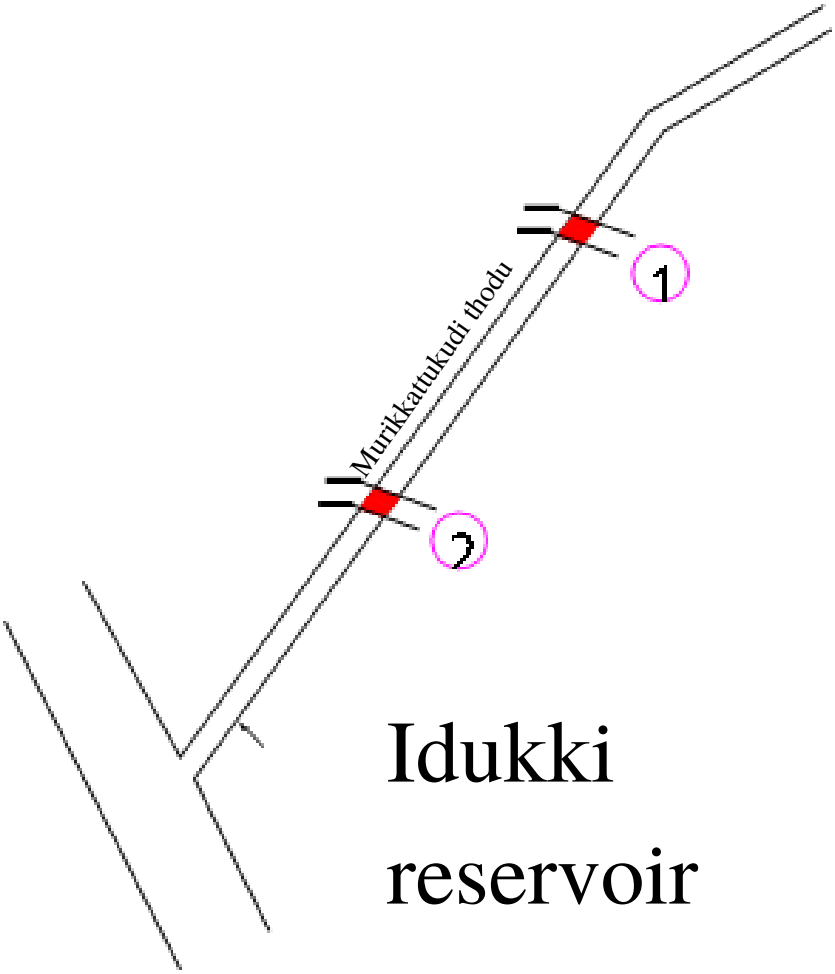
Culvert at Arayathinalpady - Ch.0/100

Bridge at Swaraj- Kozhimala road – Ch.0/810

The bridge constructed in Swaraj - Kozhimala road across Mattapilly thodu.The span and vertical clearance of bridge is sufficient There is no obstruction of flow.Vegetation and silt deposited found on d/s of bridge

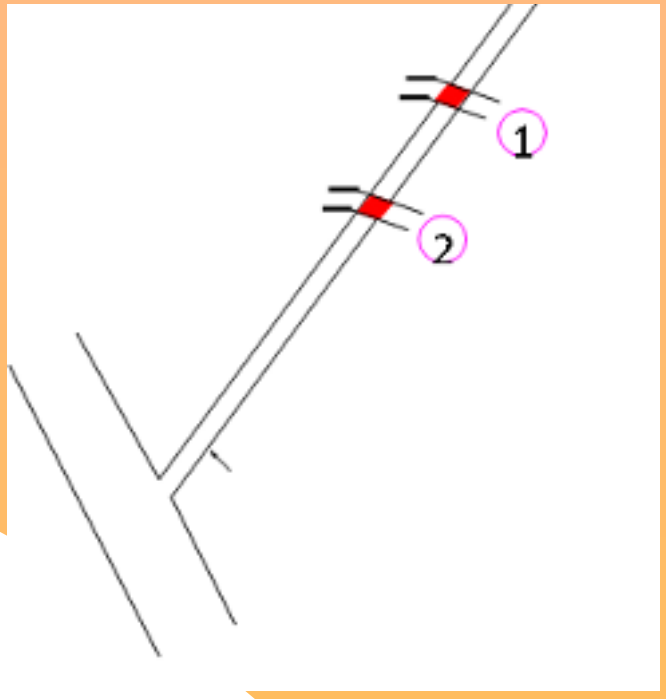
Murikkattukdi thodu@ Ch.100.50km

This tributary originates in marshy land of thick forest about 1.60km from Kanjikallu forest boundary, has a length about 3.51 km and joins with Idukki reservoir at 600m from Murikkattukdi Jn. This flows through Kanchiyar Panchayath



Culvert at Govt.Ayurveda Hospital - Ch.2/350
There is a small Culvert for access to Govt.Ayurveda hospital. There is no obstruction of flow,vegetation and sedimention.The bed of thodu is rock at this portion

Bridge at Murikkattukudi Jn in Kozhimala road – Ch.2/856
The bridge constructed in Kozhimala road across Murikkattukudi thodu at Murikkattukudi Jn.The span and vertical clearance of bridge is sufficient and there is no obstruction of flow.But small vegetation and silt deposited on banks of thodu.



Kozhimala thodu
This tributary starts from Kozhimalanirappu and flows through Rajapuram, has a length about 1.70 km and joins to Idukki reservoir. This flow through KanchiyarPanchayath

Culvert at Rajapuram - Ch.0/680

The culvert is constructed in road to the house of Kozhimala Raja.The span and height of culvert is very less. Hence flow of water obstructed .Land at both sides are in settlement area. Both banks are unprotected.

Culvert at Manjapara - Ch.0/897

The culvert is constructed across Kozhimala thodu at Manjapara area.The span of the culvert is less than actual width of thodu. Hence flow of water obstructed .Land at both sides is in settlement area. Both banks are unprotected

Palakadathodu

This tributary starts from Kalthotty and flows through wet and dry land in KanchiyarPanchayath, has a length about 5.75 km and joins with Idukki reservoir at Anjurali behind water falls

Culvert near Govt.PHC Kalthotty – Ch.0/322

The culvert constructed across Palakada thodu near Kalthotty PHC at Kalthotty road.Vegetation seen on both banks of thodu and banks not protected d/s of culvert.

VCB near Penthacost church Labbakada – Ch.2/310

There is a VCB constructed across Palakada thodu near Penthacost church Labbakada.Now concrete slab constructed over pier of VCB and act as a culvert. The VCB has three span.But two span on both sides partialy closed due to silt deposited and vegetations.Hence flow of water obstructed .No protection work on both sides.

Bridge at Kattappana – Kuttikanam road – Ch.3/500

This is a small bridge constructed across Palakada thodu at Kattappana – Kuttikanam road near Palakada.The thodu at this portion having soil bed and small vegetations.Both banks are unprotected.

Culvert at Palakada – Pezhumkandam thodu – Ch.3/607
This is a culvert 4.00m span constructed across Palakada thodu at Palakada – Pezhumkandam thodu near Palakada Jn.Silt deposited on Left bank.Both banks are protected.

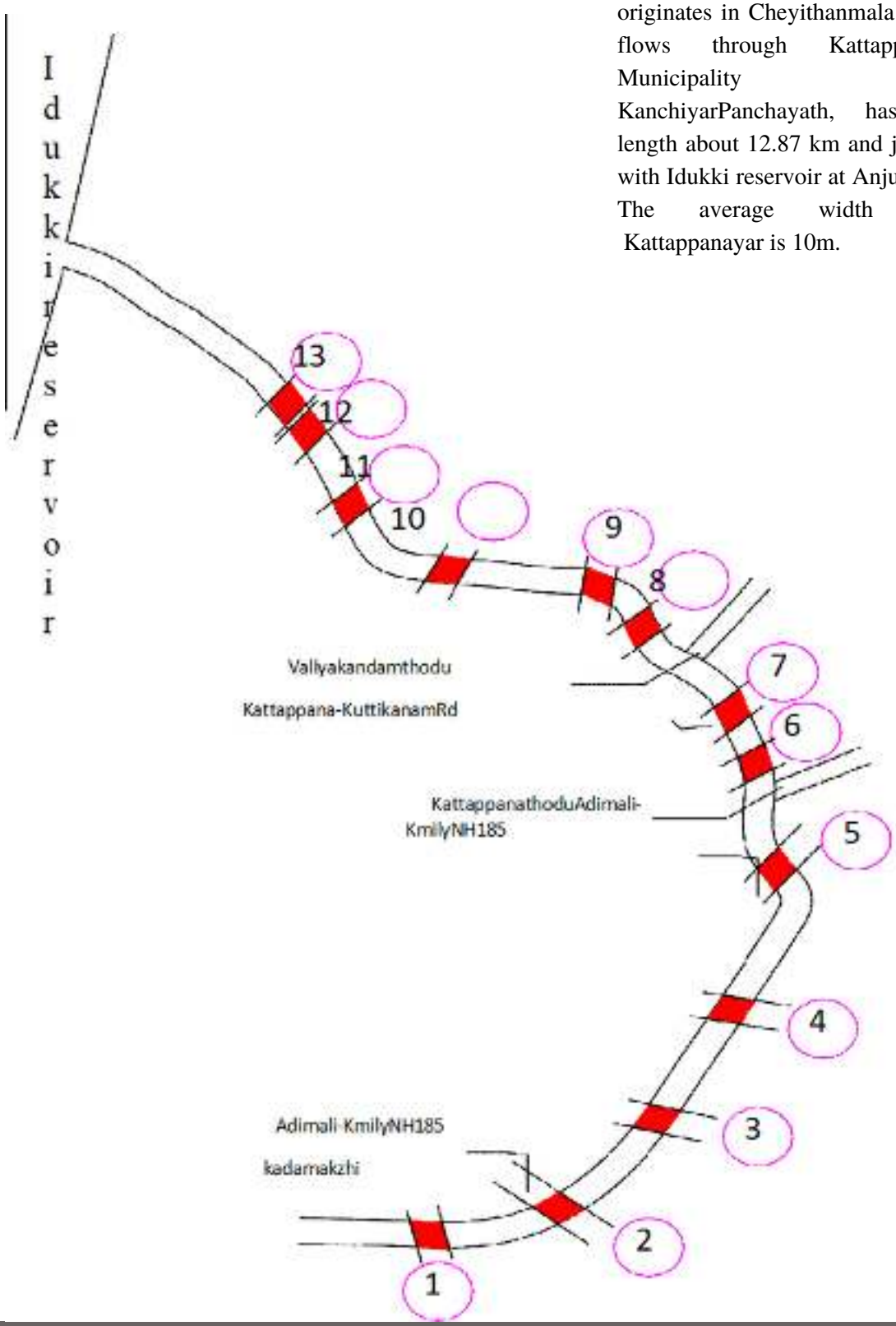
6.30.5 VCB near Penthacost church Palakada – Ch.3/714
This is an old aged VCB constructed across Palakada thodu near Penthacost church Palakada.Small vegetations and silt deposited on u/s of VCB.

6.30.6 Culvert at Kanchiyar Puthiyapalam – Ch.4/440
This is a culvert having 3.50m span constructed across Palakada thodu at Kanchiyar Puthiyapalam. The thodu at this portion having rocky bed and small vegetations on banks.

Culvert near Pezhumkandam – Ch.4/807
This is a culvert having 3.00m span constructed across Palakada thodu near Pezhumkandam. The thodu at this portion having rocky bed .Both banks are unprotected.There is no obstruction to flow

Kattappanayar

This is one of the main tributary of Periyar.Kattappanayar originates in Cheyithanmala and flows through Kattappana Municipality and KanchiyarPanchayath, has a length about 12.87 km and joins with Idukki reservoir at Anjurali. The average width of Kattappanayar is 10m.



6.31.1 Culvert at Pottamkulam Estate – Ch.1/310

This culvert constructed across Kattappanayar at Pottamkulam estate.The width of Aar at this point is 3.00m. The span of culvert is 2.50 m and both banks protected.

6.31.2 Culvert at Kadamakuzhi chappath in Adimaly – Kumily road

This culvert constructed across Kattappanayar at Kadamakuzhi chappath in Adimaly – Kumily highway(NH 185).The width of Aar at this point is 5.00m. The span of culvert is 4.00 m and both banks protected.

Bridge at Kannamundapady – Ch.3/286

This bridge constructed across Kattappanayar at Kannamundapady.The width of Aar at this point is 6.00m. The span of bridge is 6.00 m and both banks on upstream of bridge protected. But downstream side unprotected and silt deposited on upstream.

6.31.4 Checkdam cum Bridge at Mettukuzhi Road – Ch.4/078

This Checkdam cum bridge constructed across Kattappanayar at starting of Mettukuzhi road.The width of Aar at this point is 12.00m. The length of Checkdam cum bridge is 12.00. No obstruction to flow and silt deposition.

6.31.5 Bridge near Ambalakavala in Adimaly – Kumily Rd– Ch.5/003

This Bridge is constructed across Kattappanayar near Ambalakaval in Adimaly – Kumily highway(NH 185).The width of Aar at this point is 8.00m. The span of bridge is 4.00 m .The span of bridge to be increased for smooth flow of water.Both banks are protected.

Kattappana thodu – Ch.5/756 (Tributary of Kattappanayar)

Kattappana thodu is a tributary of Kattappanayar.This origantes by joining two small streams from Pliyanmala and Anakuthy.The length of thodu is about 3.67km, joining Kattappanayar near St.Johns Hospital

6.31.6.2 Culvert at Parakadavu bypass-Ch.2/220

This culvert is constructed across Kattappana thodu in Parakadavu bypass near popular service canter. Banks on upstream protected and downstream unprotected.

Pipe culvert at Parakadavu in Thodupuzha – Puliyanmala road-Ch.1/130

This pipe culvert is not sufficient for smooth flow of water. Now pipe is partialy filled with silt. Hence flow of water is obstructed and silt deposited on upstream with vegetations.

6.31.6.3 Culvert at Adimaly – Kumily Highway-Ch.3/015

This culvert is constructed across Kattappana thodu in Adimaly – Kumily highway(NH 185) near St.Marthas Conventpady. Banks on both side protected. Silt deposited on upstream with small vegetations.

6.31.6.4 Bridge near St.Johns Hospital-Ch.3/600

This bridge is constructed across Kattappana thodu near St.Johns Hospital Banks on both side protected. Silt deposited on left bank with vegetations.

6.31.7 Bridge near St.Johns Hospital , Kattappana – Ch.5/826

This bridge is constructed across Kattappanayar near St.Johns Hospital. The width of Aar at this point is 10.00m. The span of bridge is 4.00 m .The span of bridge to be increased for smooth flow of water. Banks are protected except downstream left bank.

6.31.8 Bridge at Erupathekkar in Kattappana – Kuttikanam Rd – Ch.6/922

This bridge is constructed across Kattappanayar at Erupathekkar in Kattappana – Kuttikanam road. The width of Aar at this point is 13.00m. The span of bridge is 13.00 m .The silt deposited in downstream with small vegetation

6.31.9 Valiyakandam thodu – Ch.7/895(Tributary of Kattappanayar)

Valiyakandam thodu is a tributary of Kattappanayar.This strats near Vellayamkudi.The length of thodu is about 3.58km, joining Kattappanayar at upstream of Anjalipalam.

6.31.9.1 Pipe culvert at Vellayamkudi in Thodupuzha – Puliyanmala road-Ch.0/116

This pipe culvert is not sufficient for smooth flow of water. Now pipe is partialy filled with silt. Hence flow of water is obstructed and silt deposited on upstream and downstream. Both banks are protected.

6.31.9.2 Culvert at Kakkattukada road-Ch.0/670

This culvert is constructed across Valiyakandam thodu in Kakkattukada road near Vellayamkudi Jn. Banks on both side protected. Silt deposited on downstream with small vegetations.

VCB at Valiyaparambilpady-Ch.1/138
This VCB is constructed across Valiyakandam thodu at Valiyaparambilpady. Banks on both side protected. There is no obstruction to flow and silt deposited.

6.31.9.4 VCB near Milleniumroad-Ch.1/294
This VCB is constructed across Valiyakandam thodu near Millenium road at Valiyakandam padasekharam. Banks are unprotected in downstream side. Widening and desilting required at downstream of thodu.

6.31.9.5 Culvert at Manamthadampady in ITI Jn.to College jn road-Ch.2/630
This Culvert is constructed across Valiyakandam thodu near at Manamthadampady in College road. Banks are protected in downstream side and unprotected in upstream side Widening and desilting required at upstream of culvert .

6.31.9.6 Culvert near Penthacost church Valiyakandam -Ch.2/969

This Culvert is constructed across Valiyakandam thodu near Penthacost Church. Banks are unprotected .The span of culvert is less than width of thodu.Hence flow of water is obstructed.The span of culvert and width of thodu on upstream side to be increased for smooth flow of water.

6.31.10 Bridge at Anjilipalam in Vellayamkudi road – Ch.8/249

This bridge is constructed across Kattappanayar at Anjalipalam in Vellayamkudi road. The width of Aar at this point is 10.00m. The span of bridge is 10.00 m .The silt deposited in upstream and downstream with small vegetations.Banks are unprotected except downstream right.

Foot Bridge near IHDP Colony Samsakarikanilayam – Ch.8/349

This foot bridge is constructed across Kattappanayar at Anjalipalam in Vellayamkudi road near IHDP Colony Samskarikanilayam. The width of Aar at this point is 12.00m. There is no obstruction to flow. Both banks protected.

6.31.12 Bridge at Thovarayar – Ch.9/204

This bridge is constructed across Kattappanayar at Thovarayar in Thovarayar road. The width of Aar at this point is 12.00m. The span of bridge is 10.00 m .There is no obstruction to flow and silt deposit.

Bridge at Sumithikada near Kakkattukada – Ch.9/957

This bridge is constructed across Kattappanayar at Sumathikada near Kakkattukada. The width of Aar at this point is 12.00m..There is no obstruction to flow. Silt deposited on banks with small vegetations.

6.31.14 Johnykada Chappathpalam – Ch.10/667

This is a Chappath constructed across Kattappanayar at Johnykada. The width of Aar at this point is 10.00m. The chappath has a height of 1.50m only .Hence flow of water is obstructed. Both banks protected.

6.31.14 Johnykada Chappathpalam – Ch.10/667

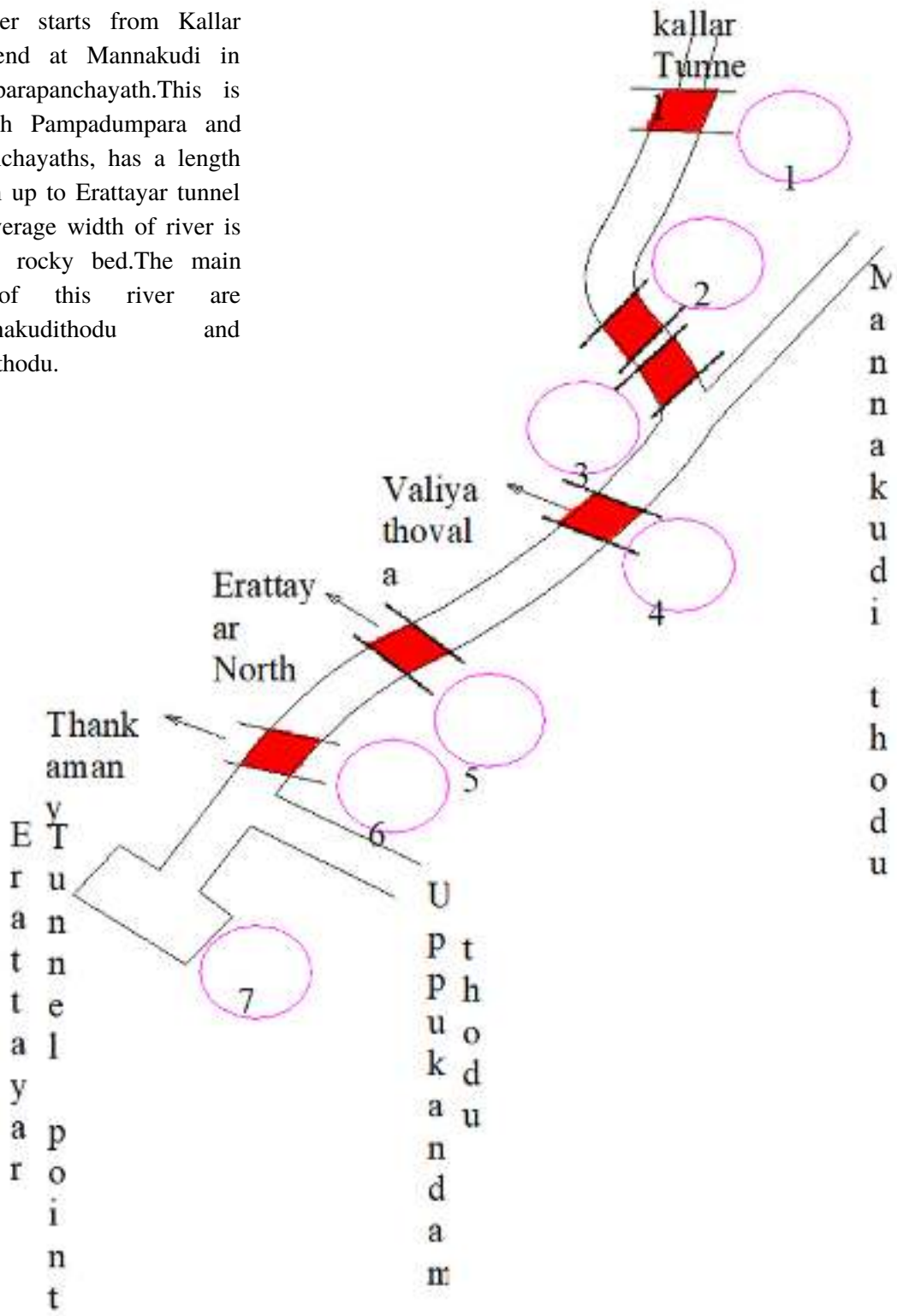
This is a Chappath constructed across Kattappanayar at Johnykada. The width of Aar at this point is 10.00m. The chappath has a height of 1.50m only .Hence flow of water is obstructed. Both banks protected.

Bed Level Crossbar – Ch.10/770

This is a Bed level crossbar constructed across Kattappanayar near Water Authority Pump house. The width of Aar at this point is 12.00m. There is no obstruction to flow. Both banks protected

Erattayar river

Erattayar river starts from Kallar tunnel tail end at Mannakudi in Pampadumparapanchayath.This is flows through Pampadumpara and ErattayarPanchayaths, has a length about 5.35km up to Erattayar tunnel point.The average width of river is 10.00m with rocky bed.The main tributaries of this river are Mannakudithodu and Uppukandamthodu.



Kallar Tunnel tail end at Mannakudi – Ch.0/000

This is the starting point of Erattayar river. The stored water from Kallar dam reaches Erattayar river at this point. During 2018 flood, land sliding occurred near tunnel point , then the tunnel temporarily blocked and Kallar dam opend to Perinjakutty river.

Foot bridge u/s of Mannakudi bridge –Ch.1/100

This foot bridge constructed across Erattayar river upstream of Mannakudi bridge.The length of foot bridge is 10.00m which is same as river width at this point.There is no obstruction to flow and both banks unprotected.

Mannakudi bridge – Ch.1/290

The span of bridge is same as river width at this point.There is no obstruction to flow and both banks unprotected .The bed of river is rocky.

6.32.4 Mannakudi thodu- Ch.1/470

Mannakdi thodu is a tributary of Erattayar river.This strats near Mannakudi in Pampadumpara panchayath.The length of thodu is about 1.40km, joining Erattayar river at downstream of Mannakudi bridge.

6.32.4.1 Foot bridge at Ayyanamkuzhy pady – Ch.0/435

Both banks protected.No silt deposit and obstruction to flow

6.32.4.2 Culvert at Kollamkunnelpady – 0/850

Both banks are protected. Small vegetation is found.But no silt deposited

6.32.4.3 Culvert at tail end – 1/350

Both banks are unprotected. Small vegetation and silt deposited

6.32.5 Valiyathovala bridge – Ch.2/294

The span of bridge is same as river width at this point. There is no obstruction to flow and both banks unprotected.The bed is rocky and small vegetation on banks.

6.32.6 Bridge at Erattayar – Ch.4/204

This bridge is constructed across Erattayar river in Erattayar north road. There is no obstruction to flow. This area comes under custody of KSEB because premises of Erattayar dam.

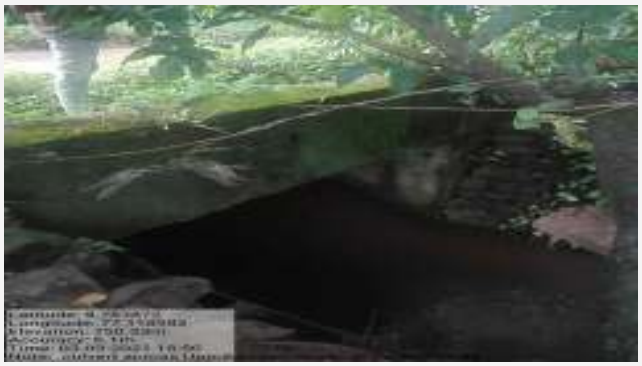
Bridge at Kumarakam – Cumbum road – Ch.4/650

6.32.8 Uppukandam thodu – Ch.4/850

Uppukandam thodu is a tributary of Erattayar river.This strats from Athikayam in Kattappana Muncipality.This flows through Kattappana Municipality and Erattayar Panchayath.The length of thodu is about 5.91km, joining Erattayar river at downstream of bridge at Kumarakam – Cumbum road. The silt deposited at various places of thodu

6.32.8.1 Culvert at Kanakkalpady – Ch.1/160

This culvert is constructed in Kochuthovala – Erattayar road across Uppukandam thodu.The silt deposited in upstream and downstream of culvert with vegetation on both banks.



6.32.8.2 Culvert at Colonykavala – Ch.2/365

This culvert is constructed near Colonykavala across Uppukandam thodu.There is no obstruction to flow and silt deposited.

6.32.8.3 Culvert near Nalukandampady road – Ch.2/745

This culvert is constructed in Kochuthovala – Erattayar road across Uppukandam thodu at starting of Nalukandampady thodu.The silt deposited in upstream and downstream of culvert.

6.32.8.4 Culvert near Mariyan Industries – Ch.3/775

This culvert is constructed near Mariyan industries across Uppukandam thodu.There is no obstruction to flow and silt deposited.Both banks are protected.

6.32.8.5 Culvert at Kattappana – Erattayar road – Ch.4/500

This culvert is constructed in Kattappana – Erattayar road across Uppukandam thodu.The thodu on upstream and downstream of culvert is comes under custody of KSEB because premises of Erattayar dam.

6.32.8.6 Culvert at Tunnel site road – Ch.5/515

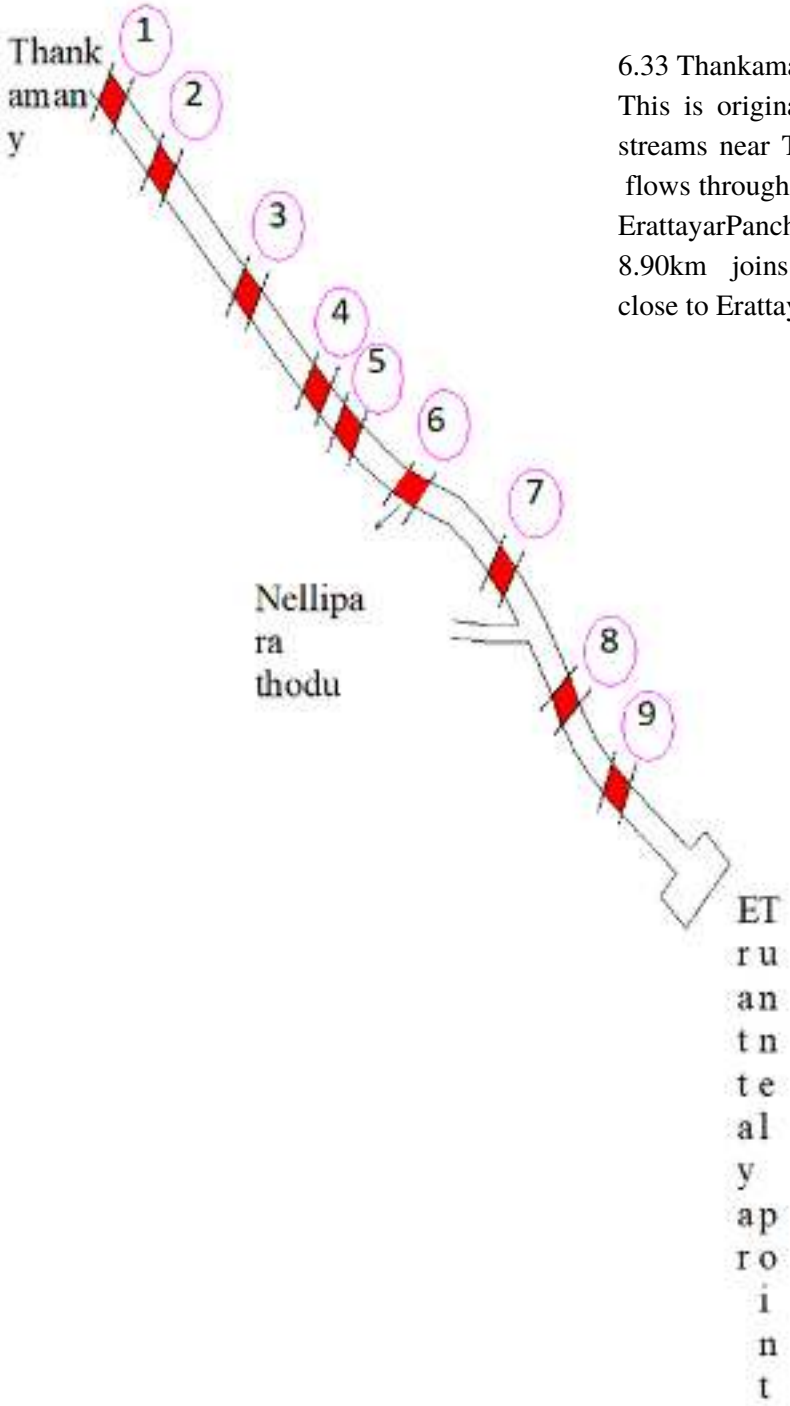
This culvert is constructed in Tunnel site road across Uppukandam thodu. The thodu on upstream and downstream of culvert is comes under custody of KSEB because premises of Erattayar dam.

6.32.9 Erattayar Tunnel point – Ch.5/350

This is the starting point of Anjuruli Tunnel.The water from Kallarpuzha and Erattayar river diverted to Idukki reservoir through Anjurali Tunnel by constructing Kallar dam across Kallarpuzha and Erattayar dam across Erattayar river.Thankamany thodu meets Erattayar river very close to Erattayar Tunnel point

6.32.10 Erattayar dam

This is a small diversion dam constructed in Erattayar riverin the upper reaches of river Perinjamkutty a tributary of Periyar .The type of dam is concrete gravity dam with a height of 19.81m and length 146.30m.The storage capacity of Erattayar dam is 5.352 MCM. It acts mainly as a diversion dam to supply water to the Idukki dam.Diversion of water from Erattayar forebay to Idukki reservoir is through Anjuruli tunnel.Location as Latitude : 9.810298, Longitude: 77.105876



6.33 Thankamanythodu

This is originates by joining two small streams near Thankamany town. This is flows through KamakshyPanchayath and ErattayarPanchayath,has a length of 8.90km joins with Erattayar river very close to Erattayar Tunnel point.

6.33.1 Culvert u/s of Harithapady – Ch.0/135

This culvert constructed across Thankamany thodu u/s of Harithapady.The vertical clearance of culvert is less than the bank height. Hence flow of water obstructed. Both banks protected.

6.33.2 Culvert at Schoolpady – Ch.0/880

This culvert constructed across Thankamany thodu at Schoolpady.Both banks protected , no obstruction to flow and silt deposited.

6.33.3 Culvert at Koothrappallipady – Ch.2/295

This culvert constructed across Thankamany thodu at Koothrappallipady The right abutment of culvert inside the thodu.Hence flow of water obstructed.Silt deposited and small vegetation found.

6.33.4 Culvert at Pezhanalpurayidam – Ch.3/270

This culvert constructed across Thankamany thodu at Pezhanalpurayidam.The span of culvert is less than width of thodu.Hence flow of water obstructed and silt deposited .

6.33.5 Culvert at Kumbalavelilpady – Ch.3/800

This culvert constructed across Thankamany thodu at Kumbalavelilpady.There is no obstruction to flow and silt deposited.

6.33.6 Bridge at Kumarakam – Cumbum road – Ch.4/460

This bridge constructed across Thankamany thodu at Kumarakam – Cumbum road. The span of bridge is less than the width of thodu. Hence flow of water obstructed and silt deposited.

6.33.7 Bridge at Nalumukku Jn – Ch.6/000

This bridge constructed across Thankamany thodu near Nalumukku Jn. Now this bridge is under construction for widening towards downstream side. But span of old construction on upstream side is narrow.

6.33.8 Nellipara thodu – Ch.6/100 (Tributary of Thankamany thodu)

Nellipara thodu originates by joining two small streams at Illikkalpady near Kalvary mount.This flows through Kamakshy and Erattayar Panchayaths.The length of thodu about 5.67 km joins with Thanakamany thodu near Nalumukku Jn.The thodu upto 2.50km from starting required widening and deepening

6.33.8.1 Culvert at 8th mile – Thankamany road- Ch.1/060

This culvert constructed across Nellipara thodu at 8th mile – Thankamany road.There is no obstruction to flow and silt deposited.

6.33.8.2 Culvert at 7th mile –Nellipara road – Ch.1/585

This culvert constructed across Nellipara thodu at 7th mile – Nellipara road. Now widening work of culvert is going on .The span of culvert is same as width of thodu. There is no obstruction to flow and silt deposited

6.33.8.3 Culvert at Mathaipady – Pallinirappu road – 2/455

This culvert constructed across Nellipara thodu at Mathaipady - Pallinirappu road. There is no obstruction to flow and silt deposited

6.33.8.4 Culvert at Vazhavara – Nalumukku road – 4/975

This culvert constructed across Nellipara thodu at Vazhavara – Nalumukku road. The span of culvert is less than the width of thodu.

6.33.9 Kattiyanmalapalam – Ch.7/210

This area comes under custody of KSEB because premises of Erattayar dam.

6.33.8.5 Culvert at Erattayar – Nalumukku road – 5/625

This culvert constructed across Nellipara thodu at Erattayar – Nalumukku road near confluence point of Tankamany thodu. Both banks are unprotected.

KSEB foot bridge – Ch.8/390
This area comes under custody of KSEB because premises of Erattayar dam.

6.34 Narakakanamthodu

Narakakanamthodu starts from joining small streams from mountains on left side of Idukki road including Kalvarimount .The water from Narakakanamthodu diverted to Idukki reservoir through NarakakanamTunnel.Thethodu has a length of 2.10km up to Narakakanam tunnel.Major construction across this thodu are:-

6.34.1 Culvert near Narakakanam Jn.-Ch.1/510

This culvert is constructed across Narakakanam thodu near Narakakanam junction. The span of culvert is less than actual width of thodu.Both banks are protected.

Narakakanam Tunnel point @ end – Ch.2/100

This is a starting point of Narakakanam Tunnel.The length of Tunnel is about 800m to Idukki reservoir from this point.

6.34.2Check dam at Vazhakulampady

This check dam constructed across Narakakanam thodu at Vazhakulampady.The length of checkdam is more than the actual width of thodu.Small vegetation and silt deposited on upstream side.Both banks are protected.

6.35.2 VCB at Theesalangattpady – Ch.3/050

This VCB constructed across Idinjamala thodu at Theesalangattpady. Small vegetation and silt deposited on right bank

6.35.3 VCB at Ch.3/460

Both banks protected and there is no obstruction to flow

6.35 Idinjamala thodu

This thodu start from kannimala in Kamakshy Panchayath and flowing through Kamakshy and Erattayar Panchayat, has a length of about 4.85km joins with Erattayar reservoir near Water Authority Pump house. Major construction across this thodu are

5.35.1Culvert near Idinjamala – Ch.1/250

This culvert constructed across Idinjamala thodu near Idinjamala Jn.There is no obstruction to flow and silt deposited.

6.35.4 VCB at Ch.3/950

Both banks are unprotected.

Vegetation and silt deposited on right bank

VCB at Chemblam – 7th mile Road – Ch.4/400

Left bank protected and no silt deposited. Rocky bed and right bank not protected.

Near Water Authority Pump house – 4/850

6.36 JillaAshupathriCheruthonithodu @ Ch 121.680 Km

JillaAshupathri-Cheruthonithodu originates inside Idukki forest near left bank of Cheruthoni dam passes near through Idukki district hospital and Cheruthoni town and reaches Periyar river at chainage 121.68 (25m downstream side of Cheruthoni submersible bridge). This thodu is 2.00 km long with a width of 3.00m and is in VazhathoppePanchayath.Details of structures across this thodu is given in table 4.

Sl No	Structure/thodu	Chainage	location	
			Latitude	Longitude
1	Culvert	1.6	9°50'39.46" N	76°57'34.21" E
2	Thodu	1.35	9°50'41.18" N	76°57'35.43" E
3	Jilla asupathri Culvert	1.27	9°50'54.08" N	76°57'36.33" E
4	Police Station Culvert	0.39	9°51'16.06" N	76°57'41.76" E
5	Cheruthoni Culvert	0.22	9°51'20.34" N	76°57'42.37" E
6	Cheruthoni Town Culvert	0.03	9°51'25.06" N	76°57'45.5" E

Table 4 : Details of structures across Jilla Ashupathri-Cheruthoni thodu

6.36.1 Ch. 0/030 – Cheruthoni Town culvert

The Cheruthoni Town culvert is located in Jilla Ashupathri Cheruthoni thodu at ch.0/030.Confluence point of this thodu is 30m downstream of this culvert. This culvert is across Kumily Adimaly NH road. The location of the culvert is 9°51'25.06" N, 76°57'45.5" E. It has approximate length 10.0m, width 2.50m and height 2.5m. The upstream and downstream banks are occupied by private building. Encroachment in both sides reduced the width of this thodu both upstream and downstream, cause obstruction to flow. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.36.1 Ch. 0/220– Cheruthoni culvert.

The Cheruthoni culvert is located in Jilla Ashupathri Cheruthoni thodu at ch. 0/220. This culvert is across panchayath road. The location of the culvert is 9°51'20.34" N, 76°57'42.37" E. It has approximate length 3.0m, width 2.50m and height 2.0m. The upstream and downstream banks are occupied by private building. Encroachment in both sides reduced the width of this thodu both upstream and downstream, cause obstruction to flow. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.36.3 Ch. 0/390– Cheruthoni Police station culvert.

The Cheruthoni culvert is located in Jilla Ashupathri Cheruthoni thodu at ch. 0/390. This culvert is across Thodupuzha Kattappana PWD road. The location of the culvert is 9°51'16.06" N, 76°57'41.76" E. It has approximate length 6.0m, width 3.00 m and height 2.0m. The upstream side is not protected and downstream banks are occupied by private building. Encroachment in both sides reduced the width of this thodu both upstream and downstream, cause obstruction to flow. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream is government and downstream of culvert is private.

6.36.4 Ch. 1/270– Jilla asupathri Culvert.

The Jilla asupathri culvert is located in Jilla Ashupathri Cheruthoni thodu at ch. 1/270. The width of thodu in this location is 3.00m. This culvert is across jilla Asupathri road. The location of the culvert is 9°50'54.08" N, 76°57'36.33" E. It has approximate length 5.0m, width 3.00 m and height 2.0m. The upstream side is partially protected and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is government

6.36.5 Ch. 1/650–Culvert. This culvert is located in Jilla Ashupathri Cheruthoni thodu at ch. 1/650. The width of thodu in this location is 3.00m. This culvert is across panchayath road. The location of the culvert is 9°50'39.46" N, 76°57'34.21" E. It has approximate length 3.0m, width 3.00 m and height 2.0m. The upstream side and downstream is protected. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream of culvert is private.

Diversion Tunnel Narakakanam

6.37 NayaruparaThodu

This thodu originates in Narakakanam area of MariyapuramGramaPanchayath and reaches Narakakanam Diversion point, where water is diverted to Idukki reservoir through tunnel. surplus water from this diversion structure and other small streams constitute water in this thodu. Nayaruparathoducontails water only during rainy seasons. This thodu is 6.00 km long with an average width less than 3.00m and is in Mariyapuram Panchayath.

6.38 MariyapuramThodu

Mariyapuramthodu originates near Thankamany in KamakshyPanchayth Thisthodu is 7.00 km long with width varies from 13.00m to 3.00m, passes through Kamakshy and MariyapuramPanchayath and reaches Periyar river at chainage 122.85. Details of structures across this thodu is given in table 6.

Sl No	Structure/ thodu	Chainage	Latitude	Longitude
1	Patham Mile Road Culvert	5.94	9°49'57.32" N	77°2'22.99" E
2	Kamakshi Thodu	5.18	9°49'49.4" N	77°0'42.34" E
3	Mariyapuram SNDP Padi Road Bridge	4.97	9°50'32.03" N	77°0'20.23" E
4	Pvt. Culvert	4.78	9°50'35.22" N	77°0'14.34" E
5	Anganvady Millum padi Road Bridge	4.54	9°50'39.26" N	77°0'8.89" E
6	Chettikuzhy Road Bridge	3.81	9°50'54.96" N	76°59'52.37" E
7	Panchayath Check Dam	3.59	9°50'59.87" N	76°59'48.46" E
8	Millum Padi Bridge	3.29	9°51'8.21" N	76°59'4747" E
9	PHC Padi Road Bridge	2.11	9°51'19.01" N	76°59'21.88" E
10	PHC Padi Check Dam	2	9°51'19.08" N	76°59'18.13" E
11	Pvt.Culvert	0.78	9°51'20.81" N	76°58'40.58" E
12	Culvert	0.4	9°51'22.16" N	76°58'33.7" E

Table 6 : Details of structures across Mariyapuram thodu

6.38.1 Ch. 0/400–Culvert.

This culvert is located in Mariyapuram thodu at ch. 0/400. The width of thodu in this location is 5.00m. This culvert is across panchayath road. The location of the culvert is 9°51'22.16" N, 76°58'33.7" E. It has approximate length 4.0m, width 3.00 m and height 1.5m. Flow may be obstructed as the opening of culvert is small. The upstream side and downstream is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private

6.38.2 Ch. 0/780– PHC Padi Check Dam

This Checkdam is located near Mariyapuram PHC across Mariyapuram thodu at ch. 0/780. The width of thodu in this location is 7.00m. he location of the culvert is 9°51'19.08" N, 76°59'18.13" E. It has approximate length 7.0m, and height 1.80 m. The upstream side is protected and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is government.

6.38.3 Ch. 2/110– Millum Padi Bridge

The Bridge is located in Millumpady area is across Mariyapuram thodu at ch. 2/110. The width of thodu in this location is 5.00m. This culvert is across Mariyapuram Kamakshi PWD road. The location of the culvert is 9°51'8.21" N, 76°59'4747" E. It has approximate length 5.0m, width 4.00 m and height 2.5m. There is no obstruction to flow in this location. The upstream side is partially protected and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.38.4 Ch. 3/590– Chettikuzhy Road Bridge

The Bridge is located in Chettikuzhy area is across Mariyapuram thodu at ch. 3/590. The width of thodu in this location is 4.00m. This culvert is across private road. The location of the culvert is 9°50'54.96" N, 76°59'52.37" E. Flow is obstructed by the abutment constructed inside thodu. It has approximate length 3.0m, width 3.00 m and height 1.5m. The upstream side and downstream side is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private

6.38.5 Ch. 3/810– Anganvady Millum padi Road Bridge
The Bridge is located in Millumpady area is across Mariyapuram thodu at ch. 3/810. The width of thodu in this location is 3.00m. This culvert is across Anganvadi Miilumpadi panchayath road. The location of the culvert is 9°50'39.26" N, 77°0'8.89" E. There is no obstruction to flow in this location. It has approximate length 4.0m, width 4.00 m and height 2.0m. The upstream side and downstream is partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.38.6 Ch. 5/780– Mariyapuram SNDP Padi Road Bridge
The Bridge is located in near SNDP and is across Mariyapuram thodu at ch. 5/780. The width of thodu in this location is less than 3.00m. This culvert is across SNDP padi panchayth road. The location of the culvert is 9°50'32.03" N, 77°0'20.23" E. It has approximate length 3.0m, width 3.00 m and height 1.5m. The upstream side and downstream is partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

Ch. 5/940- Patham Mile Road Culvert

The culvert is located in pathammile area is across Mariyapuram thodu at ch. 5/940. The width of thodu in this location is 2.00m. This culvert is across panchayth road. The location of the culvert is 9°49'57.32" N, 77°2'22.99" E. It has approximate length 3.0m, width 1.00 m and height 1.5m. This culvert may obstruct flow of water. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.39 PepparaThodu

Pepparathodu originates inside Idukki forest near Maniyarankudy area of Vazhathoppepanchayath reaches Periyarriver at chainage 123.90. This thodu is 9.00 km long with width varies from 20.00m to 3.00m. This thodu is in Vazhathoppu Panchayath.

Details of structures across this thodu is given in table 7

Sl No	Structure/thodu	Chainage
1	Culvert	8.45
2	Culvert	7.72
3	Culvert	7.52
4	Culvert	7.29
5	Culvert	6.99
6	Culvert	6.83
7	City Bridge	6.54
8	Private Bridge	6.32
9	Panchayath Bridge	6.10
10	Bridge	4.35
11	Check Dam	3.95
12	Bridge	3.93
13	Bridge	3.49
14	Peppara Bridge	2.79
15	Njavalchuvadu Bridge	1.00
16	Bridge NH	0.10

Ch. 0/100– Bridge NH

This bridge is located across Peppara thodu at ch. 0/100. This bridge is across Kumily Adimaly NH road. The location of the culvert is 9°51’53.99" N, 76°57'56.37" E. It has approximate length 8.0m, width 6.00 m and height 2.5 m. There is no obstruction to flow in this location. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

location	
Latitude	Longitude
9°54'20.53" N	76°55'14.03" E
9°54'7.74" N	76°55'30.04" E
9°54'00.52" N	76°55'38.82" E
9°53'54.54" N	76°55'46.04" E
9°53'51.01" N	76°55'49.60" E
9°53'46.06" N	76°55'56.52" E
9°53'45.36" N	76°56'02.16" E
9°53'34.66" N	76°56'03.20" E
9°53'40.14" N	76°56'07.87" E
9°53'09.69" N	76°56'29.90" E
9°52'59" N	76°56'36.95" E
9°52'58.7" N	76°56'37.31" E
9°52'34.12" N	76°56'55.66" E
9°52'33.64" N	76°56'57.9" E
9°52'2.07" N	76°57'35.19" E
9°51’53.99" N	76°57'56.37" E

Table 7 : Details of structures across Peppara thodu

Ch. 1/0.00–Njavalchuvadu Bridge

This bridge is located across Peppara thodu at ch. 1/00. This bridge is across Cheruthoni Maniyarakudi road. The location of the culvert is 9°52'2.07" N, 76°57'35.19" E. It has approximate length 5.0m, width 4.00 m and height 2.5 m. There is no obstruction to flow in this location. The upstream side and downstream side is partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

Ch. 2/270– Peppara Bridge

This bridge is located across Peppara thodu at ch. 2/270. This bridge is across Cheruthoni Maniyarakudi road. The location of the culvert is 9°52'33.64" N, 76°56'57.9" E. It has approximate length 5.0m, width 4.00 m and height 2.5 m. There is no obstruction to flow in this location. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.39. 4 Ch. 3/490– Bridge

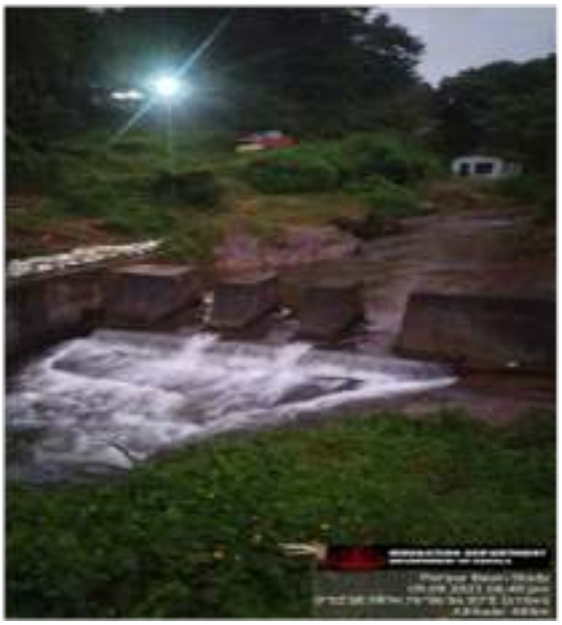
This bridge is located across Peppara thodu at ch. 3/490. This bridge is across Cheruthoni Maniyarakudi road. The location of the culvert is 9°52'34.12" N, 76°56'55.66" E. It has approximate length 5.0m, width 4.00 m and height 2.00 m. There is no obstruction to flow in this location. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.39.5 Ch. 3/930– Bridge

This bridge is located across Peppara thodu at ch. 3/930. This bridge is across Cheruthoni Maniyarakudi road. The location of the culvert is 9°52'58.7" N, 76°56'37.31" E. It has approximate length 5.0m, width 4.00 m and height 2.5 m. There is no obstruction to flow in this location. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.39.6 Ch. 3/950– Check Dam

This bridge is located across Peppara thodu at ch. 3/950. This checkdam is in location 9°52'59" N, 76°56'36.95" E. It has approximate length 8.0m, and height 1.8 m. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.



VazhathoppePallithazhamthodu

VazhathoppePallithazhamthodu originates near Maniyarankudy area of Vazhathoppe panchayath reaches Periyarriver at chainage 124.85. This thodu is 3.00 km long with width varies from 6.00m to 3.00m. This thodu is in VazhathoppePanchayath.Details of structures across this thodu is given in table 8.

Sl No	Structure/thodu	Chainage	Latitude	Longitude
2	Culvert	1.76		
3	Culvert	0.86	9°52'29.22" N	76°57'34.89" E
4	Culvert	0.79	9°52'30.14" N	76°57'36.89" E
5	Bridge NH	0.11	9°52'25.71" N	76°57'14.99" E

Table 8 : Details of structures across Vazhathoppe Pallithazham thodu

6.40.1Ch. 0/110 – Bridge NH

This bridge is located across Vazhathoppe Pallithazham thodu at ch. 0/110. This bridge is across Kumily Adimaly NH road. The location of the culvert is 9°52'25.71" N, 76°57'54.99" E. It has approximate length 6.0m, width 6.00 m and height 2.5 m. There is no obstruction to flow in this location. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.40.2 Ch. 0/790 – Culvert

This culvert is located across Vazhathoppe Pallithazham thodu at ch. 0/790. Width of thodu at this location is 3.00m. This culvert is across Vazhathoppe Pallithazham panchayath road. The location of the culvert is 9°52'30.14" N, 76°57'36.89" E. It has approximate length 4.5m, width 3.00 m and height 1.8m. Flow may be obstructed as the opening of culvert is small. The upstream side and downstream side is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.40.3 Ch. 0/860 – Culvert

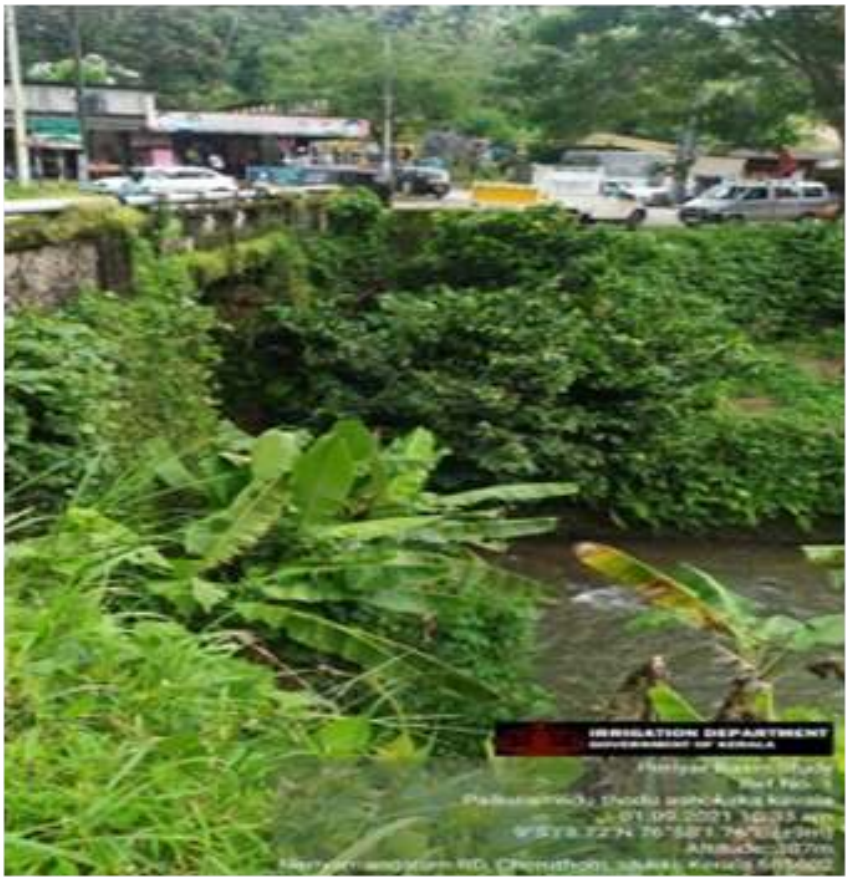
This culvert is located across Vazhathoppe Pallithazham thodu at ch. 0/860. Width of thodu at this location is 3.00m. This culvert is across Vazhathoppe Pallithazham Maniyarankudy PWD road. The location of the culvert is 9°52'29.22" N, 76°57'34.89" E. It has approximate length 5.00m, width 2.00 m and height 1.5m. The upstream side is encroached and buildings are constructed. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

Palkulamedu- Asoka jn, thodu

Palkulamedu- Asoka jnthodu originates inside Idukki forest near Palkulamedu of Idukki-KanjikuzhyPanchayath and passes through VazhathoppePanchayath and reaches Periyar river at chainage 126.49. This thodu is 7.20 km long with width varies from 20.00m to 3.00m. Details of structures across this thodu is given in table 9

Table 9 : Details of structures across Palkulamedu- Asoka jn thodu

Sl No	Structure/thodu	Chainage	location	
			Latitude	Longitude
1	Culvert	6.77	9°54'54.13" N	76°55'31.26" E
2	Culvert	5.85	9°54'41.32" N	76°55'55.73" E
3	Culvert	4.92	9°54'28.1" N	76°56'19.71" E
4	Check Dam	4.38	9°54'18.99" N	76°56'33.63" E
5	Check Dam	3.69	9°54'13.07" N	76°56'54.12" E
6	Mulakuvalli Bridge	3.63	9°54'12.8" N	76°56'55.89" E
7	Mulakuvalli Thodu	3.59	9°54'13.18" N	76°56'57.05" E
8	Thodu	3.43	9°54'9.08" N	76°57'0" E
9	Culvert	3.40	9°54'8.19" N	76°57'2.29" E
10	Mulakuvalli Chappath	3.10	9°54'1.56" N	76°57'6.94" E
11	Mulakuvalli Foot bridge	2.73	9°53'57.43" N	76°57'7.66" E
12	Mulakuvalli Foot bridge	2.17	9°53'51.52" N	76°57'6.4" E
13	Manjappara Foot bridge	1.76	9°53'30.42" N	76°57'25.29" E
14	Chappath	0.65	9°53'14.95" N	76°57'49.73" E
15	Ashoka junction NH Bridge	0.20	9°53'8.8" N	76°58'1.96" E



Ch. 0/200– Ashoka junction NH Bridge

The Ashoka junction NH Bridge is located in Palkulamedu thodu at ch. 0/200. The width of thodu in this location is 7.00m. This bridge is across Kumily Adimaly NH Road. The location of the culvert is 9°53'8.8" N, 76°58'1.96" E. It has approximate length 6.0m, width 8 m and height 4.0m. There is no obstruction to flow in this location. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.41.2 Ch. 0/650– Chappath

This Chappath is located in Palkulamedu thodu at ch.0/650. The width of thodu in this location is 7.00m. This bridge is across Palkulamedu-Mulakuvally Road. The location of the culvert is 9°53'14.95" N, 76°57'49.73" E. It has approximate length 7.0m, width 4.0 m and height 1.8m. There is no obstruction to flow in this location. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.41.3 Ch. 1/760– Manjappara Foot bridge

This Foot bridge is located in Manjappara across palkulamedu thodu at ch. 1/760. The width of thodu in this location is 7.00m. The location of the culvert is 9°53'30.42" N, 76°57'25.29" E. It has approximate length 7.0m, width 1.0 m and height 2.0m. There is no obstruction to flow in this location. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.41.4 Ch. 2/170– Mulakuvalli Foot bridge

The Mulakuvalli Foot bridge is located across Palkulamedu thodu at ch. 2/170. The width of thodu in this location is 7.00m. The location of the culvert is 9°53'51.52" N, 76°57'6.4" E. It has approximate length 6.0m, width 2 m and height 2.0m. The upstream side and downstream is partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.41.5 Ch. 3/400– Culvert

This culvert is located in Palkulamedu thodu at ch. 3/400. The width of thodu in this location is 8.00m. This culvert is across panchayth Road. The location of the culvert is 9°54'8.19" N, 76°57'2.29" E. It has approximate length 7.0 m, width 3 m and height 2.0m. Flow may obstructed due to this structure here as the size of opening is small. The upstream side is silted up. The upstream side and downstream is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.41.6 Ch. 3/590– Mulakuvalli Thodu

This thodu is at ch. 3/590. The width of thodu in this location is less than 3.00m.

This thodu joins palkulamedu thodu at location 9°54'13.18" N, 76°56'57.05" E. This thodu side is silted up. The upstream side is partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land both bank is private.

6.41.7Ch. 3/630 – Mulakuvalli Bridge

This bridge is located in Mulakuvalli across palkulamedu thodu at ch. 3/630. The width of thodu in this location is 6.00m. This culvert is across palkulamedu Road. The location of the culvert is 9°54'12.8" N, 76°56'55.89" E. It has approximate length 6.0 m, width 4 m and height 2.0 m. There is no obstruction to flow in this location. The upstream side and downstream is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private

6.41.18Ch. 4/380– Check Dam

This Check Dam is located in Palkulamedu thodu at ch. 4/380. The width of thodu in this location is 9.00m The location of the culvert is 9°54'18.99" N, 76°56'33.63" E. It has approximate length 9.0m, width 1 m and height 1.5 m. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private. The upstream of check dam is slightly silted up.

6.42 Vimalagirithodu

Vimalagirithodu originates near Udayagiri of Kamakshypanchayath and passes Vimalagiri in Mariyapurampanchayath and reaches Periyar river at chainage 127.13 (uptream side of Karimban bridge). This thodu is 10.00 km long with width varies from 6.00m to 3.00m.Details of structures across this thodu is given in table 10.

Table 9 : Details of structures across Vimalagiri thodu

Sl No	Structure/thodu	Chainage	Location	
			Latitude	Longitude
1	Culvert	9.10	9°51'12.53" N	77°2'5.99" E
2	Culvert	8.75	9°51'16.66" N	77°01'56.19" E
3	Culvert	8.59	9°51'18.88" N	77°01'51.65" E
4	Culvert	8.34	9°51'19.27" N	77°01'46.72" E
5	Culvert	6.99	9°51'24.33" N	77°01'01.83" E
6	Check Dam	6.85	9°51'25.22" N	77°00'58.05" E
7	Private bridge	6.14	9°51'37.25" N	77°00'39.92" E
8	Culvert	5.77	9°51'44.49" N	77°00'31.26" E
9	Bridge Culvert	5.49	9°51'48.68" N	77°0'23.63" E
10	Private bridge	3.54	9°52'28.88" N	76°59'37.94" E
11	Check Dam	3.41	9°52'31.52" N	76°59'34.75" E
12	Foot bridge cum Check Dam	2.48	9°52'53.57" N	76°59'16.47" E
13	Karimbanvalley Check Dam	1.75	9°53'0.49" N	76°59'1.54" E
14	Private bridge	1.64	9°53'1.45" N	76°58'58.05" E
15	Chappath Culvert	1.13	9°53'1.76" N	76°58'44.80" E
16	Foot bridge	0.63	9°53'1.15" N	76°58'31.21"E
17	Ottanackal Bridge	0.55	9°53'3.27" N	76°58'29.92"E
18	Confluence poin	0.00	9°53'14.04" N	76°58'27.81" E

6.42.1 Ch. 0/0– Confluence point

The confluence point of Vimalagiri thodu is at chainage ch. 0/0. The location of the culvert is 9°53'14.04" N, 76°58'27.81" E. It has approximate width is 7.00 m. The both banks are protected. The type of soil on bed of the thodu at this location is rock.

6.42.2Ch. 0/550– Ottanackal Bridge

The Ottanackal Bridge is located in Vimalagiri thodu at ch. 0/550. The width of thodu in this location is 7.00m. This culvert is across Karimpan Murickassery PWD Road. The location of the culvert is 9°53'3.27" N, 76°58'29.92" E. It has approximate length 6.0m, width 3.50 m and height 2.0m. Abutments are constructed inside the thodu. This may cause obstruction to flow of water. The upstream side is partially protected and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.42.3 Ch. 1/130– Chappacity Culvert

The Chappacity Culvert is located in Vimalagiri thodu at ch. 1/130. The width of thodu in this location is 5.00m. This culvert is across Chappacity Panchayath Road. The location of the culvert is 9°53'1.76" N, 76°58'44.80" E. It has approximate length 4.0m, width 3.50 m and height 2.5m. Abutments are constructed inside the thodu. This may cause obstruction to flow of water. The upstream side is partially protected and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of culvert is private.

6.42.4Ch. 1/640– Private bridge

This private bridge is located in Vimalagiri thodu at ch. 1/640. The width of thodu in this location is 5.00m. This culvert is on private Road. The location of the culvert is 9°53'1.45" N, 76°58'58.05" E. It has approximate length 3.0m, width 4.0 m and height 2.5m. There is no obstruction to flow in this location.The upstream side and downstream is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.42.5Ch. 1/750– Karimbanvalley Check Dam

This Checkdam is located in Vimalagiri thodu at ch. 1/750. The width of thodu in this location is 6.00m. This checkdam is on panchayth Road. This is constructed by NGO. The location of the culvert is 9°53'0.49" N, 76°59'1.54" E. It has approximate length 3.0m, width 6 m and height 2.5m. The upstream side and downstream is protected, but is in damaged condition. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private

6.42.6Ch. 2/480– Foot bridge cum Check Dam

This Foot bridge cum Check Dam is located in Vimalagiri thodu at ch. 2/480. The width of thodu in this location is 12.00m. This checkdam is on private footway. This footbridge is in damaged condition. The location of the culvert is 9°52'53.57" N, 76°59'16.47" E. It has approximate length 13.0m, width 1 m and height 1.2m. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

6.42.7Ch. 3/410– Check Dam

This Check Dam is located in Vimalagiri thodu at ch. 3/410. The width of thodu in this location is 7.00mThe location of the culvert is 9°52'31.52" N, 76°59'34.75" E. It has approximate length 13.0m, width 1 m and height 1.2m. The upstream side and downstream is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private. The upstream of check dam is silted up and carriage capacity of check dam is reduced.

Ch. 5/490–Bridge Culvert

This culvert is located in Vimalagiri thodu at ch. 5/490. The width of thodu in this location is 5.00m. The location of the culvert is 9°51'48.68" N, 77°0'23.63" E. It has approximate length 5.0m, width 4 m and height 1.8m. Abutments are constructed inside the thodu. This may cause obstruction to flow of water. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

Ch. 5/770 – Culvert (Irooty)

This culvert is located in Vimalagiri thodu at ch. 5/770. The width of thodu in this location is 4.00m. The location of the culvert is 9°51'23.90" N, 77°1'1.97" E. It has approximate length 4.0m, width 3m and height 1.5m. Flow may be obstructed by this structure, as the size of opening is small. The upstream side and downstream is partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private

Ch. 9/100– Culvert

This culvert is located in Vimalagiri thodu at ch. 9/100. The width of thodu in this location is less than 3.00m. The location of the culvert is 9°51'12.53" N, 77°2'5.99" E. It has approximate length 5.0m, width 3m and height 2.5m. The upstream side and downstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream of bridge is private.

Bridge across Upputhodu thodu at Chalikkada

Culvert across

UPPUTHODU Thodu @ Chainage 130.100Km

This tributary passes through Vathikudi and Mariyapuram Grama panchayats, has a length about 4 km and joins with Periyar river at ANTOPURAM . Major constructions across this thodu are

Bridge across Upputhodu thodu at Chalikkada - Ch.1/300

Bridge across Upputhodu Thodu at chalikkada. It is a small span bridge built on tall abutments. The upstream and downstream banks are not protected. There is no obstruction to flow in this location.The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Culvert across Upputhodu thodu at Chalikkada - Ch.1/650

Culvert across Upputhodu thodu at chalikkada. It is a single span culvert and abutments are in river channel, so flow is partially obstructed.The right bank protected and left bank not protected.The type of soil on bed of the thodu at this location is siltwith sand.

Culvert across Upputhodu Thodu at chalikkada

Culvert across Upputhodu thodu at Karimaruthungalppadi - Ch.2/460

Culvert across Upputhodu thodu at Karimaruthungalppadi. The abutments are in river channel, so flow is partially obstructed. Both banks not protected.The type of soil on bed of the thodu at this location is silt with sand.

Culvert across Upputhodu thodu at Antopuram - Ch.3/380

Culvert across Upputhodu Thodu at Antopuram. It is a single span culvert and abutments are in river channel, so flow is partially obstructed.. Both banks not protected.The type of soil on bed of the thodu at this location is silt with sand.

Churulithodu

This tributary starts from Edakkadu passes through Vazhathoppu and Idukki-KanjikuzhyGramapanchayats, has a length about 5 km and joins with Periyarriver at PERIYAR VALLEY.Major constructions across this thodu are

1.	Culvert across Churuli thodu	- Ch. 0/150 m
2.	Culvert across Churuli thodu	- Ch. 0/850 m
3.	Culvert across Branch of Churuli thodu	- Ch. 1/600 m
4.	Bridge across Churuli thodu at CHURULI Town	- Ch. 1/950 m
5.	Culvert across Churuli thodu	- Ch. 3/600 m
6.	Bridge across Churuli thodu in Alappuzha - Madurai Rd	- Ch. 4/300 m

Culvert across Churuli thodu - Ch.0/150

Culvert across Churuli Thodu at Ch.0/150. The upstream and downstream banks are not protected. There is no obstruction to flow in this location. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private.

Culvert across churuli thodu

Culvert across Churuli thodu - Ch.0/850

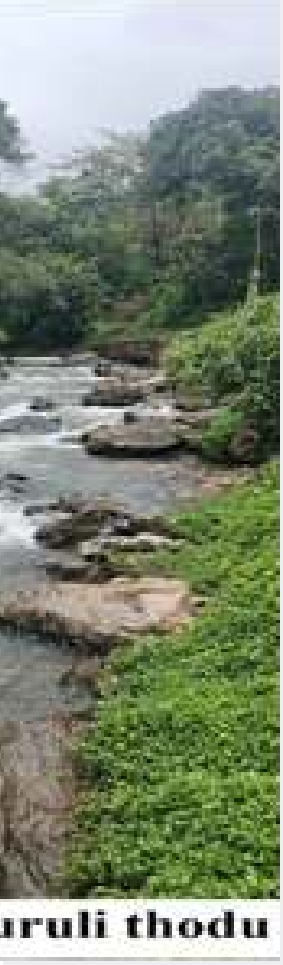
Culvert across Churuli Thodu at Ch.0/850. The upstream and downstream banks are not protected. There is no obstruction to flow in this location. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private

Culvert across Ch

Bridge across branch of Churuli thodu

Culvert across Branch of Churuli thodu - Ch.1/600

Newly constructed bridge across branch of churuli thodu.Built on tall pillars, so flow is not obstructed. Rocky river bed in the vicinity of bridge.



Bridge across Churuli thodu at Churuli Town - Ch.1/950

Bridge across churuli thodu at Churuli town. It is a small span bridge and flow is obstructed due to encroachment in the vicinity. Bed is rocky near the bridge.Both banks are protected.

Culvert across Churuli thodu - Ch.3/600

Culvert across churuli thodu at Periyar valley. It is a small span culvert and abutments are in river channel, so flow is partially obstructed. The Approach roads of culvert is severely damaged in last year flood. Silt deposited with vegetation.Both banks are unprotected.

Bridge across Churuli thoduAlappuzha - Madurai Rd - Ch.4/300

Bridge across churuli thodu at Periyar valley.Built on tall pillars, so flow is not obstructed. Both banks are unprotected.

Irrigation Department

KEERITHODU Thodu @ 133.700Km

This tributary starts near PalliJn and passes through Idukki-KanjikuzhyGramapanchayat, has a length about 2 km and joins with Periyar river at PERIYAR VALLEY . Major constructions across KEERITHODU thodu are

1	Thodu at PallipadiCulvert across Keerithodu	Ch. 0/500 m
2	Bridge across Keerithodu thodu at KEERITHODU Town	Ch. 0/750 m
3	Culvert across Keerithodu thodu at PERIYAR VALLEY	Ch. 1/200 m

Culvert across Keerithodu at Pallippadi

Culvert across Keerithodu thodu at Pallipadi - Ch.0/500

Culvert across keerithodu at Pallippady. It is a small span culvert and flow is obstructed due to overgrown vegetation in the course.Thodu at this location having rock bed with both banks protected.

Bridge across Keerithodu thodu at Keerithodu town

Bridge across Keerithodu thodu at KeerithoduTown-Ch.0/750

Bridge across keerithodu at Keerithodu town. It is a small span bridge and flow is obstructed due encroachment in the vicinity.Thodu at this location having rock bed with both banks protected

Culvert across Keerithodu thodu at Periyar valley

Culvert across Keerithodu thodu at Periyar Valley - Ch.1/200

Culvert across keerithodu at Periyar valley. It is a small span culvert and abutments are in river channel, so flow is partially obstructed. Both banks unprotected with rock bed

Perinjakuttythodu@ 134.800Km

This is the largest Tributary of PERIYAR in the stretch under investigation. Perinjamkutty Aar passes through Erattayar, Vathikudi, Nedumkandam and KonnathadiGramapanchayats. This Tributary has a length of 26 km and joins with PERIYAR at Periyar valley (Ch. 133.86 km). Erattayar and Kallar diversions dams are constructed across Perijamkutty Aar and a new dam is under construction stage at Chinnar (Ch. 21/200 m).Main sub- tributaries of Perijamkutty Aar are

- KALLAR Thodu (8 km) - Ch. 5/750 m
- THOPRANKUDI Thodu (2 km) - Ch. 8/150 m
- KARITHODU Thodu (2.3 km) - Ch. 11/450 m

Major structuresacross KEERITHODU- PERIJAMKUTTY RIVER

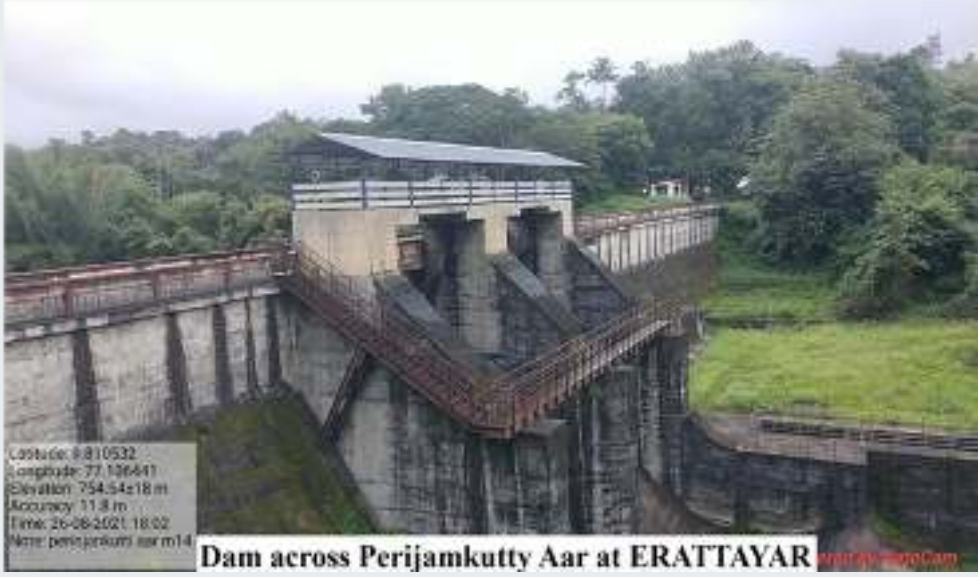
1.	Dam across Perijamkutty Aar at ERATTAYAR	- Ch. 00/000 km
2.	Culvert across Perijamkutty Aar at ERATTAYAR NORTH	- Ch. 00/340 km
3.	Bridge across Perijamkutty Aar at ETTITHOPPUKAVAL	- Ch. 01/200 km
4.	Culvert across Perijamkutty Aar at KARUNAKARANPADI	- Ch. 01/840 km
5.	Culvert across Perijamkutty Aar at ETTAKKANAM	- Ch. 03/450 km
6.	VCB across Perijamkutty Aar at ETTAKKANAM	- Ch. 03/740 km
7.	Bridge across Perijamkutty Aar at ETTITHOPPU	- Ch. 04/200 km
8.	Foot Bridge across Perijamkutty Aar at ETTITHOPPU	- Ch. 04/900 km
9.	Bridge across Perijamkutty Aar at KALLARMUKKU	- Ch. 05/790 km
10.	Bridge across Perijamkutty Aar at AMBALAMPADI	- Ch. 07/000 km
11.	VCB across Perijamkutty Aar at MELECHINNAR	- Ch. 07/500 km
12.	Bridge across Perijamkutty Aar at MELECHINNAR	- Ch. 08/000 km
13.	Foot Bridge across Perijamkutty Aar at MADAMPADI	- Ch. 08/830 km
14.	Foot Bridge across Perijamkutty Aar at BETHEL	- Ch. 09/850 km
15.	Bridge across Perijamkutty Aar at KURISHUPALLIPPAD	- Ch. 10/250k m
16.	VCB across Perijamkutty Aar at KATTYAMALAPPADI	- Ch. 10/650 km
17.	Foot Bridge across Perijamkutty Aar at KATTYAMALAPPADI	- Ch. 10/700 km
18.	Bridge across Perijamkutty Aar at PERIJAMKUTTY	- Ch. 11/600 km
19.	Culvert across Perijamkutty Aar at CHEMPAKAPPARA	- Ch. 14/400 km
20.	Bridge across Perijamkutty Aar at CHINNAR	- Ch. 20/000 km
21.	Old Chappathu across Perijamkutty Aar at CHINNAR	- Ch. 20/030 km
22.	DAM under construction across Perijamkutty Aar at CHINNAR	- Ch. 21/200 km
23.	Culvert across Perijamkutty Aar	- Ch. 21/270 km
24.	Culvert across Perijamkutty Aar at MANKUVA	- Ch. 23/200 km

Major structuresacross KALLAR RIVER

a.	Dam across KALLAR Thodu	- Ch. 0/000 km
b.	Bridge across KALLAR Thodu at KURISHUPARA	- Ch. 3/150 km
c.	Culvert across KALLAR Thodu	- Ch. 4/200 km
d.	Culvert across KALLAR Thodu	- Ch. 5/560 km
e.	Culvert across KALLAR Thodu at THOOVAL	- Ch. 5/850 km

Major structures across THOPRAKUDY RIVER

A.	Bridge across THOPRANKUDI Thodu at MELECHINNAR	- Ch. 1/750 m
B.	Bridge across KARITHODU Thodu at PERIJAMKUTTY	- Ch. 2/200 m



Dam across Perijamkutty Aar at ERATTAYAR

Dam across Perinjamkutty Aar at Erattayar - Ch.0/000
Small diversion dam built on Perinjamkutty Aar in Erattayar Grama Panchayat. It acts mainly as a diversion dam to supply water to the Idukki Dam. Diversion of water from Eattayar forebay to Idukki reservoir is through a tunnel called Anchuruli tunnel

Culvert across Perijamkutty Aar at Erattayar north

Culvert acrossPerinjamkutty Aar at Erattayar north - Ch.0/340
Culvert across Perinjamkutty Aar at Erattayar North. It is a small span culvert with short abutments and flow is obstructed due to overgrown vegetation in the course. Silt deposited and both side unprotected.

Vegitation in Perijamkutty Aar at Erattayar North

Bridge across Perinjamkutty Aar at Eattithoppukavala - Ch.1/200

Culvert across Perinjamkutty Aar at Ettithoppu kavala. This culvert has relatively high pillars and rocky river bed in the vicinity. Silt deposited.and left bank protected. Flow of water obstructed

Bridge across Perijamkutty Aar at Ettithoppu kavala

Culvert across Perinjamkutty Aar at Karunakaranpady - Ch.1/840

It is a small span culvert and abutments are in river channel, so flow is partially obstructed. Both banks unprotected .Silt deposited with small vegetation.

Culvert across Perijamkutty Aar at Karunakaranpadi

Culvert across Perinjamkutty Aar at Ettakkanam - Ch.3/450

It is a small span culvert and abutments are in river channel with less vertical clearance, so flow is partially obstructedand silt deposited with small vegetation. Both banks are protected.

Culvert across Perijamkutty Aar at Ettakkanam

VCB acrossPerinjamkutty Aar at Ettakkanam - Ch.3/740

VCB across Perinjamkutty Aar at Ettakkanam. Wing walls of VCB are damaged in the 2019 flood. The silt deposited in upstream of VCB about 1.00m depth or more with vegetation. The desilting and maintenance required.

Bridge acrossPerinjamkutty Aar at Eattithoppu - Ch.4/200

Bridge across Perinjamkutty Aar at Ettithoppu. Abutments are in river channel, so flow is partially restricted. The Aar at this portion is rock bed.Both banks unprotected and ownership ofland on both side are private.

Foot Bridge across Perinjamkutty Aar at Eattithoppu - Ch.4/900

Foot bridge across Perinjamkutty Aar at Ettithoppu. It has tall abutments and there is no obstruction to flow.Silt deposited with vegetation is found. Both banks unprotected.

Kallar thodu - Ch.5/750km (Tributary of Perinjamkutty Aar)

Kallar Dam constructed across Kallarpuzha at Kallar in Nedumkandam Panchayath and diverted water to Idukki reservoir through Kallara Tunnel and Anchurali Tunnel.The Kallar thodu starts from downstream of Kallar dam and reaches Perinjamkutty Aar at Ch.5/750.The length of Kallar thodu is about 8.00km

Culvert across Kallar thodu at Kurisupara - Ch.3/150km

It is a newly constructed culvert with abutments is in course of thodu, so flow is partially restricted. Both side unprotected.Silt deposited with vegetation.

Bridge across KALLAR Thodu at KURISHUPARA

Culvert across Kallar thodu - Ch.4/200km

It is a small span culvert built on short pillars and abutments are in course of thodu, so flow is partially restricted. Both side unprotected.

Culvert across KALLAR Thodu

Culvert across Kallar thodu at Thooval - Ch.5/560km

It is a small span culvert reduces width of thodu at this location, vertical clearance is also less. So flow of water is obstructed and silt deposited

Culvert across Kallar thodu at Thooval - Ch.5/850km

Culvert across kallar at Thooval. It is a small span culvert and abutments are in course of thodu, so flow is partially obstructed .Silt deposited with vegetation.

Bridge across Perinjamkutty Aar at Kallarmukku - Ch.5/790

Bridge across Perinjamkutty Aar at Kallarmukku . Abutments are in river channel, so flow is partially restricted. Silt deposited with vegetation are found

Bridge across Perinjamkutty Aar at Ambalampady- Ch.7/000
Culvert across Perinjamkutty Aar at Ambalappadi. It is a small span culvert built on short pillars and abutments are in river channel, so flow is partially restricted. Both banks are unprotected private land.

Bridge across Perijamkutty Aar a

VCB across Perinjamkutty Aar at Melechinnar- Ch.7/500
VCB across Perinjamkutty Aar at Melechinnar. Wing walls of VCB are damaged in the last flood.Silt deposited with vegetation is found.

VCB across Perijamkutty Aar at MELECHINNAR

Bridge across Perijamkutty Aar at MELECHINNAR

Bridge across Perinjamkutty Aar at Melechinnar- Ch.8/000
Bridge across Perinjamkutty Aar at Melechinnar. Abutments are in river channel, so flow is partially restricted. Both banks are unprotected.

Thopramkudi thodu - Ch.8/150km (Tributary of Perinjamkutty Aar)

Thopramkudi thodu strats near Thopramkudi and reaches Perinjamkutty Aar at Ch.8/150.The length ofthodu is about 2.00km

Bridge across Thopramkudi thodu at Melechinnar- Ch.1/750km

Bridge across Thopramkudi thodu at Melechinnar.No silt deposited and both banks protected.

Foot Bridge across Perinjamkutty Aar at Madampadi- Ch.8/830

Foot bridge across Perinjamkutty Aar at Madampadi. It has short abutments built using stone masonry. River bed is rocky near the foot bridge.Flow of water obstructed.Vegetations on upstream and downstream.

Foot Bridge across Perinjamkutty Aar at Bethel- Ch.9/850
Foot bridge across Perinjamkutty Aar at Bethel. It has short abutments which are in river channel, so flow is partially restricted. Silt deposited and both banks unprotected

Bridge across Perinjamkutty Aar at Kurishupallipadi- Ch.10/250
Bridge across Perinjamkutty Aar at Kurishupallippadi. Bridge has short pillars and Abutments are in river channel, hence the flow is partially restricted.Silt deposited and both banks unprotected.

VCB across Perinjamkutty Aar at Kattyamala padi- Ch.10/650

VCB across Perinjamkutty Aar at kattyamalappadi. Wing walls of VCB are damaged in the last flood.Silt deposited with vegetation and left bank unprotected.

Foot Bridge across Perinjamkutty Aar at Kattyamala padi- Ch.10/700

Foot bridge across Perinjamkutty Aar at kattyamalappadi. It has tall abutments. Flow is partially restricted due to overgrown vegetation and silt deposited near the foot bridge.

Foot Brige across Perijar

Karithodu thodu - Ch.11/450km (Tributary of Perinjamkutty Aar)

Karithodu thodu strats near Karithodu and reaches Perinjamkutty Aar at Ch.11/450. The length of thodu is about 2.30km.

Bridge across Karithodu thodu at Perinjamkutty- Ch.2/200km

Newly constructed bridge across branch of Perinjamkutty Aar at Perinjamkutty.abutments are in river channel, so flow is partially restricted

mkutti Aar at Kattyamalappadi

Bridge across Perijamkutti Aar at PERIJAMKUTTY

Bridge across KARITHODU thodu at PERIJAMKUTTY

Bridge across Perinjamkutty Aar at Perinjamkutty- Ch.11/600

Bridge across Perinjamkutty Aar at Perinjamkutty. Abutments are in river channel, so flow is partially restricted.Both banks unprotected.

Culvert across Perinjamkutty Aar at Chempakapara- Ch.14/400

Culvert across Perinjamkutty Aar at Chempakappara. It has short abutments built using stone masonry, So flow of water partialy obstructed. Silt deposited with vegetation

Culvert across Perijamkutti Aar at CHEMPAKAPPARA

Bridge across Perinjamkutty Aar at Chinnar- Ch.20/000

Bridge across Perinjamkutty Aar at chinnar. Abutments are in river channel, so flow is partially restricted.Silt deposited and both banks unprotected.

Bridge across Perinjankutty Aar at CHINNAR

Old Chappath across Perinjamkutty Aar at Chinnar- Ch.20/030

Old chappathu across Perinjamkutty Aar at chinnar. Built using concrete and flow is obstructed. Currently not being used, so need to be dismantled.

Old Chappathu across Perinjamkutty Aar at Chinnar

Dam under construction acrossPerinjamkutty Aar at Chinnar- Ch.21/200

New dam is under construction across Perinjamkutty Aar for power generation by KSEB.

Dam under construction across Perinjamkutty Aar at CHINNAR

Culvert across Perinjamkutty Aar - Ch.21/270

Culvert across Perinjamkutty Aar. It is a small span culvert built on short pillars and abutments are in river channel, so flow is partially restricted.Both side unprotected.

Culvert across Perinjankutty Aar

Culvert across Perinjamkutty Aar at Mankuva- Ch.23/200

Culvert across Perinjamkutty Aar at Mankuva. It is a small span culvert built on short pillars and abutments are in river channel, so flow is partially restricted. Small veetation with rock bed.

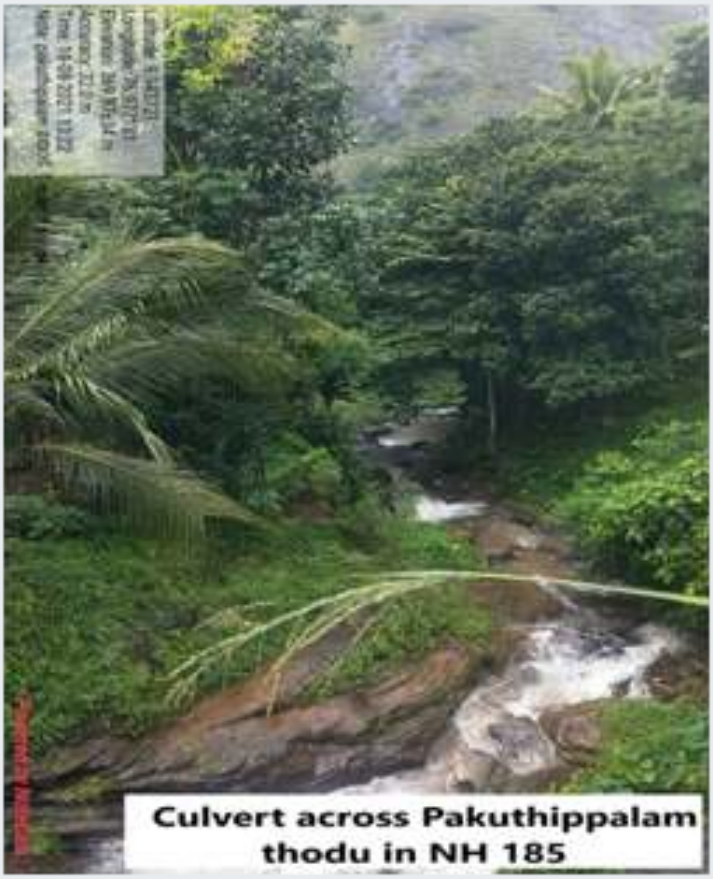
PAKUTHIPPALA M thodu @ Ch 135.25 Km

This tributary passes through Idukki-Kanjikuzhy Grama panchayat, has a length about 1 km and joins with Periyar river at PERIYAR VALLEY..

1. Culvert across Pakuthippalam thodu in NH 185 - Ch. 0/600 m
2. Culvert across Pakuthippalam thodu at PERIYAR VALLEY - Ch. 0/720 m

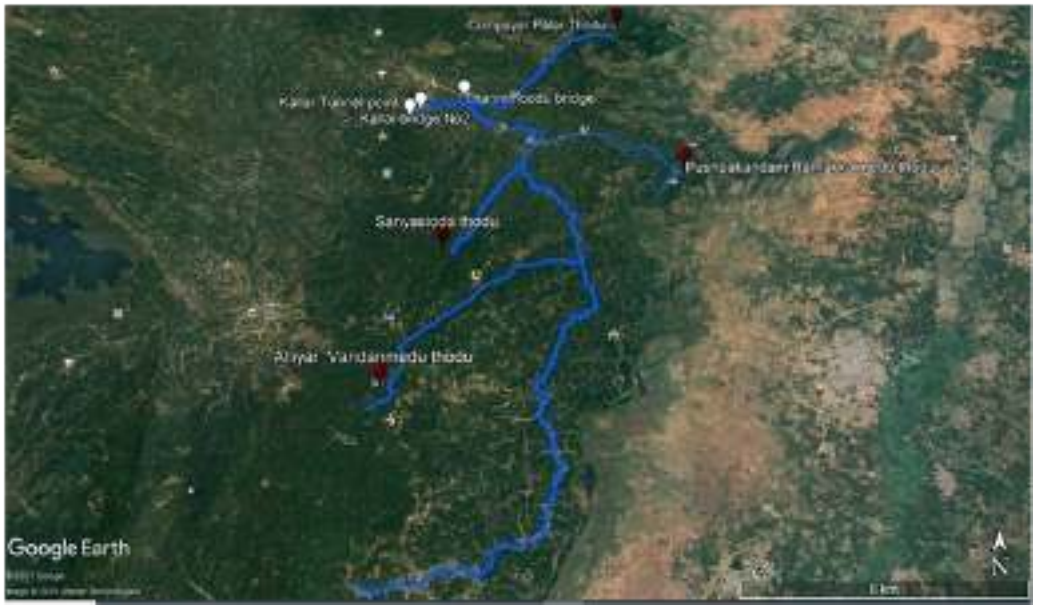
Culvert across Pakuthipalam thodu in NH 185- Ch.0/600

A single span Culvert across Pakuthipalam thodu in NH 185.Rock bed with small vegetation



Culvert across Pakuthipalam thodu at Periyar Valley- Ch.0/720

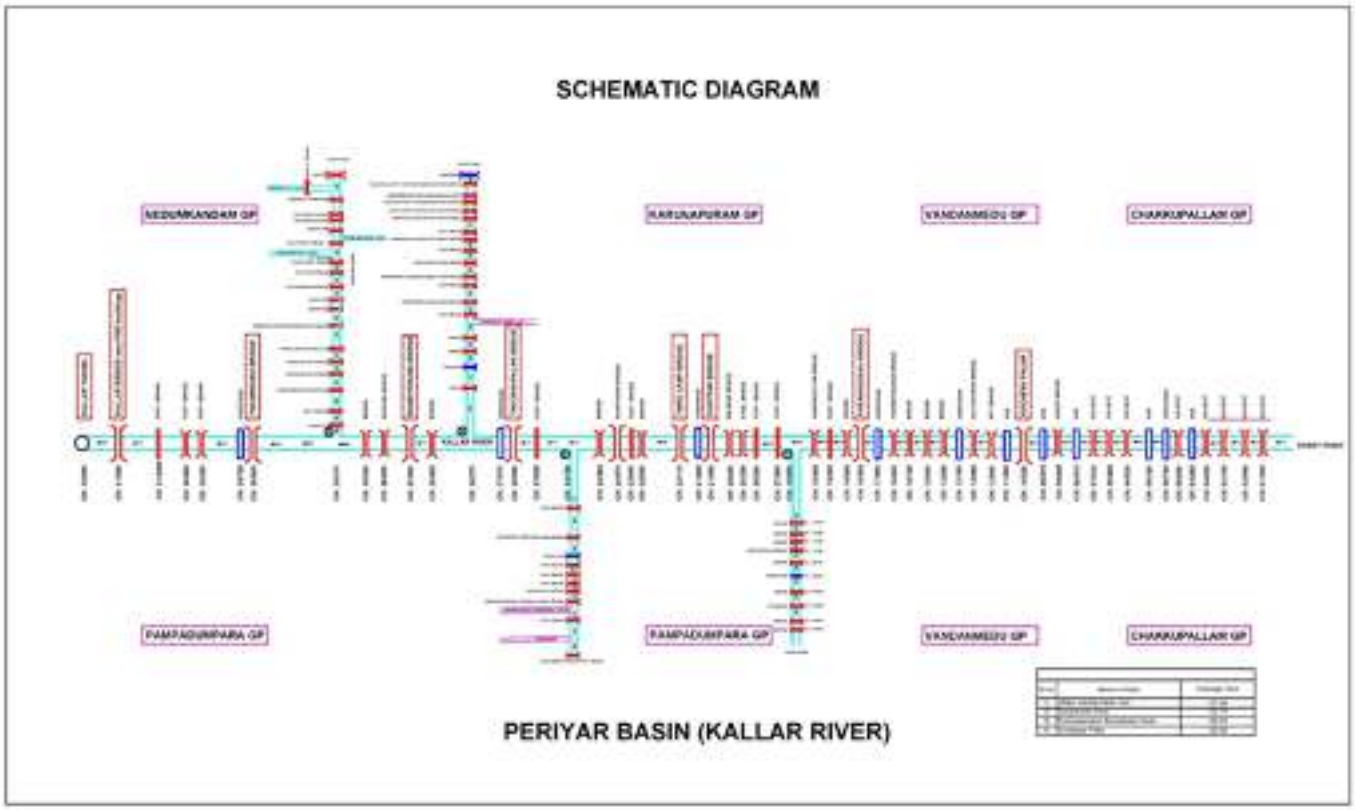
Culvert across Pakuthipalam thodu at Periyar Valley. It is a small span culvert and abutments are in course of thodu, so flow is partially restricted. Small vegetation with rock bed.



KALLAR RIVER

Kallar river is a tributary of Periyar river basin. It is diverted using Kallar Dam mannakudy – Valiyathovala – Erattayr river through Kallar tunnel, which then diverted using Erattayar Dam to Idukki Reservoir through Erattayar Nalumukke Tunnel. It has for major tributaries and a number of small streams. It is 32 Km long and originates in cardamom hills of Chakkupallam GP and passes through Chakkupallam, Vandanmedu, Karunapuram Nedumkandam and Pampadumpara GP. Total length of major tributaries is 36.70 Km. Althogh it has larger catchment area and longer length, the discharge though the river is less as this area receive less rainfall.

Kallar river is a tributary of Periyar and reaches Idukki reservoir at Anchuruli. Water reaches Anchurali through Kallar-Mannakudy tunnel and Erattayar- Anchurali Tunnel. Kallar has mainly four tributaries. The length of Kallar is 32.00 Km and originates in Chakkupallam GP in Idukki district and passes through Chakkupallam, Vandamedu, Karunapuram, Nedumkandam and Pampadumpara grama panchayth.



KALLAR RIVER SCHEMATIC DIAGRAM

Ch 1.2Km. Kadashikadavu Culvet

This culvert is located near Kadasikkadavu area along Kumily Munnar SH across Kallar rivert ch. 1/200. The location of the culvert is 9.67913° N, 77.14681°E. It has approximate length 6.0m, width 2.5 m and height 2.0m.There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is silt rock. The ownership of land on upstream and downstream banks of culvert is private.

STRUCTURES

Ch4.2Km.AnakkaraCulvert

This culvert is located near Anakkara area along 8th mile Puttady MDR across Kallar rivert ch. 4/200. The location of the culvert is 9.679625° N, 77.162662°" E. It has approximate length 6.0m, width 2.5 m and height 2.0m. The upstream is not protectedbut downstream banks are protected. The type of soil on bed of the thodu at this location is silt rock. The ownership of land on upstream and downstream banks of culvert is private.

Ch 5.8Km Culvert

This culvert is located near Anakkara area along panchayath road across Kallar rivert ch. 5/080. The location of the culvert is 9.68156° N, 77.17841° E. It has approximate length 5.0m, width 2.5 m and height 1.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private.

Ch 5.78Km. Check Dam

This checkdam is located near Anakkara kochera area across Kallar rivert ch. 5/780. The location of the checkdam is 9.69016°N, 77.19287° E. It has approximate length 6.0m, and height 1.0m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of checkdam is private.The thodu in this area is silted up

Ch 8.51Km. AKMUP School VCB

This VCB is located near AKMUP School, Kochera area across Kallar rivert ch. 8/510. The location of the VCB is 9.69864°N, 77.19638°E. It has approximate length 8.0m, and height 1.8m. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of VCB is private. The thodu in this area is silted up.

Ch 8.55Km. AKMUP School Bridge

This bridge is along Chellarkovil Kochera PWD road at AKMUP School Across Kallar river at Ch.8/550. The location of the bridge is 9.69848°N,77.19615°E.It has approximate length 5.0m, width 3.00 m and height 2.0m. Abutment is constructed inside the river, which may obstruct the flow. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is silt rock. The ownership of land on upstream and downstream banks of bridge is private. The downstream side of this bridge is silted up.

Ch 10.32Km. Kocherapalam

This bridge is along Puttady Manthipra PWD road across Kallar river at ch.10/320. The location of the bridge is 9.71356°N, 77.1977°E. It has approximate length 4.0m, width 3.00 m and height 2.0m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 11.93Km. Old Kochera Check Dam

This checkdam is across kallar river in old kochera at ch.11/930. The location of this check dam 9.72282°N, 77.19461°E. It has approximate length 4.0m, width 3.00 m and height 2.0m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private. The check dam is in damaged condition and is filled with silt and clay. This checkdam cause obstruction to flow.

Ch 12.5.Km. Old Kochera Private Bridge

This bridge is a private bridgetowards a house across Kallar river at ch.12/500. The location of the bridge is 9.72546°N, 77.19482°E. It has approximate length 3.0m, width 3.00 m and height 2.0m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 12.96Km. Old Kochera Bridge

This bridge is along Chettukuzhy Cumbumettu PWD road across Kallar river at ch.12/960.The location of the bridge is 9.72856°N, 77.19671°E. It has approximate length 5.0m, width 3.00 m and height 2.0m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 16.6Km. Thommithazham Bridge

This bridge is along Miladipadi Kuzhuthollu panchayath road across Kallar river at ch.16/600.The location of the bridge is 9.75286°N, 77.2045°E. It has approximate length 8.0m, width 3.5 m and height 2.0m. There is no obstruction to flow in this location. The upstream side is protectedand downstream bank is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private. The upstream and downstream is silted up.

Ch 17.00Km. Parakkadavu Check Dam

This checkdam is across kallar river in parakkada miladipadi at ch.17/000. The location of this check dam9.7527°N, 77.20795°E. It has approximate length 6.0m, and height 1.20 m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of checkdam is private. The upstream and downstream bank of check dam is in damaged condition and need protection. Checkdam is filled with silt and clay. This checkdam cause obstruction to flow.

Ch.18.00Km. Parakkadavu Bridge

Thisbridge is along Cumbumettu Puliyanmala PWD road at Parakkadavu across Kallar river at Ch.18/000. The location of the bridge is 9.7582°N, 77.21125°E. It has approximate length 5.0m, width 5.00 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 19Km. Parappanagadi road bridge

This bridge is along Parakkadavu Parappanangadi panchayath road at Angekoottar across Kallar river at Ch.19/000. The location of the bridge is 9.76558°N, 77.20847°E.It has approximate length 4.0m, width 3.00 m and height 2.0m.There is no obstruction to flow in this location. The upstream and downstream banks are partially protected. The type of soil on bed of the thodu at this location is silt. The ownership of land on upstream and downstream banks of bridge is private.

Ch 19.20Km. Foot bridge

This foot bridge is at Angekoottar across Kallar river at Ch.19/200. The location of the bridge is 9.76764°N,77.20821°E.It has approximate length 9.0m, width 1.00 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 19.60Km. Angekoottar Bridge

This bridge is along Kuzhitholu Koottar PWD road at Angekoottar across Kallar river at Ch.19/600. The location of the bridge is 9°46'15.19" N,77°12'27.96" E.It has approximate length 5.0m, width 4.00 m and height 2.0m. The size of opening of this culvert is small, which may obstruct the flow of water. The upstream is not protected but downstream banks is protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 20.59Km. Koottar footbridge

This foot bridge is at Angekoottar across Kallar river at Ch.20/590. The location of the bridge is 9°46'23.57" N, 77°12'25.97" E.It has approximate length 12.0m, width 1.00 m and height 2.5m.There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 20.30Km. Koottar Steel Bridge

This steel bridge is at koottar across Kallar river at Ch.20/300. The location of the bridge is 9°46'35.45" N,77°12'24.39" E.It has approximate length 10.0m, width 3.00 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banksof bridge is private

Ch.20.60Km. Koottar Bank Bridge

This bridge is at koottar across Kallar river near SBI bank at Ch.20/600. The location of the bridge is 9°46'46.38" N,77°12'21.83" E.It has approximate length 8.0m, width 3.00 m and height 1.5m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 21.00Km. Koottar Bridge

This bridge is at koottar along Cumbumettu Nedumkandam PWD road across Kallar river at Ch.21/000. The location of the bridge is 9°46'57.83" N,77°12'18.42" E.It has approximate length 10.0m, width 3.5 m and height 1.80m. There is no obstruction to flow in this location. The upstream and downstream banks are partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 22.11Km. Third camp Bridge

This bridge is across thirdcamp- edatharamukku panchayath road at Ch.22/110. The location of the bridge is 9°47'26.81" N,77°12'10.99" E.It has approximate length 12.0m, width 4.0 m and height 1.8m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 22.82Km. Thirdcamp Asupathripadi Bridge

This bridge is at Thirdcamp Asupathripadi across Kallar river near govt LP School at Ch.22/820. The location of the bridge is 9°47'41.13" N,77°11'57.67" E.It has approximate length 8.0m, width 3.00 m and height 2.0m. The abutment is inside the river, which obstruct the flow of water. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 22.84Km. Thirdcamp Asupathripadi Foot Bridge

This foot bridge is across Kallar at Thirdcamp bank at Ch.22/840. The location of the bridge is 9°47'71.7" N,77°11'57.42" E.It has approximate length 8.0m, width 3.00 m and height 1.5m. The footbridge is in damaged condition.

Ch 24.07Km. Balagram Santhigiri Bridge

This bridge is at balagram across Kallar river at Ch.24/070. The location of the bridge is 9°48'0.53" N,77°11'32.07" E.It has approximate length 6.0m, width 3.00 m and height 3.0m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 25.90Km. Thookkupalam Bridge

This bridge is at Thookkupalam across Kallar river at Ch.25/900. The location of the bridge is 9°48'51.77" N,77°11'35.71" E.It has approximate length 8.0m, width 3.00 m and height 3.0m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. Old Thookupalam bridge is adjacent to this bridge, which is in good condition. The downstream side protection is in damaged condition. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 26.07Km. Thookupalam Check Dam

This checkdam is at thookupalam across Kallar river at Ch.26/070. The location of the bridge is 9°48'56.7" N,77°11'37.54" E.It has approximate length 8.0m, and height 1.5m. The upstream and downstream banks are protected, but is in damaged condition. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 27.59Km. Mundiyeruma Bridge

This bridge is at Mundiyeruma along mundiyeruma Compayar road and is across Kallar river at Ch.27/590. The location of the bridge is 9.81931°N,77.18318°E.It has approximate length 8.0m, width 3.50 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 29.66Km. Thannimoodu Bridge

This bridge is at Thannimood across Kallar riverat Ch.29/660. The location of the bridge is 9.82887°N,77.17105°E.It has approximate length 6.0m, width 4.0 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 29.72Km. Thannimoodu Check Dam

This checkdam is at Thannimoodur across Kallar riverCh.29/720. The location of the bridge is 9°49'44.03" N,77°10'14.62" E.It has approximate length 8.0m, and height 1.5m. This check dam is constructed for raising water level to nearby Water Authority Pumphose in dry season The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 31.52Km. Kallar New Bridge

This bridge is along Puliyanmala Nedumkandam pwd road at kallar across Kallar resrvoir at Ch.31/520. The location of the bridge is 9.82542°N, 77.15694°E. There is no obstruction to flow in this location. It has approximate length 20.0m, width 8m and height 2.5m. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 31.65Km Kallar Diversion Dam

Kallar dam is a small diversion dam constructed at Perinchankuttyar in Nedunkandam grama Panchayat, Idukki District, Kerala, India. It acts mainly as a diversion dam to supply water to the Idukki Dam. It is a small dam measuring 67.91 m in length and 12.19 m in height. The water stored in the Kallar Dam reaches the Erattayar River through a tunnel and the Erattayar Dam through the Erattayar River. Water reaches Idukki Dam from Irattayar Dam through Irattayar Tunnel / Anchuruli Tunnel. Reservoir area of this Dam is 220 Hectars.

Specification

- Latitude : 9^0 49′ 30 ” N
- Longitude: 77^0 09′ 20” E
- Panchayath : Nedumkandam
- Village : Kalkoonthal
- District : Idukki
- River Basin : Periyar
- River : Perinjamkutty (Tributary of Periyar)
- Release from Dam to river : Periyar
- Type of Dam : Concrete- Gravity
- Classification : LH (Low height)
- Maximum Water Level (MWL) : 824.48 meters
- Full Reservoir Level (FRL) : 824.48 meters
- Storage at FRL : 0.793 Mm3
- Height from deepest foundation : 12.19 m
- Length : 57.91 m
- Spillway : Ogee type – 4 Nos. Radial gates, each of size 7.62 x 6.10 m
- Year of completion : 1975
- Crest Level : 818.38 m
- Name of Project : Idukki HEP
- River Outlet : No outlet
- Type of Project : Hydro Power

Ch 31.55Km. Kallar Small Bridge

This bridge is along Thookkupalam Nedumkandam pwd road at kallar across Kallar river at Ch.31/520. The location of the bridge is 9°49'29.13" N,77°9'27.03" E.It has approximate length 5.0m, width 7.00 m and height 1.5m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 32Km. Kallar Tunnel

This Tunnel is a part of Idukki Hydro Electric Project and is used to divert water from Kallar Reservoir to Erattayar Reservoir. The length of this tunnel is 2.90 Km and reaches Mannakkudy tunnel outlet. The tunnel isat Ch.32/00. The location of the bridge is 9.82199°N, 77.1539°E.

Triburaties of Kallar River

Alliyar Vandanmedu river

Alliyar Vandanmedu river originates in cardamom hills in Vandanmedu GP, passes through Vandanmedu, Pampadumpara, Karunapuram grama panchayth and joins kallar river at Angeekoottar in Karunapuram GP. The length of this river is 15.40 km. Width varies from 6.00m to 15.00m.

Ch 0.00Km. Angekoottar Bridge

This bridge is at Angekoottar across Alliyar riverat Ch.0/10. The location of the bridge is 9°46'14.13"N,77°12'26.98" E.It has approximate length 4.0m, width 4.0 m and height 2.5m. There is no obstruction to flow in this location. The downstream banks are protected and upstream is not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 0.43Km. Angekoottar Bridge

This bridge is at Angekoottar across Alliyar riverat Ch.0/430. The location of the bridge is 9°46'12.61"N,77°12'15.24" E.It has approximate length 4.0m, width 4.0 m and height 2.0m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 3.15Km. Alliyar Bridge

This bridge is at Alliyar across Alliyar riverat Ch.3/150. The location of the bridge is 9°45'56.55"N,77°11'08.53" E.It has approximate length 4.0m, width 4.0 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Location Name	Lattitude	Longitude	Chainage
Vandanmedu	9°43'00" N	77°08'29.72" E	11.8
Vandanmedu	9°43'36.44"N	77°08'57.65" E	10.2
Pumbhosepadi bridge	9°43'58.90"N	77°09'13" E	9.1
near puliyanmala	9°44'26.13"N	77°09'22.85" E	8.16
Hemakadavu checkdam	9°44'45.70"N	77°09'29.21" E	7.3
Hemakadavu bridge	9°44'45.82"N	77°09'29.66" E	7.28
Aniyartholu bridge	9°45'51.28"N	77°10'53.36" E	3.66
Aniyartholu bridge	9°45'51.69"N	77°10'54.06" E	3.64
Alliyar bridge	9°45'56.55"N	77°11'08.53" E	3.15
Angekoottar bridge	9°46'12.61"N	77°12'15.24" E	0.43
Angekoottar bridge	9°46'14.13"N	77°12'26.98" E	0.00

Ch 3.66Km. Aniyarthollu Bridge

This bridge is long Cumbumettu Puliyanmala PWD road atAniyarthollu across Alliyar riverat Ch.3/660. The location of the bridge is 9°45'51.28"N, 77°10'53.36" E.It has approximate length 6.0m, width 4.0 m and height 4m.There is no obstruction to flow in this location. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 7.28Km. Hemakadavu bridge

This bridge is along Puliyanmala Hemakadavu PWD road at Hemakadavu across Alliyar riverat Ch.7/280. The location of the bridge is 9°44'45.82"N,77°09'29.66" E.It has approximate length 8.0m, width 4.0 m and height 2.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 7.30Km. Hemakadavu Checkdam

This check dam is across Alliyar riverat Ch.7/300. The location of the checkdam is 9°44'45.70"N,77°09'29.21" E.It has approximate length 8.0m, and height 2m. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of checkdam is private

Ch 9.10Km. Pumphousepadi bridge

This bridge is along Puliyanmala KumilyPWD road atPumphosepadi across Alliyar riverat Ch. 9/100. The location of the bridge is 9°43'58.90"N,77°09'13" E.It has approximate length 6.0m, width 8.0 m and height 3.5m. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Saniyasioda thodu

Saniyasioda thodu originates puliyanmala area in Vandanmedu GP and passes through Pampadumpara GP and reaches Kallar river in Balagram. The length of this thodu is 6.33 Km width varies from 3.00 m to 8.00 m. Details of structures across this river is given in table.

Sl No	Structure/thodu	location		Chainage
		Latitude	Longitude	
1	CULVERT	9. 76°N	77.16227 °E	6.33
2	FOOTBRIDGE	9.78799°N	77. 17727°E	2.37
3	BRIDGE	9.79512 °N	77.18167 °E	1.39
4	PANCHAYATH BRIDGE	9.7963 °N	77.18282 °E	1.2
5	FOOTBRIDGE	9.79804 °N	77.1836 °E	1.01
6	FOOTBRIDGE	9.79908 °N	77.18479°E	0.8
7	FOOTBRIDGE	9.80027 °N	77.18536°E	0.66
8	CHECKDAM	9.80061 ° N	77.18584 °E	0.59
9	BRIDGE	9.80354 °N	77.18828 °E	0.23
10	BRIDGE	9.80451°N	77.118895°E	0.00

Ch 0.00Km Foot Bridge

This foot bridge is at Balagram across Kallar river at Ch.0/010. The location of the bridge is 9.80451°N,77.118895°E.It has approximate length 5.0m, width 1.50m and height 2.00. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 0.23Km. Bridge

This foot bridge is at Balagram across Kallar river at Ch.0/230. The location of the bridge is 9.80061 ° N,77.18584 °E.It has approximate length 5.0m, width 1.50m and height 2.00. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 0.59Km. CheckDam and Foot Bridge

This foot bridge is at Balagram across Kallar river at Ch.0/590. The location of the bridge is 9.80354 °N,77.18828 °E.It has approximate length 5.0m, width 1.50m and height 2.00. There is no obstruction to flow in this location. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

.4Ch 1.01Km. Foot Bridge

This foot bridge is at Balagram across Kallar river at Ch.1/010. The location of the bridge is 9.79804 °N,77.1836 °E.It has approximate length 5.0m, width 1.50m and height 2.00. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 0.80Km. Foot Bridge

This foot bridge is at Balagram across Kallar river at Ch.0/800. The location of the bridge is 9.79908 °N, 77.18479°E.It has approximate length 5.0m, width 1.50m and height 2.00.There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 1.20Km. Panchayath culvert

This foot bridge is at Balagram across Kallar river at Ch.1/200. The location of the bridge is 9.7963 °N,77.18282 °E.It has approximate length 5.0m, width 1.50m and height 2.00. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 2.37Km. Foot Bridge

This foot bridge is at Balagram across Kallar river at Ch.2/370. The location of the bridge is 9.78799°N, 77. 17727°E.It has approximate length 5.0m, width 1.50m and height 2.00. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 6.33Km. Culvert

This foot bridge is at Balagram across Kallar river at Ch.6/330. The location of the bridge is 9.76°N,77.16227 °E.It has approximate length 5.0m, width 1.50m and height 2.00. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Pushpakandam Ramakkalmedu thodu originates in puliyanmala area in Vandanmedu GP and passes through Pampadumpara GP and reaches Kallar river in Balagram. The length of this thodu is 9.43 Km with width varies from 3.00 m to 5.00 m. Details of structures across this river is given in table

SL No.	Structure/thodu	Latitude	Longitude	Chainage
1	Checkdam	9.7954°N	77.22261°E	9.43
2	BRIDGE	9.79522°N	77.23309 °E	8.29
3	Culvert	9.79509°N	77.23124°E	8.08
4	BRIDGE	9.81649°N	77.21224°E	2.81
5	BRIDGE	9.81358°N	77.20261°E	2.56
6	FOOT BRIDGE	9.81678°N	77.2089°E	2.4
7	BRIDGE	9.81646°N	77.20577°E	2.05
8	FOOT BRIDGE	9.81604° N	77.20519°E	1.91
9	BRIDGE	9.81343°N	77.20198°E	1.45
10	BRIDGE	9.81335°N	77.199334°E	1.13
11	FOOTBRIDGE	9.81289°N	77.19898°E	1.07
12	BRIDGE	9.81294°N	77.1988°E	1.05
13	FOOTBRIDGE	9.81432° N	77.19713°E	0.76
14	BRIDGE	9.81724°N	77.19708° E	0.41
15	BRIDGE	9.8179° N	77.19681° E	0.33
16	CHECKDAM	9.4904°N	77.1145°E	0.22
17	BRIDGE	9.81815° N	77.19422° E	0

Ch 0.00Km. Bridge

This bridge is at along Pushpakandam Thookkupalam across Pushpakandam Ramakkalmedu thoduat Ch.0/00. The location of the bridge is 9.81815 °N, 77.19422°E. It has approximate length 5.0m, width 1.50m and height 2.00. Width of opening of bridge is less than width of thodu, which may obstruct the flow. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 0.22Km. Check Dam

This checkdam constructed through MNREGA across Pushpakandam Ramakkalmedu thoduat Ch.0/220. The location of the checkdam is 9.4904°N, 77.1145°E. It has approximate length 5.0m, and height 1.50m. The check dam has few number of small vent ways. This resulted in sedimentation in the upstream of checkdam andflow is obstructed, because of this check dam. The upstream and downstream banks are partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of checkdam is private.

Ch 0.33Km. Culvert

This culvert is across Pushpakandam Ramakkalmedu thoduat Ch.0/330. The location of the culvert is 9.8179° N,77.19681° E.It has approximate length 4.0m, width 2.00m and height 1.00m. The abutment is constructed inside thodu, this may cause obstruction to flow. The upstream and downstream banks are partially protected. The type of soil on bed of the thodu at this location is loam soil. The ownership of land on upstream and downstream banks of culvert is private

Ch0.41Km. Culvert

This culvert is across Pushpakandam Ramakkalmedu thoduat Ch. 0/410. The location of the bridge is 9.81724°N,77.19708° E.It has approximate length 4.0m, width 2.0m and height 2.00m. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 1.13Km. Bridge

This culvert is across Pushpakandam Ramakkalmedu thoduat Ch.1/130. The location of the culvert is 9.81335°N,77.199334°E.It has approximate length 5.0m, width 1.50m and height 2.00. Flow may be obstructed due to small size of opening of culvert. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private

Ch 1.45Km. Culvert

This culvert is across Pushpakandam Ramakkalmedu thoduat Ch.1/450. The location of the culvert is 9.81343°N,77.20198°E.It has approximate length 5.0m, width 2.00m and height 2.00m. Abutnents are constructed inside thode, this may obstruct the flow in this location. The upstream and downstream banks are partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private.

Ch 2.81Km. Culvert

This culvert is across Pushpakandam Ramakkalmedu thodu at Ch.2/810. The location of the bridge is 9.81512 °N, 77.21878°E. It has approximate length 3.0m, width 2.50m and height 2.00. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 1.91Km. Foot Bridge

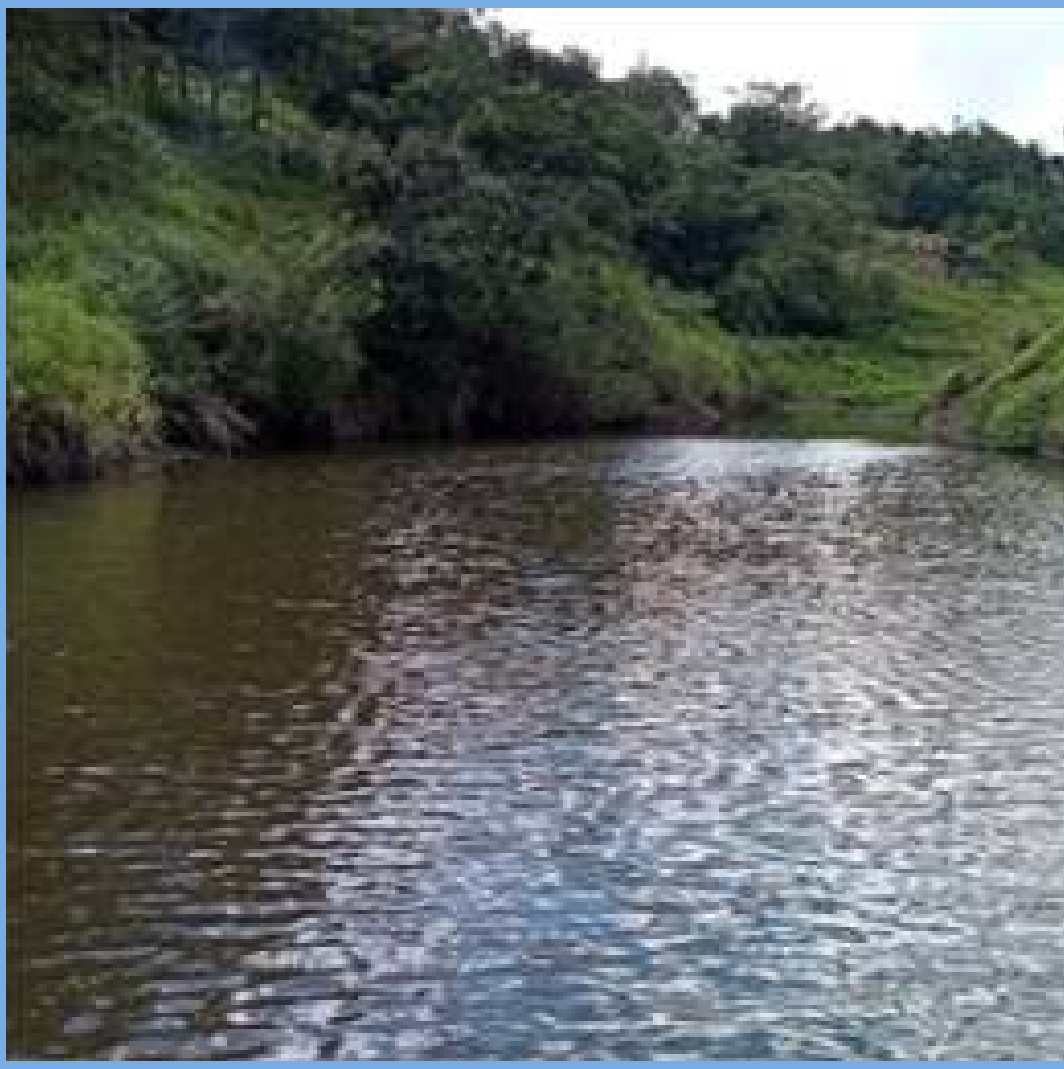
This bridge is across Pushpakandam Ramakkalmedu thoduat Ch.1/910. The location of the bridge is 9.81604° N, 77.20519°E. It has approximate length 3.0m, width 1.50m and height 2.00. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are partially protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 8.29Km. Bridge

This bridge is across Pushpakandam Ramakkalmedu thoduat Ch.8/290. The location of the bridge is 9.79522°N, 77.23309 °E. It has approximate length 5.0m, width 3.00m and height 1.50m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 9.43Km. CheckDam

This check dam is at Kurivikkanamat Ch.9/430. The location of the check dam is 9.7954°N, 77.22261°E. This is the origin of this thodu. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.



Compayar Palar river

Compayar Palar river originates puliyanmala area in Vandanmedu GP and passes through Pampadumpara GP and reaches Kallar river in Balagram. The length of this thodu is 8.00 Km with width varies from 3.00 m to 12.00 m. Details of structures across this river is given in table.

Sl No	Structure/thodu	location		Chainage
		Latitude	Longitude	
1	Anakallu Bridge	9°51'43.09" N	77°12'43.46" E	7.1
2	Thodu	9°51'41.23" N	77°12'40.54" E	6.2
3	Culvert	9°51'41.11" N	77°12'40.67" E	6.13
4	Culvert	9°51'19" N	77°12'24.85" E	5.95
5	Culvert	9°51'18.54" N	77°12'23.97" E	5.37
6	Check Dam	9°51'14.25" N	77°12'21.65" E	4.79
7	Pushpakandam Thodu	9°50'46.27" N	77°12'2.91" E	4.77
8	Palar Foot Bridge	9°50'46.04" N	77°12'1.2" E	4.38
9	Munnurekkar Thodu	9°50'39.16" N	77°11'51.35" E	4.23
10	Palar Road Bridge	9°50'34.19" N	77°11'50.84" E	3.82

11	Pattathimukku Bridge	9°50'26.73" N	77°11'42.94" E	3.26
12	Pallipadi Bridge	9°50'14.16" N	77°11'34.18" E	2.79
13	Check Dam	9°50'0.1" N	77°11'22.54" E	2.47
14	Check Dam	9°49'55.15" N	77°11'19.54" E	2.47
15	Combayar Pushpakandam Road Bridge	9°49'48.32" N	77°11'14.34" E	2.19
16	Pandalam Padi Check Dam	9°49'37.68" N	77°11'6.21" E	1.78
17	Pandalam Padi Bridge	9°49'35.33" N	77°11'3.32" E	1.65
18	Checkdam Padi Bridge	9°49'42.19" N	77°10'48.67" E	0.85
19	Checkdam Padi Check Dam	9°49'41.97" N	77°10'48.59" E	0.62
20	Tanimude Foot bridge	9°49'39.85" N	77°10'32.93" E	0.27
21	Tannimude Weir	9°49'40.06" N	77°10'29.46" E	0.19

Ch 0.00Km. Kallar Combayar Thodu Starting point

The location of confluence of compayar river to Kallar river is9°49'40.34" N, 77°10'25.36" E(Chainage Ch.0/00). It has approximate width of 11.50m. The upstream and downstream banks are not protected. This bank is included under KSEB catchment areaSedimentation in this area is found. The bed of thodu is loam soil

Ch 0.27Km. Thannimood Foot bridge

This foot bridge is across compayar river at Ch.0/270. The location of the bridge is 9°49'39.85" N, 77°10'32.93" E. It has approximate length is 10.0m, and height is 1.50m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private. The upstream is moderately silted.

Ch 0.19Km. Tannimood Weir

This weir is at across compayar river at Ch.0/190. The location of the weir is 9°49'40.06" N, 77°10'29.46" E. It has approximate length is 10.0m, and height is 1.00. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private. The upstream is silted.

Ch 0.62Km. Checkdam Padi Check Dam

This checkdam is across compayar river at Ch.0/620. The location of the checkdam is 9°49'41.97" N, 77°10'48.59" E. It has approximate length is 10.0m, and height is 2.00m. The upstream bank is protectedbut is in damaged condition. The downstream bank is not protected. The type of soil on bed of the thodu at this location is rock. The check dam is silted up and carrying capacity is reduced. The ownership of land on upstream and downstream banks of check dam is private. The upstream is silted.

Ch 0.85Km. Checkdam Padi Bridge

This bridge is along panchayath road across compayar river at Ch.0/850. The location of the bridge is 9°49'42.19" N, 77°10'48.67" E. It has approximate length is 8.0m, and height is 1.80m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are protected but is partially damaged. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private. The upstream is silted.

Ch 1.65Km. Pandalam Padi Bridge

This bridge is across compayar river at Ch.1/650. The location of the bridge is 9°49'35.33" N, 77°11'6.21" E. It has approximate length is 7.0m, width is4.00m and height is 1.80m.The abutment is constructed inside river and this may obstruct the flow of river. The upstream and downstream banks are protected, but are in damaged condition. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private. The upstream is silted.

Ch 1.78Km. Pandalam Padi Check Dam

This checkdam is across compayar river at Ch.1/780. The location of the checkdam is 9°49'37.68" N, 77°10'29.46" E. It has approximate length is 10.0m, and height is 1.50. The upstream and downstream banks are not protected. This checkdam is full of sand, silt and clay, so it cannot store water during summer. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of checkdam is private. The upstream is silted.

Ch 2.19Km. Combayar Pushpakandam Road Bridge

This bridge is along compayar pushpakandam road across compayar river at Ch.2/190. The location of the bridge is 9°49'48.32" N, 77°11'14.34" E. It has approximate length is 8.0m, and height is 3.00. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not well protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private. The upstream is silted.

Ch 2.47Km.Check Dam and Foot bridge

This check dam cum foot bridge is at compayar kurishupallipady across compayar river at Ch.2/470. The location of the check dam is 9°49'55.15" N, 77°11'19.54" E. It has approximate length is 8.0m, and height is 2.0m. The upstream and downstream banks are protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of check dam is private. The upstream is silted.

Ch 2.79Km. Jalanidhi Check Dam

This checkdam is at compayar across compayar river at Ch.2/790. The location of the check dam is 9°50'0.1" N, 77°11'22.54" E. It has approximate length is 7.0m, and height is 1.5m. The upstream and downstream banks are protected for a short distance. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of check dam is private. The upstream is silted. The check dam is constructed to raise the water level of river. At present the check dam is filled with silt, sand and clay.

Ch 3.26Km. Pallipadi Bridge

This bridge is across compayar river at Ch.3/260 near pllipadi, Compayar. The location of the bridge is 9°50'14.16" N, 77°11'34.18" E. It has approximate length is 8.0m, width 3.00m and height is 2.00m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 3.82Km. Pattathimukku Bridge

This bridge is at across compayar river at Ch.3/820. The location of the bridge is 9°50'26.73" N, 77°11'42.94" E. It has approximate length is 6.0m,width is 4.00m and height is 2.50m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 4.77Km. Palar Foot Bridge

This foot bridge is at across compayar river at Ch.4/770. The location of the bridge is 9°50'46.04" N, 77°12'1.2" E. It has approximate length is 6.0m, and height is 2.00.There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private.

Ch 7.10Km. Anakallu Bridge

This bridge is at across compayar river at Ch.7/100. The location of the bridge is 9°51'41.11" N, 77°12'40.67" E. It has approximate length is 4.00m,width is 4.00m and height is 1.80m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

6.48.4.13 Ch 6.13Km. Culvert

This culvert is at across compayar river at Ch.6/130. The location of the culvert is 9°51'18.54" N, 77°12'23.97" E. It has approximate length is 3.0m, width 3.00m and height is 1.5m. Flow may be obstructed due to abutments The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private.

Ch 7.10Km. Bridge

This bridge is at across compayar river at Ch.7/10. The location of the bridge is 9°51'43.09" N, 77°12'43.46" E. It has approximate length is 5.00m,width is 3.00m and height is 2.50m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of bridge is private

Ch 6.20Km. Culvert

This culvert is at across compayar river at Ch.6/200. The location of the culvert is 9°51'19" N, 77°12'24.85" E. It has approximate length is 4.00m, width is 4.00m and height is 1.80m. There is no obstruction to flow in this location due to this structure. The upstream and downstream banks are not protected. The type of soil on bed of the thodu at this location is rock. The ownership of land on upstream and downstream banks of culvert is private.

MUTHIRAPUZHA RIVER @Ch 136.40 Km

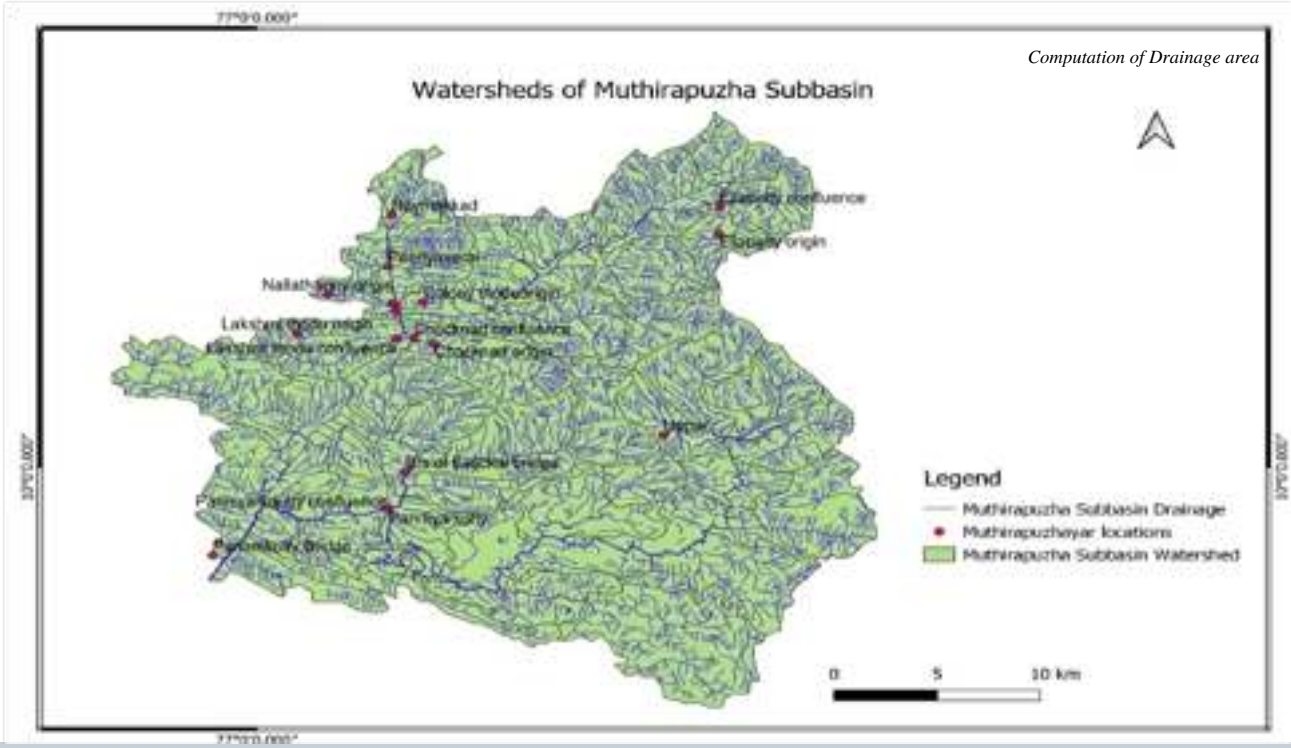
The river has its origin from series of hills at Naymakkadu South of Rajamala hills at location known as 8th mile.This stream considered as the parent river.During its traverse the river cross MunnarUdumalpetta road at Periyavari and joins with Nallathanniyar and Kundalayarsuccessively.The confluence of three rivers, Nallathanni, Kundala and Kanniyar at Munnar derives its name from the region Munnar.After the confluence the river runs through Pallivasal, Kunjithanni ,Ellakkal and joins with the tributary Panniyarwhich is at 2.1km in the downstream of Panniyarkutti bridge, after the confluence of Panniyar,.Muthirappuzha River joins in Periyarat Panamkutty . Total length of main stream from Nayamakkadto Panamkuttyis40.6km.

1Catchment Characteristic

In its course from Munnar gorge up to the confluence with Periyar, Muthirapuzha is full of rapids and falls aggregating to about 1190m.The Muthirapuzha river basin drains on area of nearby 740 sq.km portion of which experiences heavy incidence of rainfall in both the south-west and north-west monsoons. This basin yield total run off 1218M.cum/annum. The major part of the scheme catchment is covered with tea estates. The overburden over the rocky substratum is heavy thus aiding retentiveness of the soil.

During the two monsoons almost 90% of the annual rainfall in the catchment is precipitated. The S.W monsoon precipitates almost 2/3rd of the annual rain fall during the middle of May to September. The N.E monsoon is experienced from October to December. The month of December to may account for the remaining 10% of the rainfall.

The effect of topography is more pronounced in the distribution of rainfall over the catchment. The western part of the catchment receives fairly heavy rainfall and there is a gradual decrease towards the eastern portion of the catchments. The average annual rainfall of the catchment is 2927mmas per the reports of KSEB at the time of installation of pallivasal H.E scheme But during last decade there is upward trend in rain fall goes above state average which will be detailed.



WATERSHEDS OF MUTHIRAPUZHA SUBBASIN OF PERIYAR

Sl. No.	WSCODE	WSNAME	Area (m2)	Perimeter (m)	Remarks
1	14P40r	PERIYAR	11951968.760	14996.912	
2	14P40k	PERIYAR	11965070.393	16682.600	
3	14P40q	PERIYAR	19206955.243	22803.991	
4	14P40s	PERIYAR	13952239.642	16542.854	
5	14P40t	PERIYAR	10526622.962	18807.380	
6	14P40p	PERIYAR	9650552.868	18419.198	
7	14P40u	PERIYAR	7263797.633	27039.605	
8	14P40o	PERIYAR	8229117.451	15205.946	
9	14P40l	PERIYAR	7134395.966	11456.917	
10	14P40j	PERIYAR	12169552.283	21696.223	
11	14P40v	PERIYAR	17220459.017	19179.876	
12	14P40w	PERIYAR	7013165.509	15311.952	
13	14P40m	PERIYAR	7870588.847	13478.702	
14	14P40n	PERIYAR	11168816.768	16541.453	
15	14P40x	PERIYAR	9902646.774	18695.542	
16	14P40y	PERIYAR	15076150.488	20852.113	
17	14P40z	PERIYAR	9301357.234	17470.902	
18	14P40aa	PERIYAR	4940627.797	14972.203	
19	14P40ab	PERIYAR	23396261.717	23909.759	
20	14P40i	PERIYAR	20315804.328	20971.040	
21	14P40h	PERIYAR	7516863.389	14421.675	
22	14P40ag	PERIYAR	18201036.943	21895.227	
23	14P40ac	PERIYAR	8468266.718	15401.925	
24	14P40af	PERIYAR	11582598.366	16089.900	
25	14P40ad	PERIYAR	12669908.760	15483.876	
26	14P40ae	PERIYAR	6822490.253	15310.455	
27	14P40g	PERIYAR	4660995.262	11175.389	
28	14P40ah	PERIYAR	8715681.777	22858.008	
29	14P40ai	PERIYAR	11120826.043	18011.829	
30	14P40b	PERIYAR	32163697.523	31305.052	
31	14P40c	PERIYAR	11797647.465	16740.724	
32	14P40a	PERIYAR	18942450.922	24600.064	
33	14P40d	PERIYAR	5425522.299	9985.205	
34	14P40e	PERIYAR	9070985.891	14155.548	
35	14P40f	PERIYAR	10211752.343	17475.020	
36	14P40ar	PERIYAR	21341032.983	25403.854	
37	14P40at	PERIYAR	9191967.175	17036.152	
38	14P40as	PERIYAR	9406363.677	15434.021	
39	14P40aq	PERIYAR	12435982.140	18045.125	
40	14P40au	PERIYAR	15404901.466	19568.672	

41	14P40am	PERIYAR	9338250.087	12869.785	
42	14P40aw	PERIYAR	28612367.765	27371.606	
43	14P40ap	PERIYAR	6095929.474	11195.359	
44	14P40av	PERIYAR	5680535.596	12923.380	
45	14P40al	PERIYAR	12711317.098	18372.827	
46	14P40ao	PERIYAR	11908086.020	24400.857	
47	14P40aj	PERIYAR	10019909.929	19144.942	
48	14P40an	PERIYAR	8513321.304	17895.266	
49	14P40ak	PERIYAR	14361103.631	19355.867	Kundala reservoir
50	14P40be	PERIYAR	11083590.155	15598.307	
51	14P40bd	PERIYAR	5415180.327	24057.424	
52	14P40ax	PERIYAR	24417875.441	28436.744	
53	14P40bg	PERIYAR	15069238.834	23155.023	
54	14P40ay	PERIYAR	11438679.030	19707.575	
55	RESERVOIR	PERIYAR	2494120.999	24397.197	Ponmudi reservoir
56	14P40bc	PERIYAR	7971984.499	24929.584	
57	14P40az	PERIYAR	7744112.503	15230.466	
58	14P40ba	PERIYAR	47522806.873	37084.729	
59	14P40bb	PERIYAR	10632325.102	20635.586	
60	14P40bf	PERIYAR	6176417.014	10457.261	
		Total	740614274.761	1132652.675	
		Total	740.614 km2	1132.653 km	

Drainage area Muthirapuzha sub basin = 740.614 km2

Note : The area computation is based on QGIS . This area is less than the value 777 sq km mentioned in early reports of KSEB

6.49.4 Flooding in Muthirapuzha basin

As mentioned earlier Muthirapuzha sub basin have total drainage area of 747 sq km which is about 13.83 % of total drainage area of Periyar basin . In 1924 this sub basin is eye cantered due to high rain fall and storm discharge. At that time the entire catchment contributed monsoon discharge. But the situation is now changed due to the construction of storage reservoirs at Mattupetty, Kundala and RAhead works at Munnar which in turn result in the reduction of free catchment to certain extent even though they are cascade dams with less storage. It is highlighting that major part of free periyar catchment is belongs to Muthirapuzha basin (747/2362), high intense rain fall in this basin will cause high flood discharge in Periyar,so this matter is to address properly while adopting flood control measures.

Due to the peak flood that experienced in this century so far during 2018 , there is abrupt rise of water level in Muthirapuzhayar to the tune of 6 m than previous year maximum level . All the streams contributing flow to the parent river was subject to maximum run off and the Munnar region in the proximity of Muthirapuzhayar submerged due to flood . Flood affected area in Muthirapuzhayar

- Periavarai bridge location
- Munnar high school location
- DTPC centre Munnar
- Ellackal
- Panniyar kutty confluence

Details of flood plain will be mentioned in sub head 10

Basin map- Muthirapuzha Sub basin

RIVER STRETCH

The river stretch of mainstream "Muthirapuzhayar"for data collection is assigned between chainage 0.00 to 26.32 Km ie, from the origination point at Naymakkadu South of Rajamala hills at location known as 8th mile and up to Panniyarkutty where the river confluence with its tributary Panniyar. The Muthirapuzhayar derives the name due to confluence of 3 streams namely Kanniyar which is considered as the parent river and treated as main stream and the other 2 streams naming Nallathanniyar and Kundalayar. This sub head describe only main stream. Details of other two streams briefly mentioned in content 5 and 6.

Main stream have comparatively less width at origination point which is about 7m and during traverse stream become wider at Periavarai from wherethe river flow with width varies from 35 m to 50 m upto Munnar Head works. From Munnar head works onwards river possess rocky bed upto confluence with Panniyar. Pallivasal power house the first hydroelectric project in the state is utilizing water resources of Muthirapuzhayar and its tributary kundala

Origination point :- Neymakkadu

Latitude:- 10.149900

Longitude:- 77.068132

Local body at origination- Munnar(both bank)

First Confluence point- Panniyarkutty

Latitude:- 9.977719

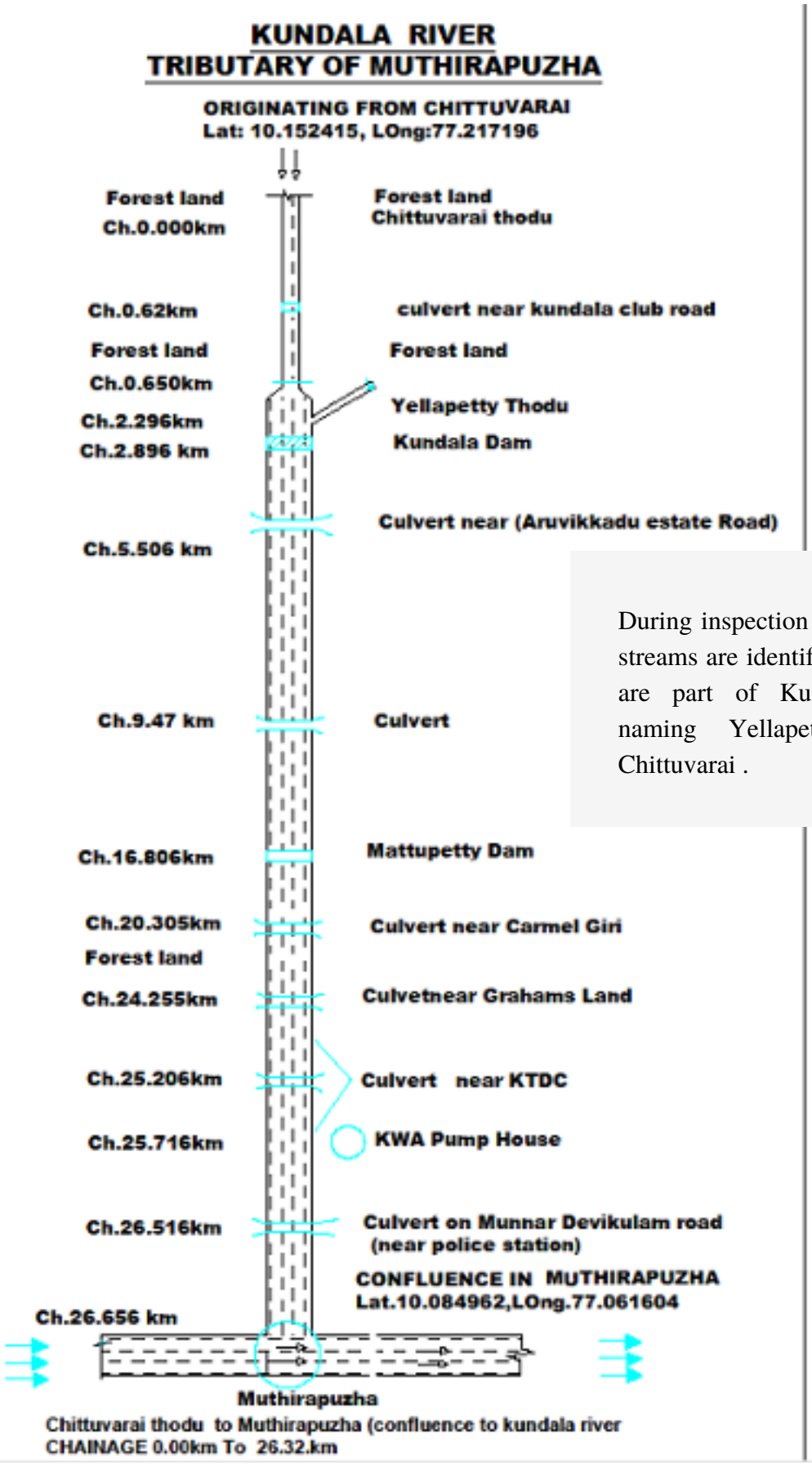
Longitude:- 77.057752

MAIN TRIBUTORIES

Kundalayar

The river has its origin in the peaks of ridges formed by Kundala, Talaimalai, Madavaraimalai and Thandamalai, about 19km north of Devikulam, nearby 2286m above M.S.L up to its confluences with periyavaraistream at Munnar. It has a length of 26.656km. In its initial reaches, the river is known as Kundale or Palar. Major stretch of the river is reservoir water body of Kundala Dam and Mattupetty Dam and river course is from Mattupetty dam down stream at chainage 16.806km. From there the river flow with anaverage width of river is 25 m. The Kundalayar joins Muthirapuzha river at chainage 9.57km at Munnar.Origination point :- Kundala hills. Latitude:-10.152415, & Longitude:-77.217196 Local body at origination- Devikulam (both bank)

Confluence of Kundala river with Muthirapuzha river



During inspection two sub streams are identified both are part of Kundalayar naming Yellapetti and Chittuvarai .

Schematic diagram of Kundala River

Yellapettithodu

Originating from Yellapetti hills in the form of various minor water springs and joining near yella petti tea factory the stream attain a width of 3 m and flow further for 3 km to merge with Kundala reservoir . The stream is not subject to siltation and pollution. Latitude:-10.126698 & Longitude:-77.20417.Local body at origination- Devikulam

Yellapetty confluence

Yellapetty origin

Chittuvarai thodu

Chittuvarai sub stream is a part of Kundala reservoir with width less than 3 m

Local body : Devikulam

NALLATHANNIYAR(IIndTributary of Muthirapuzhayar)

Nallathanniyar originate from Kallar estate valley and Nallathanni estate. The river traverse through area near Tea museum and Little flower Girl High School and merge to Muthirapuzhayar at Nallathanni junction. The river stretch is 4km long. The river course receive main "Nallathanni" due to the presence of clean water in the past. Nallathanniyar joins with Muthirapuzhayar at chainage 8.855km.

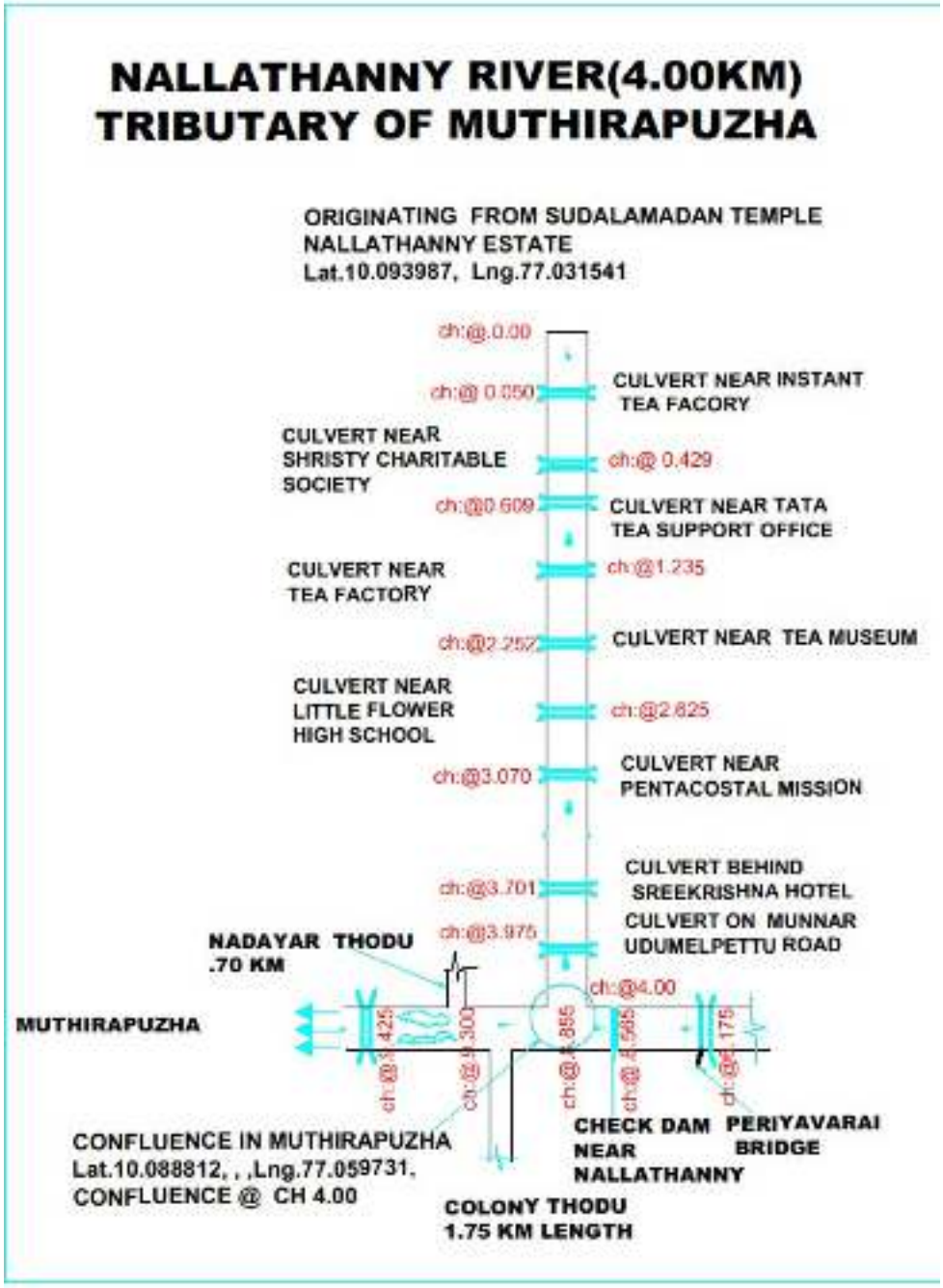
Origination point :- Kallay estate valley

Latitude:-10.093987,

Longitude:-77.03154

Local body at origination- Munnar (both bank)

Origin of Nallathanny ch @0.00kmConfluence of Nallathanny Ch @ 4.0km



Schematic diagram of NallathannyRiver

3COLONY THODU

Originate from MG colony upper hill. The thodu traverse distance of 1.75km to join with Muthirappuzha in upstream of Churchilbridge at Ch 9.006 Km on left. The average width of the thodu is 4m.This thodu is highly contaminated with house hold waste include sewage. Numerous dowelling houses situated on bank of thodu and many encroachment seen on either bank. This stream subjected to excess siltation and need to rejuvenate.

Latitude:-10.089674,
Longitude:-77.07367
Local body at origination- Munnar (both bank)
Confluence point-Near Churchil bridge
Latitude:-10.061562
Longitude:-77.061562
Local body at confluence – Munnar (both bank)
Total length of the river 1.75km

Origin of Colony thodu ch @0.00km Confluence of Colony thodu with Muithirapuzhayar

Schematic diagram of Colonythodu River

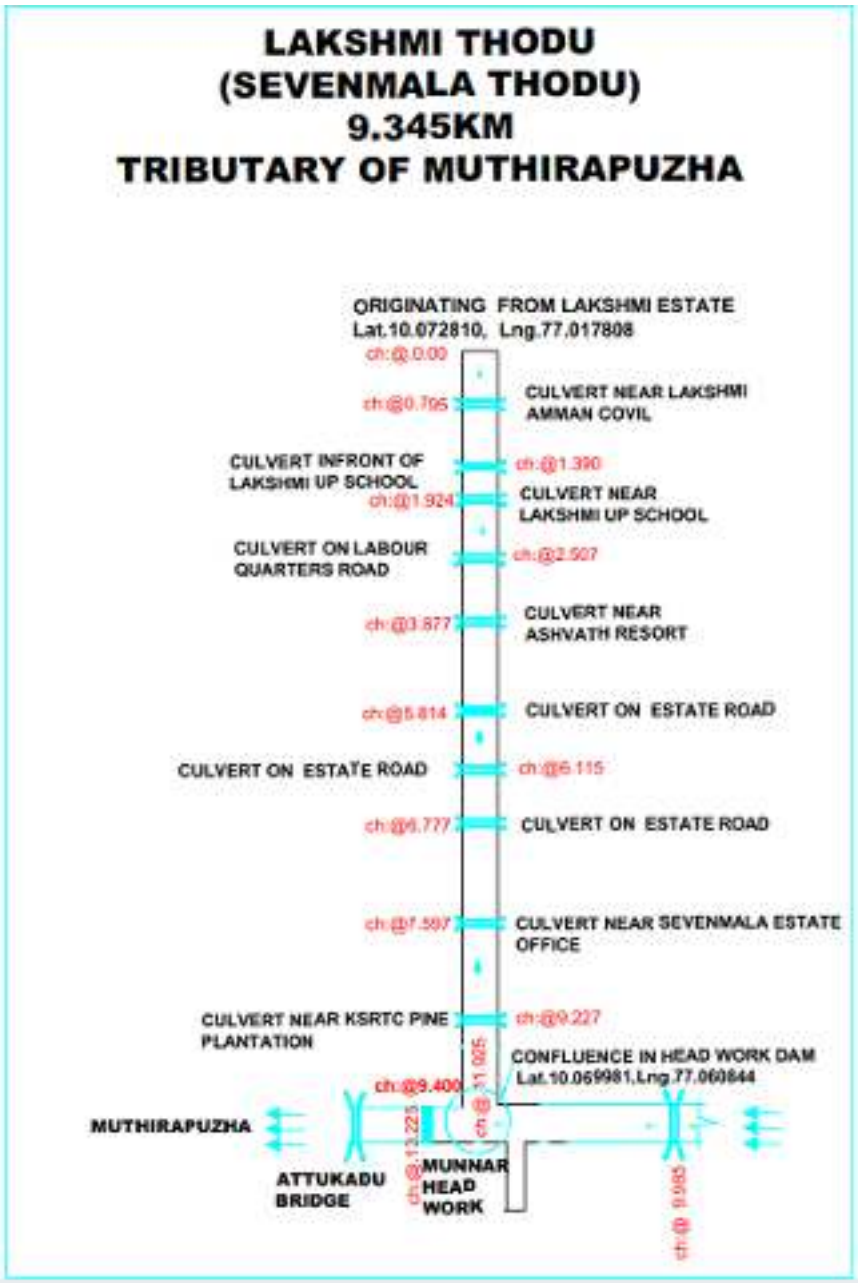
4SEVENMALAITHODU (LEKSHMITHODU)

Originating from Lekshmi and Sevenmalai estate the stream flow through the tea plantation are receiving in flow from the catchment in Lekshmi estate and Sevenmalai estate. The stream usually have very lean summer flow and experienced monsoon discharge during peak monsoon. The stream joins Muthirapuzhayar near KSRTC depot in the upstream of MunnarRA head works. The length of the stream is 9.4km and confluence chainage 11.925km right.The width of thodu at origination point is 3 mtr and that at confluence point is 15 m .

Latitude:-10.07281
Longitude:-77.017808
Local body at origination- Munnar (both bank)
Confluence point- U/S Munnar head works
Latitude:-10.069981
Longitude:-77.061845
Local body at confluence – Munnar (both bank)
Total length of the river 9.4km

Origination point in Lekshmi estate

Confluence location with Muthirapuzha

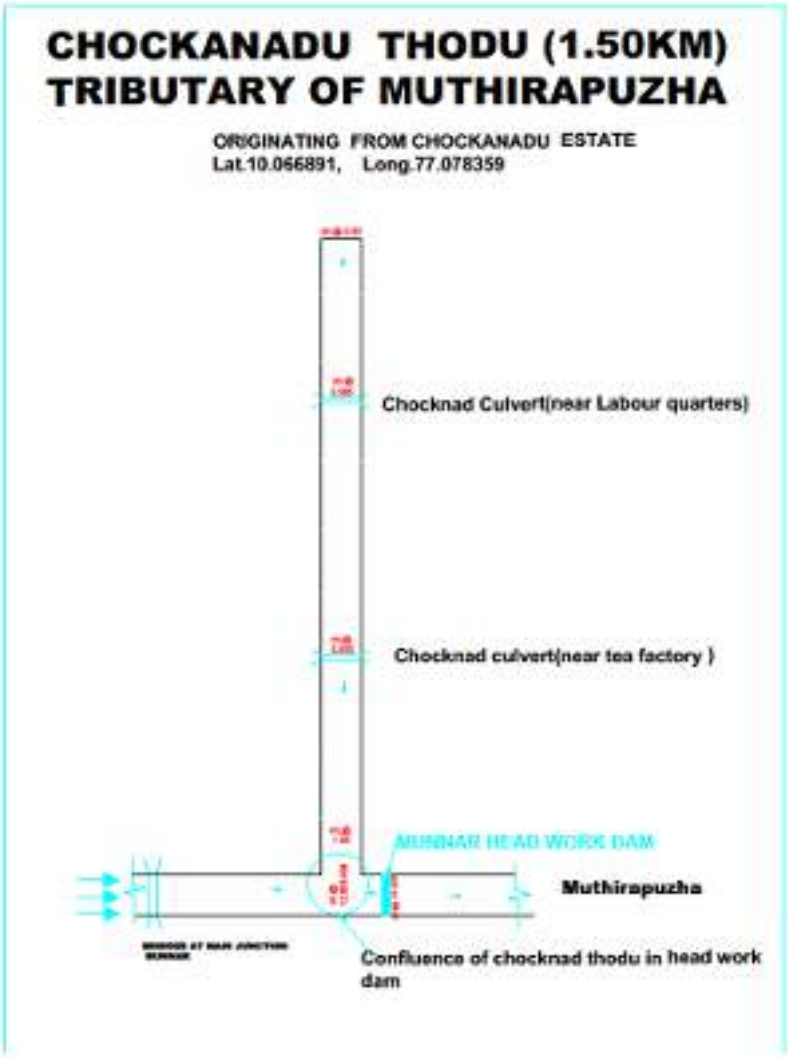


Schematic diagram ofSevenmalai River

Latitude:-10.066891,
Longitude:-77.078359
Local body at origination- Munnar (both bank)
Confluence point- Near Munnar head works
Latitude:-10.069896,
Longitude:-77.069509
Local body at confluence – Munnar (both bank)
Total length of the river 1.5km

CHOKKANADUTHODU

Chokkanaduthodu joins withMuthirapuzhayar at chainage 12.859km left in the upstream of Munnar RA headworks. It is a small stream of width varies from 3 to 5m. Thodu have a length of 1.5km it originate from Chokkanadu estate. This stream subjected to siltation and vegetation in few stretches.



Schematic diagram of Chokkanad thodu

Uppar river

Among the sub streamsit is the major stream with length 15.34km and confluence with Muthirapuzhayar at chainage22.514km on left bank. Average width of stream is 7.5m. Originated due to merging of numerous streams from Muttukadu hills and old Devikulam division it runs through Bysonvalley Panchayath before join withMuthirapuzhayar. Uppar River staring from ODK division at Devikulam and flows through Chinnkkanal Power house and continue through Bysonvally panchayth and joining Muthirappuzha River near Ellakkal bridge .This stream subjected to siltation due to land slide in previous season. But major quantity cleared by local bodies. Now desiltation in between chainage 8.0 to 8.8km necessitated to maintain smooth flow without any obstructions.

Origination point- Muttukadu hills

Latitude:-10.015226,

Longitude:-77.179388

Local body at origination- Devikulam

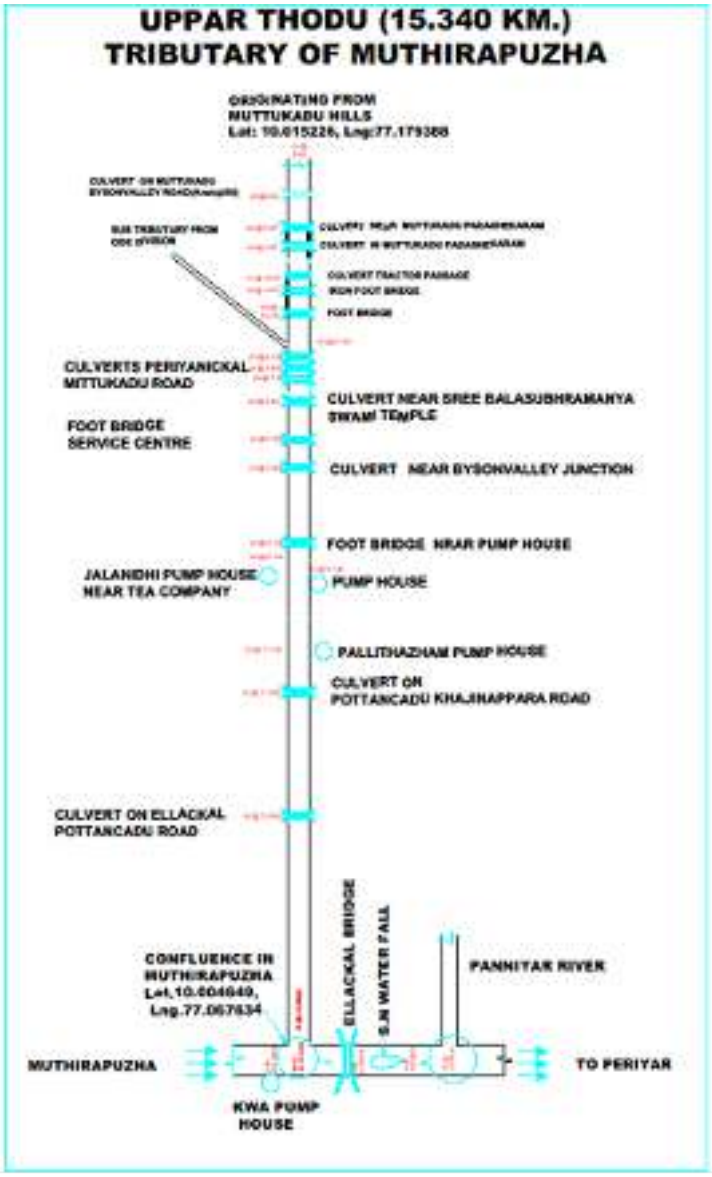
Confluence point- Up stream of Ellakkal bridge

Latitude:-10.004649,

Longitude:-77.067634

Local body at confluence – Bysonvalley (Both bank)

Origin from ODK division (water fall@gap road-
Confluence point with Muthirapuzha



Schematic diagram of Uppar river

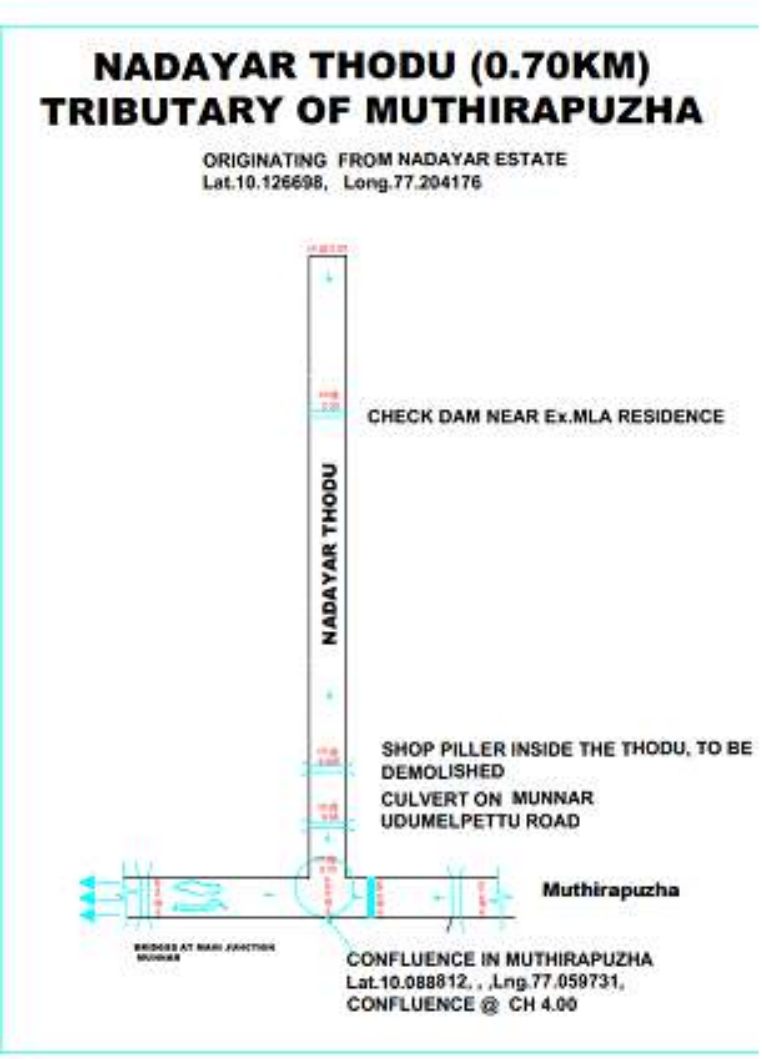
Nadayar thodu

It is a minor stream of 0.7km length. Originating from Nadayar estate it runs through Munnar township part and confluence to Muthirapuzhayar at chainage . 9.351 Km upstream of main junction bridge .This stream is not subject to siltation. Unauthorized construction noticed. Particulars as below

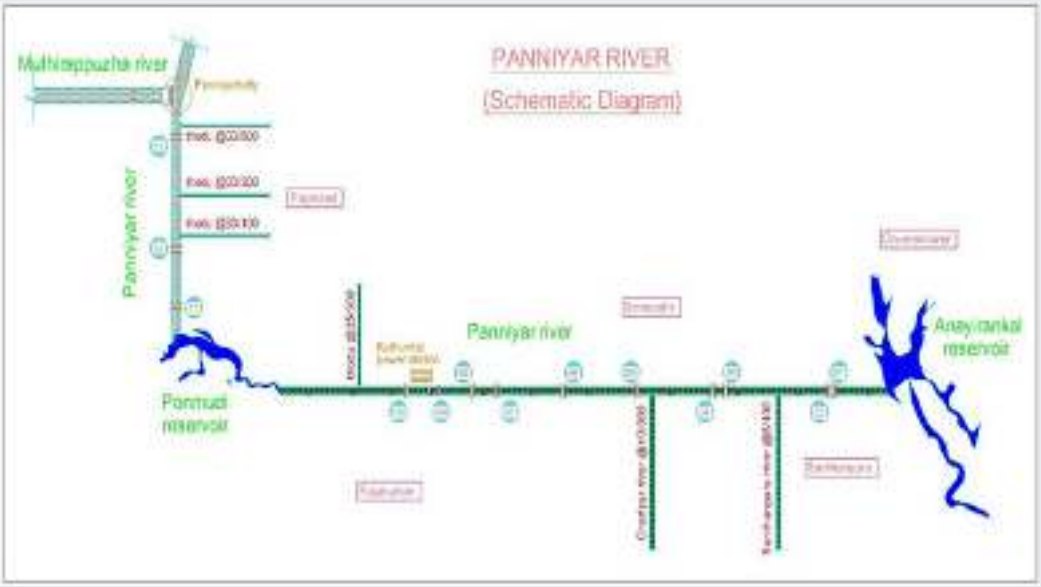
Nadayar confluence

Nadayar origin

Latitude:-10.126698,
Longitude:-77.204176
Local body at origination- Munnar
Confluence point- Munnar town upstream of main junction bridge
Latitude:-10.086030,
Longitude:-77.060219
Local body at confluence - Munnar (Both bank)



Schematic diagram Nadayar



PANNIYAR RIVER

Panniyarriver is one of the major tributaries of the Periyar River. The river flows through Idukki district.The water from the Anayirankal dam flows through the Panniyarriver and reaches Kuthunkal and Ponmudi dams. Power is generated at Kuthunkal and Panniyar power houses. Panniyarriver joins Muthirappuzhariver at Panniyarkutty. The tailwater from the Panniyar powerhouse and the spill from Ponmudi dam reach the Kallarkuttydam through Muthirappuzhariver and then flows to Periyar. The total length of Panniyarriver is around 34.0 kms and the average width is around 40.0 mts.Panniyar is the major source of drinking water for hundreds of people Rajakumari, Rajakkad, Santhanpara and Senapati in Idukkidistrict.Santhanpara river, Cheriyar river, Rajakkadthodu etc. contributes the major tributaries of Panniyar river.

The river at various cross structures on different chainages explained in details are given below.

Ch. 0/000 – Anayirankal Dam.

Anayirankal dam is one of the largest earthen dams built on Panniyar river in Chinnakanal and SanthanparaPanchayaths, 22 kms from Munnar in Idukki district of Kerala. The dam is surrounded on one side by forest and on the other side by Tata Tea Plantation. The Dam is located near the Kumily-Munnarroad. The reservoir is spread along 6 km in Chinnakkanal mountain valley. The water flowing from the dam reaches Kuthunkal and Ponmudi dams through the Panniyarriver. The dam stores water from small streams flowing from Bealram and rain water from the hills on the Tamilnadu boarder. The waterfalls here, popularly known as Power House Waterfalls, cascade down a steep rock 2000 m above sea level. The spot is enriched with the scenic view of the Western Ghat ranges, Anayirankalis a lush green carpet of tea plants.The location of dam is Latitude 10o0'33"N, Longitude 77o12'22"E. The height of dam is 34.14m and length is 326.13m.The ownership of dam is vest under KSEB.

Ch. 4/800 - Pooppara New Bridge.

The above bridge is located across Panniyar River at chainage 4/800 in SanthanparaPanchayath. The bridge is connecting Anayirankal and Bodimettu at Pooppara. The location of the bridge is Latitude 9o58'42"N, Longitude 77o12'31"E. It has an approximate length 35.00 m, width 16.00m and height 8.00m. The upstream of river at the right bank is protected and at the left bank is not protected. The downstream banks of river are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. Large amount of waste deposited near the bridge. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is private.

Ch. 4/900 - Pooppara Old Bridge.

The above bridge is located across Panniyar River at chainage 4/900 in SanthanparaPanchayath. The bridge is connecting Anayirankal and Santhanpara at Pooppara. The location of the bridge is Latitude 9o58'43"N, Longitude 77o12'28"E. It has an approximate length 33.00m, width 10.00m and height 6.00m. The upstream and downstream banks of Panniyar are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. Large amount of waste deposited near the bridge. River encroachments are visible at this location. Commercial and residential buildings are constructed by encroaching the banks of the river. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 7/200 - ArattukadavuBridge.

The above bridge is located across Panniyar River at chainage 7/200 in between Santhanpara – PoopparaPanchayath. The bridge is connecting Thottikkanam and Pooppara at Arattukadavu. The location of the bridge is Latitude 10o0'33"N, Longitude 77o12'22"E. It has an approximate length 15.00 m, width 5.00m and height 7.00m. The upstream and downstream banks of Panniyar are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 7/700 - Vakkodan City Bridge.

The above bridge is located across Panniyar River at chainage 7/700 in between Rajakumari – SenapathiPanchayath. The bridge is connecting Thottikkanam and Murikkumthotty at Vakkodan City. The location of the bridge is Latitude 9o57'57"N, Longitude 77o11'47"E. It has an approximate length 20.00 m, width 5.00m and height 5.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is silty soil. The ownership of land on upstream and downstream of bridge is Private.

Ch. 10/700 - SenapathiBridge.

The above bridge is located across Panniyar River at chainage 10/700 in between Senapathi - SanthanparaPanchayath. The bridge is connecting Senapathi and Rajakumari at Senapathi. The location of the bridge is Latitude 9o57'11"N, Longitude 77o11'5"E. It has an approximate length 15.00 m, width 4.00m and height 4.00m. The upstream and downstream banks of Panniyar are not protected at this location. The height of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. The type of soil on bed of the river at this location is silty soil. The ownership of land on upstream and downstream of bridge is Private.

Ch. 15/800 - Rajakumari Bridge.

The above bridge is located across Panniyar River at chainage 15/800 Connecting Rajakumari and SenapathiPanchayaths. Rajakumari. The location of the bridge is Latitude 9o57'45"N, Longitude 77o8'52"E. It has an approximate length 25.00 m, width 7.00m and height 5.00m. The upstream and downstream banks of Panniyar are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 20/700 – Kanakappuzha Bridge.

The above bridge is located across Panniyar River at chainage 20/700 in RajakkaduPanchayath. The bridge is connecting Rajakkadu and Udumbanchola at Kanakappuzha. The location of the bridge is Latitude 9o57'19"N, Longitude 77o7'3"E. It has an approximate length 26.00 m, width 8.00m and height 8.00m. The upstream banks of Panniyar are not protected at this location. The downstream left bank is protected and the right bank is not protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 21/700 – Vakkacity – Mukkudil Bridge.

The above bridge is located across Panniyar River at chainage 21/700 in RajakkaduPanchayath. The bridge is connecting Vakkacity and Mukkudil at Vakkacity. The location of the bridge is Latitude 9o56'59"N, Longitude 77o6'50"E. It has an approximate length 24.0 m, width 7.00m and height 4.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private. An island formation is there ar upstream of this bridge.

Ch. 24/300 - Kuthunkal Dam.

The above dam is located in Panniyar River at chainage 24/300 in RajakkaduPanchayath. This dam is situated in Senapathi – Rajakkadu road. The dam was constructed in 2000 as a part of a hydroelectric project. The location of the dam is Latitude 9o56'19"N, Longitude 77o6'21"E. The type of soil at this location is rock. The ownership of land of dam is Private.Kuthunkalhydro electric powerhouse uses this water for power production. It is locsted 2km upstream of Kuthunkal water fall.

Ch. 24/300 - Kuthunkal Bridge.

The above bridge is located across Panniyar River at chainage 24/300 in RajakkaduPanchayath. The bridge is connecting Senapathi and Rajakkadu at Kuthunkal. The location of the bridge is Latitude 9o56'17"N, Longitude 77o6'21"E. It has an approximate length 20.00 m, width 6.00m and height 5.00m. The upstream and downstream banks of Panniyar are protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private. An island formation is there at downstream of this bridge.

Ch. 32/000 - Ponmudi Dam.

The ponmudi dam is a concrete gravity dam built across the Panniyarriver which is a tributary of Periyar River at Konnathadipanchayath of Konnathadi village. This dam is one of the many dams of the evergreen Idukki, with the beautiful green nature around. The above dam is located acrossPanniyar River at chainage 32/000. The location of dam is Latitude 9o57'37"N, Longitude 77o3'19"E. It has an approximate width 294.00m.The dam was constructed in 1963 as a part of a hydroelectric project.The power house is located at vellathooval.The upstream and downstream banks of Panniyar are protected at this location. The type of soil on bed of the river at this location is rock. The ownership of dam vests in KSEB.

Ch. 32/400 - Ponmudi Suspension Bridge.

The above bridge is located across Panniyar River at chainage 32/400 in between Konnathady – RajakkaduPanchayath. The bridge is connecting Rajakkadu and Ponmudi at Ponmudi. The location of the suspension bridge is Latitude 9o57'51"N, Longitude 77o3'26"E. It has an approximate length 40.00 m, width 3.00m and height 25.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private

Ch. 33/000 - Chappath Wholesale Bridge.

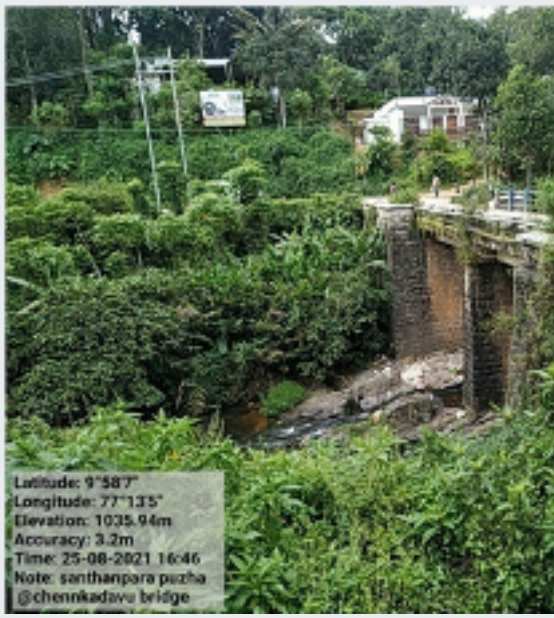
The above bridge is located across Panniyar River at chainage 33/000 in Konnathady – RajakkaduPanchayath. The bridge is connecting Ponmudi and Rajakkadu cut road at Chappath. The location of the wholesale bridge is Latitude 9o58'12"N, Longitude 77o3'29"E. It has an approximate length 30.00 m, width 4.00m and height 3.00m. The upstream and downstream banks of Panniyar are protected at this location. The height of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

The above bridge is located across Panniyar River at chainage 33/700 in Konnathady – RajakkaduPanchayath. The bridge is connecting Ponmudi and Vellathooval at Panniyarkutty. The location of the bridge is Latitude 9o58'32"N, Longitude 77o3'29"E. It has an approximate length 45.00 m and height 10.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is silty soil. The ownership of land on upstream and downstream of bridge is Private.

Tributaries of Panniyar

Santhanpariver.

It begins from Mathikettan shola and joins Panniyarriver at Ch.6/100 near Santhanpara. It is one of the major tributaries of Panniyarriver. It has a total length of 7.2 km out of which 6km length is through Mathikettan shola. Chennakkadavubridge crosses Santhanpara river near Santhanpara town. (Latitude 9o58'07"N, Longitude 77o13'05"E). The width of river is around 30m at this point, but the length of bridge is less than that of river. The downstream of the river is protected at both sides of the river. But in upstream only right bank of the thodu is protected. Damaged pillars of old bridge are still present at the upstream of the river. Large amount of waste is found at the downstream of this bridge.



Cheriyarriver.

It begins from Cheriyar and joins Panniyar river at Ch.10/000 near Thottikkanam. It is one of the major tributaries of Panniyarriver.It has a total length of 2.1 kms.3 bridges are crossing this river on its way. Pinakkadcitybridge crosses Cheriyar river near Thottikkanam is shown in this figure. (Latitude 9o57'23"N, Longitude 77o11'30"E). The width of river is around 15m at this point, but the length of bridge is less than that of river. The upstream and downstream of the river are protected at both sides of the river.

RajakkaduThodu.

It begins from the lower portion of Mullakkanam hills and cross through the Pazhayaviduthi – KallimaliPadasekharam and joins the right bank of the Panniyarriver. It crosses Rajakkadu- Adimali road below the Post office Junction (Latitude 9o57'32"N, Longitude 77o5'39"E). The total length of the thodu is around 4.00 km and the mouth of the thodu is at Ch. 25/300 of Panniyar river and is located at the downstream portion of Kuthunkal bridge.

Kulatharakkuzhy – PanniyarkuttyThodu.

It begins from the upper part of Adimali-Rajakkadu road near by Panniyarkutty junction and crosses the road in two different locations. It also crosses the cut road of Ponmudi - Rajakkadu road and joins the river at Ch. 33/180 of Panniyarriver. The location of the bridge is Latitude 9o58'14"N, Longitude 77o3'30"E. The total length of the thodu is around 3.50 km and mouth of the thodu is upstream portion of Chappathu wholesale bridge across Panniyarriver. It is the right bank tributary of Panniyarriver.

Undamala – PanniyarkutyThodu.

It is a small tributary of Panniyarriver and it begins from Undamala nearby Panniyarkutty junction. Its length is only 1.00 km and it joins the river at Ch. 33/315.The location of the thoduis Latitude9o58'19"N, Longitude 77o3'33"E. It is the right bank tributary of Panniyarriver.

Ambalamkunnu – PanniyarkuttyThodu.

It begins from Ambalamkunnu hills nearby Panniyarkutty junction. The total length of the thodu is about 2.00 km it crosses PanniyarkuttyThekkinkkanam road and the location of thodu is Latitude 9o58'33"N, Longitude 77o3'42"E.It is the right bank tributary of Panniyarriver. It joins the river at Ch. 34/450 and the mouth of thodu is located at the downstream portion of Panniyarkutty Bridge.

Ambazhachal River -Tributaries to Ambazhachal River
PeechaduThaliyam check dam – KallarThodu (@ 2/390)

Ch.00/000 PeechaduThaliyam Check dam.

This is the starting point of PeechaduThaliyam check dam – Kallarthodu. The upstream and banks of the check dam is Elapattayam land. Both banks are unprotected and silt sedimentation found in check dam. This check dam is constructed across a small stream from forest. The length of the check dam is about 40m. The check dam reservoir and downstream thodu requires de siltation. This check dam is located at 10°03'27.5"North and 76°57'40.5"East.

Private bridge - 10°03'26.8"N 76°57'37.9"E

Ch.00/113 Private bridge.

This bridge is across PeechaduThaliyam Check dam – KallarThodu just below the peechaduthaliyam check dam, in Pallivasalgramapanchayath. In this location both Thodu sides are unprotected private land. Both upstream and downstream thodu filled with mud and silt. Urgent de siltation required here. This bridge is located at 10°03'26.8"North and 76°57'37.9"East.

Pipe culvert –Kallar Mankulam road - 10°03'21.5"N 76°57'17.5"E

Ch.00/918 Pipe culvert – KallarMankulam road.

There is a Pipe culvert laid alongPeechaduThaliyam Check dam – KallarThoduacross theKallar-Mankulam road in Pallivasalgramapanchayath. This pipe culvert is not sufficient for smooth flow of water. It causes flooding in this area. Upstream and downstream of the culvert, thodu side is unprotected private land. Thodu filled with mud and silt. Urgent de siltation required here. This culvert is located at 10°03'21.5"North and 76°57'17.5"East.

Ch.01/067 Confluence Point of thodu to kallar.

PeechaduThaliyam Check dam – KallarThodu is joining to Kallarriver in this point. Both banks are un protected private land with loose soil. Up to this point thodu fully filled with mud, silt and vegetation. Urgent desiltation required. It is located in 10°03'20.8"North and 76°57'12.7"East.

Thokkupara tunnel near by bridge, 10°01'57.1"N, 77°01'33.5"E

Thokkupara-Ambazhachalthodu (@12/940)

Ch.00/000 Thokkupara tunnel near by bridge

The bridge is located downstream of the tunnel from 2nd mile. The river approximately having 4m width, rocky formation and lateritic sides. The boulders and debris deposited need to be removed.

Ch.00/0.95
ThokkuparaAnanthavilasam Karadipara road near check dam

The check dam having a span of 8m located aside the thokkuparaananthavilasam-karadippara road. The checkdam upstream is completely filled with sand, gravel and muck which has considerably reduced the reservoir capacity.

Anandavilasam ckeck dam, 10°01'32.1"N, 77°01'21.3"E

Thokkupara - Ananthavilasam road bridge

Ch.01/040Thokkupara - Ananthavilasam road bridge

The bridge is located about 100m downstream of the check dam, filled with boulders and muck. The bridge causes serious obstruction to the natural flow, as the bridge span is merely half the width of the thodu.

Ch.01/670 19 Palam

19 Palam is having a span about 8m, both the left and right bank are unprotected with 2m bank height. A shallow deposit of muck is seen need to be removed for the efficient flow of water. Both sides are unprotected.

Ch.02/140Ambazhachal-Kandiyampara road bridge

The span of the bridge is insufficient for the efficient flow of water, which causes flooding in this area. The bridge is having only about 6m span but the thodu having width about 10m. The sand, gravel and muck deposited on the bed also needs to be removed.

Table 1 Tributaries of Muthirapuzha River at a glance

Muthirapuzha

Name of Tributary	Sub tributaries	Length of thodu	Origination location	Confluence location	Latitude	Longitude
Nallathanniyar		4.00km	Instant tea company	Nallathanny junction	10.088812	77.059731
Nadayarthodu		0.70km	Nadayar estate	Munnar junction	10.085874	77.060728
Colony Thodu		1.750km	MG colony	Munnar town	10.089674	77.07367
Kundala river		26.565km	Kundala hills	Munnar town	10.084962	77.061604
Kundala river	1.Yellapetty thodu 2.Chittuvarai thodu	3 km 1 km	Yellapetty Chittuvarai Division	Confluence to kundala Dam Confluence to Kundala dam	10.141534, 10.146243	77.204814 77.215137
Lakshmi thodu(sevenmala)		9.4km	Lakshmi estate	U/s of Head work dam Munnar	10.069981,	77.061845
Chockanaduthodu		1.5km	Chockanadu estate	U/s of Head work dam Munnar	10.069896	77.069509
Upparthodu		15.34km	ODK division Devikulam	U/S of ellackal bridge	10.004649	10.004649

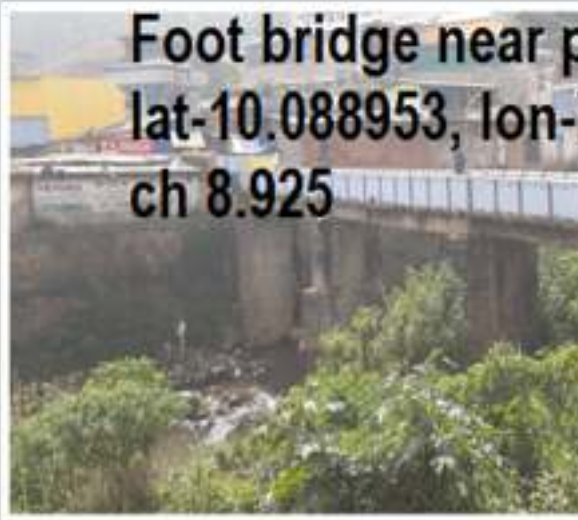
Table2 DETAILS OF LENGTH - MAIN STREAM AND TRIBUTARIES

Sl no	Name of river / tributary	Name of local bodies	Confluence chainage/bank	Length in KM
	Main stream			
1	Muthirapuzha	Munnar, Pallivasal, Bysonvalley, Vellathooval Rajakkad		26.32
	Tributaries			
1	Kundala	Munnar	9.57km/left bank	26.656
1.1	Yellapetty	Devikulam		3.00
2	Nallathanni	Munnar	8.855km/rightbank.	4.00
3	Colony thodu	Munnar	9.006 Km / left bank	1.75
4	Nadayar thodu	Munnar		0.7
5	Lakshmi thodu	Munnar	11.925km/ right bank	9.345
6	Chokkanadu thodu	Munnar	12.859 km/left	1.15
7	Uppar thodu	Byson valley	22.514 Km/left bank	15.34
8	Panniyar	Konnathady, Rajakkad and VellathoovalGramapanchayath.	26Km	34.00
10	Ambazhachal River	Mangulam & Pallivaasal		

MAIN STRUCTURES ACROSS MUTHIRAPPUZHA

General

The destination Munnar is attracting tourist from all over the part of country. The major department like tourism, PWD, KSEB, Forest and other departments including NH are improving infrastructure facilities in and around Munnar. In this connection several amenities are under execution. Many bridges and minor bridges for improving traffic facilities in the locality are constructed across Muthirapuzhayar and its tributaries. Now days the tourism actives extended apart from Munnar township towards places like Pallivasal, Kunchithanni, Kundala etc. due to the proximity river frontage. This development activities and construction to be in a such a manner that hydraulic particulates in the river stretch is not affected. The structures across stream classified as



Across Muthirapuzha main stream

Pipeline Bridge
Lat:10.082192, lng77.062261 ,Chainage : 9.965km

Munnar Bypass Bridge
Lat:10.082167, lng77.062619 ,Chainage 9.985km

Across Muthirapuzha main stream

Across Muthirapuzha main stream

CHECK DAM CONSTRUCED BY IRRIGATION DEPARTMENT

Recently the Minor irrigation wing of Irrigation department completed the construction of Check dam across Muthirapuzha parent branch named as Periavarai /Kannimalayar at about --- Km upstream of confluence of three streams. The purpose of construction is conservation of water to meet the water demand of Munnar town area during lean flow season.

General

Dam Name : kannimalayar check dam

Name of River : Muthirappuzha(Kannimalayar)

Dam location : Idukki District.

Lat/Long : 100 04' 05" N & 770 04'01" E

Type : Concrete Check dam Gravity type with 3Nos Vent ways

Length : 26 m

Vent : 3 nos size 1mx3 m with FRP shutters

Afflux length :500 m approx

Munnar check dam ch@ 8.565km Lat:10.091094,Lat 77.060388

Ch. 26/400 - PanniyarkuttyAmbulance Bridge

There is an ambulance bridge on the Mudirapuzhayar at about 80 m downstream of Panniyar river condluence point called Pothupara – Vallakkadavubridge, having a height of 10 m and length 35 m. Presently, only the construction up to pier is completed. Side protection is not found on both the upstream and downstream of the bridge. Both the sides of the bridge are private properties.

Latitude: 9o58' 38"

Longitude: 77o 03' 28"

Ch. 29/600 - Sengulam power House

The Sengulam Project was mainly intended to utilise the tailrace water from Pallivasal project. The water released from the Pallivasal Hydroelectric Project is conveyed through penstock tunnels to the Chenkulam Reservoir. The water collected here is conveyed through a penstock pipe to the Chenkulam powerhouse which generates 51.2 MW of electricity. Sengulam Hydroelectric Project is located on the Right bank of Muthirappuzha in the VellathoovalGramaPanchayath in Idukki district. The project is commissioned in the year 1954 with an approved and installed capacity of 48 MW. The tailrace discharge joinsMudirapuzhariveron the downstream ofVellathooval Bridge and is flowing downstream to kallarkutty reservoir.

Latitude: 09o58' 34"

Longitude: 77o 01' 46

Ch. 29/650 -Vellathooval Bridge

Vellathooval Bridge is on Adimali – Rajakkadu road, across Mudirapuzhayar, connecting Vellathooval and KonnathadyGramapanchayaths near Panniyar and Sengulam Power Houses. The bridge have a length of 50 m and height of 25 m. Only upstream right bank is protected near Shengulam power house. There is a check dam at about 200 m downstream of the Vellathooval Bridge.Right and left banks are owned by KSEB and Left bank is Panniar Hydro Electric Project power house compound.

Latitude: 09o58’ 32”

Longitude: 77o 01’ 45”

Ch. 29/600 - Panniyar Power House

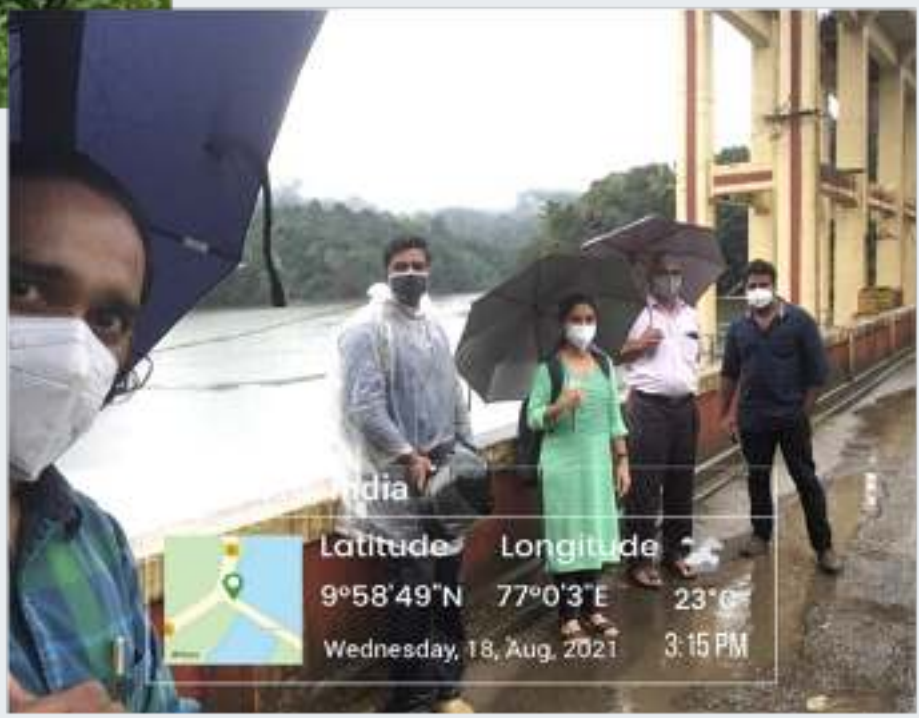
Panniyar Power House inKonnathadiGrama Panchayat, on the left bank of MuthirapuzhaRiver.The water stored in Ponmudi reservoir is utilized for power generation by diverting the flows through a 3066-metre tunnel followed by two lines of penstock pipes each with a diameter of 1.7 metres and a length of 762 metres, creating a head of 220 metres. The power station located at Panniyar is provided with installation of 30 MW comprising two units.The first unit is commissioned in 29 December 1963 with an installed capacity of 15 MW and second unit is commissioned in 26 January 1964 with an installed capacity of 15 MW. . There is a small checkdam structure to form a small reservoir in the upstreem of power house. In this point, the water after generation joining to river. Left bank of river is protected and right bank not protected. Each bank land is owned by KSEB.After power generation, water is released back to MudirapuzhaRiver on the upstream ofVellathooval Bridge and flows downstream to kallarkutty reservoir.

Latitude: 09o58’ 27”

Longitude: 77o 01’ 40”

Ch. 33/170 - Kallarkutty Dam

Kallarkutty dam is a part of Neriamangalam Hydro Electric Project, constructed in 1961 and is located at Kallarktty. The reservoir of the Neriamangalam Hydro Electric Project is created by constructing a dam at Kallarkutty across Mudirapuzhariver. It is a gravity masonry dam, which has 183 meter length and 43 meter height. The reservoir spread about 0.648 sqkm and has 6.88 million cubic meter capacity.The dam is constructed to the downstream of tail race confluences of Sengulam and Panniyar Power stations. The tail water of upstream projects viz. Pallivasal, Sengulam and Panniyar power stations flows to this reservoir. This reservoir is at the tail end of the Mudirapuzha basin. The spill from upstream reservoirs Kundala, Maduppetty, RA Head works, Anayirankal, Ponmudi and Sengulam also reaches this reservoir. The water from Kallarkutty reservoir is diverted through a water conductor system to the Powerhouse of Neriyamangalam HEP located on the right bank of Periyarriver. After generating power, the water is released to Periyarriver.In this point Ambazhachal river which is coming from downstream of viripara also joining to Muthirapuzhariver



Latitude: 09o58’ 49”
Longitude: 77o 00’ 03”

Kallarkutty Bridge - 9°58'26.7"N 76°59'54.5"E

Ch. 33/925 - Kallarkutty Bridge

Kallarkutty Bridge in on Adimali - Rajakkadu road in VellathoovalGramapanchayath across Kallarkutty reservoir, having a length of 80 m and width of 6 m at 340 m from KallarkuttyDam.It is locally named as Kallarkutty new bridge. The upstream and downstream of this bridge river bed is rocky and having a width of about 60m. Both banks are unprotected private land.

Latitude: 09o58’ 34”

Longitude: 77o 01’ 46”

Ch. 33/360 - Bridge to St Joseph Church.

This is a small bridge across Muthirapuzha river, which is the road connects to St Joseph church area. The upstream and downstream of the bridge have a large number of boulders, it may obstruct the smooth flow of river. Both banks are unprotected private land. It is located at 9°57'10.5"North and 76°59'09.6"East.

Bridge to St Joseph Church

Ch. 37/320 - Check Dam NearPanamkutty Bridge.

This check dam is located at upstream of Panamkutty bridge, across Periyar river. This is a RR Masonry check dam which is partially damaged. In this location the river bed is almost rocky with a width of 100m. Both banks are unprotected private land. This Check dam is located at 9°57'07.8"North and 76°58'51.0"East.

Check Dam Near Panamkutty Bridge - 9°57'07.8"N 76°58'51.0"E

- 9°57'10.5"N 76°59'09.6"E

Panamkutty Bridge - 9°57'08.2"N 76°58'50.3"E

Ch. 37/340- Panamkutty Bridge

This bridge is across Periyar River in Kallarkutti road. The width of river at this location is about 100m. Both banks of the river is unprotected private land. This is located at 9°57'08.2"North and 76°58'50.3"East.

MAIN STRUCTURES ACROSS PANNIYAR

Ch. 0/000 – Anayirankal Dam.Anayirankal dam is one of the largest earthen dams built on Panniyar river in Chinnakanal and SanthanparaPanchayaths, 22 kms from Munnar in Idukki district of Kerala. The dam is surrounded on one side by forest and on the other side by Tata Tea Plantation. The Dam is located near the Kumily-Munnarroad. The reservoir is spread along 6 km in Chinnakkanal mountain valley. The water flowing from the dam reaches Kuthunkal and Ponmudi dams through the Panniyarriver. The dam stores water from small streams flowing from Bealram and rain water from the hills on the Tamilnadu boarder. The waterfalls here, popularly known as Power House Waterfalls, cascade down a steep rock 2000 m above sea level. The spot is enriched with the scenic view of the Western Ghat ranges, Anayirankalis a lush green carpet of tea plants.The location of dam is Latitude 10o0'33"N, Longitude 77o12'22"E. The height of dam is 34.14m and length is 326.13m.The ownership of dam is vest under KSEB.

Ch. 4/800 - Pooppara New Bridge.

The above bridge is located across Panniyar River at chainage 4/800 in SanthanparaPanchayath. The bridge is connecting Anayirankal and Bodimettu at Pooppara. The location of the bridge is Latitude 9o58'42"N, Longitude 77o12'31"E. It has an approximate length 35.00 m, width 16.00m and height 8.00m. The upstream of river at the right bank is protected and at the left bank is not protected. The downstream banks of river are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. Large amount of waste deposited near the bridge. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is private.

Ch. 4/900 - Pooppara Old Bridge.

The above bridge is located across Panniyar River at chainage 4/900 in SanthanparaPanchayath. The bridge is connecting Anayirankal and Santhanpara at Pooppara. The location of the bridge is Latitude 9o58'43"N, Longitude 77o12'28"E. It has an approximate length 33.00m, width 10.00m and height 6.00m. The upstream and downstream banks of Panniyar are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. Large amount of waste deposited near the bridge. River encroachments are visible at this location. Commercial and residential buildings are constructed by encroaching the banks of the river. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 7/200 - ArattukadavuBridge.

The above bridge is located across Panniyar River at chainage 7/200 in between Santhanpara – PoopparaPanchayath. The bridge is connecting Thottikkanam and Pooppara at Arattukadavu. The location of the bridge is Latitude 10o0'33"N, Longitude 77o12'22"E. It has an approximate length 15.00 m, width 5.00m and height 7.00m. The upstream and downstream banks of Panniyar are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 7/700 - Vakkodan City Bridge.

The above bridge is located across Panniyar River at chainage 7/700 in between Rajakumari – SenapathiPanchayath. The bridge is connecting Thottikkanam and Murikkumthotty at Vakkodan City. The location of the bridge is Latitude 9o57'57"N, Longitude 77o11'47"E. It has an approximate length 20.00 m, width 5.00m and height 5.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is silty soil. The ownership of land on upstream and downstream of bridge is Private.

Ch. 10/700 - SenapathiBridge.

The above bridge is located across Panniyar River at chainage 10/700 in between Senapathi - SanthanparaPanchayath. The bridge is connecting Senapathi and Rajakumari at Senapathi. The location of the bridge is Latitude 9o57'11"N, Longitude 77o11'5"E. It has an approximate length 15.00 m, width 4.00m and height 4.00m. The upstream and downstream banks of Panniyar are not protected at this location. The height of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. The type of soil on bed of the river at this location is silty soil. The ownership of land on upstream and downstream of bridge is Private.

Ch. 15/800 - Rajakumari Bridge.

The above bridge is located across Panniyar River at chainage 15/800 Connecting Rajakumari and SenapathiPanchayaths. Rajakumari. The location of the bridge is Latitude 9o57'45"N, Longitude 77o8'52"E. It has an approximate length 25.00 m, width 7.00m and height 5.00m. The upstream and downstream banks of Panniyar are not protected at this location. The bridge abutments are constructed inside the river. Hence the bridge may cause obstructions to the smooth flow of water. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 20/700 – Kanakappuzha Bridge.

The above bridge is located across Panniyar River at chainage 20/700 in RajakkaduPanchayath. The bridge is connecting Rajakkadu and Udumbanchola at Kanakappuzha. The location of the bridge is Latitude 9o57'19"N, Longitude 77o7'3"E. It has an approximate length 26.00 m, width 8.00m and height 8.00m. The upstream banks of Panniyar are not protected at this location. The downstream left bank is protected and the right bank is not protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 21/700 – Vakkacity – Mukkudil Bridge.

The above bridge is located across Panniyar River at chainage 21/700 in RajakkaduPanchayath. The bridge is connecting Vakkacity and Mukkudil at Vakkacity. The location of the bridge is Latitude 9o56'59"N, Longitude 77o6'50"E. It has an approximate length 24.0 m, width 7.00m and height 4.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private. An island formation is there ar upstream of this bridge.

Ch. 24/300 - Kuthunkal Dam.

The above dam is located in Panniyar River at chainage 24/300 in RajakkaduPanchayath. This dam is situated in Senapathi – Rajakkadu road. The dam was constructed in 2000 as a part of a hydroelectric project. The location of the dam is Latitude 9o56'19"N, Longitude 77o6'21"E. The type of soil at this location is rock. The ownership of land of dam is Private.Kuthunkalhydro electric powerhouse uses this water for power production. It is locsted 2km upstream of Kuthunkal water fall.

Ch. 24/300 - Kuthunkal Bridge.

The above bridge is located across Panniyar River at chainage 24/300 in RajakkaduPanchayath. The bridge is connecting Senapathi and Rajakkadu at Kuthunkal. The location of the bridge is Latitude 9o56'17"N, Longitude 77o6'21"E. It has an approximate length 20.00 m, width 6.00m and height 5.00m. The upstream and downstream banks of Panniyar are protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private. An island formation is there at downstream of this bridge.

Ch. 32/400 - Ponmudi Suspension Bridge.

The above bridge is located across Panniyar River at chainage 32/400 in between Konnathady – RajakkaduPanchayath. The bridge is connecting Rajakkadu and Ponmudi at Ponmudi. The location of the suspension bridge is Latitude 9o57'51"N, Longitude 77o3'26"E. It has an approximate length 40.00 m, width 3.00m and height 25.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private

Ch. 32/000 - Ponmudi Dam.

The ponmudi dam is a concrete gravity dam built across the Panniyarriver which is a tributary of Periyar River at Konnathadipanchayath of Konnathadi village. This dam is one of the many dams of the evergreen Idukki, with the beautiful green nature around. The above dam is located acrossPanniyar River at chainage

32/000. The location of dam is Latitude 9o57'37"N, Longitude 77o3'19"E. It has an approximate width 294.00m.The dam was constructed in 1963 as a part of a hydroelectric project.The power house is located at vellathooval.The upstream and downstream banks of Panniyar are protected at this location. The type of soil on bed of the river at this location is rock. The ownership of dam vests in KSEB.

Ch. 33/000 - Chappath Wholesale Bridge.

The above bridge is located across Panniyar River at chainage 33/000 in Konnathady – RajakkaduPanchayath. The bridge is connecting Ponmudi and Rajakkadu cut road at Chappath. The location of the wholesale bridge is Latitude 9o58'12"N, Longitude 77o3'29"E. It has an approximate length 30.00 m, width 4.00m and height 3.00m. The upstream and downstream banks of Panniyar are protected at this location. The height of the bridge is less so that the river may get flooded due to materials struck at the bridge pillars. The type of soil on bed of the river at this location is rock. The ownership of land on upstream and downstream of bridge is Private.

Ch. 33/700 – Panniyarkutty Bridge.

The above bridge is located across Panniyar River at chainage 33/700 in Konnathady – RajakkaduPanchayath. The bridge is connecting Ponmudi and Vellathooval at Panniyarkutty. The location of the bridge is Latitude 9o58'32"N, Longitude 77o3'29"E. It has an approximate length 45.00 m and height 10.00m. The upstream and downstream banks of Panniyar are not protected at this location. The type of soil on bed of the river at this location is silty soil. The ownership of land on upstream and downstream of bridge is Private.

Tributaries of Panniyar

Santhanpararivier.

It begins from Mathikettan shola and joins Panniyarriver at Ch.6/100 near Santhanpara. It is one of the major tributaries of Panniyarriver. It has a total length of 7.2 km out of which 6km length is through Mathikettan shola. Chennakkadavubridge crosses Santhanpara river near Santhanpara town. (Latitude 9o58'07"N, Longitude 77o13'05"E). The width of river is around 30m at this point, but the length of bridge is less than that of river. The downstream of the river is protected at both sides of the river. But in upstream only right bank of the thodu is protected. Damaged pillars of old bridge are still present at the upstream of the river. Large amount of waste is found at the downstream of this bridge.

RajakkaduThodu.

It begins from the lower portion of Mullakkanam hills and cross through the Pazhayaviduthi – KallimaliPadasekharam and joins the right bank of the Panniyarriver. It crosses Rajakkadu- Adimali road below the Post office Junction (Latitude 9o57'32"N, Longitude 77o5'39"E). The total length of the thodu is around 4.00 km and the mouth of the thodu is at Ch. 25/300 of Panniyar river and is located at the downstream portion of Kuthunkal bridge.

Cheriyarriver.

It begins from Cheriyar and joins Panniyar river at Ch.10/000 near Thottikkanam. It is one of the major tributaries of Panniyarriver.It has a total length of 2.1 kms.3 bridges are crossing this river on its way. Pinakkadcitybridge crosses Cheriyar river near Thottikkanam is shown in this figure. (Latitude 9o57'23"N, Longitude 77o11'30"E). The width of river is around 15m at this point, but the length of bridge is less than that of river. The upstream and downstream of the river are protected at both sides of the river.

Kulatharakkuzhy – PanniyarkuttyThodu.

It begins from the upper part of Adimali-Rajakkadu road near by Panniyarkutty junction and crosses the road in two different locations. It also crosses the cut road of Ponmudi - Rajakkadu road and joins the river at Ch. 33/180 of Panniyarriver. The location of the bridge is Latitude 9o58'14"N, Longitude 77o3'30"E. The total length of the thodu is around 3.50 km and mouth of the thodu is upstream portion of Chappathu wholesale bridge across Panniyarriver. It is the right bank tributary of Panniyarriver.

Undamala – PanniyarkutyThodu.

It is a small tributary of Panniyarriver and it begins from Undamala nearby Panniyarkutty junction. Its length is only 1.00 km and it joins the river at Ch. 33/315.The location of the thoduis Latitude9o58'19"N, Longitude 77o3'33"E. It is the right bank tributary of Panniyarriver.

Ambalamkunnu – PanniyarkuttyThodu.

It begins from Ambalamkunnu hills nearby Panniyarkutty junction. The total length of the thodu is about 2.00 km it crosses PanniyarkuttyThekkinkkanam road and the location of thodu is Latitude 9o58'33"N, Longitude 77o3'42"E.It is the right bank tributary of Panniyarriver. It joins the river at Ch. 34/450 and the mouth of thodu is located at the downstream portion of Panniyarkutty Bridge.

MAIN STRUCTURES ACROSS AMBAZHACHAL RIVER

Ch.00/000 - KSEB Tunnel from Viripara

The stream originates from the Letchmi estate, and the water is being impounded on the Viripara weir reservoir. The head of the water is used for power generation by KSEB Upper Kallar Small Hydropower Project. The salient features of the project are

State	:-	Kerala
District	:-	Idukki
Thaluk	:-	Devikulam
Village	:-	Anaviratty
Panchayath	:-	Munnar&Pallivasal
River	:-	Kallar
River Basin	:-	Periyar
Catchment Area	:-	28.50 Sq.m
Reservoir	:-	Viripara weir
Branch tunnel	:-	48m length, 2.5m width, D shaped
Forbay	:-	20mx13.84m, Rectangular in shape

Water conducting system

Broad Crested weir – 4.5mx1mx1m – inside the existing diversion tunnel

Adit cum power tunnel – 21.16m length, 2.5m width, D shaped

Penstock - 168.58m length, 1.2m dia.

KSEB Tunnel from Viripara - 10°04'19.7"N 76°57'35.4"E

KSEB Power house bridge - 10°04'13.6"N 76°57'32.8"E

Location	:-	Left bank of river
Size	:-	21.50mx11.44m
Net head	:-	51m
Type of turbine	:-	Horizontal Francis
Number of Units	:-	2 Nos (1000kw each)
Tail race channel	:-	45m length

The installed capacity of the project is 2 MW. It is estimated that 5.15 MU of energy can be generated annually from this scheme. Work started in August 2016 and was scheduled to be completed by August 2018. Due to to some unfavorable geological issues the same was delayed and now the project is nearing completion.

Ch.00/227 - KSEB Power house bridge

This bridge is across Kallarriver. Due to the construction activities near the bridge, the stream got filled with muck and debris which obstructs the natural flow and also makes water muddy and turbid. This bridge is located at 10°04'19.7"North and 76°57'35.4"East.

Ch. 01/270- Kallar–Mankulamroad bridge d/s of power house

There is a bridge of span 8 m built across the kallar along the kallarmankulam road, with sufficient waterway for the flow. Both the banks are unprotected and are private elappattayam land. The leachate from the construction site made the water turbid and the vegetation/ trees fell on the waterbody needs to be removed. This bridge is located in 10°03'45.2"North and 76°57'30.0"East.

Kallar - mankulam road bridge d/s of power house - 10°03'45.2"N 76°57'30.0"E

Ch. 01/500- Check dam by Jalanidhi

The check dam was constructed with the purpose of meeting the drinking water requirements in the downstream, but the sand deposited in the dam upstream has reduced capacity of the dam. Also the water is muddy due to the localised subsidence of unprotected sides and leachate from the powerhouse work site. This check dam is located at 10°03'39.9"North and 76°57'26.2"East.

Ch. 03/361- Peechadbridge

The bridge is located @ 3/361 with location lat10°03'01.0"N& long76°57'11.0"E. The bridge having a span of 7m and having sufficient waterway. The river having 7m width at the bridge gets narrowed to about 3m wide at about 50m downstream of bridge. Vegetation and muck/ gravel deposited on the bed needs to be removed.

Private bridge near Wild Spice Trails Resort - 10°02'43.4"N 76°57'16.4"E

Private bridge to private land near Swiss nest - 10°02'34.3"N 76°57'46.0"E

Private bridge to Swiss nest - 10°02'34.4"N 76°57'44.5"E

Private bridge to Hom

Samsung Estate - Vengayapara Bridge - 10°02'40.9" N 76°57'26.8" E

Ch.04/245 to Ch.05/684 – Private Bridges

The river further flows along the kallarmankulam road and several private bridges are constructed across the river connecting the road and the private property across the river. Most of the structures causing slight to moderate obstruction to the flow of water.

me - 10°02'33.4" N 76°57'57.2" E

Private bridge to Flower valley - 10°02'34.2" N 76°57'48.0" E

Kurishupara Bridge - 10°02'29.6"N 76°58'06.8"E

Ch.06/037- Kurishupara Bridge

This bridge is across kallar river in Kurishupara – Kottapara road. In left bank upstream and downstream of bridge are protected and encroachment found. Right bank of the river not protected. A kaithodu of 2m wide entering 10m downstream of bridge onto the right bank. In this location river have a width of 8m. This bridge is located at 10°02'29.6"North and 76°58'06.8"East.

Ch.06/196BridgetoPallivasalgramapanchayatsamskarikanilayam,Kurisupara

This bridge is across Kallarriver. Near Palivasalgramapanchayathsamskarikanilayam, kurishupara. In this location river have a width of about 12m. Left bankprotected and encroaching buildings found. Right bank is not protected.Debris on left bank near a pipe culvert to be removed. This bridge is located at 10°02'31.4"North and76°58'11.4"East.

Bridge to Pallivasal grama panchayat samskarika nilayam kurisupara - 10°02'31.4"N 76°58'11.4"E

Ch. 06/637 - Bridge near bubbly falls

This bridge is across Kallarriver near bubbly falls. In this location river have a width of 12m. In this area river have a rocky bed. Left bank of the river is protected and right bank not protected. This bridge is located at 10°02'29.6"North and 76°58'24.4"East.

Bridge near bubbly falls - 10°02'29.6"N 76°58'24.4"E

Bridge near kallar valley anganwadi - 10°02'27.4"N 76°58'36.1"E

Ch.07/004- Bridge near Kallar valley anganvadi.

This bridge is across kallar river near kallarvalleyanganavadi. In this location river have a width of 8m. Left bank of the river is protected and encroachment found. Right bank not protected. This bridgeis located at 10°02'27.4"North and 76°58'36.1"East.

Ch.07/307 - Bridge near kallarvalley waiting shed.

This bridge is across kallar river near kallarvalley waiting shed. In this location river have a width of 8m. Both left and right banks are not protected. This bridge is located at 10°02'27.4"North and 76°58'45.4"East.

Bridge near kallrvalley waiting shed - 10°02'27.4"N 76°58'45.4"E

Kallar bridge - 10°02'03.6"N 76°59'11.7"E

Ch.08/759 –Kallarbridge

This bridge is across Kallarriver in Adimali-Munnar road. In this location river have a width of about 20m. The downstream river bed having large number of big boulders and banks are not protected. Upstream banks protected as part of KSEB tunnel work. This bridge is located at 10°02'03.6"North and 76°59'11.7"East.

Kambiline -

Kambiline check dam - 10°01'25.2"N 77°00'16.7"E

Ch.11/578 - KambilineCheck dam

This check dam is across Kambiline river nearKambiline in ward no 13 of pallivasalpanchayat. Now this check dam requires maintenance and canals are in damaged condition due to flood and erosion. The Canal is used for irrigation of near by farms mostly of cash crops and also supplying water to Kandyampara Ambedkar Colony. The canal is severely damaged.In this location the width of river is about 30m. The river bed is almost rocky. Both banks are protected private land. This check dam is located at 10°01'25.2"North and 77°00'16.7"East. The maintenance of canal and check dam work is proposed by Irrigation department.

Am

chundakkadu bridge - 10°01'25.0"N 77°00'12.4"E

Ch.11/434 - Kambiline - chundakkadu bridge

This bridge is across kambiline river in kambiline – chundakkadu road. In this location the river bed is almost rocky. Both right and left banks are unprotected private land. This bridge is located at 10°01'25.0"North and 77°00'12.4"East.

nbazhachal bridge - 10°01'06.1"N 77°00'52.7"E

Ch.13/016– Ambazhachalbridge

Ambazhachalbridge is across Ambazhachalriver in Adimali – Munnar by pass road. In this location width of the river is about 15m and bed having silt. Upstream of the bridge, river banks not protected, downstream of the bridge, river banks protection works on going.Rock and debris deposit about 100m downstream of bridge. A kaithodu entering from left bank at about 50m upstream of ambazhachal bridge. This bridge is located at 10°01'06.1"North and 77°00'52.7"East.

Iruttukanam small hydel power project check dam - 10°00'53.9"N 77°00'45.9"E

Ch.13/448– Iruttukanam small hydel power project check dam

This check dam is across Ambazhachalriver in the downstream of Ambazhachalbridge. In this location river have a width of about 20m. Left bank of the river is protected and right bank is not protected. This check dam is located at 10°00'53.9"North and 77°00'45.9"East.

Mankadavu bridge - 9°59'38.7"N 77°00'31.9"E

Ch.16/322 – Mankadavubridge

This bridge is across Ambazhachalriver which is locally named as mankadavupuzha. In this location river have a 55m width with rocky bed. Here both banks are unprotected private land. This bridge is located at 9°59'38.7"North and 77°00'31.9"East.

Tributaries to Ambazhachal River

PeechaduThaliyam check dam – KallarThodu (@ 2/390)

This is the starting point of PeechaduThaliyam check dam – Kallarthodu. The upstream and banks of the check dam is Elapattayam land. Both banks are unprotected and silt sedimentation found in check dam.

Peechadu Thaliyam Check dam - 10°03'27.5"N 76°57'40.5"E

This check dam is constructed across a small stream from forest. The length of the check dam is about 40m. The check dam reservoir and downstream thodu requires de siltation. This check dam is located at 10°03'27.5"North and 76°57'40.5"East.

Ch.00/113 Private bridge.

This bridge is across PeechaduThaliyam Check dam – KallarThodu just below the peechaduthaliyam check dam, in Pallivasalgramapanchayath. In this location both Thodu sides are unprotected private land. Both upstream and downstream thodu filled with mud and silt. Urgent de siltation required here. This bridge is located at 10°03'26.8"North and 76°57'37.9"East.

Private bridge - 10°03'26.8"N 76°57'37.9"E

Pipe culvert –Kallar Mankulam road - 10°03'21.5"N 76°57'17.5"E

Ch.00/918 Pipe culvert –KallarMankulam road.

There is a Pipe culvert laid alongPeechaduThaliyam Check dam – KallarThoduacross theKallar-Mankulam road in Pallivasalgramapanchayath. This pipe culvert is not sufficient for smooth flow of water. It causes flooding in this area. Upstream and downstream of the culvert, thodu side is unprotected private land. Thodu filled with mud and silt. Urgent de siltation required here. This culvert is located at 10°03'21.5"North and 76°57'17.5"East.

Ch.01/067 Confluence Point of thodu to kallar.

PeechaduThaliyam Check dam – KallarThodu is joining to Kallarriver in this point. Both banks are un protected private land with loose soil. Up to this point thodu fully filled with mud, silt and vegetation. Urgent desiltation required. It is located in 10°03'20.8"North and 76°57'12.7"East.

Thokkupara-Ambazhachalthodu (@12/940)

Thokkupara tunnel near by bridge, 10°01'57.1"N, 77°01

Ch.00/000 Thokkupara tunnel near by bridge

The bridge is located downstream of the tunnel from 2nd mile. The river approximately having 4m width, rocky formation and lateritic sides. The boulders and debris deposited need to be removed.

Ch.00/0.95
ThokkuparaAnanthavilasamKaradipara road near check dam
The check dam having a span of 8m located aside the thokkuparaananthavilasam-karadippara road. The checkdam upstream is completely filled with sand, gravel and muck which has considerably reduced the reservoir capacity.

Anandavilasam ckeck dam, 10°01'32.1"N, 77°01'21.3"E

Thokkupara - Ananthavilasam road bridge

Ch.01/040Thokkupara - Ananthavilasam road bridge
The bridge is located about 100m downstream of the check dam, filled with boulders and muck. The bridge causes serious obstruction to the natural flow, as the bridge span is merely half the width of the thodu.

Ch.01/670 19 Palam
19 Palam is having a span about 8m, both the left and right bank are unprotected with 2m bank height. A shallow deposit of muck is seen need to be removed for the efficient flow of water. Both sides are unprotected.

Ch.02/140Ambazhachal- Kandiyampara road bridge
The span of the bridge is insufficient for the efficient flow of water, which causes flooding in this area. The bridge is having only about 6m span but the thodu having width about 10m. The sand, gravel and muck deposited on the bed also needs to be removed.

STRUCTURES OBSTRUCTING FLOW

During inspection and field survey , it observed that there are numerous structures that are obstructing smooth water flow in various streams in Muthirapuzha sub basin . The structures are either reconstructed or altered to restore natural water way of streams so as to minimize the flood damages . Location with photographs attached

LOCATION OF BRIDGES AND STRUTURES TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES

COLONY THODU

Location 1. Near Sangeetha Hotel ch: 1.195Km The Culvert is 3 m wide situated in Colony thodu near Sangeetha Hotel in Munnar Grama Panchayath . The flow obstructed due to the sinking of abutment into the Thodu – To be reconstructed.
(Lat:10.087659,Long;77.065805)

Location 2. Foot Bridge near govt. Hostel Munnar Ch: 1.235Km

Pedestrian bridge is 4 m wide located in the Colony thodu near Govt: Hostel in Munnar Gramapanchayath, the Abutment of the bridge located inside the thodu and its abutment were destroyed in the flood and seen to obstruct flow, so it have to be replaced with new one- To be reconstructed.
(Lat:10.088230,Long;77.06338)

Location 3. Pump shed near camp Munnar Hotel Ch: 1.065Km
Pump shed situated in middle of colony thodu near camp Munnar hotel in Munnar Grama Panchayath. Structure of the Pump house which obstruct the flow of the thodu so it needs to be demolished . (Lat:10.087659,Long;77.065805)

YELLAPETTY THODU
Location 1. Near Yellapetty Tea Factory Ch: 0.098Km

The Culvert is 3 m wide situated in Yellapetty thodu near tea factory in Devikulam Grama Panchayath . The flow obstructed as the abutment of culvert is located in the thodu ,and need to reconstruct without obstructing flow- To be reconstructed (Lat:10.127528,Long;77.203635)

Nadayar thodu @CH 0.3 KM

The Present Check dam is a temporary storage structure and damaged .To ensure proper storage of water to facilitate irrigation to near by winter vegetable farming the present structure to be replaced with new one.(Lat:10.127060, ,Long;77.204101)

UPPAR THODU

Location 1. Foot bridge near service center Ch: 8.460Km Private pedestrian bridge is 10 m wide located in the Uppar river near service center in Bysonvalley Grama panchayath, the abutment of the bridge located inside the thodu which can be seen obstructing flow -To be reconstructed (Lat:10.88812,Long;77.059731)

Location 2. Foot Bridge near Jalanidhi Pump house Ch: 9.124Km

Pedestrian bridge is 10 m wide located in the Uppar thodu near Jalanidhi pump house in Bysonvalley Grama panchayath, the abutment of the bridge located inside the thodu and its piers were destroyed in the flood which can be seen to obstructing the flow- To be reconstructed (Lat:10.00608,Long;77.114538)

Pollution of water bodies in Muthirapuzha sub basin

The National Water Policy adopted by the Government of Kerala in 2008 and Government of India in 2012 has given due importance to the upkeep of rivers, especially the quality of water. It emphasizes that improvements in existing strategies and innovation of new techniques resting on a strong science and technology base are needed to eliminate the pollution of surface and ground water resources in the country to improve water quality. The policy mentions that water resources development and management will have to be planned on the basis of a hydrological unit such as watersheds or river basins or aquifer in the case of ground water for sustainable use incorporating the quantity and quality aspects of water as well as environmental considerations. The policy also calls for regular monitoring of the quality of both surface water and ground water. A phased programme for improvements in water quality, treatment of effluents to acceptable levels and standards before discharging them into natural streams, adoption of the principle of 'polluter pays' in management of polluted water and formulation of necessary legislation for preservation of existing water bodies by preventing encroachment and deterioration of water quality etc. are the priority actions envisaged. It is also highlighted that the research efforts in various areas, including water quality needs to be intensified for effective and economical management of our water resources.

The Haritha Kerala Mission launched by the Government of Kerala envisages the conservation and upkeep of all the water bodies in the state including wells, ponds, lakes, reservoirs, streams, rivulets, rivers etc. as well as maintain an aesthetic environment through appropriate sanitation and waste management measures. Further, it is envisaged that the availability of clean water will reduce the disease burden, the manure generated from waste will be of use to increase safe-to-eat agricultural products, and adequacy of water in time and place will improve the primary and secondary production sectors as well as improve the tertiary service sectors.Unfortunateley our rivers are polluted and contaminated due to various sources they are,

- Run-off from agricultural land containing substances including pest control products, animal medicines, slurry, sewage sludge and manure
- Run-off and leaching from contaminated land
- Silt and dust from mining, quarrying, construction and demolition
- Groundwater drainage discharging from disused mines
- Incorrect waste pipe connections
- Trade effluent going into surface water drains instead of foul water drains, or straight into watercourses
- Pollutants from car parks and transport, such as oil and brake fluid, rubber and metal from tyres and brakes, exhaust emissions, and detergents and grease from vehicle cleaning
- Heavy metals and pollution washed from roofs.
- Based on the above factors that affecting quality of water, the pollution of Munnar water bodies in Muthirapuzha Sub basin is described below.

Pollution of Munnar Rivers

Munnar and adjoining areas are one of the most sought-after destinations in the national and international tourism circuit. The tourism products here are the climate characteristics, mountain landscape, natural vegetation and plantations, wildlife, vastness of reservoirs, water falls, high velocity streams, clean water etc. The Nallathanni River drains the north-western region of Munnar and joins the Muthirapuzha River (Figure 1) from the east through the Kannimala River in Munnar town. These rivers, therefore, are the life-line of Munnar region and their environmental upkeep is extremely critical to the liveability of the region. Currently, 2 of the rivers receive considerable discharges from the plantation and tourism industries as well as local habitation in the absence of safe sanitation measures and appropriate pollution control systems which is highly detrimental to a very fragile terrain like Munnar. As far as the pollution in Muthirapuzhayar is concerned the major contribution is the agricultural run –off. Major area of garden land in the sub basin is utilized for plantation crop like Tea, coffee, cardamom. This intensive agricultural practice all along the banks and watershed area has been enriching the river water with high concentration of pesticides and fertilizers especially during surface run off in the rainy season. Besides, loosening of surface soil and removal of vegetation from catchment area generate problems. Idukki District is industrially backward despite generation of large quantum of electricity. Lack of infrastructural facilities, vastness, remoteness of the District and the diversity in climate are all factors limiting the establishment and growth of industries in the District. As per the details collected related to pollution of Muthirapuzha rivers the Nallathanni Riverand Muthirapuzha main stream are mostly affected, which are detailed below

POLLUTION IN NALLATHANNI RIVER

The Nallathanni River originates from the southern part of Thalayar hills and flows adjacentto the Eravikulam National Park and reaches Munnar Town where it merges with River Muthirappuzha (Figure 2). The Headworks of the Pallivasal Hydroelectric Project is located just downstream of the confluent point. The watersheds of Nallathanni River and Muthirapuzha River are prone to land degradation and in recent times experiences huge increase in population as well as tourists. This, in turn, has promoted haphazard urbanization and undesirable land uses. Consequently, there is increased generation of solid and liquid waste as well as chemical residues due to increased use of chemical fertilizers and pesticides. Due to lack of appropriate measures for waste management and regulation of chemical fertilizer and pesticide use, the assimilative capacity of both the rivers may have affected adversely. The average annual rainfall of the region is 3785 mm Nallathanny means pure water it is a Tamil word. The colour and the purity of the river brings this name at the end of 18and 19 th century there was no contamination in Munnar rivers, increased population and the increased number of shops situated near by the rivers make the situations worse, the starting point of the nallathanniyar on the part of tea plantations and its end is at the joining point of kanniyar is Munnar town, out of the total length of this river one km is in the town area is fully contaminated automobile works shop, slaughter houses, hotels, houses etc residing in the area flows the waste directly in to
this river tea factory situated near beginning point is also contaminating the river. Tea waste dumping near the river flows to the river creates various issues. And it changes the colour of water in this area its colour become blackish. Munnar Gramma Panchayathhas constructed a toilet near by side of the river and its waste indirectly passing through the river there are 30 shops in this area are directly or indirectly contaminating the Nallathanny river KSPCB identified 2 points in Nallathannryar where the coliform content Cfu/100ml is 1200 and 4800 respectively which is above the value 500Cfu/100ml prescribed for bathing slandered. In addition to the above point of source of diffusion noticed 3.near Srishti Charitable trust(D/S of Tata Instant Tea),Munnar ch:0.429km

1. Near Srishti Charitable trust(D/S of Tata Instant Tea),Munnar ch:0.429km
2. Nallathanni River near Pentacost Church Ch: 3.07km

Additional location identified

1. At origination point- The agency responsible is M/S Tata Instant Tea Company
2. Cattle shed constructed on left bank at 3.465km- Cow dung and other waste directly discharging to the river.

Identified given points of waist deposit by KSPCB the photographs of identified location with description is as below

MUTHIRAPUZHA SUB BASIN- NALLATHANNI – POLLUTED LOCATIONS – PHOTOS		
Nallathanni rivernear Srishti Charitable trust(D/S of Tata Instant Tea),Munnar ch:0.429km	Seen Liquid waste in nallathanni thodu and blackish colour	Munnar GP
Nallathanni River near Pentacost Church Ch: 3.07km	Blackish color water discharging to river from Church,silt and vegetation along the sides	Munnar GP

	Starting point of Nallathanniyar near Tata Instant tea company	Tea waste disposed mixed with river water	Munnar GP
	Cattle shed situated on Nallathanniyar left bank at ch: 3.465km cow dung disposed to river	Cow dung and other waste mixed with water	Munnar GP

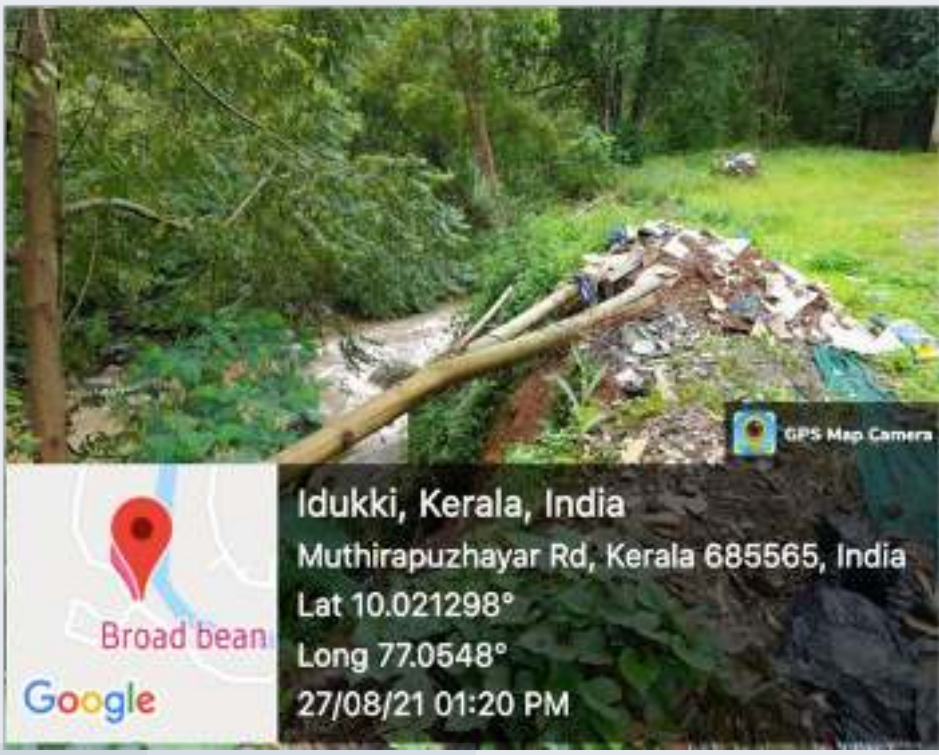
POLLUTION IN MUTHIRAPUZHAYAR

It is the main stream formed due to confluence of 3 rivers at Munnar town and the stream traverse towards Munnar Head works through the township. The majority of the resorts, Tourist amenities, commercial establishments, Hotels etc. are located in the river bank. Agriculture run of in the upper catchment and contaminated water of main tributaries leads to the pollution of water to a large extent in Muthirapuzhayar. The contamination of water in tributaries mainly accountable due to the presence of tea waste effluent. The coli form bacteria level is abnormally high than the bathing standard level. The critical locations with observed value is on below (KSPCB report)

Sl. No.	Location	Coliform level (Cfu/100ml)	Local body
1	Muthirapuzha-Avondale cottage	7800	Munnar
2	Muthirapuzha-KSEB RA head works	8700	Munnar
3	Muthirapuzha-Kannimala reach upstream of confluence	4400	Munnar
4	Muthirapuzha-Broad bean resort	8400	Munnar
5	Muthirapuzha-Ellackal bridge	8600	Byson valley

PHOTOS –LOCATION 1		Muthirappuzhayar near Avondale cottage	No waste dumping identified this area	Munnar GP
LOCATION 2		Muthirappuzha river at Head works KSEB	Seen wastedumped along the side of river one area, water polluted	Munnar GP

PHOTOS LOCATION 4



Muthirapuzha-Broad bean resort	Polluted water and waste dumping	Munnar GP

LOCATION -5 –PHOTOS

Muthirapuzha River at ELLackal bridge	This area is already cleaned condition, no wastage deposit identified now	Bysonvally GP

POLLUTION IN KUNDALAYAR

Kundalayar the tributary of Muthirapuzhayar with total length 26.656km flowing through Munnar G.P. Only the tail end of about 10km the stream have normal river course and the remaining upstream reaches is the reservoir body of Kundala and Mattupetti dams. The majority stretch of tail end up to DTPC center Munnar runs through forest glad and not affected by pollution. From the DTPC location up to the confluence river passing Munnar town ship and residential areas on inspection the contamination of water is noticed near double bridge. KSPCB conducted sampling at this point and presence of coli form bacteria identified to the tune of 12000cfu/100ml which is the second highest value observed in the region of Munnar. Photographs of the location of attached .In the upper reaches there is high concentration of tourists visiting the dam site at Kundala , Mattupetty and tourists location like top station , Vattavada etc. Contamination of water due to throwing of wastes by tourist is most common here . The reservoir water bodies of bothy dam are under control of KSEB .The high value of pollution related to coliforms found near Munnar township.

Kundala river at Bridgeconnecting two parallel roads at Munnar	Wastage deposit not found this area,Vegitation and silt deposit along the sides. Presence of coliform bacteria seen	Munnar GP

POLLUTION IN COLONY THODU

It is a tributary of Muthirapuzhayar. The entire stretch passing through thickly populated residential area in Munnar town. It is the highly polluted streams in Muthirapuzha basin. Effluent from the nearby hotels, resorts, house hold waste and agriculture run off from upper catchment are the main reason for the pollution. KSPCB observed the value of coliform is 15000cfu/100mlwhich is the highest value observed in Muthirapuzha basin. The location identified is near Edassery east end cottage. This issues related to contamination and pollution is to properly address. Photographs of the locations

POLLUTION IN NADAYAR THODU

Nadayar thodu is the minor stream originate from Nadayar estate and joins with Muthirapuzhayar near town bridge. Encroachment on both bank in the vicinity of confluence made the stream very narrow with respect to the original cross section. The presence coliform bacteria accounted due to run off form tea plantation and solid waste dumped by numerous shops in the town. The content of coli form bacteria 1600cfu/100ml.

Nadayar Drain near Silver spoon restaurant (old name)	Waste dumping noticed from road side and from road side shops	Munnar GP
stream at Back side of Edassery Eastnd (Pankaj cottage)	At Nadayaar Thodu waste deposit into the thodu from resorts and hotels shop etc	

Nadayar Drain near Silver spoon restaurant (old name)	Waste dumping noticed from road side and from road side shops	Munnar GP

PUMPING STATIONS

60.51.1 Jalanidhi Pump house in Uppar thodu :- Jalanidhi Pump House situated in Right Bank of Uppar thodu @ Chainage 9.134 in Bysonvalley Grama Panchayath. (Lat:10.006023,Long;77.1145)

Pump house near kunjithanni in Muthirapuzha river

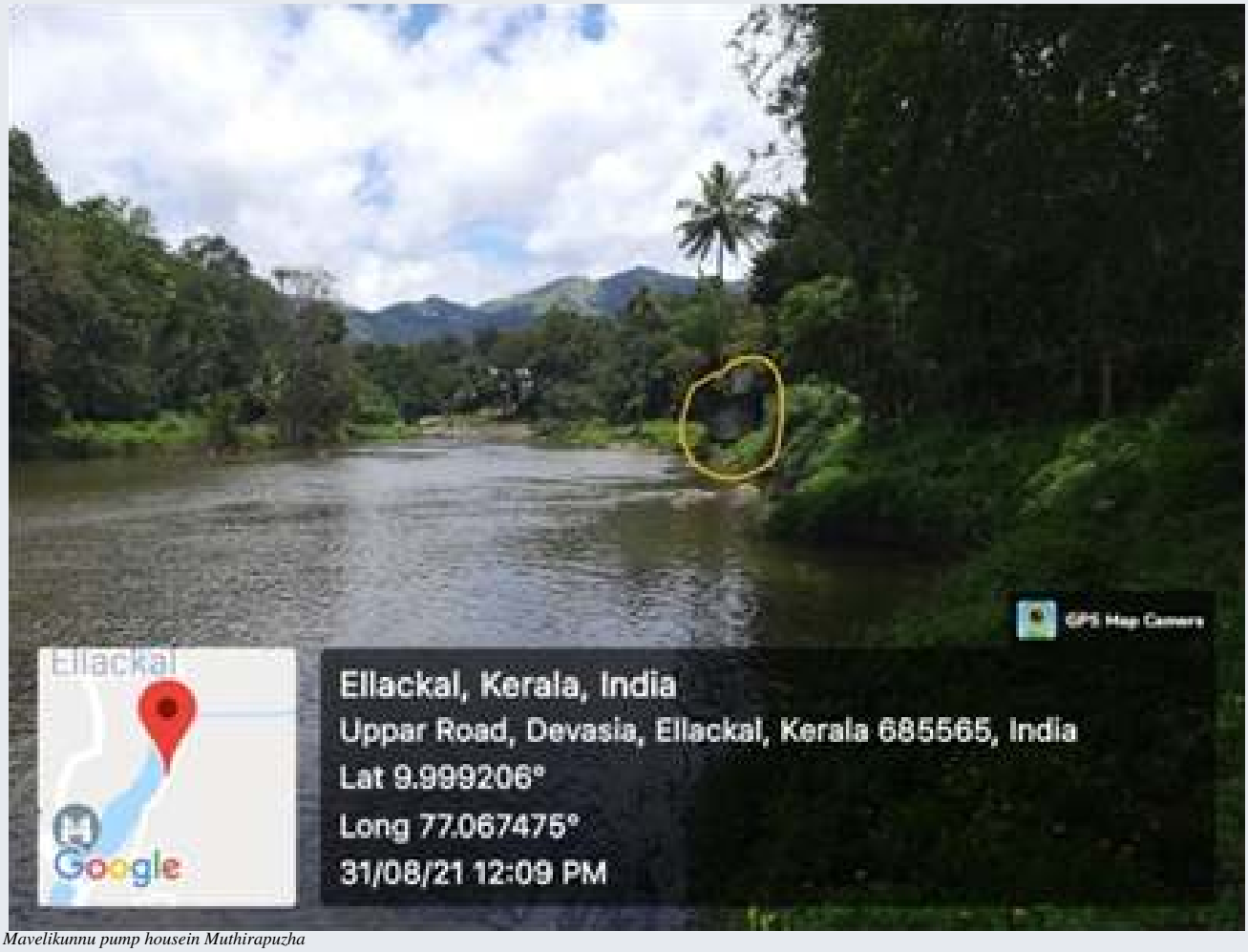
KWA Pump House situated in Right Bank of Muthirapuzha U/S of kunjithanni river @ chainage20.980 in Pallivassal g.p (Lat:10.027517.Long;77.053854)

KWA pump house near ellackal:-KWA Pump House situated in Right Bank ofMuthirapuzha @ chainage22.810 in Pallivdssal G.P (Lat:10.001453,Long; 77.065701)

Pump house in kundala river near ktdc park Munnar on left bank
KWA Pump HouseNear Ktdc in Left Bank of Kundala River @ chainage25.716 in Munnar G.P. (Lat:10.84358.Long;77.0701

Pallithazham pumphouse in uppar thodu Chainage 11.134(Left Bank)

Lat:10.001065, Long 77.096441
Pallithazham pumphouse in uppar thodu Chainage 11.134(Left Bank)



Mavelikunnu pump housein Muthirapuzha

Ratnagiri pump housein Uppar

FOREST AREA:-The river Muthirapuzha from origination point to Periavaria location upstream ie from Ch 0.00 to Ch 6.185 Km runs through Forest area partially and some extent of river course is through the area leased to TATA tea company.From there river runs through munnar township upto Head works. Another stream runs through forest is the Kundala river and its sub stream Yellapetty thodu .The forest area in the kundala stream extended from ch 0.00 to Ch 24.255 Km . In this stretch the river course which is part of reservoirs of Kundala and Madupetty is under control of KSEB.

DETAILS OF HYDROELECTRIC PROJECTS IN THE ASSIGNED REACH

HYDEL POWER DEVELOPMENT

Among all river basin of Kerala , Periyar basin is the richest in hydel power Potential About 60 % of the Total Power Potential of the state lies in this basin . Even though there 10 schemes by K.S.E.B and two two scheme by private agencies the Power potential of the basin is not fully tapped .

In the first decade of this century a 400 Kw plant was installed at Munnar by the K.D.H.P company ,to serve the need of their factory, by harnessing the Muthirapuzha tributary of Periyar. The installed capacity was raised to 1900 KW by them later. The Electricity Department of Kerala took over the scheme from K.D.H.P Company.

PALLIVASAL HYDOELECTRIC PROJECT- IST GEVORNMENT H.E PROJECT

The first Gevernment Hydo Power in the State Utilising the water of Muthirapuzha was commissioned in 1939 at Pallivasal with installed capacity of 13500 K.W (3x4500 K.W)u under the first stage. In 1950-51.two unit of 7500 K.W each werw added.During the first Five year plan, one more unit of 7500 K.W was added and the three unit of 4500 K.W were replaced by three 5000 K.W units, thus raising the installed capacity of the station to the present 37500 K.W.

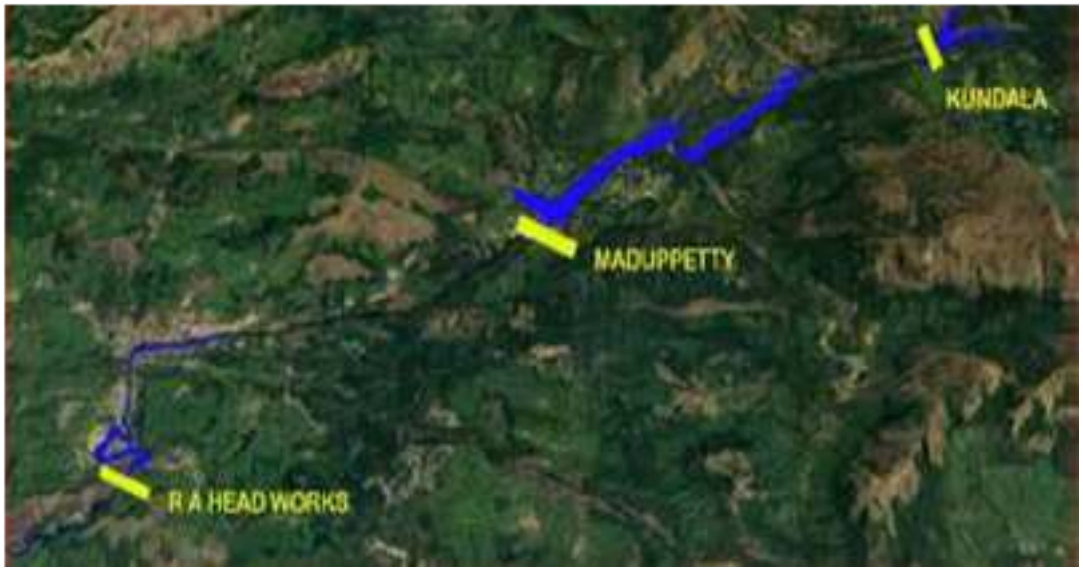
This hydel scheme have three major storage components

1 . Dam at Kundala
2. Dam at Mattupetty
3. Barrage RA head works Munnar

Details of above components are in the following sub head

2Dams operated by KSEB for pallivasal H.E project

Kundala Dam, Maduppetty Dam & R A Head Works are constructed in Muthirapuzha stream, a tributary of River Periyar, as part of Pallivasal Hydro Electric Project. These are cascadingstructures with Kundala at the upstream and R A Head Works at downstream.Kundala is comparatively a small reservoir. The water stored in the reservoir is released tothe downstream Maduppetty reservoir through the river when water level in Maduppettyreservoirs lowers. The water stored in the Maduppetty reservoir plus the water releasedfrom Kundala is further released to downstream through a Dam Toe Power Station. R AHead Works, a gated diversion structure, constructed downstream of Maduppetty in the Muthirapuzhayar about 3.68 Km downstream of confluence point of three streamshelps todivert the water released from the upstream reservoir as well as the inflow from owncatchment to Pallivasal Power Station. These structures are operated and maintained by the same officials. The inundation area consequent to breach/large control releases of these dams falls in same Panchayath(Munnar Panchayath).The tail race discharge from Pallivasal power house together with the runoff from free catchment and tributaries contributing discharge from Pallivasal powerhouse to Downstream.



A General layout of dams is as shown below

Kundala dam

Kundala Dam is constructed in the upstream reaches of Mudirappuzha sub basin,downstream of the confluence of Chittuvarai, Ellappatti and Chunduvarai streams, in PeriyarBasin in Idukki District, Kerala State. The upstream most dam in Mudirappuzha sub basin isKundala. It is a masonry dam, constructed during 1947.The location of dam is 770 11’ 55” E/100 08’ 37” N. Maduppetty is the immediate downstream dam in the same stream.

The Gross Storage of Kundala Dam is 7.78 Mm3 and live storage 7.65 Mm3. FRL of thereservoir is 1758.69 m and the MWL is 1759.30 m. Top level of dam is 1759.92 m. There are five vertical gates (falling type), each of size 5.18 m x 2.74 m. Crest level of spillway is1756.86 m. One lower level outlet of 1.8 m dia. is also provided in the dam. Spillway capacity is 184 m3/s. the reservoir will be at FRL near the end of monsoon season. The water stored in the reservoir is released to Maduppetty Reservoir, located about 4 km downstream, through the river course generally from April to May. The reservoir will be empty by the end of May.

General

Dam Name	:-	KUNDALA DAM
Name of River	:-	Kundala river (Tributary of Muthirappuzha)
Dam location	:-	Idukki District.
Lat/Long	:-	770 11’ 55” E/100 08' 37" N
Seismic Zone	:-	Zone III
Year of Starting Dam Construction	:-	1941
Year of first Impoundment	:-	1947
Year of commissioning of Dam	:-	1947
Name of Immediate Upstream Dam	:-	Nil
Name of Immediate Downstream Dam	:-	Maduppetty

Main Dam
Type : Masonry Gravity
Length : 259 m
Maximum Height : 26.2 m
Top Width : 3.05 m
Top of Dam : 1759.92 m
Drainage area : 36.43 km2
Spillway
Crest level : 1756.86 m
No of gate : 5
Size : 5.18 m X 2.74 m
Lower Level outlet : 1 No 1.8 m dia. at 1735.84 m
Reservoir
Full Reservoir Level: 1758.69 m
Live Storage : 7.65 Mm3
Gross storage : 7.78 Mm3
Reservoir Spread Area at FRL : 0.65 Km2

Maduppetty Dam

Maduppetty dam is constructed about 10 km downstream of Kundala Dam. It is a concreteGravity dam. This reservoir stores the water from the catchment downstream of Kundaladam. It also routes the releases from Kundala dam to RA Head works from where it is diverted to Pallivasal Power Station. This dam was constructed in 1956 and is intended to store water for power generation.

The Gross Storage of Maduppetty Dam is 55.23 Mm3 and live storage 54.77 Mm3. FRL &MWL of the reservoir is 1599.59 m. Top level of dam is 1600.20 m. There are three nos. Of radial gates each of size 6.70 m x 4.95 m. Crest level of spillway is 1594.71 m. One lowerlevel outlet of 1.2 m dia. is also provided at elevation 1565.15 m Spillway capacity is 453m3/s. The water stored in the reservoir is released through a Dam Toe Power Station, which in turn used for generating power from Pallivasal Hydro Electricity Project.

General	:-	
Dam Name	:-	MADUPPETTY DAM
Name of River	:-	Kundala river (Muthirapuzha river)
Dam location	:-	Idukki District
Lat/Long	:-	770 07’ 26” E/100 06’ 23” N.
Seismic Zone	:-	Zone
Year of first Impoundment	:-	1956
Year of commissioning of Dam	:-	1956
Name of Immediate Upstream Dam	:-	Kundala
Name of Immediate Downstream Dam	:-	R A Head Works
Main Dam		
Type	:-	Concrete Gravity
Length	:-	237.70 m
Maximum Height	:-	46.33 m
Top Width	:-	6.1 m
Top of Dam	:-	1600.20m
Drainage area	:-	57.106 km2
Spillway	:-	
Crest level	:-	1594.71 m
No of gate	:-	3
Size	:-	6.70 X 4.95 m
Lower level outlet	:-	1.2 m dia. at 1565.15 m
Reservoir		
Full Reservoir Level	:-	1599.59 m
Live Storage	:-	55.23 Mm3
Gross storage	:-	54.77 Mm3
Reservoir Spread Area at FRL	:-	3.24 Km2

R A Head Works

This is a barrage like structure with gate arrangements which diverts water to the tunnel of

Pallivasal Hydro Electric Project. The water is impounded by gates. The sill level of the gate isalmost at the bed level of the stream. Release from Maduppetty reservoir as well as inflow from own catchment reaches R A Head Works. This structure is constructed during 1944.

The pondage of the diversion structure is 0.22 Mm3. The Full Reservoir Level is 1450.92 m.The crest level of gate is 1445.00 m. There are three vertical lift gates for this barrage eachof size 11.6 m X 6.7 m. The rate of diversion to the power station is about 8 m3/s.

General

Dam Name : R A Head Works
Name of River : Muthirappuzha
Dam location : Idukki District.
Lat/Long :10004' 05" N & 770 04'01" E
Seismic Zone : Zone III
Year of first Impoundment :: 1944
Year of commissioning of Dam: 1944
Name of Immediate Upstream Dam: Maduppetty
Name of Immediate Downstream Dam : Kallarkutty

Main Dam

Type : Barrage (gated structure)
Length : 3 Vents 11.6 X 6.7 m
Maximum Height : 0.30 m (height of sill)
Drainage area: 238.256 km2
Spillway
Crest level : 1445.00 m
No of gate : 3
Size : 11.60 X 6.70 m
Reservoir
Full Reservoir Level : 1450.92 m
Gross storage : 0.22 Mm3
Reservoir Spread Area at FRL: 0.01 Km2

CH:2.896 KM in Kundala River

KUNDALA DAM

Mattupetty Dam CH 16.086 KM in Kundala River

GPS Map Camera
Munnar, Kerala, India
SH 16, Munnar, Kerala 685612, India
Lat 10.068086°
Long 77.06685°
28/07/21 03:06 PM
85
Google

RA HEAD WORKS AT MUNNAR – CH : 13.225 KM IN MUTHIRAPUZHA

A. NEW PROPOSAL S FOR HYDROELECTRIC PROJECT BY KSEB

As the present hydroelectric projects run by KSEB is not tap full hudroelectric potential in Muthirapuzha basin , some new proposals to install hydroelectric schemes are on investigation stage. As mentioned earlier in this sub basin only two cascade dams are functioning which have limited storage ascompared to the heavy inflow from the catchment. From the downstream of Mattupetty dam free catchment with high intense rain fall contributing the major part of run off to Muthirapuzha and finally to Periyar. In view of effective utilization of water sources to power generation further storage to construct in the free catchment portion is essential. These storage structures can reduce the flood intensity in the lower reaches of Periyar. M/S KSEB LTD is now on the way of investigation to implement two hydewl project. One is in Kundala river downstream of Mattupetty Dam near Grahmsland and the other one is in Lekshmi stream known as Sevenmalai thodu . The salient features in the proposal are.

Propose Hydel projects by KSEB in Muthirappuzha Sub basin.

1. SALIENT FEATURES(GRAHAMSLAND Scheme)

Location

State : Kerala
District : Idukki
Taluk : Devikulam
Gramma Panchayth : Devikulam
Access by road : 4km away from Munnar town on Devikulm road near Grahms Land
Nearest Railway station : Aluva
Nearest Airport : Kochi
Geographical co-ordinates (DAM)
Latitude :10*18*45 N
Longitude :76*38*10* E

Hydrology

River : Maduppettiyar
Basin Periyar
Total catchment area of river above Grahams land :155sq km
Scheme Catchment area : 50 Sqkm (Grahmsland)
FRL :+1520.00
Gross storage :20mcum
Installed capacity :4 MW

2. SALIENT FEATURES (LETCHMI Scheme)

LOCATION

State Kerala
District Idukki
TalukDevikulam
GrammaPanchaythMunnar- Pallivasal
Nearest Railway station Aluva
Nearest airport Kochi
Geographical Co-ordinate
(Hand GPS- Garmin/ WGS 84 –UTM)
Dam (left bank)
Latitude 1113825 N
Longitude 724390 E
UG power house (below Nagamala Hill)
Latitude 1110780 N
Longitude 723550 E
(PES DPR)
Latitude 10*02*00 N
Longitude 77*02*30E)

Hydrology

River Letchmi
River basin Periyar
Catchment area 18Sq Km
Average annual Rain fall 3000 MM
Component Structures

Dam

Type Concrete Gravity Overflow type
FRL +1535.00
Storage 80 MCUM

FLOOD PLAIN AREAS

Our state witnessed the great flood in 2018 in this century. As mentioned in flood history of Muthirapuzha sub basin it is clearly understood that the region Munnar is high flood zone area. The wider extent of free catchment with high intense rain fall is the major reason for high magnitude run off in the river Muthirapuzha. In the subsequent flood in 2019 also Munnar region is worstly affected. The main reason in addition to the above stated is the reduction of water carrying capacity of river due to siltation, rapid urbanisation leads to illegal constructions and lack of storage structures etc. during flood comparitively low laying areas are submerged .

They are

1. Periavaria at Munnar udumalpetta road
2. Munnar town ship
3. DTPC centre portion ,Munnar
4. NH from Head works to Periavarai
5. Kunchithanni
6. Ellakkal
7. Panniyarkutty confluence

During flood the waterlevel in the locality raised than previous year level by 2.5 m to 6 m Munnar town and panniyarkutty are worstly affected during flood.

Flood prone area

Location 1 Flood plain area Panniyarkutty confluence – Muthirapuzha- Ch 26.32Km

Flood plain area Periyavrai- Muthirapuzhayar Ch 6.185 Km

Flood plain area Ellackal bridge vicinity - Muthirapuzhayar

Flood plain area Kunjithanni near Kunjithanni bridge - Muthirapuzhayar

Flood Plain area Munnar town- 6.185 Km to 13.225 Km -Muthirapuzhayar

B. DISCHARGE DETAILS OF BARRAGE/ DAM

In the assigned reach The tail race discharge from Pallivasal power house together with the runoff from free catchment and tributaries contributing discharge from Pallivasal to down stream. The water from Munnar head works which have the contribution from Madupetty reservoir is used for power generation at Pallivasal . The tail race discharge from Pallivasal together with release from Ponmudy dam and its tale race discharge is catched at Kallarkutty dam . The tale race discharge from kallarkutty is again used to power generation at Lower Periyar and released to Periyar which in turn reach bhoothathankettu. As the tale race discharge from pallivasal which is the only release from hydroelectric project and further stored in the kallarkutty reservoir with in short distance , the measuring of release from HE projects have not much implications and usally we are considering release from Lower Periyar only.

C.RAINFALL DETAILS IN THE CATCHMENT AREA

The destination Munnar is attracted by Tourist mostly due to the peculiar ecology of locations. The presence of mountains in western Ghat, the beauty of plantation, presence of hydroelectric projects and assoisiated hydel tourism, trecking, Eravikulam national park, Anamudi peak, Chinnkkanal and Anayirangal power housae water falls, Top station , Tea meseum and above all the comfortable climate. Even in summer max temperature is only to the tune of 26 degree Celsius, which make this wonderful land to the most prominent tourism location of Gods own country.Koppen-Geiger climate classification system classifies region as subtropical highlandwith monthly average temperature below 22 degree Celsius.Munnar region receive comparatively high rain fall above state normal.

Presently, there is no rain guage stations installed by IMD for assessment of rain fall intensity. So the study team adopted data of UPASI (united plantation association of South India), apex bodyof planters of tea, coffee, rubber, pepper etc in the South state. They presented data of temperature and rain fall in the region of Munnar based on the readings from the rain guage installed at Nallathanni estate .

ACTION PLAN LONG TERM-MUTHIRAPUZHA :-From the details collected in the studythe action plan to be formulated to attain the purpose of achieving room for river periyar. Such activities classified under long term plan and short term plan-

- Long term plan- Need more duration for implementation of program.
- Short term plan- Target to be achieved in short span of time before the onset of monsoon 2022

This sub head include items under long plan

Long plan items to be incorporated are rejuvenation of main stream Muthirapuzhayar from the location 6.185km to Munnar head works(13.225km), clearing obstructions at the confluence of Panniyar by excavating elevated rock mass which create obstructions and meandering flow. This activity to be implemented in a phased manner to clear the natural water way, and restoration of original river cross section to improve water holding capacity during peak monsoon so that flood damages can be considerably reduced.

Nature of work – Desiltation for removing accumulated delta from river bed in Muthirapuzhayar

Approximate quantity of desiltation 218985m3

The cut spoil of excavation to be disposed by local self-government through public auction without any loss to public exchequer.

Nature of work- Excavation of rock mass

Location 1. Up stream of Munnar Bypass bridge

2.Panniyarkutti confluence

Approximate quantity ofexcavation – 3800m3

The excavated rock is proposed to issue for department works through government agencies .

6.SHORT TERM PLAN

Under the short term plan the proposals included to rejuvenate tributaries of Muthirapuzhayar in the specified locations prior to onset of monsoon 2022.

Nature of work- Desiltation of tributaries Kundala, Nallathanni, Uppar, Chokkanadu, Colony thodu

Approximate quantity of desiltation for all tributaries above – 31274.4M3

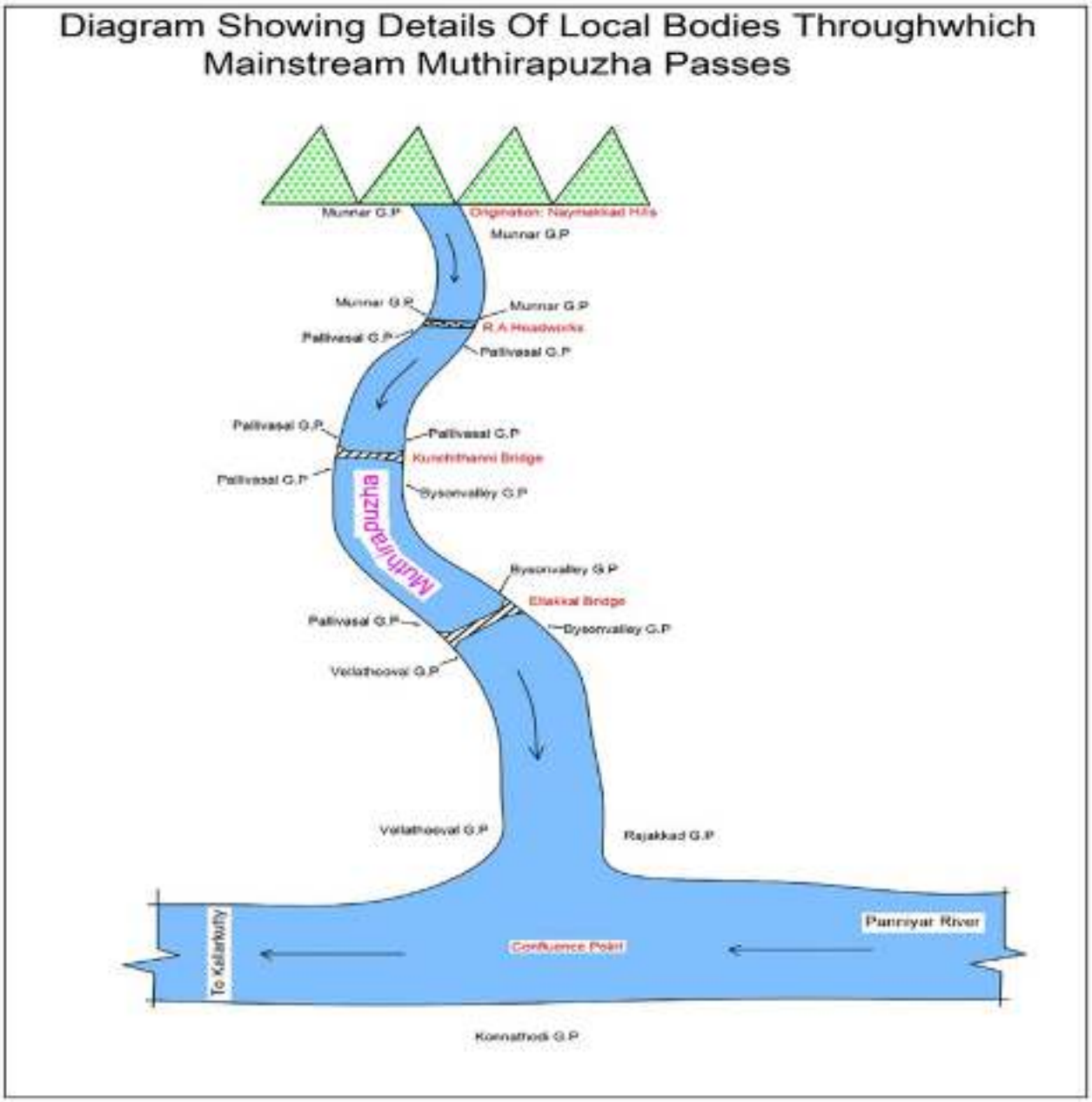
17. OBSERVATION

The study area is Muthirapuzha basin from 0.00 to 26.32 km with its tributaries. The major observations are

- The Muthirapuzha sub basin with catchment area 747 Sq.Km belongs to free Periyar catchment of area 2362Sq. Km and contributing 32% of free catchment Periyar
- The assigned reach having drainage area 336.659 Sq. Km constitute 45% of catchment of Muthirapuzha
- Out of the 336.65 Sq Km, 243.123 Sq. Km is in the downstream of Mattupetti Dam and Categorised to free catchment which is about 72% of drainage area in assigned reach. This free catchment experienced high intense rain fall and average rain fall in Munnar region as per the rain gauge data representing above area is 44.8% above state average 3000mm. This is the reason for excess runoff through Muthirapuzhayar.
- Due to the excess siltation in main stream from Periyavari to Munnar Head works water carrying capacity of river reduced and not accommodating flood water which in turn cause submergences of Munnar Township.
- The tributaries in the assigned reach need to rejuvenated.
- The constructional activities affecting ecology of Munnar and proper attention to be ensured.
- The existing storage structures (Dams of KSEB) are cascading structures only with low storage capacity. There is scope for implementation of further HE projects in free catchment zone which will enhance power production and storage. The new proposals of KSEB in Kundala river and Lakshmi thodu can serve the above purpose so that flooding possibility in Muthirapuzhayar can be minimised.
- The tourism acceleration in destination Munnar and plantation activities causing contamination and pollution of Munnar rivers. The matter to be addressed properly for the protection of the natural resources and save the environment. Coordination of various departmental agencies are inevitable to achieve the goal.

Local bodies through which main stream and tributaries passes

The Muthirapuzhayara originate from Neymakkad in Munnar Gpp and confluence with Panniyarkutty at 26.32 Km . During the traverse in the mentioned stretch ,river passes through the local bodies Viz. Pallivasal , Bysonvalley, Rajakkad, and Vellathooval as detailed below



Pambla Thodu@ Ch 140.90 Km

Pambla Thodu orginates from Mailappuzha hills and is about 9.5 km in length. It is known by the name Varikkamuthan thodu at the place of origin and 2 kms downstream it merges with Mailappuzha Thodu, there after its called by the name Mailappuzha- Vattuvampara thodu that flows downstream and emerges as the Punnayar waterfalls. Finally, the stream merges with the main course of Periyar as Pambla thodu at a chainage of 140.90 km.

PazhayarikkandamThattekaniThodu@ Ch 144.70 Km

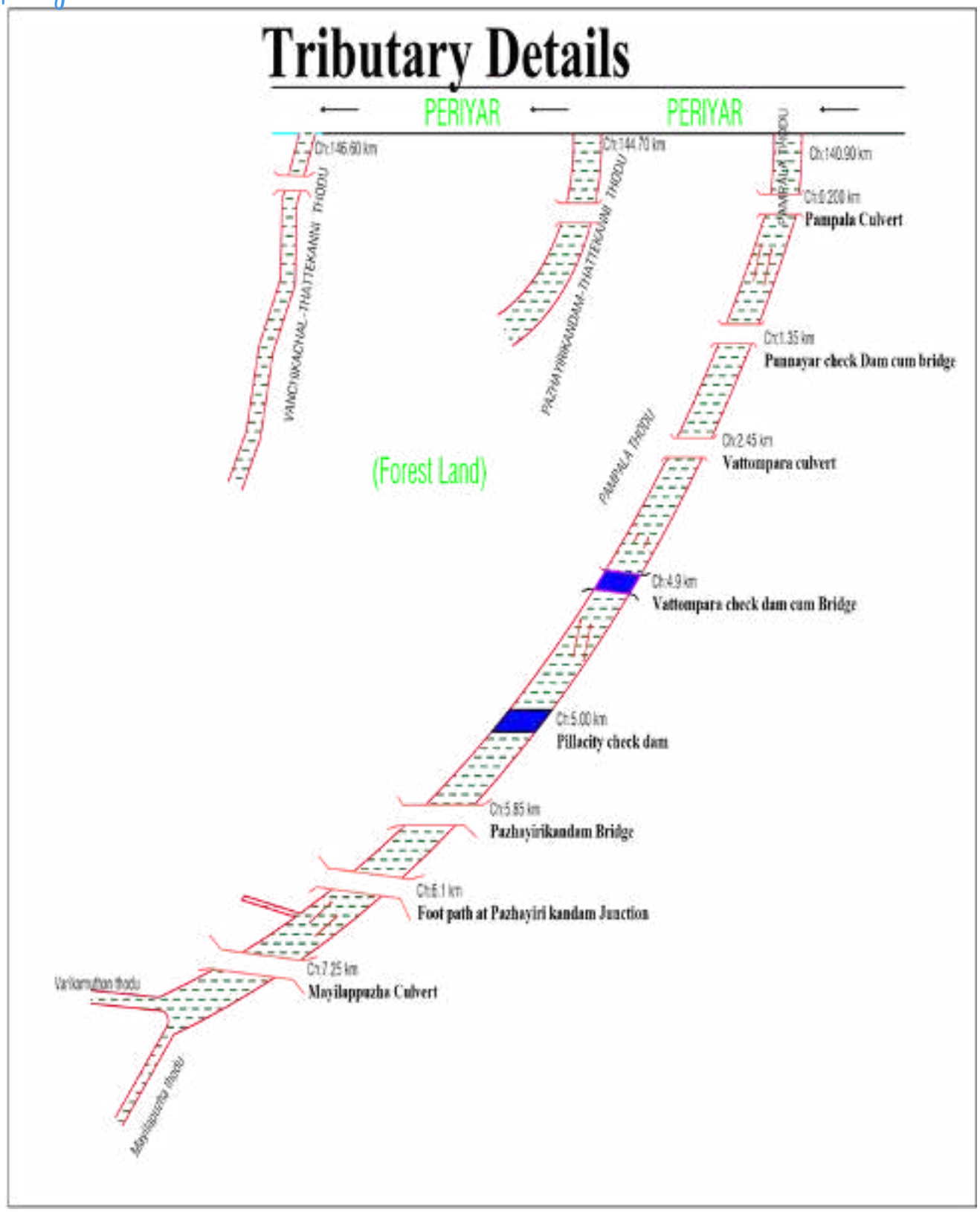
The thodu originates from forest land near Pazhayarikkandam and passing through forest and joined with Periyar river at Ch: 8.10 KM from Panamkutti bridge. The average width of thodu is 4.00m and the total length is about 2.0km. This thodu crosses Neryamangalam – Idukki road at Thattekkanni.

Vanchikkal Thattekanny Thodu@ Ch 144.70 Km

The thodu originate from forest land near Vanchikkal and passing through forest and joined with Periyar river at Ch: 10.00 KM from Panamkutti bridge. The average width of thodu is 5.00m and the total lengh is about2.5km. This thodu crosses Neryamangalam – Idukki road at Thattekanny

Tributary from Right side :

The thodu originate from forest land and passing through forest and joined with Periyar river at Ch: 15.10 KM from Panamkuttibridge near ThattekkanniPallippadi. Total lengh about 1.5km.



Structures on tributaries

Structures on Pambla thodu.

A. Mayilappuzha Culvert- The culvert located at Mayilapuzha (latitude:9.960416, longitude: 76.902075) at a chainage of 2.3 kmfrom the origin of Pambla thodu. The structure is safe and does not create any obstrutions to flow.

B. Footpath at Pazhayiri kandam Junction-

The structure is located at Pazhayirikandam junction (latitude:9.966475, longitude:76.909064) at a chainage of 3.45 KM from the origin of Pambla thodu. The right bank is protected to some extend while the left bank remains unprotected. The structure does not create any hindrance to flow of water and is a safe condition.

C. Pazhayiri kandom Bridge

The bridge at Pazhayirikandam (latitude: 9.966753, longitude: 76.911299) is located at a chainage of 3.7 km from the origin of Pambla thodu. The structure is safe and does not create any obstructions to flow. The left and right banks are protected to some extend and the right

D. Check dam near Pilla City

The check dam near Pilla city (latitude:9.968434, longitude: 76.913465) at a chainage of 4.55 Km from the origin of Pambla thodu. It spans about 14 m. The structure is nw at a safe condition and does not create any obstructions to flow.

E. Check dam across Vattompara thodu near Prabha city

The check dam is located near Prabha city ((lattitude : 9.966055, longitude: 76.919037) at a chainage of5.2 Km from origin of Pambla thodu. The banks of the thodu are protected upto a certain extend. No waste deposits are found near the reach and the structure is safe and does not create any obstructions to the flow.

F. Vattompara culvert

Vattompara culvert (lattitude : 9.9593, longitude: 76.92996) is located at a chainage of 7.1 kmfrom the origin of Pambla thodu. It spans about 10.8 m having a width of 3.2 m. The structure is at present in a safe condition and does not create any obstructions to flow.

G. Punnayar check Dam cum bridge

The Punnayar check Dam cum bridge (lattitude : 9.961724, longitude: 76.938982) is located at a chainage of 8.2 kmfrom the origin of Pambla thodu. It spans about 23 m having a width of 3.2 m. The banks are naturally protected about 60%. The U/S side of the structure has a small island formation but it does not create much hindrance to the flow of the water. The check dam cum brigde is at present in a safe condition.

H.Pambla culvert

The Pambla culvert (latitude:9.964093, longitude: 76.946577) is located at a chainage of 9.35 km from origin of Pambla thodu. The thodu flows in a steep terrain and the banks of the thodu are not at all protected.

a. Structures on Pazhayarikkamdam –Thattekkanni Tributary

I. Culvert at Thattekkanni:

There is one culvert at Thattekkanni in Pazhayarikkamdam - ThattekkanniTributary with span 4.00 m and height 2.00 m height

b. Structures on Vanchikkal – Thattekkanni Tributary

1. culvert at Thattekkanni in Vanchikkal – ThattekkanniTributary:- culvert at Thattekkanni in Vanchikkal - ThattekkanniTributary with span 5.00 m and 3.00 m height. These thods are crosses Neryamangalam – Idukki road at Thattekkanni and the culverts are in cutting so there is no obstructions to flow though it.

ABSRACTION OF WATER FROM PERIYAR RIVER

From the study of main reach of Periyar it is observed that 2 pump houses intake water directly from the main stretch of Periyar between Chappath and Ayyappankovil bridge.These are 2 pump house units of Kerala Water AuthorityOne pump house is located at Thonithady and other one is located at Upputhara town.

7.10 KWA Pump House at Thonithady

This pump house is located near Periyar river on its right bank @ chainage 98.57 Km. It is located in Ayyappankovil Panchayath. It was constructed in 1967. But the old pump house well is not used now. Another new pump house is built beside the old one. It started functioning from 2002. It is used to supply drinking water to 6 Wards of Ayyappankovil Grama Panchayath namely Aanakuzhy,village padi, Thonithady,6 acre, Marykulam and Mattukatta.

It is basically a treatment pump house and water is taken from the intake well of 40 ft depth. The waste materials are collected in a well near pump house and not disposed into the river.There are 3 shifts of pumping daily. Two pumps of 25 Hp and 20 Hp are used for pumping. It usually pumps 8 lakhs litres per day on normal condition and 10 lakhs litre per day during Summer Season This pump house is under Nedumkandam section of Painav Subdivision of KWA.

11KWA Pump House at Upputhra Town

This pump house is located near Periyar river on its left bank @ chainage 97.73 Km. It is located in Ayyappankovil Panchayath. It was constructed before 20 years. It is used to supply drinking water to Upputhara Town, Njarakunnu, Hospital Junction, 9 Acre, Sooryakanthithadi and Ambalamedu.It is basically not a treatment pump house and water is taken from the intakes and bleaching is done by adding bleaching powder in the water. So there arises no waste materials. There are 2 shifts of pumping daily. Each shift is 8 hours to pump for 16 hours daily. Around 6 lakh litres of water is pumped per day Two pumps of 30 Hp and 40 Hp are used for pumping. This pump house is under Peermade section of Peermade Subdivision of KWA

7.11 Ch 29.76Km Jalanidi openwell cum pumphouse This openwell is within KSEB catchment area and is owned by beneficiaries of Nedumkandam GP. The location of this open well is 9.82641°N, 77.16019°E

Ch 29.76Km Jalanidi openwell cum pumphouse

This openwell is within KSEB catchment area and is owned by beneficiaries of Nedumkandam GP. The location of this open well is 9.826241°N, 77.161551°E

7.13 Ch 29.76Km KWA open well cum pumphouse

The location of this open well is 9.829119°N, 77.171061°E. This open well is in Thanimoodu area of Nedumkandam Panchayath. This pumphouse provide water facility to Nedumkandam area. This pump house is under Nedumkandam section of Painav Subdivision of KWA.

7.14 Ch 29.76Km Jalanidhi open well cum pumphouse

This openwell is within KSEB catchment area and is owned by beneficiaries of Nedumkandam GP. The location of this open well is 9.827921°N, 77.173631°E near combayar confluence point.

Bed Level Crossbar near Water Authority Pumphouse – Ch.10/770 of Kattappanayar

This Water Authority Pump house situated near the banks of Kattappanayar in Kanchiyar Panchayath.

Near Water Authority Pump house – 4/850 of Idinjamala thodu

This Pump house situauted the side of Idinjamala thodu at joining point of Idinjamala thodu in Erattayar reservoir.

SILT DEPOSIT& DELTA FORMATION

The land use pattern and watershed characteristics of the Periyar River basin indicated that the deforestation of the catchment area over the years led to erosion of the soil in the upper reaches and the silt flown down settled in the lower reaches. Therefore the River bed of Periyar is silted up over the years due to lack of maintenance. In many places deltas / shoals have been developed and waterway is shrunken which are obstructing the free flow of the River which ultimately reducing the carrying capacity of the River. For flood control, the method of improving the channel by improving the hydraulic conditions of the River channels by desilting, dredging to enable the River to carry its discharges within its banks has been often advocated. Hence, over laden silt only has been recommended to be removed by dredging / desilting operations for improvement of carrying capacity of drainage channel of the River without disturbing the original River bed.

Ch. 74.91 Km: Vandiperiyar near Vandiperiyar bridge

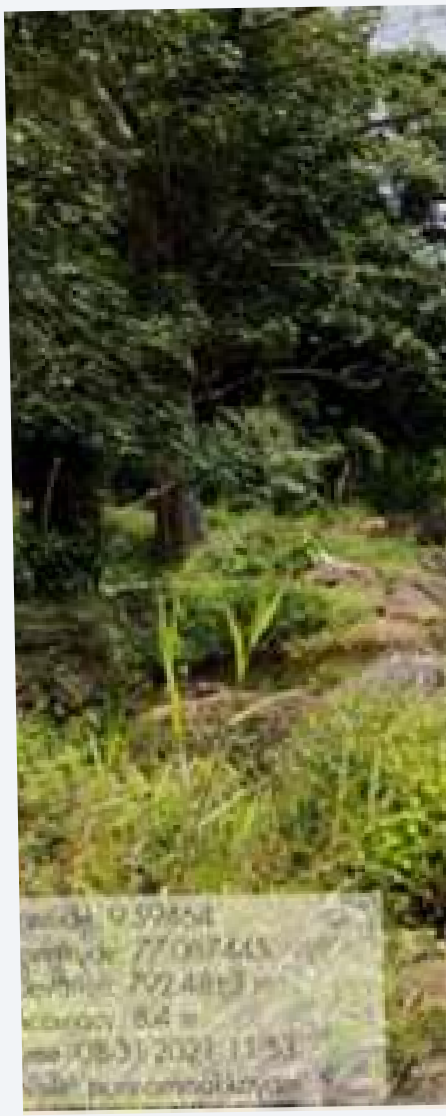
During the flood in 2018, silt deposits are formed over the rocky bed at many places in the river bed and has turned into silt islands with the growth of vegetation, shrubs etc. IT will be difficult to remove it mechanically as the depth may be varying from 100mm to 750mm depending on the rock bed profile.

Ch. 76.61 Km: Vandiperiyar near CWC Guaging station

During the flood in 2018, silt deposits are formed over the rocky bed at many places in the river bed and has turned into silt islands with the growth of vegetation, shrubs etc. Small silt deposits are formed on both sides also

Ch. 78.01 Km: Meenakshikkayam

During the flood in 2018, silt deposits are formed over the rocky bed at many places in the river bed and has turned into silt islands with the growth of vegetation, shrubs etc. IT will be difficult to remove it mechanically as the depth may be varying from 100mm to 750mm depending on the rock bed profile.



Ch. 78.91 Km:Near Kochukayam

Rocky bed are available throught this streach from Vandiperiyar bridge. In some pockets, silt deposits are formed with the growth of vegetation, shrubs etc.

Ch. 79.21 Km: Near Chandravanam

During the flood in 2018, silt deposits are formed over the rocky bed at many places in the river bed and has turned into silt islands with the growth of vegetation, shrubs etc. IT will be difficult to remove it mechanically as the depth may be varying from 100mm to 750mm depending on the rock bed profile.

CH: 81.09 km:DELTA FORMATION

The large delta formation at this portion of the river is,(1). Length - 130m, breadth - 10m, depth - 1m, (2). Length - 40m, breadth - 7m, depth - 1m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9˚61’00” N, Longitude 77˚07’16” E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private

CH: 81.95 km: DELTA FORMATION

The large delta formation at this portion of the river is,(1). Length - 70m, breadth - 15m, depth - 1m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9˚61’16” N, Longitude 77˚06’81” E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private

CH: 80.69 km: DELTA FORMATION

The large delta formation at this portion of the river is,(1). Length - 50m, breadth - 10m, depth - 1m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9˚60’72” N, Longitude 77˚07’38” E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private

CH: 81.38 km: DELTA FORMATION

The large delta formation at this portion of the river is, Length - 80m, breadth - 10m, depth - .75m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9˚61’26” N, Longitude 77˚06’99” E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private

CH: 81.46 km: DELTA FORMATION

The large delta formation at this portion of the river is, Length - 60m, breadth - 10m, depth - 1m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9°61'26" N, Longitude 77°06'97" E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private

CH: 85.27 km: DELTA FORMATION

The large delta formation at this portion of the river is, Length - 50m, breadth - 40m, depth - 1m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9°63'19" N, Longitude 77°05'08" E. Left bank protected right bank not protected. The ownership of land on left and right bank of the river at this portion is private

CH: 85.6 km: DELTA FORMATION

The large delta formation at this portion of the river is, Length - 60m, breadth - 10m, depth - 1m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9°63'15" N, Longitude 77°05'10" E. both banks are protected. The ownership of land on left and right bank of the river at this portion is private

CH: 86.84 km: DELTA FORMATION

The large delta formation at this portion of the river is, (1). Length - 70m, breadth - 30m, depth - 2m, (2). It may obstruct the smooth flow of river. Approximate composition of soil is 75% silt and 25% clay. The location of this portion is Latitude 9˚63'90" N, Longitude 77˚04'58" E. Left bank protected right bank not protected. The ownership of land on left and right bank of the river at this portion is private

8.13 CH: 86.74 km: DELTA FORMATION

The large delta formation at this portion of the river is, Length - 120m, breadth - 40m, depth - 2m, It may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9˚63'99" N, Longitude 77˚04'71" E. Left bank protected right bank not protected. The ownership of land on left and right bank of the river at this portion is private

8.15 CH: 87.20 km: DELTA FORMATION

The large delta formation at this portion of the river is, (1). Length - 45m, breadth - 15m, depth - 2m, (2). Length = 315m, Average breadth = 30m, depth =2.50m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9.640533 N, Longitude 77.043595 E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private.

8.16 CH: 87.235 km: THENGAKAL THODU JOINS TO PERIYAR RIVER

It is a small tributary of Periyar River and it begins from Thengakal bhagam. The location of the joining portion of this thodu to Periyar River is Latitude 9.640641 N, Longitude 77.043546 E. Both banks are not protected. The ownership of land on left and right bank of the thodu at this portion is private.

8.17 CH: 89.302 km: ELAPPARA VALLAKKADAVU BHAGAM

The large delta formation at this portion of the river is, (1). Length - 275m, breadth - 50m, depth – 1.50 m, (2). Length = 250m, Average breadth = 20m, depth =1.50m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. The location of this portion is Latitude 9.647504 N, Longitude 77.030801 E. Both banks are not protected. The ownership of land on left and right bank of the river at this portion is private.

8.18 CH: 93.61 km: MOONAATTUMUKKBHAGAM

The location of this portion is Latitude 9.658379 N, Longitude 77.016685 E. The delta formation at this portion of the river is, (1). R/B, Length - 265m, breadth - 50m, depth – 4.00 m, (2). R/B, Length = 200m, Average breadth = 10m, depth =3.00m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. Both banks are not protected. The ownership of land on both bank of the river is private.

8.19 CH : 94.395 km : UPSTREAM SIDE OF CHAPPATH BRIDGE

The location of this portion is Latitude 9.65911 N, Longitude 77.019293 E. The delta formation at this portion of the river is, (1). L/B, Length - 235m, breadth - 20m, depth – 2.50 m, it may obstruct the smooth flow of river. Approximate composition of soil is 80% silt and 20% clay. Both banks are not protected. The ownership of land on right bank of the river is private and left bank of the river is Tea Company.

Ch. 121.65- Cheruthoni SubmersibleBridge

During the flood in 2018, both sides in upstream of bridge severely affected when shutters of Cheruthoni dam opened. Sides of Cheruthoni – Kattappana road was washed away. Silt deposits are formed over the rocky bed at downstream of the bridge with the growth of vegetation, shrubs etc.

Cheruthoni Bridge during 2021

Ch. 125.63 – Thadiyampadu Chappath

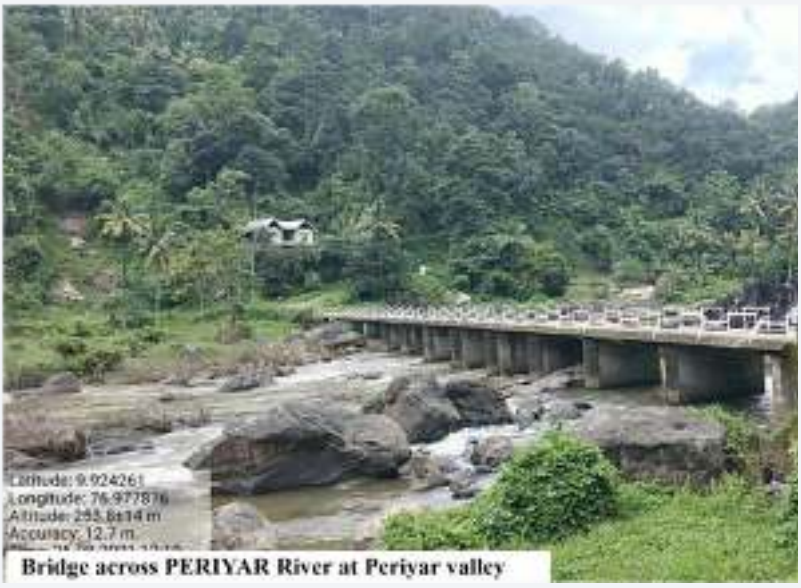
This chappath consist of three box culverts of approximate size 9.00 x 3.00 x 2.00 m. The length of chappath is 170m and width is 9.00m. Average height of chappath is 2.5m. During normal monsoon, water flows through this three culverts without submerging this chappath. But when Cheruthoni dam shutters are opened, this chappath will be submerged. This chappath was damaged during flood occurred in August 2018 and reconstructed after flood. Silt deposits are formed over the rocky bed at upstream and downstream and has turned into silt islands with the growth of vegetation, shrubs etc.

Thadiyampadu Chappath

Karimban Bridge

Ch. 128.80 – Karimban bridge

During 2018 flood, when Cheruthoni dam was opened, this was the only bridge which provided access to the both bank of Periyar. The location of this bridge is 9°53'55.86" N, 76°58'27.56" E. The silt deposited on both banks with vegetation.



Ch. 132.45 – Bridge at Periyar Valley @ ch132.45km

Rock boulders found on river bed on downstream of bridge. This should be removed for smooth flow of water.

Bridge at Erupathekkar across Kattappanayar @ Ch.6/922

This bridge is constructed across Kattappanayar at Erupathekkar in Kattappana – Kuttikanam road. Silt deposit found on downstream with vegetation.

Bridge at Anjilipalam across Kattappanayar @ Ch.8/249

The silt deposited in upstream and downstream with small vegetation. Banks are unprotected except downstream right.

Bridge near Kakkattukada across Kattappanayar @ Ch.9/957
Silt deposited on both banks upstream of bridge near Kakkkattukada

VCB near Penthacost church Labbakada across Palakada thodu – Ch.2/310

There is a VCB constructed across Palakada thodu near Penthacost church Labbakada. The VCB has three span.But two span on both sides partialy closed due to silt deposited and vegetation. Silt with vegetation on upstream and downstream of VCB

VCB near Penthacost church Palakada across Palakada thodu – Ch.3/714

Silt deposited with vegetation on both banks upstream of VCB near Penthacost church Palakada

VCB at Theesalangattpady across Idinjamala thodu – Ch.3/050

This VCB constructed across Idinjamala thodu at Theesalangattpady.Small vegetation and silt deposited on right bank

VCB across Idinjamala thodu - Ch.3/950

This VCB constructed across Idinjamala thodu.Vegetation and silt deposited on right bank

Silt deposited with vegetation on both banks at Vathalloorepady in Thankamany thodu

Pipe culvert at Parakadavu in Thodupuzha – Puliyanmala road-Ch.1/130 of Kattappana thodu

This pipe culvert is not sufficient for smooth flow of water. Now pipe is partialy filled with silt. Silt deposited on upstream with vegetation.

Culvert across Churuli thodu - Ch.3/600
Culvert across churuli thodu at Periyar valley. The Approach roads of culvert is severely damaged in last year flood. Silt deposits are formed over the rocky bed at upstream and downstream and has turned into silt islands with the growth of vegetation, shrubs etc.

Culvert across Churuli thodu at Periyar valley

Vegitation in Perijamkutty Aar at Erattayar North

Perinjamkutty Aar at Erattayar north - Ch.0/340
Perinjamkutty Aar at Erattayar North near culvert. Silt deposited with overgrown vegetation in the course.

VCB across Perinjamkutty Aar at Ettakkanam - Ch.3/740 VCB across Perinjamkutty Aar at Ettakkanam. Wing walls of VCB are damaged in the 2019 flood. The silt deposited in upstream of VCB about 1.00m depth or more with vegetation.

VCB across Perijamkutty Aar at Ettakkanam

Silt deposit and Vegitation in Perijamkutti Aar at Kattyamalapadi

Perinjamkutty Aar at Kattyamala padi- Ch.10/700 Silt deposits are formed over the rocky bed and has turned into silt islands with the growth of vegetation, shrubs etc.

Silt deposited on main river @ch 147.4km main river

Silt deposited on mainriver@148km

Silt deposit at pazhayari culvert

35
system in lower periyar dam

ASSESSMENT OF APPROXIMATE QUANTITY OF SILT DEPOSITED *Refer , Pg:1392, 1407)*

Main/Tributary/Sub Tributary	Banks	Name of River/ Tributary	Chainage	Approx. Qty of Sedimentation in M3
MAIN		Periyar	66.40km to 75.00km	3872
Tributary	L/B	GaviThodu		forest
Tributary	L/B	Vallakkadavupoabs Estate Thodu		150
Tributary	L/B	KocokkadThodu		100
Tributary	R/B	HpcThodu		200
Tributary	R/B	InjakkaduThodu		150
Tributary	L/B	Aranakkal Estate Thodu		180
Tributary	L/B	VandiperiyarSthramThodu		100
Sub Tributary		KumilyThodu		150
MAIN		Periyar	80.69km to 94.395km	148780
MAIN		Periyar	119.90km to 136.40km	219400
Tributary	R/B	Vellilamkandam Thodu		1200
	R/B	Mattapilly thodu		900
Tributary	R/B	Murikkattukdi thodu		700
	R/B	Kozhimala thodu		950
	R/B	Palakada thodu		1500
	R/B	Kattappanayar		5000
Sub-Tributary	R/B	1.Kattappana Thodu		2000
	R/B	2.Valiyakandam Thodu		2500
Tributary	R/B	Erattayar River		2000
Sub-Tributary	R/B	1.Mannakudi Thodu		1200
	R/B	2.Uppukandam Thodu		1800
Tributary	R/B	Thankamany Thodu		3000
Sub-Tributary	R/B	1. Nellipara Thodu		2300
Tributary	R/B	Idinjamala Thodu		1000
Tributary	R/B	KALLAR PUZHA		26600
Sub-Tributary	R/B	Puspakandom Ramakkalmedu thodu		7100
	L/B	Alliyar		4200
	R/B	Compayar		13860
	L/B	Balagram -Puliyanmala THodu		2640
Tributary	R/B	Narakakkanam Thodu		900
Tributary	R/B	Cheruthoni- jilla Asupathri thodu		840
	R/B	Nayarupara Thodu		500
Tributary	R/B	Mariyapuram Thodu		2550
	R/B	Peppara Thodu		4200
Tributary	R/B	Vazhathoppe Pallithazham thodu		900
	R/B	Palkulamedu- Asoka jn, thodu		3840
Tributary	R/B	Vimalagirithodu		4310
Tributary	R/B	Upputhodu thodu		nil
Tributary	L/B	Churuli Thodu		1500
Tributary	L/B	Keerithodu Thodu		nil
Tributary	R/B	Perinjamkutty Aar		51117
Tributary	L/B	Pakuthippalam Thodu		nil
Tributary	L/B	Muthirappuzha		221185
Sub Tributary				37874
MAIN		Periyar	136.40km to 154.40km	5745

Recommendations& Suggestions

1. As the silt deposit and vegetation growth in the silt islands are on the natural rock bed in some points, it may not be possible to remove these, by way of mechanical means. As the depth of silt deposit is less, MGNREGS workers may be deployed to clear the vegetation and silt on the rock bed. The vegetations on the banks of the river may also be removed by the MGNREGS workers. At some spots Delta formation is in more thickness and shpuld beremoved for the smooth flow of flood water. Some points are of rock boulders of medium size and may be removed for smooth flow.

2. It is advisable to demarcate the boundary of Government revenue land on both the sides of the river and the thodu to avoid the encroachment on the banks.

3. Based on the information from the local people, it is known that the presence of fish in the river has drastically decreased and many natural fish species has become extinct in these areas. This may be due to the excessive use of pesticides which are being used in tea, coffee and pepper plantations and also due to the improper disposal of the same. Hence, awareness camps in this regard may be conducted for the plantation workers and also necessary steps may be taken by the concerned department to recover the lost fish species and its natural habitual environment.

4. There is extensive encroachments and pollution in the Chottupaara thodu and Elappara thodu which are passing through the market places. An action plan is to be prepared to evict the encroachments and to reduce pollution.

5.Proposal for de siltation at the reaches of silt deposits as built up of silt will lead to a reduction in water depth of the watercourse, increased risk of flooding, the release of nasty smelling odours from the process of biological decomposition and potentially the loss of the watercourse. Silt removal is necessary when the breakdown of dead plant leaves and other organic material along with runoff from surrounding fields causes a build up on the bed of a thodu. This can have serious consequences on the future of the water and the life there is within it.

The major observations in the Main tributary Muthirapuzha are:-

• The Muthirapuzha sub basin with catchment area 747 Sq.Km belongs to free Periyar catchment of area 2362Sq. Km and contributing 32% of free catchment Periyar

• The assigned reach having drainage area 336.659 Sq. Km constitute 45% of catchment of Muthirapuzha

• Out of the 336.65 Sq Km, 243.123 Sq. Km is in the downstream of Mattupetti Dam and Categorised to free catchment which is about 72% of drainage area in assigned reach. This free catchment experienced high intense rain fall and average rain fall in Munnar region as per the rain gauge data representing above area is 44.8% above state average 3000mm. This is the reason for excess runoff through Muthirapuzhayar.

• Due to the excess siltation in main stream from Periyavari to Munnar Head works water carrying capacity of river reduced and not accommodating flood water which in turn cause submergences of Munnar Township.

• The tributaries in the assigned reach need to rejuvenated.

• The constructional activities affecting ecology of Munnar and proper attention to be ensured.

• The existing storage structures (Dams of KSEB) are cascading structures only with low storage capacity. There is scope for implementation of further HE projects in free catchment zone which will enhance power production and storage. The new proposals of KSEB in Kundala river and Lakshmi thodu can serve the above purpose so that flooding possibility in Muthirapuzhayar can be minimised.

• The tourism acceleration in destination Munnar and plantation activities causing contamination and pollution of Munnar rivers. The matter to be addressed properly for the protection of the natural resources and save the environment. Coordination of various departmental agencies are inevitable to achieve the goal.

LongTerm &Short Term Action PlanFrom the details collected in the study the action plan to be formulated to attain the purpose of achieving room for river periyar. Such activities classified under long term plan and short term plan-

• Long term plan- Need more duration for implementation of program.

Long plan items to be incorporated are rejuvenation of Periyar and its tributaries and clearing obstructions by excavating elevated rock mass which create obstructions and meandering flow. This activity to be implemented in a phased manner to clear the natural water way, and restoration of original river cross section to improve water holding capacity during peak monsoon so that flood damages can be considerably reduced.

• Short term plan

Target to be achieved in short span of time before the onset of monsoon 2022

CONCLUSION

In the light of flood during 2018and in succeeding flood there is drastic changes in the river course noticed in major streams in our state. The silt accumulation, deviation of rivers path, delta formation and accumulation of bio mass etc. are the main issue which affecting the smooth flow of monsoon flood. The holding capacity of the river has been reduced and the flood prone area are considerably increased due to absence of regular cleaning of rivers .

The river basin study conducted in Periyar basin in the assigned reach of 0 to 154.40 Km and its tributaries. The study meant for identifying the flood prone area, location subjected to excessive silting, pollution and contamination in the assigned reach.

The study report recommending that de-siltation in the mentioned location is necessary to achieve the said objectives – “Create room for River” which will effectively manage flood control in the region of Periyar.

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Periyar from Karimanal to Bhoothathankettu Barrage

From Ch.154.400km To 179.550km

Brief Overview-

Periyar enters Ernakulam district at Karimanal area.The 25.15 km long reach from Karimanal bridge to Bhoothathankettu barrage is covered in this section *(Refer, Pg:1254)*. The local bodies along the banks of river in this reach are Kavalangadu , Keerampara ,Pindimana Adimaly and Kuttampuzha Grama Panchayaths .Thottiyar Hydro Electric Project construction is ongoing near Karimanal bridge. It is envisaged for generating 70MW by constructing an over flowing weir of 100 m long and 7.5 m height across Thottiyar up-stream of Valara Waterfalls and a power house near Karimanal, in the right side of Periyar at Ch: 154.400 km.

The renowned Thattekkad bird sanctuary also comes under this reach. It is located on the right bank of Periyar near Thattekkad bridge at chainage 176.13 km. Idamalayar, a major tributary of Periyar river , joins Periyar river at ch.178.33 km. Bhoothathankettu barrage is situated in Pindimana Panchayath at Ch: 179.55 km of Periyar.Periyar valley irrigation projectirrigating an area of 32,800 hectares and Idamalayar irrigation project envisaged for irrigating an area of 14,394 hectares, are the major irrigation projects which draw water from Bhoothathankettu Barrage. Bhoothathankettu Small Hydro Electric Project is an ongoing project of KSEB with an installed capacity of 24MW (3 x 8 MW - Horizontal Bulb turbines) and expected an-nual generation of 83.5 Mu utilising the water from Bhoothathankettu bar-rage.

The details regarding various structures across the river and the identified problems associated with Periyar in this reach is illustrated in the following section.

No major obstruction to the flow is noted in this reach of the river. But there exist sand deposit near Neriamangalam Bridge, near Ch: 163.000 km, in the left side of the river. The deposit is for 10 m to 30 m in width and 200 m long. The approximate quantity of deposit is estimated as 5000 m3. Here right side of the river is in forest.

MAIN STRUCTURES ACROSS PERIYAR FROM KARIMANAL TO BHOOTHATHANKETTU BARRAGE *(Refer , Pg:1447)*

1. Karimanal Bridge
2. Neendapara Suspension Bridge
3. Manianpara Suspension Bridge (Damaged)
4. Neriamangalam Arch Bridge
5. Inchattotty Hanging Bridge
6. Thattekkad bridge
7. Bhoothathankettu barrage

Karimanal Bridge

This bridge is at Ch: 154.400 km of the river with Latitude 10.0249840 N and Longitude 76.8410320E. The bridge is constructed by KSEBL under Thottiyar Hydroelectric Power Project, for access to Power House site at Karimanal. The proposed tail race of the power house is just upstream of the bridge. Total length of the bridge is 110 m.

Sand Deposit near Ch: 163.000 km

Neendapara Suspension Bridge

Neendapara steel suspension bridge at Ch: 156.420 km, is connecting left bank Neendapara with the right bank Inchapathal, which is an isolated place in the Idukki district. The bridge is located at latitude of 10.0308710N and longitude 76.8239580E. Total length of the bridge is 130 m.The suspension bridge constructed by KEL is completed in 2018. Steel wire ropes were used for construction and presently in good condition. The bridge is supposed only for the pedestrian traffic. Presently the bridge is in good condition, but regular maintenance is required to keep the bridge in the healthy condition.

Neendapara Suspension Bridge @ Ch: 156.420 km

Manianpara Suspension Bridge (Damaged)

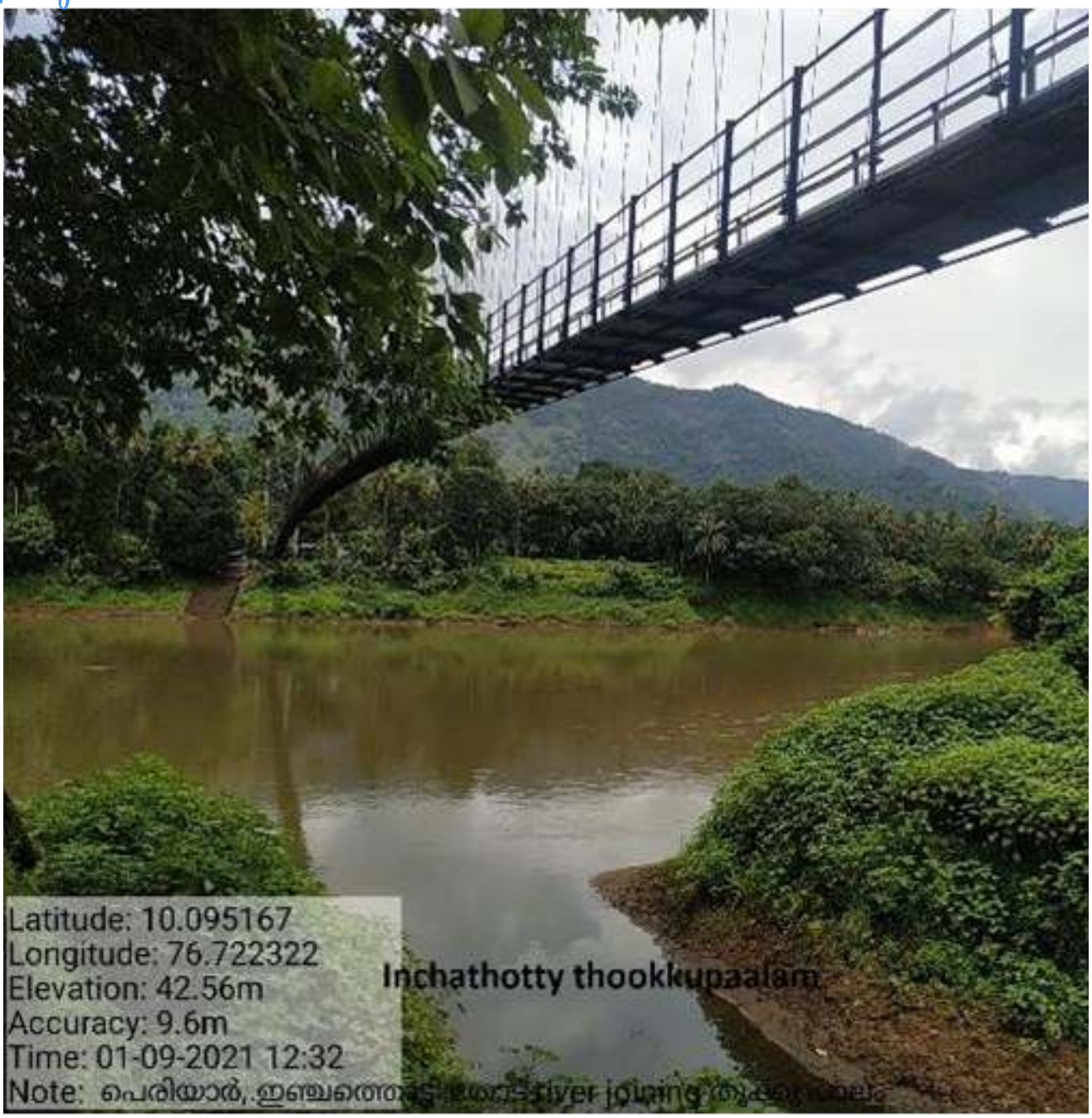
This suspension bridge at Ch: 159.800 km washed away during the 2018 flood. This bridge was a connection for pedestrians from Kanjiravelin the right bank to the Manianpara in the left bank. Both end supporting structures are available in the banks of the river.

Damaged suspension bridge at Maniyanpara near Ch: 159.800 km

Neriamangalam Arch Bridge

Neriamangalam arch bridge is located at Ch: 163.200 km with latitude 10.0585970N and longitude 76.7769760E. Neriamangalam bridge is the first arch bridge in South India.This bridge often referred as “The Gateway to the High Ranges”. The road to Munnar from Ernakulam through Thattekkad Pooyamkutty Mankulam collapsed in the 1924 flood . An alternative route was necessitated and hence this bridge construction had been started in the year 1924 by Rani Sethu Lakshmi Bhai and completed and opened to traffic by Sri Chithira Thirunal Ramavarma in the year 1935 march 2nd. The bridge is made of Surkhi, having 5 spans,4.90m width and 214 m length situated in Kochi Dhanushkodi highway(NH 85).The bridge is having an important role in the development of High Range.

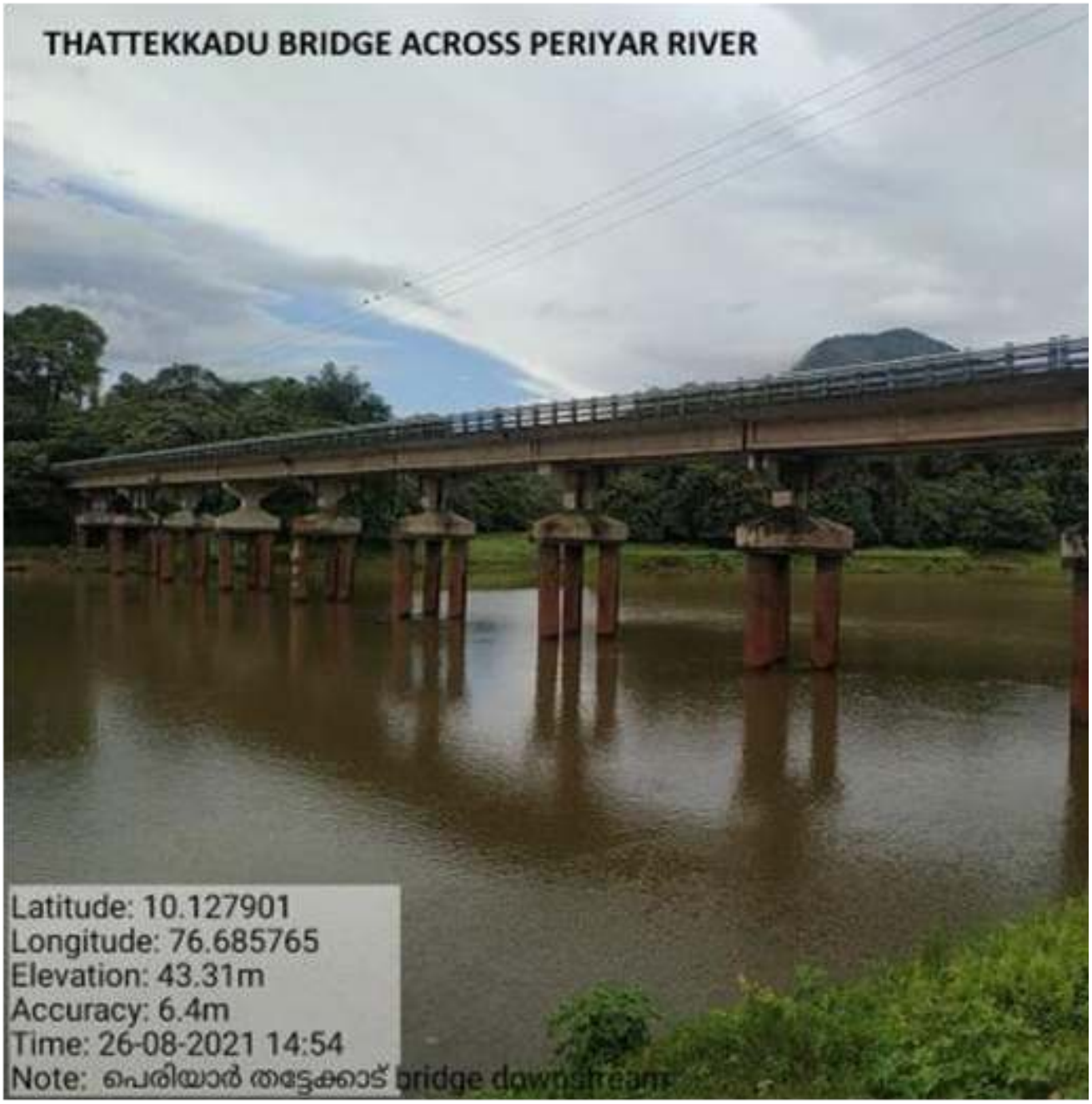
Neriamangalam Arch Bridge @ Ch: 163.200 km



Inchathotty hanging bridge

Inchathotty Hanging Bridge

Inchathottyhanging bridge at Ch:170.660km is having a length of 183m and a width of 1.2 mconnecting Kuttampuzha & Keerampara panchayaths. It is the longest suspension bridge in Kerala which is a life line of about 300 families. It is constructed by KEL in the year 2012. It is also a tourist location. Kayaking facility is also there.



Thattekkad Bridge

Thattekkad bridge at Ch: 176.130km bridge is having a total length of 186.23m (11 spans of 16.93m) & width of 10.50m. This bridge connects Keerampara and Kuttampuzha panchayath. It was constructed by PWD. Now the bridge is in good condition.

Bhoothathankettu Barrage

Bhoothathankettu Barrage is located at Ch:179.550km which is provided with 15 numbers of electrically operated framed steel shutters. Periyar valley irrigation project, Idamalayar irrigation project, Bhoothathankettu Small Hydro electric Project(upcoming) are the major projects which draw water from Bhoothathankettu Barrage. Bhoothathankettu barrage is situated in Pindimana Panchayath .The length of barrage is 210.92m.

Barrage Details

Catchment area -3048 km2

Gross storage capacity after deducting storage abstracted by Hipparagi Barrage -.60 TMC

Lowest River Bed level - +23.1 m

Full reservoir Level - +34.95m

Top level of barrage - +45.89m/44.67m

Maximum area of water spread - 16.4 Sq.km

Length of Barrage - 210.92 m

No and size of spillway crest gates-15 nos

3 nos - 9.14m x 10.36 m &12 nos - 12.19m x9.14m

Bhoothathankettu Barrage

IRRIGATION PROJECTS IN PERIYAR AND IN TRIBUTARIES

1. PERIYAR VALLEY IRRIGATION PROJECT
2. IDAMALAYAR IRRIGATION PROJECT
3. BHOOTHATHANKETTU SMALL HYDRO ELECTRIC PROJECT
4. THOTTIYAR HYDRO-ELECTRIC PROJECT

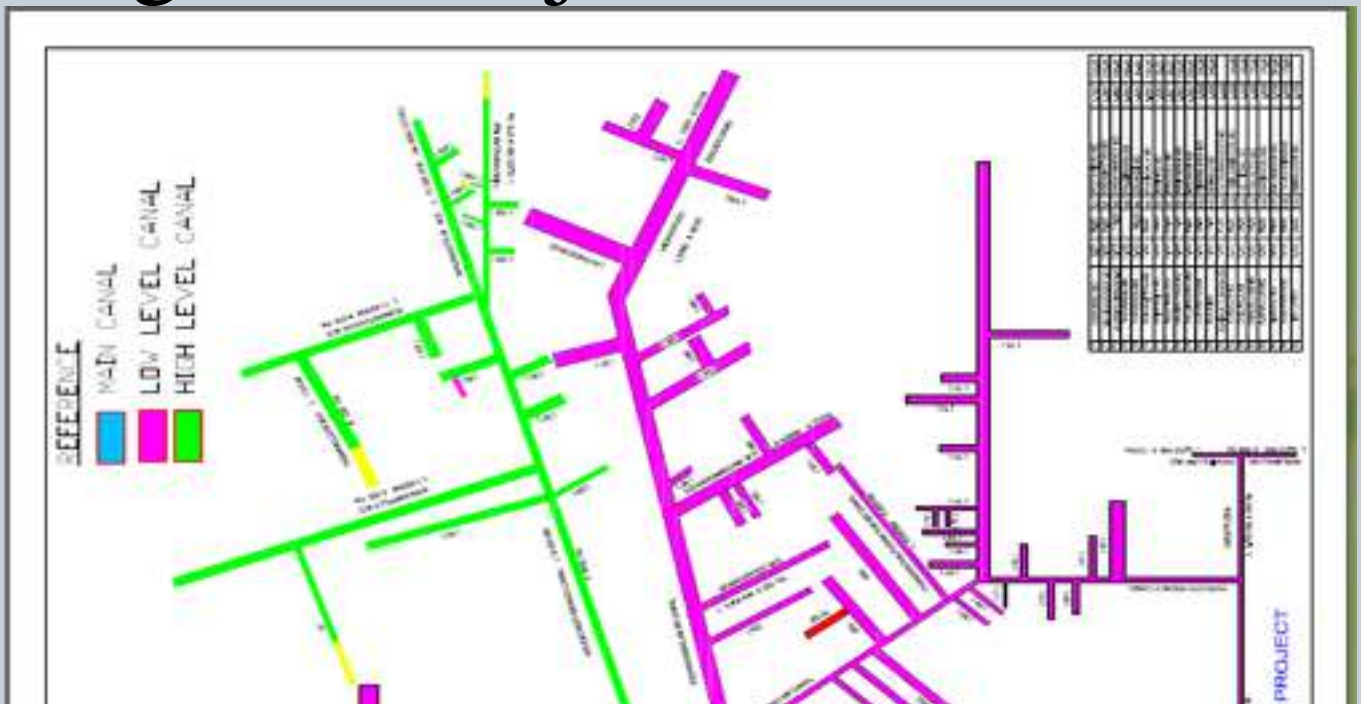
PERIYAR VALLEY IRRIGATION PROJECT

The Periyar Valley Irrigation Project is one of the major irrigation projects in Kerala situated in Ernakulam Disrict.The Periyar valley Irrigation project utilizes the tail race discharge from the Idamalayar Power house and river Periyar together run off from the uncontrolled catchment (938 sq km) of Periyar river, for irrigating an area of 32,800 hectares (81,000 acres) of land lying on the left bank of Periyar through a network of canal system and controlling devices. The scheme consists of a Barrage at Bhoothathankettu with a catchment area of 3,048 square kilometres (1,177 sq miles) along with a network of canals.

The low-level canal was commissioned in 1967 and High level Canal in 1988. The Project was declared as completed in 1992.Apart from irrigation on left bank of Periyar, the project also enables a supply of minimum quantity of water through the river to check the intrusion of salinity at lower reaches of the river as well as to meet the requirements of many lift irrigation schemes of river Periyar. Supply of water for drinking and industrial purposes are met by a portion of storage water by the barrage of Bhoothathankettu. Chengara regulator controls the water distribution.

Kothamangalam, Muvattupuzha, Kunnathunad, Aluva, Kanayannoor and Parur Taluks in Ernakulam District are the beneficiaries of the project.

Cut Off Diagram Periyar Valley Irrigation Project



PRESENT SCENARIO

For more than 52 years the Project was functioning without any major intervention. The system now needs through improvement from the source to the outlets .As the canal with bund roads traverse through developed and populated areas the proximity of people is very high when compared with other canals. This renders utility towards drinking water, domestic requirements, agriculture and industrial needs and has helped the socio-economic development of the entire district. At the same time, the accessibility of the people and animals have created lot of damages in the past period of 52 Years by way of encroachments, fishing inside canals, grazing of animals in addition to normal wear and tear. The continuous flow of water , tropical climate and soil conditions promoted growth of jungle and weeds in the wetted area of canal have damaged entire lining. The weeds and jungle regrown within one month after maintenance done will stand as a barrier against the flow of water retarding the normal velocity. The cross drainage works are also in a very pathetic condition due to weathering, flow of water consequent to disposal of wastes by the public resulting in blockage of drainages like UT, SP etc. weakening the canal profile.

Once the designed cross section of the canal is lost, water management becomes difficult. The project staff had to take much pain and strain to transmit water to the tail ends of the system and still there are a lot of complaints from the farmers and public criticism. This has necessitated the Project to be taken up under Revamping scheme.

By remoulding the canal to its originally designed regime, preventing unnecessary leakage through seepage in weak portions of canal and by repairing damaged shutters and aqueducts, a lot of water loss can be saved. Maintaining the canal bed to its original bed level with the designed bed slope will definitely ensure smooth flow of water. This will result in assured water supply to the fields and as per the demand of the farmers. Incorporating modern technologies and high yielding varieties of seeds, timely irrigation, uniformity in planting and harvesting with proper guidance from Agricultural Departments and Irrigation Department, can result in bumper crops and substantial saving in water.

It is significant that Idamalayar Irrigation Project also draw water from Bhoothathankettu Barrage through right bank of Periyar. Accordingly the demand of water for P.V.I.P , I.I.P and minimum flow is to be assured through river Periyar are to be maintained to cater the present needs. The flow through river feed the demand of water for Minor Irrigation Projects, Water Authority, Industries and also to prevent salinity intrusion. Keeping in view of all these non-comprisable water demands, the renovation of PVIP Project is inevitable and cannot be postponed under any circumstances.

Hence upkeep and maintenance of this PVIP project which caters water supply to 748 Km is to be given top priority so as to facilitate water needs for the agriculture, industrial and drinking water needs of Ernakulam District.

NECESSITY OF REVAMPING

The low-level canal was commissioned in 1967 and High level Canal in 1988. The Project was declared as completed in 1992. The project was designed to feed its complete command but it failed to irrigate the designed ayacut effectively.

The canals are severely eroded and damaged in many locations causing heavy loss of water through almost all of the filling portion of the embankment. The flood in 2018 made the situation worse. Even though adequate water is released from the barrage it does not reach the tail end and also causes water logging in the upper reaches. Due to slipping and erosion of sides, the designed cross-section of the canal has been lost there by reducing the capacity of the canal

IDAMALAYAR IRRIGATION PROJECT

The river Idamalayar is a major tributary of Periyar. Under Idamalayar Irrigation Project, the tail race discharge from the Idamalayar powerhouse is picked up at the barrage constructed across the Periyar River at Bhoothathankettu and is diverted through a canal system on the right bank of the barrage. The irrigation benefits envisaged covers an area of 14,394 hectares (35,570 acres) of wet and dry agricultural lands, out of which the cultivable command area is 13,209 hectares (32,640 acres). The project is under implementation since 1981. Itis a diversion scheme for irrigating cultivable land in Periyar Basin on right side of Periyar River in Aluva and Paravur Taluks of Ernakulnm District and Mukundapurnm Taluk of Thrissur District. It also envisages extension of irrigation on left and right bank of Chalakudy River. Now water distribution through Chalakudy left bank and right bank canals under CRDS are being done through Thumburmuzhy weir across Chalakudy river. After completing Idamalayar Irrigation Project, water from Bhoothathankettu barrage will be benefitted to Main canal. Low Level Canal and Chalakudy left Bank canal (under CRDS) through connecting Link Canal by interbasin transfer of water from Periyar basin to Chalakudy basin and hence water from Thumburmuzhi weir will be benefitting exclusively for Chalakudy Right Bank Canal. The total ayacut for irrigation aimed at by the implementation of the Project using the water of Periyar and Chalakudy Rivers is 14394 Hectares. The main source of water is Ennakkal Dam of Kerala State Electricity Board which is already completed, and the runoff from the free catchment upstream of Bhoothathankettu. Remodelling the existing left and right bank canals of the Chalakkudy River Diversion Scheme are also included in the project.
The Project started in 1981 with approved cost of Rs. 17 Crores. The project was approved by State Government for Rs. 107 Crores as per 1992 Schedule of Rates. The expenditure up to 31/03/2021 is Rs.507.99 Crores Works- 385.839 Crores & Establishment- 122.151 Crores.

Main Components of the Project

A head regulator across the main canal is the starting point. The main canal offtakes from the right side of the Bhoothathankettu barrage. Diversion of water is accomplished by means of a diversion weir of length 185m. Non-availability of sufficient quantity of water as specified in the PAP agreement there is very high scarcity of water in the canal system. This has significantly reduced the agricultural production owing to insufficient irrigation. As such, it was proposed to link the existing CRD scheme with Idamalayar Irrigation Project which abstracts water from Periyar River by linking the CRD Scheme with IIP. Water requirement of the entire left bank canal system could be met from Periyar River whereas water from Thumburmuzhy weir would benefit exclusively for the Right Bank canal system.

Idamalayar Dam

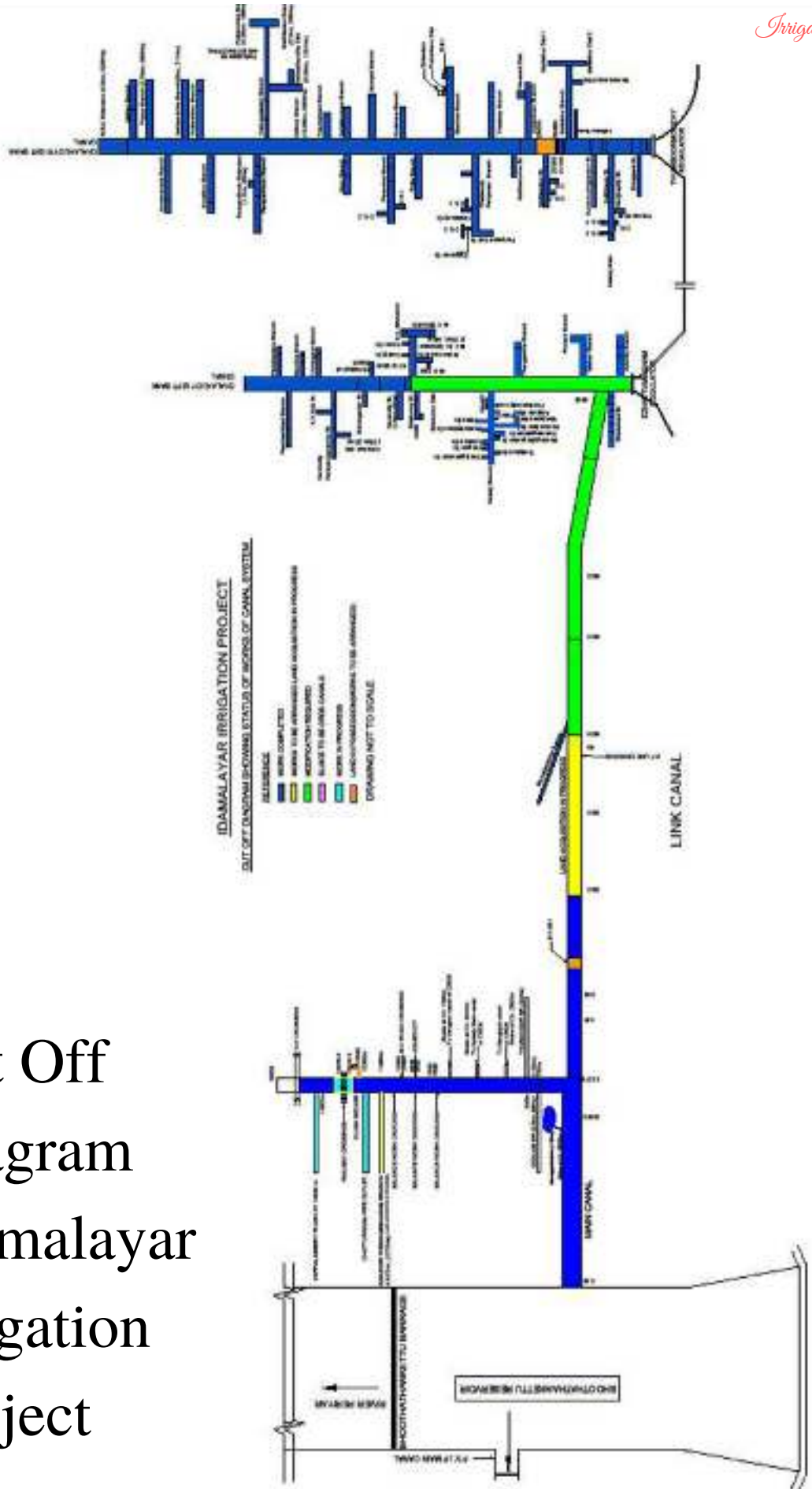
Idamalayar Dam is a multipurpose concrete gravity dam constructed across Idamalayar River, a major tributary of Periyar located at Ennakkal near Bhoothathankettu in Ernakulam district and is operated by the Kerala State Electricity Board to augment its peak power generation requirements

The reservoir storage is utilized by a hydroelectric power station which has an installed capacity of 75 MW with two units of 37.5 MW capacity, producing an annual energy output of 380 GW·h The dam is The reservoir covers 28.3 km2 in the scenic hills of the Anamalais.. The large reservoir created by the Idamalayar Dam will benefit the Idamalayar Irrigation Development Project by diverting water released from the tail race channel of the Idamalayar power station. The construction acitivites of the project were started during 1976 and then project completed in 1987.
The project envisages utilization of the water from 381 km2 of the catchment of the Idamalayar in addition to the releases from the Nirar weir/dam proposed in the upper Idamalayar catchment under the Parambikulam Aliyar Project.

Idamalayar Dam Salient Features:

Dam Name	IDAMALAYAR DAM
Name of River	Idamalayar
Dam Location	Idamalayar
Lat/|Long	100 13’18”N & 760 42’23”E.
Seismic Zone	Zone III
Year of starting dam construction	1976
Year of first impoundment	1987
Year of Commissioning of dam	
Name of immediate upstream Dam	Nil
Name of immediate downstream Dam	Periyar Barrage at Bhoothathankettu
Emergency Planning manager	Biju P N
Phone Number	9446008425
Type of dam	Concrete
Length	373 m
Maximum Height	91 m
Top Width	8.5 m
Top of dam	172 m
Drainage Area	481 km2
Spillway	
Crest Level	161 m
No of gates	4
Size	11.5 m x 9.7 m
Lower Level Outlet	
Nos	2
Size	1.5 m
Elevation	103.5 m
Reservoir	
Full Reservoir Level	169 m
Gross Storage	1089 Mm3
Reservoir Spread Area at FRL	28.3 Km2

Idamalayar Dam



Cut Off Diagram Idamalayar Irrigation Project

BHOOTHATHANKETTU SMALL HYDRO ELECTRIC PROJECT

Bhoothathankettu small hydro electric Project is an ongoing project of KSEB with an installed capacity of 24MW (3 x 8 MW - Horizontal Bulb turbines) and expected annual generation of 83.5 Mu. It is located at Bhoothathankettu in Kuttampuzha Grama Panchayath in Kothamangalam Taluk of Ernakulam District. The proposed power house site is very close to the Periyar Valley Irrigation Project Barrage. This Project proposes to utilize the water from Bhoothathankettu irrigation barrage, which is the part of Periyar Valley Irrigation Project. The inflow to the reservoir is the controlled release from the power stations upstream and water from its own free catchment. The scheme is planned as a run off the river scheme utilizing the storage of the existing reservoir of the Periyar Valley Irrigation Project less its irrigation releases. The total catchment area of the scheme is 2122 km2.

INTAKE

Location	:	Right Bank of Bhoothathankettu barrage
Type	:	Flume
POWER CHANNEL	:	
Type	:	Reinforced Concrete Lined
Inside Width	:	28.00m
Bed slope	:	1 in 2000
Shape	:	Rectangular
Normal Depth of Water	:	5.50m
FRL of canal	:	+34.95m
Inlet Sill Level of canal at intake gate	:	+29.45m
Maximum Design Discharge (15% over load) for 3 units	:	404 m3/sec
Maximum Velocity	:	2.623 m/sec
Total length of Canal up to trash track	:	300.00m

TRASH RACK

Type	:	Straight type
Type of raking	:	Mechanical raking

POWER HOUSE

Location	:	Right bank of river
Central line of machine	:	18.25m
Size of Power House	:	56.5m x 25.50m
Maximum gross head	:	11.95m
Design Head	:	8.54m.
Design discharge / Unit	:	117.10m3/sec.
Installed Capacity	:	24.0 MW
No. of units	:	3 x 8 MW
Type of Turbine	:	Bulb Turbine (Horizontal)
No. of Intake gates of PH	:	3 nos.
No. of Draft Tube gates	:	3 nos.

TAIL RACE CHANNEL

Length	:	50.00 m
Width	:	41.00 m
Tail race pool	:	34.5 m x 42.3 m
Tail Race Weir crest level	:	+22.91 m
Minimum discharge over weir	:	31.26m3/sec
Head over crest	:	0.60m
Minimum Tail Water level	:	+23.51m
Maximum discharge over weir	:	343.893m3/sec
Head over crest	:	2.67m

Maximum TW level for full generation	:	+25.58m
High flood level	:	+34.00m
Bed level of river at confluence	:	+22.00 m
Normal water level at river	:	22.50m

SWITCH YARD

Switch yard size	:	56m x 52m
Annual energy generation	:	83.50 Mu

THOTTIYAR HYDRO-ELECTRIC PROJECT

The construction of Thottiyar Hydro Electric project is in progress. The project is envisaged for generating 70MW by constructing an over flowing weir of 100 m long and 7.5 m height across Thottiyar at Ch: 16.150 km, upstream of Valara Waterfalls and a power house near Karimanal, in the right side of Periyar at Ch: 154.400 km. Water from the check dam brought in to the power house through penstock to run three Pelton wheel type turbines to generate a total power of 70 MW. The gross capacity of the reservoir planned is 0.394Mm3. The total area sunken due to the project is 0.1323 km2 (13.23 ha) at FRL. The project is envisaged to generate power during the Monsoon and keeping the normal flow to downstream of Thottiyar during all seasons.

Power House -Bhoothathankettu small hydro electric Project

Salient Features:

(i) Concrete Gravity Ogee Weir

(ii) Latitude : 10.0366670 N

(iii) Longitude : 70.8466670 E :

(iv) Length of over flow portion : 100m

(v) Base width @ bed level : 8.068m

(vi) FRL : +520 m

(vii) Crest level : +520 m

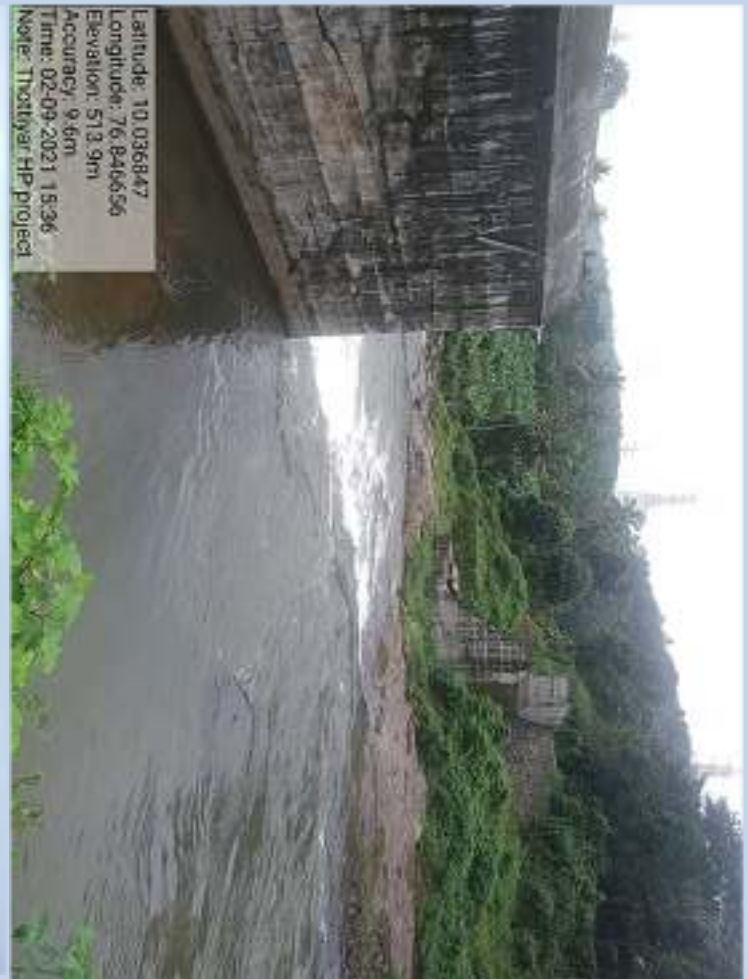
(viii) MDDL : +516 m

(ix) Design discharge of intake : 18.22 cumecs

(x) Design flood discharge : 500 cumecs

Thottiyar HEP - Check dam (under construction) downstream view

Thottiyar HEP - Check dam (under construction) upstream view



Thottiyar HE Project – Intake structure (under construction)

Thottiyar HE Project – Power House @ Ch: 154.400 km of Periyar

TRIBUTARIES OF PERIYAR FROM KARIMANAL TO BHOOTHATHANKETTU BARRAGE

In this area,8 tributaries are joining from right side of river and 17 tributaries are joining from left side of river. Out of these, major tributaries are Idamalayar, Thottiyar and Kambline thodu

Sl. No.	Name of Tributaries	Average width (m)	Length (Km)	Chainage of confluence (Km)
	Tributaries on right side of Periyar			
1	Inchapathal thookku palam thodu	4 to 6	0.32	156.8
2	Inchapathal thodu	4 to 4.9	0.19	157.31
3	Thottiyar	6.5 to 120	24.962	159.9
4	Kambiline Thodu	3 to 16	4.51	162.9
5	Chaarupaara Kadavu thodu	3	500 m	164.8
6	Avolichal kadavu opposite thodu	3 to 4	356 m	167.7
7	Inchathotty post office thodu	4 to 5	890 m	167.5
8	Idamalayar	90 to 100		178.33
	Tributaries on left side of Periyar			
1	RSP kunnu thodu	4 to 5	0.516	154.73
2	Neendapara vayanasalappady thodu	3 to 5	0.45	155.4
3	Chembankuzhy thodu	6 to 8	0.82	158.3
4	Manianpara thodu	4 to 5	0.18	159.8
5	Neriamangalam colony thodu	4 to 15	0.398	161.2
6	Neriamangalam krishi bhavan thodu	3.2	0.213 m	164.2
7	Manimaruthumchal thodu	3	0.575 m	165.95
8	Pothupara thodu	7.7	0.356 m	166.6
9	Avolichal thodu	3.2 to 4.6	0.350 m	167.6
10	Chaarupara valiya thodu	4.2 to 8.6	0.420 m	168.6
11	Chaarupaara Kadavu thodu	3.2 to 5.6	0.420 m	169.5
12	Inchathotty thodu	3.2 to 5.6	0.450 m	170.7
13	Cheekkodu thodu -3	3.5 to 4.8	1.050 m	171.5
14	Cheekkodu thodu – 1 & 2	3.5 to 4.8	0.620 m	172.2
15	Palamattom thodu	4.6 to 8	1.170 m	173.5
16	Quarry thodu	4 to 5	1.170 m	174.25
17	Nadukaani thodu(koorukulam thodu)	5.6 to 8.7	1.090 m	175.25

TRIBUTARIES FROM RIGHT SIDE OF PERIYAR

Inchapathal thookku palam thodu

This thodu has a length of 0.320 km with one sub-tributary having length of 0.100 km and joints at Ch: 0.103 from left side. This stream joins Periyar at Ch: 156.800 km from right side.

Inchapathal thodu

Inchapathal thodu has a length of 0.190 km and joins Periyar atat Ch: 157.310 km from right side. There exists one bridge across the thodu.

Thottiyar (Deviyar)

Thottiyar which also known as Deviyar starts from the Western Ghats near Adimali and it joins Periyar at Ch: 159.900 km near Kanjiraveli. There is a Devi temple in the Island near 10th mile in Adimali Grama Panchayath. Thus this tributary also known locally as Deviyar. This tributary has a total length of 24.962 km from Adimali. Polinjapalam thodu and Padikappu thodu are the main sub-tributaries of Thottiyar. There exists 24 Bridges, 2 VCBs, 3 Check dams across this tributary. All the structures except one foot bridge near Ch: 9.945 km and one chappathu near Ch: 13.068 km connecting to Devi temple, are in good condition. The foot bridge near Ch: 9.945 km near 14th mile in Adimali Grama Panchayath, damaged in the flood of 2018. Two spans were washed away. Now the local people use a wooden foot bridge to cross Thottiyar.

Thottiyar origin view from Adimaly town

Damaged foot bridge near Ch: 9.945 km

Damaged Chappathu to Devi temple @ Ch: 13.068 km

Valara water falls near Ch: 18.00 km

Chiappara waterfalls near Ch: 19.400 km

Under Thottiyar Hydro-Electric Project, check dam construction is in progress near Valara. Valara waterfalls is also in this main stream. Chiappara waterfall is in the sub-tributary which meets the main stream near Ch: 19.400 km. These waterfalls are the main tourist attractions in this area. After Valara waterfalls Thottiyar passes through thick forest up to Ch: 24.000 km near Kanjiraveli area.

Concrete Bridge at Irumbupalam @ Ch:4.850 km

Sub-tributaries of Thottiyar

a)Polinjapalam thodu

The sub-tributary Polinjapalam thodu which starts near Polinjapalam area in South –East side Adimaly. It joins Thottiyar near Camco Junction at Ch: 1.600 km and has a length of 2.850 km from Polinjapalam. This thodu has a width of 3 m to 5m. In this stream there are 3 bridges and are in good condition. One small sub-tributary join with the Polinjapalam thodu near Ch: 0.100 km

Padikappu thodu confluence with Thottiyar @ Ch: 11.000 km

b)Padikappu thodu

Padikappu thodu starts in forest of Kattumudy area. This stream joins Tottiyar near Irumbupalam at Ch: 11.000 km and has a length of 4.960 km. There are 11 bridges, 2 check dams and 1 VCB across this stream and all are in good condition.

Kambiline Thodu

Kambiline thodu starts in forest in the western side of Mamalakkandom and joins Periyar riverat Ch: 162.900 km. This stream is of 4.510 km length with 4 small sub-tributaries joining the stream. There are 4 bridges in the stream and are in good condition.

Chaarupaara Kadavu Thodu

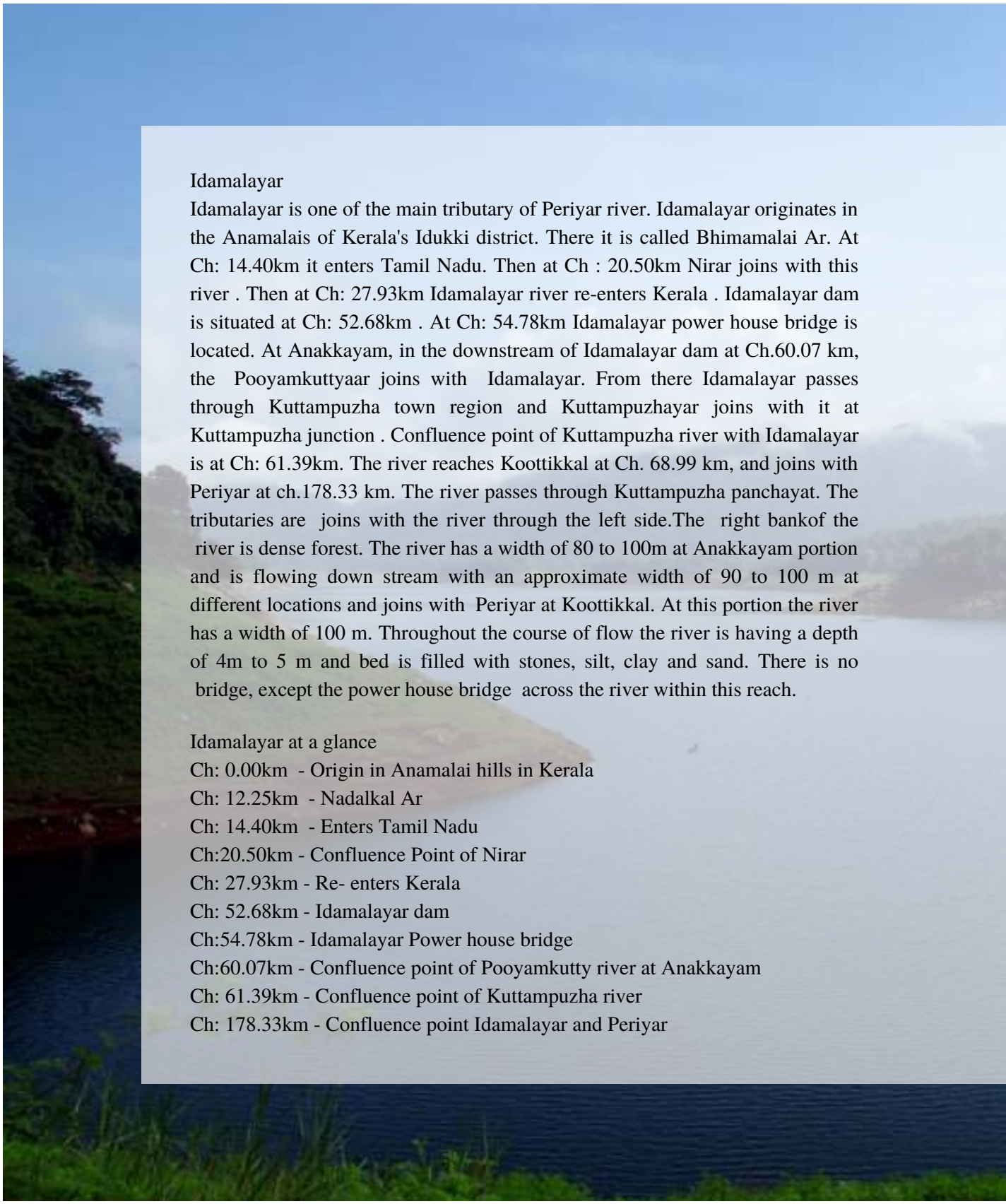
This thodu originates from the right side forest of Inchathotty hills, and flows for a length of 304m and joinsPeriyar at ch, 164.80 km . The thodu has a width4 mand bank height of 3 m and is filled with sand, and clay at various points. Some portions of the thodu is covered with thick vegetation. A culvert is seen at ch. 115 m which is in good condition.

Avolichal Kadavu Opposite Thodu

This thodu originates from the right side forest of Inchathotty hills, and flows for a length of 356m and joins Periyar at ch, 166.70 km . The thodu has an average of width8 m and bank height 2 m and is filled with rock, stone, silt, and clay at various points. Some portions of the thodu is filled with vegetation. A culvert is seen at ch. 116 m which is in good condition.

Inchathotty Post Office Thodu

This thodu originates from the right side forest of Inchathotty hills, and flows for a length of 897 m and joinsPeriyar at ch, 167.50 km. The thodu has a varying width from 4 m to 5 m and bank height 2 m to 1.5 m height and is filled with rock, stone, laterite, silt, and clay at various points. Some portions of the thodu is filled with vegetation. A small bridge is.seen at ch. 504 m which is in good condition



Idamalayar

Idamalayar is one of the main tributary of Periyar river. Idamalayar originates in the Anamalais of Kerala's Idukki district. There it is called Bhimamalai Ar. At Ch: 14.40km it enters Tamil Nadu. Then at Ch : 20.50km Nirar joins with this river . Then at Ch: 27.93km Idamalayar river re-enters Kerala . Idamalayar dam is situated at Ch: 52.68km . At Ch: 54.78km Idamalayar power house bridge is located. At Anakkayam, in the downstream of Idamalayar dam at Ch.60.07 km, the Pooyamkuttyaar joins with Idamalayar. From there Idamalayar passes through Kuttampuzha town region and Kuttampuzhayar joins with it at Kuttampuzha junction . Confluence point of Kuttampuzha river with Idamalayar is at Ch: 61.39km. The river reaches Koottikkal at Ch. 68.99 km, and joins with Periyar at ch.178.33 km. The river passes through Kuttampuzha panchayat. The tributaries are joins with the river through the left side.The right bankof the river is dense forest. The river has a width of 80 to 100m at Anakkayam portion and is flowing down stream with an approximate width of 90 to 100 m at different locations and joins with Periyar at Koottikkal. At this portion the river has a width of 100 m. Throughout the course of flow the river is having a depth of 4m to 5 m and bed is filled with stones, silt, clay and sand. There is no bridge, except the power house bridge across the river within this reach.

Idamalayar at a glance

Ch: 0.00km - Origin in Anamalai hills in Kerala
Ch: 12.25km - Nadalkal Ar
Ch: 14.40km - Enters Tamil Nadu
Ch:20.50km - Confluence Point of Nirar
Ch: 27.93km - Re- enters Kerala
Ch: 52.68km - Idamalayar dam
Ch:54.78km - Idamalayar Power house bridge
Ch:60.07km - Confluence point of Pooyamkutty river at Anakkayam
Ch: 61.39km - Confluence point of Kuttampuzha river
Ch: 178.33km - Confluence point Idamalayar and Periyar

Details of tributaries of Idamalayar

In this area, 2 major tributaries are joining from the right side of the river and 8 other tributaries are joining from the left side of the river. Out of these, major tributaries are Nadalkalaar, Nirar, Pooyamkuttyaar and Kuttampuzhaaar

Sl. No.	Name of Tributaries	Average width (m)	Length (Km)	Chainage of confluence (Km)
	Tributaries on right side of Idamalayar			
1	Nadalkal Ar	20 to 30	12.6	12.25
2	Nirar	20 to 25	24.7	20.5
	Tributaries on left side of Idamalayar			
3	Tributary 1 from forest	4 to 10	1.09	56.11
4	Tributary 2 from forest	12 to 22	1.09	56.91
5	Pooyamkuttyaar	80 to 100	6.3	60.07
6	Kuttampuzha aar	5 to 15	10	61.39
7	Koottambara thodu	8 to 10	1.508	61.801
8	Arambankudy thodu	5	0.482	63.661
9	Vengassery thodu	5	0.599	65.027
10	Aliyarpady thodu	3 to 5	0.762	66.527

Ch: 0.00km

Idamalayar originates in the Anamalais of Kerala's Idukki district at Lat 10.23065 and Long 77.05916 . There it is called Bhimamalai Ar.

Ch: 12.25km

Nadalkal Ar having a total length of 12.600 km also originates from Anamudi hills and joins Bhimamalai at Ch 12.25 km just before Kerala – Tamilnadu border at Lat 10.21396 and Long 76.99723. The width of the stream at this chainage is 48.00m.

Nirar having a total length of 24.700 km joins Idamalayar at chainage 20.50 at Lat 10.237195, Long 76.947259. The width of the stream at this chainage is 30.00m. The banks of the river is a layer of rock overburdens with hard soil strata .

Ch: 52.68km

Idamalayar dam comes at the Ch: 52.68 km. Idamalayar Dam is a multipurpose concrete gravity dam located at Ennakkal near Bhoothathankettu in Ernakulam district and is operated by the Kerala State Electricity Board to augment its peak power generation requirements. The dam is located 81 kilometres from Ernakulam in Ernakulam district and 10–12 kilometres from the Bhoothathankettu barrage. Geographical coordinates of dam location are Lat 10.222091 & Long 76.706391.

The reservoir storage is utilized by a hydroelectric power station which has an installed capacity of 75 MW with two units of 37.5 MW capacity, producing an annual energy output of 380 GW•h

The dam is constructed across Idamalayar River, a tributary of Periyar The reservoir covers 28.3 km2 in the scenic hills of the Anamalais.. The large reservoir created by the Idamalayar Dam will benefit the Idamalayar Irrigation Development Project by diverting water released from the tail race channel of the Idamalayar power station. The construction acitivites of the project were started during 1976 and then project completed in 1987.

The project envisages utilization of the water from 381 km2 of the catchment of the Idamalayar in addition to the releases from the Nirar weir/dam proposed in the upper Idamalayar catchment under the Parambikulam Aliyar Project.

Ch: 54.78km

Idamalayar power house bridge comes at chainage 54.78 and at Lat 10.205320, Long- 76.713487. The width of the stream at this chainage is 98.00m. The banks of the river is a layer of rock overburdened with hard soil strata.

Ch: 56.110km

At downstream of Power house bridge at chainage 56.110 km , a tributary joins Idamalayar from left side at Lat 10.190723, Long 76.724819 . The width of the stream at this chainage is 4 to 10 m. The banks of the river is a layer of rock overburdens with hard soil strata.

Ch: 56.910 km

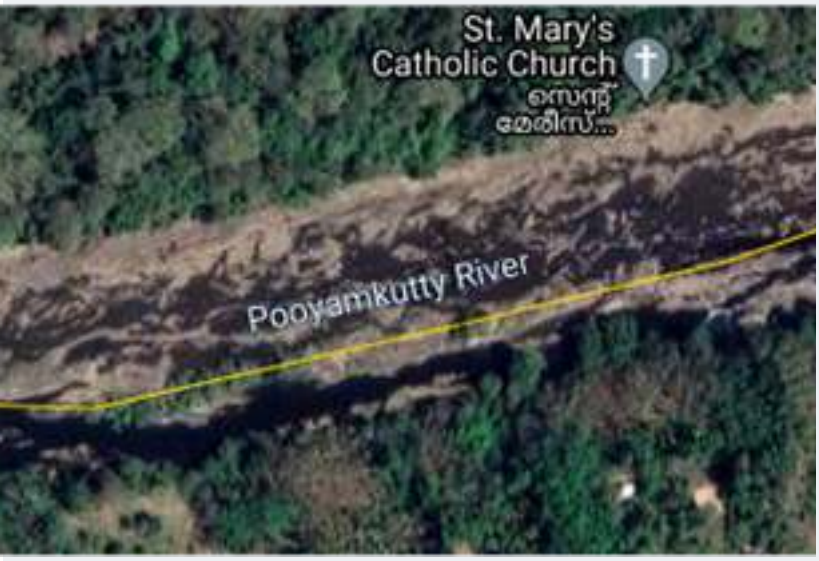
At chainage 56.910 km , second tributary joins Idamalayar from left side at Lat 10.195251, Long 76.719580 . The width of the stream at this chainage is 12 to 22 m. The banks of the river are a layer of rock overburden with hard soil strata.

Confluence of Muthirapuzhayar, Karintiriyar & Pooyamkuttiyar

Ch: 60.07km

At chainage 60.070km , Pooyamkutty river joins Idamalayar from left side at Anakkayam . Pooyamkutty river is the major tributary of Idamalayar. The river Pooyamkutty is located in Ernakulam District of Kerala. Its catchment extends to 232 km2 falling within 10o 0' and 10o 10' N and 76o 45' and 76o 55' E. The catchment is an undulating terrain with a mosaic of moist deciduous, semi-evergreen, low elevation evergreen and riverine forests. Scattered agricultural patches are also present. The catchment is rich in reeds and bamboo, which has been commercially exploited extensively for decades. (Source: ZOOS' PRINT JOURNAL 16(4): 467-469

. The Pooyamkutty River taps water mainly from two tributaries known as Karinthiriyar and Muthirapuzhayar (Pichiyar) on the left and right bank respectively. These rivers joins at Ch: 41 (Karinthiriyar) downstream of Pooyamkutty Chappath. Then other 8 tributaries Paarankamaaly thodu, Madathinaalpady thodu, Pallipady thodu, Korangaatty thodu, Thaannikkunnelpady thodu, EdaattuChelakkattupady thodu, Aanikkanaalpady thodu, Kuttyamchal Kurukku thodu (Appakkal kunnu thodu) joins the stream from left side. And at Ch : 60.070km (of Idamalayar) Pooyamkutty river joins Idamalayar at Anakkayam.



The Kerala State Electricity Board had envisaged a major Hydro Electric Project during 1980s. The Pooyamkutty hydroelectric project envisages harnessing the power potential of two major rivers, viz. Pooyamkutty and Idamalayar, both tributaries of river Periyar. A complex of six reservoirs and four separate hydel schemes viz., Anamalayar, Upper Idamalayar, Mankulam and Pooyamkutty with an installed power generating capacity of 750 MW.The project was designed to build a hydroelectric power station at Peendimedu waterfall, 8 kilometres deep inside the forest from Pooyamkutty. It was started in the 1980s and abandoned in 1990s due to environmental issues

TRIBUTARIES

The details of tributaries are given below. *(Refer , Pg:1255)*

Sl. No.	Name of Tributaries	Average width (m)	Length (Km)	Chainage of confluence (Km)
1	Muthirapuzhayar (Right side)	60-70	18.7	41.07
2	Karinthiriyar(Left side)	70-80	41.03	41.07
3	Paarankamaaly thodu (Left side)	6 to 4	0.672	41.515
4	Madathinaalpady thodu(Left side)	5 to 4	0.552	41.946
5	Pallipady thodu(Left side)	5 to 3	0.769	42.13
6	Korangaatty thodu(Left side)	5 to 3	0.624	44.22
7	Thaannikkunnelpady thodu(Left side)	5 to 3	0.599	44.93
8	EdaattuChelakkattupady thodu (Left side)	5 to 3	0.501	45.262
9	Aanikkanaalpady thodu (Left side)	6 to 4	0.719	45.27
10	Kuttyamchal Kurukku thodu (Appakkal kunnu thodu) (Left side)	6 to 3	1.708	47.542

Confluence of Muthirapuzhayar,Karintiriyar&Pooyamkuttiyar

1. Muthirapuzhayar(PichiAr)

The PichiAr taps surroundings of Varium (1095m) and Kolattapati (1205m) in the Pooyamkutty catchment.It passes through Edamalayar and Kuttampuzha forest range, Kuttampuzha and Edamalakkudy pachayath.It is having a total length of 18.70 km and joins Karinthiriyar (Pooyamkuttyar) @Ch:41.03km. A tributary of Irupukalkudy joins Muthirapuzhayar on the left bank @Ch:2.57 km. Another tributary originates from Kunjippara joins to the Muthirapuzha @ch. 12.33 km.

1.1) Tributaries of Muthirapuzhayar

a) Tributary 1-Irupukalkudy

A tributary originates from Irupukalkudy area having a length of 3.53 km joins Muthirapuzhayar at left bank @ Ch:2.57 Km. (10.192038, 76.895373). The width of the stream varies from 3.00 to 15.00m. The stream is flowing through thick forest in Edamalakkudy Panchayath.

b) Tributary 2 – Kunjippara

A tributary originates from Kunjippara tribal settlement area having a length of 5.41 km joins Muthirapuzhayar at right bank @ Ch:12.33 Km. (10.187831, 76.824003). The width of the stream varies from 3.00 to 8.00m. The tributary flows through Edamalayar and Kuttampuzha forest range.The stream is flowing through thick forest in Kuttampuzha Panchayath.

2) Karinthiriyar

The Karinthiriyar originates from Anamala ranges at an altitude of 2500m. (10°09´59.52" ,77°01´14.68")

CH- 1.08km

RCC bridge comes across the river at this chainage. The width of the river at this portion is 5.00m and no obstruction to the flow is noticed at this point. The banks of the river are a layer of rock overburden with hard soil strata. The river banks have a height of 1.50m. The river bed contains silt and rock boulders.

Pettimudi stream (2021)

CH-1.62km

At this chainage a stream from Pettimudy area joins with the Karinthiriyar at the right bank(10°09´42.1"77°00´40.0") The width of the river at this portion is 6.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The river banks have a height of 1.50m. The river bed contains silt and rock boulders. The stream is a trail of massive landslides occurred during 2020,consequent to the relentless rainfall. More than 70 people died in the mishap.

CH- 4.12km

At this chainage (10°09´4.27" 76°59´58.31") an RCC bridge comes across the river. The width of the river at this portion is 24.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The river banks have a height of 2.50m. The river bed contains silt and rock boulders. This area belongs to Munnar panchayath

CH- 10.52km

At this chainage (10°07´43.71", 76°58´24.91")another tributary joins with the Karinthiriyar at the left bank in dense forest. The width of the river at this portion is 25.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The river banks have a height of 3.00m. The river bed contains silt and rock boulders. This area belongs to Munnar panchayath

CH- 10.73km

A major tributary namely Kadalar, originates from Rajamalajoins with the Karinthiriyar at the right bank (10°07´38.33" 76°58´20.87") at this point.The width of the river at this portion is 18.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The river banks have a height of 1.50m. The river bed contains silt and rock boulders. This area belongs to Munnar panchayath

Karinthiriyar at Pettimudi(2020)

CH-15.04km

At this point (10°07´58.7"76°56´24.1") an RCC foot bridge is situated across the river. The width of the river at this portion is 40.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The river banks at left bank have a height of 2.50m and that of right bank have a height of 4.00m. The river bed contains silt and rock boulders. This area belongs to Mankulam panchayath

CH-16.05km

At this chainage, (10°08´08.1"76°56´00.1"), a suspension bridge comes across the river. The width of the river at this portion is 70.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river have a height of 3.20m&4.50m respectively. The river bed filled with rockboulders. This bridge is located at Georgiar, comes under Mankulam Panchayath

CH- 15.56km

At this location, another tributary namely Parekudithodu originates from Mankulam forest range joins with the Karinthiriyar at the right bank (10°08´08.29"76°56´15.8"). The width of the river at this portion is 50.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river have a height of 3.50m& 5.00m respectively. The river bed is filled with rock boulders.This area comes under Mankulam Panchayath.

CH- 16.05km

At this chainage (10°08´14.71", 76°55´53.57") an RCC bridge is situated across the river . The width of the river at this portion is 60.00m. The banks of the river is a layer of rock overburden with hard soil strata. The river banks at left bank have a height of 3.20 and that of right bank have a height of 3.80 m. During the flood 2018 a bridge downstream of Kuwait bridge is washed away. A suspension bridge near Georgiar at 6thmile and a causeway at Karimundacity is also washed off. Two numbers of foot bridges are also washed away at Kallakkoottykudy & Parakkudy in 50th mile tribal colony. Out of this, only one suspension bridge is re-constructed at 6th mile. Huge quantity of silt, mud and huge rock boulders got accumulated in the upstream stretches of the Perumbankuth (Kuwait) bridge in Mankulam panchayath.The river has changed its course of flow in the upstream of Kuwait bridge during flood.The width of the river is doubled and the river banks are slumped extensively. Three nos. of houses were washed away in ward No. 4. In the aftermath of flood, about 17000 m3 of silt & rock boulder deposits were removed from the river course by the Major Irrigation Department to facilitate the flow of river, which was diverted its course earlier. River bank protection for a length of 220 m was also done for bank stabilization. A road is passing adjoining to the left bank of the river is under the threat of damage due to the scouring of flood water. This road is the only access to the tribal colonies namely 6th mile, Sink kudi, Chikkanamkudi, Subrahmanyam kudi, Parekudy and Kallakkutikudy of ward No 3 of Mankulam panchayath. About 150 houses are located there. The natural depth of the river course became shallow at these stretches and a quantum of 27000 m3 of silt and rock boulders have to be removed from the upstream stretches to enhance the carrying capacity of the river. Also vegetative protection for bank stabilisation is needed at this stretch for a perennial solution.

CH- 18.63km

Another tributary namely Mankulamar, which originates from Parvathy hills Munnar joins with the Karinthiriyar at the left bank at this point, downstream of Perumbankuth water falls (10°08´25.87"76°54´49.14"). The width of the river at this portion is 60.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river have a height of 5.00m & 8.00m respectively. The river bed contains silt and rock boulders. This area comes under Mankulam Panchayath

CH- 20.11km

At this point, another tributary namely Ettacholayar originates from Mangaparakkudy joins with the Karinthiriyar at the right bank, (10°08´56.3"76°54´14.38").Theconfluence point is known as Valiyaparakkutty. The width of the river at this portion is 50.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river have a height of 4.00m &5.00m respectively. The river bed is rock, contains silt and large rock boulders. This area comes under Mankulam Panchayath.

CH- 21.93km

At chainage 21.93 Km, another tributary, which drains the water from Vathykudy area joins with the Karinthiriyar at the left bank, (10°07´24.54" 76°50´47.0"). The width of the river at this portion is 50.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river have a height of 4.00m &3.80 m respectively . The river bed contains silt and rock boulders. The river flows through dense forest through the boundary of Kuttampuzha forest range. This area comes under Mankulam Panchayath

CH- 31.03km

At this chainage, another tributary namely Kunjiyar, which originates from the gorge of Padicup joins with the Karinthiriyar at the left bank, (10°07´31.76", 76°49´09.22") The confluence point is known as Kunjikkutty. The width of the river at this portion is 48.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river have a height of 4.00m &4.20 m respectively.The river flows through dense forest through the Kuttampuzha forest range. The river bed contains silt and large rock boulders. This area comes under Mankulam Panchayath

CH- 34.63km

At this chainage, another tributary namely Mamalathodujoins with the Karinthiriyar at the left bank, (10°09´47" 76°47´12.0").The width of the river at this portion is 60.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river have a height of 3.00m &3.60 m respectively.The river flows through dense forest through the Kuttampuzha forest range. This area comes under Kuttampuzha panchayath

CH- 40.53km

At this chainage(10°09´34.37" 76°47´12.66") an RCC bridge connecting Pooyamkuttyto Manikandanchalis situated across the river. The width of the river at this portion is 90.00m. The banks of the river is a layer of rock overburden with hard soil strata. The abutment height of bridge is 2m. During monsoon seasons the bridge submerges due to its insufficient vertical clearance. And also due to its insufficient vent way large floating bodies cannot pass beneath it which weakens the bridge. Pooyamkutty bridge was built in 2002, considered as a great blessing to people staying in Manikandamchal, Vellaramkuthu and Kallelumedu. This is the one and only possible way to access the nearest town which used to gets submerged during rainy season. Left and Right bank of bridge is forest.

Pooyamkutty Bridge

CH- 41.43km

At this chainage, the Karinthiriyar confluence with Pooyamkuttyar(10°09´9.52"76°44´13.00").The width of the river at this portion is 60.00m and no obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river are forest belongs to Kuttampuzha range and have a height of 5.00m &10.00 m respectively . This area comes under Kuttampuzha panchayath.

Tributaries of Karinthiriyar

The major tributaries of Karinthiriyar is listed below:

a) Tributory -1

A tributary starts from the valley of Sangumalai having a length of 3.57 km joins the main stream at left bank @ Ch.2.63km. The average width of the stream is 3.00 to 5.00m and a culvert comes across this tributary @ ch. 1.25 km near RC Church Rajamala.No obstruction has been noticed to the free flow of stream.The stream is flowing through Munnar Panchayath.

b) Tributory -2

A tributary having a length of 1.65 km joins the main stream at right bank @ Ch.10.52km. The average width of the stream is 3.00 to 5.00m. The stream is flowing through Munnar panchayath through thick forest.

c) Tributory -3-Kadalar

It is one of the major tributary of Karinthiriyar, originates from the valley of Anamudy at Rajamala in Munnar panchayath. The tributary has a total length of 12.16 km.The average width of the stream is 3.00 to 15.00m and 5 nos. of culverts arecomes across this tributary and no obstruction has been noticed to the free flow of stream. It flows about 6 km through Kannandevan tea hillsadjacent to Kadalar tea factory of Tata Tea Ltd and 6.16km through dense forest.The Kadalarjoins with the Karinthiriyar at the left bank at Ch. 10.73 Km.

CH -0.09km

At this point, a culvert comes across in the Munnar Rajamala road . The width of the stream at this chainage is 6.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river are forest and have a height of 3.40 m &4.00 m respectively . This area comes under Munnar panchayath.

CH -1.58km

At ch.1.58 km a culvert comes across the stream. The width of the stream at this chainage is 4.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdenwith hard soil strata. The left and right banks of the river are forest and have a height of 4.00 m &5.00 m respectively . This area comes under Munnar Panchayath.

CH -2.54km

At this point a culvert comes across the stream. The width of the stream at this chainage is 3.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are forest and have a height of 4.50 m &4.00 m respectively .This area comes under Munnar Panchayath

CH -2.75km

At ch.2.75 km a culvert comes across the stream. The width of the stream at this chainage is 3.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are forest and have a height of 3.00 m &6.00 m respectively . This area comes under Munnar Panchayath.

CH-5.67km

At this point a culvert comes across the stream near Kadalar Tea factory. The width of the stream at this chainage is 12 .00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are forest and have a height of 3.50 m & 4.00 m respectively . This area comes under Munnar Panchayath.

d) Tributory -4 Mankulamar

The Mankulam tributary has a total length of 22.82 Km. The tributary originates fromParvathimala, Munnar which flows through Kallar and Lakshmi Tea estates of Tata Tea Ltd. The width of the river varies from 3.00m to 42.00 m.The river empties in to the Karinthiriyar at the left bank at Ch. 18.63km. The river is flowing through Munnar and Mankulam Panchayath.

CH -0.740km

At Ch. 0.740 km a culvert comes across the stream near Kadalar Tea factory. The width of the stream at this chainage is 5 .00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are tea plantations have a height of 3.00m . This area comes under Munnar Panchayath.

CH -2.32km

At Ch. 2.32 km, a stream from Kallar estate is joining with the Mankulamar at the right bank having a length of 0.90km.At Ch. 2.50 km a culvert comes across the stream down stream of Kallar estate. The width of the stream at this chainage is 4 .00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are tea plantations have a height of 2.50 m . This area comes under Munnar Panchayath.

CH -3.23km

At h. 3.23 km another culvert comes across the stream to provide roadway in the tea estate. The width of the stream at this chainage is 4 .00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are tea plantations have a height of 2.50 m . This area comes under Munnar Panchayath.

CH -4.32km

At Ch. 4.32km a culvert comes across the stream to get road access to the labour camp and Sri Kali Amman Kovil. The width of the stream at this chainage is 4.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are tea plantations have a height of 3.00 m.This area belongs to Munnar Panchayath.

CH -5.46km

At Ch. 5.46 km a culvert comes across the stream. The width of the stream at this chainage is 4 .00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river are tea plantations have a height of 3.00 m . This area comes under Munnar Panchayath.

CH -5.57km

Another tributary passing adjacent to the Sri Kaliamman KovilKallar estate having a length of 1.50 km joins the Mankulamar at the right bank at Ch. 5.57 km. This stream has an average width of 3.00m with one culvert crossing across the stream.

CH -10.08km

At Ch. 10.08 km a culvert comes across the stream 110m upstream of Viripara diversion Dam . The width of the stream at this chainage is 5 .00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are tea plantations have a height of 3.00 m . This area comes under Mankulam Panchayath.

Viripara Diversion weir in Mankulamar

A diversion dam is located at Viripara, Ch. 10.19 Km of the Mankulamar, which was constructed by the KSEB during 1961 as an augmentation scheme to Neriamangalam HEP. The water is diverted by constructing a weir across Mankulamar at Viripara in Mankulam panchayath through a short diversion tunnel and further through Menachery (Kallar) river in Devikulam Taluk to Kallarkutty Dam for power generation. The weir has a height of 4.57 m and length 100m.

CH -10.91km

At Ch. 10.91 km a bridge is crossingthe stream at Viripara in Mankulam Panchayath. The width of the stream at this chainage is 28.00m. The flow is obstructed through the bridge due to the lack of sufficient vent way The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river are and forest have a height of 3.00 m .

CH -14.12km

At ch. 14.12 Km there exist a water fall, namely Nakshathrakuth (pambumkayam) A small diversion weir is constructed just upstream of this water fall having a length of 15 m and depth 1.50m.The water is diverted from the weir through a penstock to the power house located in the downstream side of water fall in the right bank for producing electricity. This hydroelectric project is known as Pumbumkayam HE project, owned by MankulamPanchayath.The tailrace water is discharged in to the same river. This project has a capacity of 110 KW commissioned during the year 2004.Now the Project is dysfunctional since the penstocks are damaged during the flood.

Another Hydroelectric project is also envisaged by the KSEB , tapping the water from mankulamar by constructing a dam (221 m length & 47m height) across it at Mankulam town (10o 07’19’’ 76o55’ 21’’) having a Gross storage capacity of7.70 Mm3and conveying the water through 2.50 Km power tunnel having a diameter of 3.60m and100m penstock to the power hose located at Kurathikkudy colony. The tail race water will be released to the Mankulam river itself. The project have an installed capacity of 40 MW at Ist stage and it will be enhanced to 80 MW subsequently. The project is now at tender stage.

CH -15.14km

At Ch. 15.14 km an RCC bridge comes across the Mankulamar at Pambumkayam. The width of the stream at this chainage is 23.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are private land have a height of 4.00 & 5.6m respectively. This area comes under Mankulam Panchayath.

CH -16.69km

A causeway constructed across Mankulamar at Ch. 16.69km in Mankulam Panchayath have no sufficient vertical clearance and vent way. There is every possibility of obstruction to the flow especially during flood. Hence the same has to be dismantled and reconstructed as a bridge The width of the stream at this chainage is 30.00m. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are forest land have a height of 3.50m. This area comes under Mankulam Panchayath.

CH -17.29km

At ch. 17.29 km another tributary having a length of 0.50km joins to the Mankulamar at the right bank. A bridge is crossing the stream at Mankulam Kallar road.

CH -17.73km

At Ch. 17.73 km an RCC bridge comes across the Mankulamar namely Thalumkandam. The width of the stream at this chainage is 30.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are private land have a height of 4.00 & 5.00 m respectively. This area comes under Mankulam Panchayath.

CH -18.39km

At Ch. 18.39 km an RCC bridge comes across the Mankulamar .The width of the stream at this chainage is 30.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river are private land have a height of 3.50 & 3.70 m respectively. This area comes under Mankulam Panchayath.

CH -19.58km

At Ch. 19.58 km an RCC bridge comes across the Mankulamar. The width of the stream at this chainage is 25.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are private land have a height of 3.00m. This area comes under Mankulam Panchayath.

CH -22.22km

At chainage 22.22 km the river falls in to a deep gorge namely Perumbankuth Water fall.The width of the river at this location is 42m with rock bed.

CH -22.38km

At Ch. 22.38 km an RCC oldbridge comes across the Mankulamar to get access to Forest Office. The width of the stream at this chainage is 42.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburdens with hard soil strata. The left and right banks of the river are private land have a height of 4.00m. This area comes under Mankulam Panchayath.

CH -22.82km

At Chainage 22.82 km, The Mankulamar confluence with the Karinthiriyar. The width of the stream at this chainage is 42.00m. No obstruction to the flow is noticed at this point. The banks of the river is a layer of rock overburden with hard soil strata. The left and right banks of the river are private land have a height of 6.00m. This area comes under Mankulam Panchayath.

Confluence of Parekkudiyar with Karinthiriyar

e) Tributory -5 Parakkudythodu

This tributary has a length of 1.47 km, joins Karinthiriyar at Ch. 15.56 Km. The width of the stream varies from 3.00 to 4.00m originating from the Mankulam forest range. This stream crossing one culvert at Ch. 1.44 Km

f) Tributory -6 Ettacholayar

Ettacholayar originates from Mangaparakudy, joins at the right bank of Karinthiriyar at ch. 20.11km.The confluence point is named as Valiyaparakkutty. This river is also known as parakudyar.The Ettacholayarhave a length of 4.83 km. A tributary from Kozhiyalakudy aving a length of 5.67 km meets the Ettaholayar at ch. 1.80 km. A checkdam having a length of 17 m, depth 1.00 m and a bridge are situated across this tributary at Ch.5.04 and 5.16 Km respectively. The check dam was constructed years back and the inhabitants using the water for power generation to meet their domestic needs.

The width of this tributary varies 3 to 16 m.At chainage 3.03km famous tourist destination Anakkulam is located, where herd of elephantsfreely roam about the place for drinking water . It is also a panoramic tourist destination and the footfall of tourists is very high especially during holidays.

A thodu having a width of 3m and length 0.50km joins at the left bank at Anakulam. This stream consist of a bridge , anin completed VCB and a culvert at chainage 0.17km, 0.30km and 0.44km respectively. The river flows further downwards and joins the Karinthiriyar at Valiyaparakkutty. The river flows through forest belongs to Mankulam Panchayath.

Checkdam at kozhiyalakudy

Confluence of Ettacholayar with Karinthiriyar

a)Tributory -7 - Vathykudy

This tributary flows through the tribal settlement area of Vathykkudy having a length of 3.91km with width varies from 3 to 8m.It drains the water from the Vathykudy area and empties in to the Karinthiriyar at left bank, Ch. 21.93KM. This stream consists 3 culverts at Ch. 1.26, 1.91 and 3.07 km respectively. The tributary flows through thick forest belongs to Neriyamangalam forest range.

b)Tributory -8 - Kunjiyar

Confluence of Kunjiyar with Karinthiriyar

This tributary has a length of 15 km .The water from the area of Avarukudy is drained through this river. It joins the Karinthiriyar at Ch. 31.03 km namely Kunjukutty, situated

amidst a large expanse of dense green forests, Kunjikutty is like a placid lake enclosed by emerald greenery; a jungle stream that flows slowly out of the lake; sprawling banks of powder-soft sand. Groups of wild elephants and other animals ambling down to the water to quench their thirst and play with one another.

The river has a width varies from 3 to 20mand flows through dense forest betweenthe boundary of Kuttampuzha and Neriyamangalam forest ranges.

i) Tributory -9 Mamalathodu

Mamalathodu is one of the major tributary of Karinthiriyar . This thodu originates from Neriamangalam forest range joins the Karinthiriyar in the left bank at Ch 34.63km after Chamappara waterfalls. . This thodu passes through Mamalakandam area of Kuttampuzha Panchayath. Length of this thodu is 9.50kms and average width comes to 18 m. Main structures in this Mamalathodu are MamalaChappath(lat-10.084368, log-76.818826), Elamblassery foot bridge, Elamblassery bridge with check dam (lat-10.08898, log-76.820659) and Urulikuzhi check Dam (10.09578, 76.812988).

CH – 0.97km

At chainage 0.97km a tributary of width of 6m joins Mamalathodu from left side.

CH –1.39km

At chainage 1.39km a tributary of width of 6m joins Mamalathodu from left side.

MamalaChappath

CH – 2.55km

At chainage 2.55km there a bridge commonly called MamalaChappath . This bridge is having a span of 20.00m and height of 3.00m . Left and right side of this bridge is forest.

Elamblassery footbridge

CH – 2.91km

At chainage 2.91km there a foot bridge just upstream of Elamblassery bridge. . This footbridge is having a span of 17.00m and height of 3.00m .

Elamblassery bridge

CH – 3.34km

At chainage 2.55km there is Elamblasserry bridge. This bridge connects Neriamangalam - Mamalakandam road and Elamblassery – Mankulam road. This bridge is having a span of 17.00m and height of 3.00m .

CH – 3.66km

Down stream of Elamblassery bridge at chainage 3.66km one of the tributaries of Mamalathodu called Elamblassery thodu joins Mamalathodu from right side. This Elamblassery thodu orginates from Anchukkudy and it is having a length of 2.19km. Small scale silt deposit is found in this confluence area of Mamalathodu and Elamblassery thodu.

CH – 4.61km

At chainage 4.61km a tributary called Cheriyathodu joins Mamalathodu.This thodu orginates near Shankar Memorial school and joins Mamala thodu near Ambalkadav at Ayurveda Padi, upstream of Uririkuzhi Checkdam. and it is having a length of 1.32km.

CH – 4.72km

At chainage 4.72km there Urulikkuzhicheckdam. There the width of the thodu is 18.00m . This Checkdam was constructed by LSGD. During the time of down pour the water overflows to the banks and so and now the height of the checkdam has been reduced by Panchayath authorities.

CH – 7.40km

At chainage 7.40km there Chamappara waterfalls. There the width of the thodu is about 30.00m . On the both sides of the thodu it is forest. This is one of the main tourist attractions of Mamalakandam area.

- Main tributaries of Mamalathodu are Elamblassery thodu and Cheriyathodu

Elamblasserythodu
Ch:0.00km
Elamblassery thodu originates from Anchukudy.The thodu is having a width of 2.50m here. Both sides of the thodu is in forest. A Kaithodu is joining at this location. Main structures across this Kaithodu are VenuNarayananpadi bridge and footbridge near Near Kerala State Bamboo Corporation Sub Depot .These structures are in good condition and not creating any obstructions to the flow.

Footbridge near Bamboo Corporation

VenuNarayananpadi bridge

Ch:0.220km

A check dam comes across the thodu at this chainage which is completely in damaged condition. The width of the thodu at this location is 8.00m.Inhibitants demolished some portions of check dam at the time of flood as the water is over flowing to the banks. So the inhabitants raise the need demolishing it completely.The left and right banks of the thodu are private land have a height of 1.50m.

Ch:0.226km

Thangappanpadi bridge comes across the thodu at this chainage . The width of the thodu at this location is 8.00m. The structure is in good condition and not creating any obstructions to the flow. Hard soil strata is available at both banks. The left and right banks of the thodu are private land have a height of 1.50m. Both

banks are protected. Clay and silt deposition is found on the D/S of structure for a length of 100 meter with an average depth of 0.60meters.

Ch:0.507km

A foot bridgecomes across the thodu at this chainage . The width of the thodu at this location is 8.50m. The structure is in good condition and not creating any obstructions to the flow. The left and right banks of the thodu are private land have a height of 1.50m. Clay and silt deposition is found on the U/S and D/S of structure for a total length of 100 meter with an average depth of 0.80meters.

Ch:1.182km

Sadanandhanpadi Paalam comes across the thodu at this chainage . The width of the thodu at this location is 6.00m. The structure is in good condition and not creating any obstructions to the flow. The left and right banks of the thodu are private land have a height of 2.00m. Both banks are protected.Clay and silt deposition is found near the structure for a total length of 700 meter with an average depth of 0.50meters.

Ch:1.50km

A foot bridge comes across the thodu at this chainage . The width of the thodu at this location is 6.00m. The structure is not creating any obstructions to the flow.

Ch:3.011km

At this chainage,Elamblasserythodu confluences with the Mamalathodu . The width of the thodu at this location is 6.00m. The left and right banks of the thodu are private land have a height of 2.00m. Clay and silt deposition is found for a length of 100 meter with an average depth of 0.50meters

j) Tributary 10-Vellaramkuth thodu

Vellaramkuththodu starts from VellaramKuthu and joins Karinthiriyar near Manikandanchal just upstream of confluence point of Karinthiriyar and Muthirapuzhayar. This thodu is of 3.01km length and its width varies from 3m to 12m. This thodu flows through ward No. 7 of Kuttampuzha Panchayath. Because of the criss- cross shape of this thodu, 3 bridges and 7 culverts are coming across this stream. Four vented cross bars have also been constructed along this thodu. All these cross bars are in good condition and not creating any obstructions to the flow. The L/S abutment of bridge near Manikandachal Junction is constructed encroaching the thodu. And this is creating obstructions to the flow.

Ch:0.00km

Vellaramkuth thodu originates from Vellaramkuthu.The thodu is having a width of 3 meter here. Both sides of the thodu is in forest

Ch:0.035km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 5 .00m. No obstruction tothe flow is noticed at this point. Hard soil strata is availableat both banks.. The left and right banks of the thodu are private land have a height of 2.50m

Ch:0.095km

VCB comes across the thodu at this chainage . The width of the thodu at this location is 6.30m. The structure is in good condition and not creating any obstructions to the flow.Hard soil strata is availableat both banks. The left and right banks of the Thodu are private land have a height of 1.20m. Both banks are protected. Boulder and silt deposition is found on the U/S of structure for a length of 10 meter with an average depth of 0.30meters.

Ch:0.102km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 5 .80m. No obstruction to the flow is noticed at this point. Hard soil strata is availableat both banks. The left and right banks of the thodu are private land have a height of 2.60m. D/S left bank and U/S right bank are protected. Clay and silt deposition is found on the U/S of structure for a length of 10 meter with an average depth of 0.30meters.

Ch:0.212km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 5 .70m. No obstruction to the flow is noticed at this point. Hard soil strata is availableat both banks. The left and right banks of the thodu are private land have a height of 3.00m.

Ch:0.338km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 5.70m. No obstruction to the flow is noticed at this point. Hard soil strata is availableat both banks. The left and right banks of the thodu are private land have a height of 2.10m. D/S right bank is protected. Clay and silt deposition is found on the U/S of structure for a length of 30 meter with an average depth of 0.30meters.

Ch:0.364km

A VCB comes across the thodu at this chainage . The width of the thodu at this location is 5.00m. The structure is in good condition and not creating any obstructions to the flow.Hard soil strata is availableat both banks. The left and right banks of the thoduare private land have a height of 1.60m. Both banks are protected.

Ch:0.380km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 6.00m. No obstruction to the flow is noticed at this point. Hard soil strata is availableat both banks. The left and right banks of the thodu are private land have a height of 2.30m. Right and left bank in the U/S side are protected.

Ch:0.452km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 5.60m. No obstruction to the flow is noticed at this point. Hard soil strata is available at both banks. The left and right banks of the thodu are private land have a height of 2.80m. D/S right bank is protected.

Ch:0.552km

A culvert comes across the thodu at this chainage . The width of the thodu at this location is 5.50m. No obstruction to the flow is noticed at this point. Hard soil strata is availableat both banks. The left and right banks of the thodu are private land have a height of 2.70m. U/S right bank is protected

Ch:0.788km

A stream is joining to Vellaramkuthu thodu at this location. The width of the thodu at this location is 10.40m. Hard soil strata is availableat both banks. The left and right banks of the thodu are private land have a height of 2.50m.

Ch:0.796km

A VCB comes across the thodu at this chainage . The width of the thodu at this location is 10.40m. The structure is in good condition and not creating any obstructions to the flow.Hard soil strata is availableat both banks. The left and right banks of the thoduare private land have a height of 1.50m. Both banks are protected.

Ch:0.968km

Parameswaranpadi foot bridgecomes across the thodu at this chainage . The width of the thodu at this location is 12.20m. A new bridge (Parameswaranpadi bridge) is constructed near to this. So this is not in use. Therefore it can be demolished. A thick vegetation is found on banks

Ch:0.972km

Parameswaranpadi bridge comes across the thodu at this chainage . The width of the thodu at this location is 12.20m. The structure is in good condition and not creating any obstructions to the flow. Hard soil strata is available at both banks. The left and right banks of the thoduare private land have a height of3.60m. Both banks in the U/S are protected. A thick vegetation is found on banks

Ch:2.112km

VCB comes across the thodu at this chainage . The width of the thodu at this location is 9.80m. Trees and other waste material gets blocked in the pillars due to insufficient vent way. It was constructed by forest department. Therefore continuous monitoring is required for the removal of blocked waste for the smooth flow of water. Hard soil strata is available at both banks.Both banks are protected. Clay and silt deposition is found on the U/S of structure for a length of 40 meter with an average depth of 0.40meters

Ch:2.119km

A foot bridge and bridge comes across the thodu at this chainage . The width of the thodu at this location is 9.80m. The bridge is constructed near to foot bridge. So foot bridge is not in use. Therefore it can be demolished.Left side abutment of bridge is constructed encroaching the thodu causing obstruction to the flow. Both banks of thodu are forest landhave a height of 4.00m.

Ch:2.765km
A bridge comes across the thodu at this chainage . The width of the thodu at this location is 9.00m. The structure is not creating any obstructions to the flow. Hard soil strata is available at both banks. The left and right banksof the thodu are forest land have a height of 4.50m.

Paarankamaaly thodu

Ch:3.011km
At this chainage,Vellaramkuthu thodu confluences with the Karinthiriyar. . The width of the thodu at this location is 12.00m. The left and right banks of the thodu are forest land have a height of 2.50m. Clay and silt deposition is found for a length of 450 meter with an average depth of 0.40meters.

3) Paarankamaaly thodu

Paarankamaaly thodu originates from the left side forest of Pooyamkutty hills flows 672 m and joins at ch, 41.515 km of Pooyamkuttyaar.

Atstartingreach it is having width of6m and reduces to 4 mtowards river mouth.The thodu has thick vegetation and silted with clay and stones at various points.

Madathinaalpady thodu

4) Madathinaalpady thodu

Madathinaalpady thodu originates from the left side forest of Pooyamkutty hills flows 552 m and joins at ch, 41.946 km of Pooyamkuttyaar. At starting reach it is having width of 5m and reduces to 4 m towards river mouth.The thodu has thick vegetation and silted with clay and stones at various points.

3) Pallipady thodu

Pallipady thodu originates from the left side forest of Pooyamkutty hills flows 769 m and joins at ch, 42.13 km of Pooyamkuttyaar.

Atstarting reach it is having width of5m and reduces to 3 m towards river mouth. The thodu has thick vegetation and silted with rock, claand laterite at various points.

Korangaatty thodu

6) Korangaatty thodu

Korangaatty thodu originates from the left side forest of Pooyamkutty hills flows 624 m and joins at ch, 44.22 km of Pooyamkuttyaar. Atstarting reach it is having width of5m and reduces to 3 m towards river mouth.The thodu has thick vegetation and silted with rock, clay and laterite at various points.

Thaannikkunnelpady thodu

7) Thaannillunnelpady thodu

Thaannikkunnelpady thodu originates from the left side forest of Pooyamkutty hills flows 599 m and joins at ch, 44.932 km of Pooyamkuttyaar. Atstarting reach it is having width of5m and reduces to 3 m towards river mouth.The thodu has thick vegetation and silted with rock, clay and laterite at various points.

EdaattuChelakkattupady thodu

8) Edaattuchelakkattupady thodu

EdaattuChelakkattupady thodu originates from the left side forest of Pooyamkutty hills flows 501 m and joins at ch, 45.262 km of Pooyamkuttyaar.Atstarting reach it is having width of5m and reduces to 4 m towards river mouth.The thodu has thick vegetation and silted with rock, and clay at various points.

Aanikkanaalpady thodu

9) Aanikkanaalpady thodu

Aanikkanaalpady thodu originates from the left side forest of Pooyamkutty hills flows along719 m and joins at ch, 45.27 km of Pooyamkuttyaar. Atstarting reach it is having width of6 m and reduces to 4 m towards river mouth.The thodu has thick vegetation and silted with rock, and clay at various points.

Kuttiyamchal kurukku thodu

Anakkayam beach

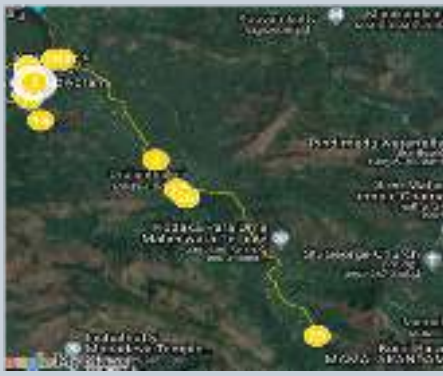
10) Kuttyamchal kurukku thodu (Appakkal kunnu thodu)

Kuttyamchal Kurukku thodu (Appakkal kunnu thodu) originates from the left side forest of Pooyamkutty hills flows 1708 m and joins at ch, 47.542 km of Pooyamkuttyaar. At starting reach it is having width of6 m and reduces to 3 m towards river mouth.The thodu has thick vegetation and silted with rock, clay and laterite at various points.

Ch: 60.81km

Koottambara thodu originates from the left side forest of 'Kuruva' hills and flows 1508 m and joins at ch, 60.81 km of Idamalayaar. Atstarting reach it is having width of8 m and widens to 10 m towards river mouth.The thodu has thick vegetation and silted with rock, stones at various points and sand towards the river mouth. A culvert is situated at ch. 1047 m and there is no obstruction to flow at this point. The condition of culvert is good. Towards the tail end it crosses Thattekkad- Kuttampuzha road under a small bridge.The condition of bridge is good.

Koottambara thodu culvert at ch.1047 m



Foot bridge at tail end portion.

Ch: 61.39km

Kuttampuzhaaar (Urulanthanni thodu) from Muthanam mudi hills of Mamalakandom joins to Idamalayarat Kuttampuzha.Kuttampuzhayar is one of the tributary of Idamalayar . It joins Idamalayar ar Ch: 61.390km Kuttampuzha river originates from Muthanam mudi hills at Mamalakandam forest and flows through Pinavoorkudi,Urulanthanni for a length of 10 km and joins Idamalayar at Kuttampuzha Junction at ch. 31.809 km.As per the information given by local people depth of river decreased and width increased as a result of flood 2018.At starting reach the thodu is having a width of 5 m and it widens to 15 m towards tail end portion at Kuttampuzha town. Also a foot bridge is seen at tail end portion towards Idamalayaar.

Tail end towards Idamalyaar river

Thodus which nourishes the Kuttampuzhayar are as follows
1.Knachery thodu
2.6th Block Thodu

Knachery thodu originates from the forest area named 'Pakshi' and after flowing for a length of 3Kms it crosses Urulanthanni – Mamalkandam road at '6th Block' at Urulanthanni and then after joins Kuttampuzha river.

6th Block Thodu to Kuttampuzha river

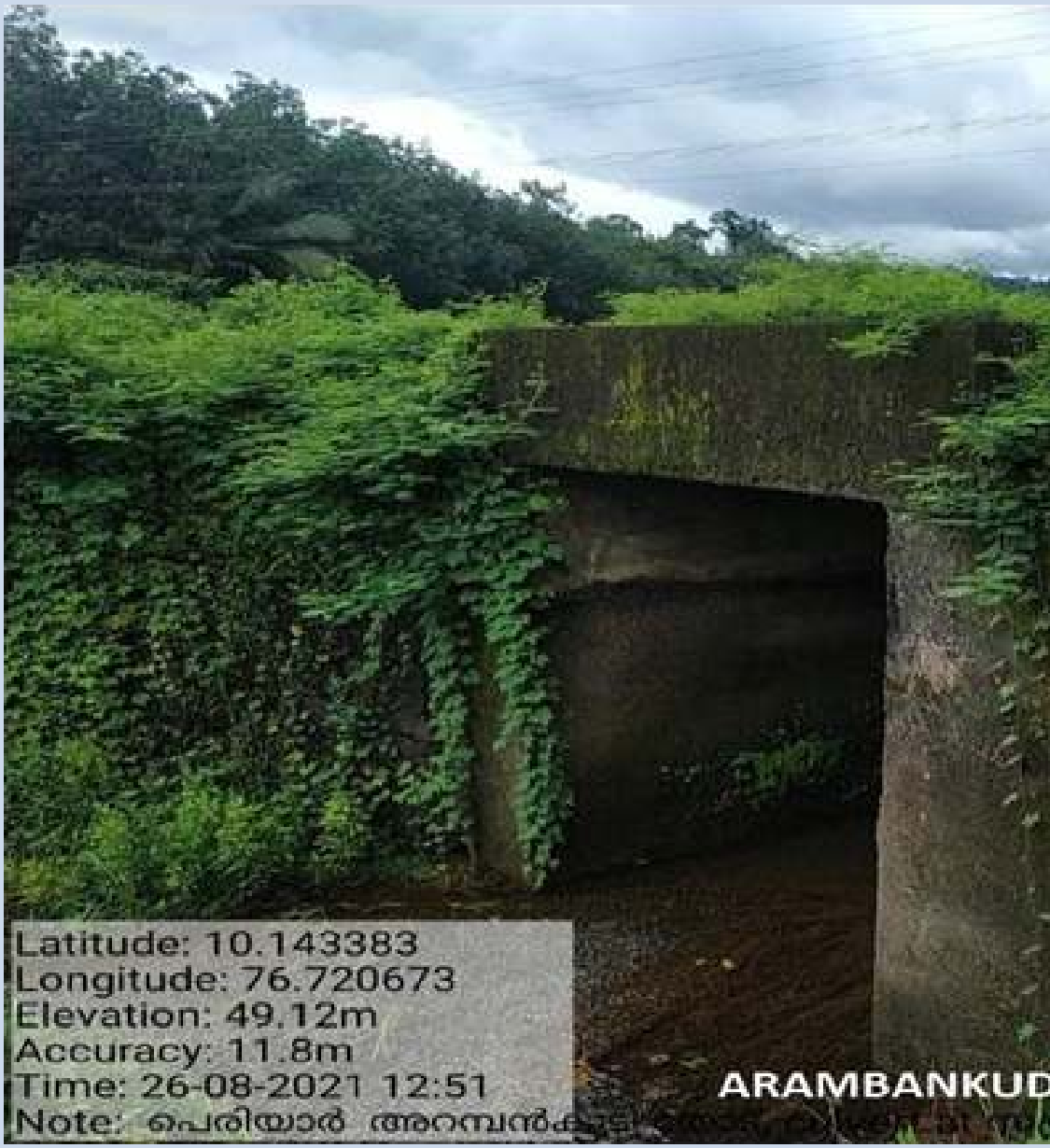
Knachery thodu (kuttampuzha yar at knachery at ch.5170 m)

A VCB is seen constructed at Urulanthanni in 14 th Ward of Kuttampuzha Panchayath. It isconstructed across Kuttampuzhayarat ch. 6.344 km with a passage to tribal colony ,by District Panchaythduring 2019-2020. There are 8 piers with a height of 1.8 m with 7 nos of vent ways of 1.10m x 1.80 m and abutments on the left side and right side of VCB. It is noted that someerosion had happened near the right side wing wall of the structure and flow is now divertedthrough nearby tribal land. The main problem pointed out by the localwas flooding in the upstream side of VCB during heavy rain and its path got divertedthrough the tribal land. This is due to lack of sufficient vent way and also the VCB isconstructed in an inclined manner which aids the diversion of the flow of water. Also treesand other waste materials got blocked between the the piers. The pier foundation top is seen exposedabove the bed level of river which obstructs natural flow and is diverted to nearby triballand through the right bank. There is a bathing ghat seen in the left bank. The thodu fromPinavoorkudy, bird sanctuary, knachery etc meets in Kuttampuzha river and there is a heavy flow of water in the river during rainy season.

VCB across Kuttampuzha at Urulanthanni

bathing ghat (opp. vcb)

Small bridge across Thattekkad- Kuttampuzha road crossing Koottambara thodu

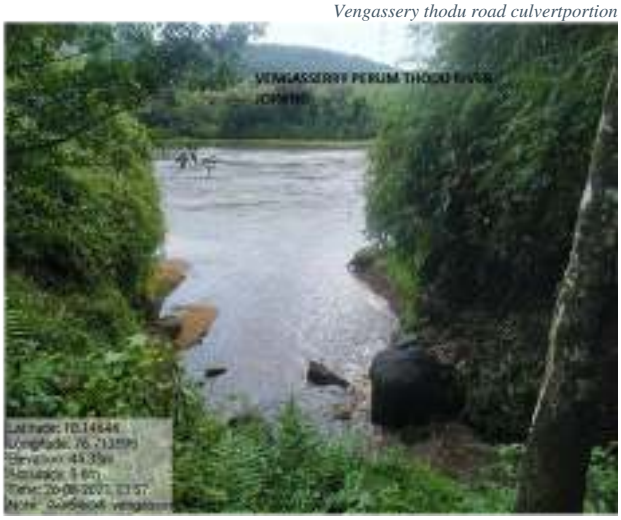


Ch: 62.58km

Arambankudy thodu originates from the left side forest of 'Kuruva' hills and flows 482 m and joins at ch, 62.58km of Idamalayaar. It is having width of5m throughout and towards river mouth.The thodu has thick vegetation and silted with rock, stones, clay at various points and sand towards the river mouth. A culvert is situated at ch. 342 m and there is no obstruction to flow at this point. The condition of culvert is good. Tail end portion of this thodu falls under the FRL area of Bhoothathankettu reservoir.

Arambankudy thodu

Vengassery thodu road culvertportion



Vengassery perumthodu tail endvengassery perumthodu (delta)

Ch: 63.946km

Vengasseri thodu originates from the left side forest of 'Kuruva' hills and flows 599 m and joins at Ch: 63.946km of Idamalayaar. It is having width of5 m throughout and towards river mouth.The thodu has thick vegetation and silted with rock, and laterite, at various points and clay and sand towards the river mouth. A culvert is situated at ch. 216 m and there is no obstruction to flow at this point. The condition of culvert is good. A large delta is seen at the opposite forest portion where Vengassery thodu joins Idamalayar.

Aliyarpady thodu

Ch: 65.446km

Aliyarpady thodu originates from the left side forest of 'Kuruva' hills and flows 762 m and joins at Ch: 65.446km of Idamalayaar. Atstarting reach it is having width of5m and reduces to 3 m towards tail end at river mouth.The thodu has thick vegetation and silted with rock, laterite at various points and towards the river mouth. A culvert is situated at ch. 280 m and there is no obstruction to flow at this point. The condition of culvert is good.Tail end portion of this thodu falls under the FRL area of Bhoothathankettu reservoir.

Ch: 68.99km

At chainage 68.99 Idamalayar joins with Periyar river at Ch: 178.33 km at Kootikkal

DRINKING WATER SCHEMES IN THE IDAMALAYAR REACH

1.RWSS to Vadattupara.

The scheme area is comprised in Kuttampuzhavillage.The total area of the village is 44.81sq.km.The places Kuttampuzha and Vadattupara are separated by Idamalayarriver. So there are 2 schemes in the panchayath for serving the 2 areas.5 wards of the panchayath are included in the scheme viz. RWSS 2 to Vadattupara for serving the Vadattupara area.

The source of the scheme is Idamamalayarriver. The intake is at Palavanpadi which is in the downstream of Idamamalayar dam and upstream of Bhoothathankettu and hence water is available even during summer.The intake well is 6m diameter & 9m deep. 2 numbers of 40 HP VT pumps are used for pumping.

2.ARWSSto Kuttampuzha

The scheme area is comprised in Kuttampuzhavillage.The total area of the village is 44.81sq.km.The places Kuttampuzha and Vadattupara are separated by Idamalayarriver. So there are 2 schemes in the panchayath for serving the 2 areas.8 wards of the panchayath are included in the scheme viz. ARWSS to Kuttampuzha for serving the Kuttampuzha area.

The source of the scheme is Kuttampuzha river. The intake well cum pump house is situated at the treatment plant compound at Kuttampuzha.The intake well is 6m dia& 9m deep. 2 numbers of 20 HP VT pumps are used for pumping

RSP Kunnu thodu crossing Neryamangalam – Painavu Road

4.2 TRIBUTARIES FROM LEFT SIDE OF PERIYAR

4.2.1 RSP Kunnu thodu

RSP Kunnu thodu joins Periyarat Ch: 154.730 km from left side having a length of about 516 m and a width of 4 to 5 m. It has 1 bridge at Ch: 0.200 km in Neriamangalam-Painavu road.

Vayanasalappady thodu mouth to river @ Ch: 155.400 km

4.2.2 Neendapara Vayanasalappady thodu

This thodu have a length of 450 m with one bridge in the Neriamangalam –Painavu road. It joins Periyar at Ch: 155.400 km from left side.

Chembankuzhy thodu – sub-tributary confluence

4.2 TRIBUTARIES FROM LEFT SIDE OF PERIYAR

4.2.1 RSP Kunnu thodu

RSP Kunnu thodu joins Periyarat Ch: 154.730 km from left side having a length of about 516 m and a width of 4 to 5 m. It has 1 bridge at Ch: 0.200 km in Neriamangalam-Painavu road.

4.2.4 Manianpara thodu

Manianpara thodu joins Periyar atCh: 159.800 km from left side. This thodu is having a length of 0.180 km and one bridge across it. The damaged suspension bridge is just down stream of the tributary mouth.

4.2.5 Neriamamgalam colony thodu

Neriamangalam thodu have a length of 0.398 km. There are 2 bridges across the thodu and 1 bridges across sub-tributary in the Neriamangalam – Painavu road. All bridges are in good condition. It joins Periyar atCh: 161.200 km from left side near Neriamangalam Sastha temple.

4.2.6 Neriamangalam Krishi Bhavan Thodu

This thodu originates from the left side forest of 611 mudi hills, flows for a length of 213 m and joins Periyar at164.20 km of periyar. The thodu has average 3.20 m width with thick vegitation and silted at various locations.

4.2.7 Manimaruthumchal Thodu

Manimaruthumachal thodu originates from the left side forest of 611 mudi hills flows 575 m and joins Periyar atch, 165.95 km. At starting reach it is having width less than 3m and increases at Manimaruthumchal. The thodu has thick vegitation and silted with sand and clay at various points.

4.2.8 Pothupara Thodu

This thodu originates from the left side forest of 611 mudi hills, flows for a length of 356 m and joins Periyar at166.6 km . The thodu has 7.70 m width and silted with sand and clay at various locations.

4.2.9 Avolichal Thodu

This thodu originates the left side forest of 611 mudi hills, flows for a length of 350m and joins Periyar at167.60 km. The thodu has 3.2 to 4.60 m width 6 and silted with sand and clay at various points.

4.2.10 Chaarupara Valiya Thodu

This thodu originates the left side forest of 611 mudi hills, and flows for a length of 420m and joins Periyar at168.60 km.. The thodu has 4.2 to 8.60 m width 3.7m height and silted with sand, rubble blocks and clay at various points. Some portions of the thodu has filled with vegetation.A culvert is seen at ch. 270 m which is at good condition.

4.2.11Chaarupara Kadavu Thodu

Another link thodu named Charupara kadavu thodu joined at ch 169.5km of periyar and having a length of 420m. The thodu has 3.3 to 4.60 m width 2.4m height and silted with sand, rubble blocks at various points. A culvert is seen at ch. 361 m which is at good condition.

4.2.12 Inchathotty Thodu

This thodu originates the left side forest of 611 mudi hills, and flows for a length of 450m and joins at ch, 170.70 km of periyar. The thodu has 3.2 to 5.60 m width 3.70m height and silted with sand, rubble blocks and clay at various points. Some portions of the thodu has filled with vegetation. A culvert is seen at ch. 210 m which is at good condition.

4.2.13 Cheekkodu Thodu

This thodu originates the left side forest of 611 mudi hills, and flows for a length of 1050m and joinsPeriyar at ch, 171.50 km . The thodu has a width of 3.50 to 4.80 m and a bank height 3.50m and is filled with silt, rubble blocks and clay at various points. Some portions of the thodu are filled with vegetation. A culvert is seen at ch. 845 m which is in good condition

4.2.14 Cheekkodu Thodu

This thodu originates from the left side forest of 611 mudi hills, and flows for a length of 623 m and joins Periyar at ch.172.2 km. The thodu has a link thodu – 1 joining to thodu -2 and has a width of 4.5 m to 5 mts. It is filled with laterite, silt and clay. Some portions of the thodu has thick vegetation. A culvert is seen at ch. 405 m which is in good condition

4.2.15 Palamattom Thodu

This thodu originates the left side forest of 611 mudi hills, and flows for a length of 1170m and joins Periyar. at ch, 173.50 km . The thodu has a width of 4.60 to 8.00 m and a bank height of3.8m and is filled with silt, sand, rubble blocks and clay at various points. Some portions of the thodu has filled with vegitations and wastage flowing from plantations. A culvert is seen at ch. 417 m which is in good condition

4.2.16 Quarry Thodu

This thodu originates from the left side forest of 611 mudi hills, and flows for a length of 1170m and joins Periyarat ch, 174.25 km . The thodu has a width of 4.0 to 5.00 m and a bank height of 3.0m and is filled with silt, sand, rubble blocks and clay at various points. Some portions of the thodu has filled with vegetation and wastage from plantations. A culvert is seen at ch. 225 m which is in good condition.

4.2.17 Nadukaani Thodu(Koorukulam Thodu)

This thodu originates from the left side forest of 611 mudi hills, and flows for a length of 1090m and joinsPeriyar at ch, 175.250 km. The thodu has a width of 5.60 to 8.70 m and bank height of 3.6m andis filled with silt, rubble blocks and clay at various points. Some portions of the thodu hasbeen covered with vegetation and wastage. A culvert is seen at ch. 700 m which is in good condition.

DRINKING WATER SCHEMES IN THE PERIYAR REACH

1 ARWSS to Kuttamangalam to Neriamangalam

The scheme area is comprised in Kuttamangalam&Neriamangalamvillage.The total area of the scheme is 60.20 sq.km. The area is divided in to 3 zones.

1.Kuttamangalam zone

2.Neriamangalam zone

3.Avolichal zone

The source of the scheme is Periyar river. The intake well and pump house is situated in the treatment plant compound at Avolichal inNeriamangalam village.The intake well has8m dia& 9m depth. 2 numbers of 20 HP VT pumps are used for pumping.

2 ARWSS to Keerampara.

The scheme is commissioned in 1993 and the capacity is 1.50 mld. The source of the scheme is Periyarriver. The intake well cum pump house is situated at Thattekkad is pumped to 1.50mld slow sand filter at Punnekkad through raw water pumping main of 200mm GI/150mm GI 5km. There is 1.75 lakh litre capacity GL tank at treatment plant site and from this tank distribution lines about 65km.

Conclusion

De-siltation required

The natural depth of the river course became shallow at the upstream stretches of Kuwait bridge due to the deposition of huge quantity of silt, mud and rock boulders during flood. Which lead to the drastic reduction in the carrying capacity of the riverin the upstream of Chainage 16.95 Km.(10°08´14.71" ; 76°55´53.57"). A quantum of 27000 m3(900 x30x1.00m) of silt and rock boulders have to be removed from the upstream stretchesof Kuwait bridge to enhance the carrying capacity of the river.This stretch of the river belongs to Ward Nos. 2 & 4 of Mankulam Panchayath. Consequent to the recurring flood occurred during yester years, this area became flood prone due to the increase in bed load in the river as well as the corresponding decrease in bank height. A road is passing adjoining to the left bank of the river is under the threat of damage due to the scouring of flood water. This road is the only access to the tribal colonies namely 6th mile, Sinkkudi, Chikkanamkudi, Subrahmanyam kudi, Parekudy and Kallakkutikudy of ward No 3 of Mankulam panchayath. About 150 houses are located there.

Silt and rock boulders deposit Upstream of Kuwait bridge

Sand delta formation at Anakkayam

There is delta formation at Anakkayam at Ch:60.070 km of Idamalayar river. This sand deposit delta was formed due to the effects of flood 2018. The sand deposits has a height of 3 to 4 m.

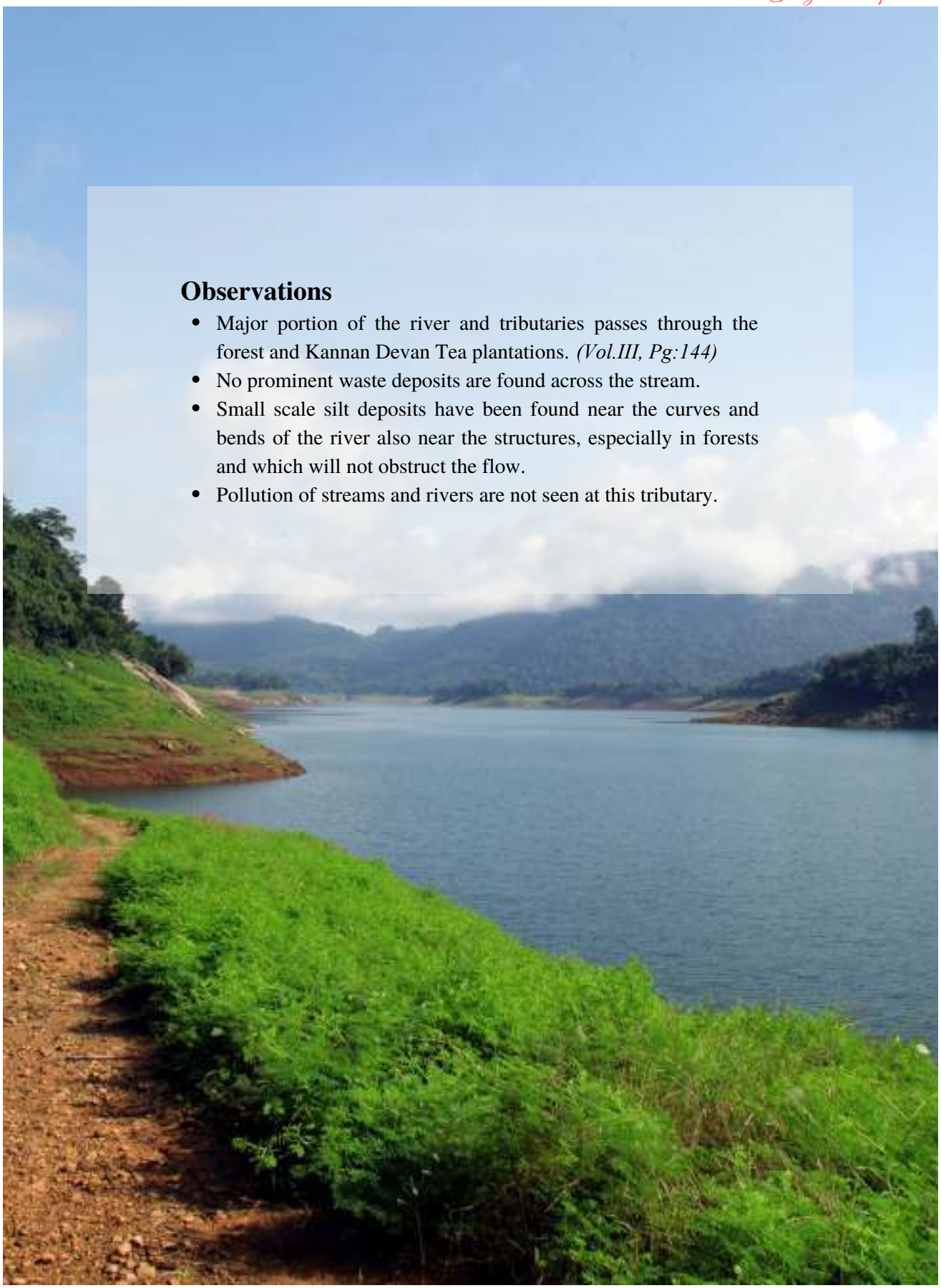
Obstructions

1) A causeway constructed across Mankulamar at Ch. 16.69km (10°06´22.12″ ; 76°55´50.71″) in Mankulam Panchayath have no sufficient vertical clearance and vent way. There became an obstruction to the flow especially during flood. Hence the same has to be dismantled and reconstructed as a bridge having sufficient vent way.

2) Left side abutment of the bridge near Manikandanchal junction in Vellaramkunnuthodu is constructed by protruding in to the thodu, by reducing the vent way. which lead to overtopping of water in the upstream. The same has to be reconstructed.

11) Pooyamkutty bridge (Manikandamchal bridge) situated in Pooyamkuttyar connects Pooyamkutty to Manikandanchal .During monsoon seasons the bridge submerges due to its insufficient height. And also due to its insufficient vent way large floating bodies cannot pass beneath it which weakens the bridge. Left and Right bank of bridge is in forest.

12) In Elamblasserythodu at U/s of Thankappan bridge there is a checkdam which is completely in damaged condition. Inhibitants demolished some portions of check dam at the time of flood as the water is over flowing to the banks. So the inhabitants raise the need demolishing it completely.



Observations

- Major portion of the river and tributaries passes through the forest and Kannan Devan Tea plantations. *(Vol.III, Pg:144)*
- No prominent waste deposits are found across the stream.
- Small scale silt deposits have been found near the curves and bends of the river also near the structures, especially in forests and which will not obstruct the flow.
- Pollution of streams and rivers are not seen at this tributary.

Periyar from Bhoothathankettu Barrage to Kalady Bridge

From Ch. 179.550 Km to Ch. 209.550 Km

Old Bhoothathankettu Dam

Brief Overview-

Reach from Bhoothathankettu barrageto Kalady bridge (Chainage 179.55km to 209.55km) *(Refer , Pg:1256)*
Beyond Bhoothathankettu barrage, Periyar flows towards west along the midlands of Ernakulam District.The details regarding the 30 km reach of Periyar river from Bhoothathankettu barrage to Kalady bridge is covered in this section . The concerned local bodies along the banks of Periyar in this stretch are Pindimana, Vengoor, Koovappady , Okkal, Malayatoor and Kalady grama-panchayats. On right bank, from Bhoothathankettu to Mulamkuzhy is the Malayatoor reserve forest.
Many eco-tourism places like Paniyeliporu, Kodanadu elephant training center, Mahagony-thottam etc are situated along the banks of the Periyar river in this reach. The world famous Malayatoor church is also located in this stretch.The natural tributaries joining the Periyar river in this reach are Thundam Thodu, Illithodu, Palluppetta Thodu and Mukkadai Thodu on the right bank and Krariyeli Thodu & Thottuva Thodu on the left bank. The identified problems in Periyar and its tributaries in this reach are detailed under the following section.

Introduction

The Periyar river from Bhoothathankettu barrage to Kalady bridge flows towards west along the midlands of Ernakulam District. The Bhoothathankettu barrage, which was built in 1964, is situated 11 km away from Kothamangalam in Ernakulam district. The original natural dam has been supplemented by a modern dam impounding the Bhoothathankettu reservoir. The name Bhoothathankettu, means "Monster Fort" - past generations believed it was built by a “Bhootham” (monster). Large blocks of unshaped stones are placed on both sides of the Periyar River to form the dam, making it look like a natural dam built by superhumans.

The story goes that, ages ago demons set out to submerge the Trikkariyoor temple, whose presiding deity is Lord Shiva, by damming the Periyar river and flooding the area. But, Lord Shiva, suspecting trickery, came up with a plan to deter them. He made it appear that dawn was approaching by making a sound like the crowing of the rooster. The demons fearing the arrival of light fled from their task. But there remains to this day the visible proof of their effort – the huge stones the demons were supposed to have rolled onto the riverbed, the “Old Bhoothathankettu”, as seen in figure 1.1. The Periyar river flows on through the narrow space which the demons did not quite manage to dam up.

Figure 1.1: Old Bhoothathankettu Dam

The actual cause for the formation of the Old Bhoothathankettu remains a conjecture. It's been attributed to two great floods – one in the 4th century and the other in 1341, which threw open the port of Kochi. The massive landslides during the flood are believed to have caused gigantic rocks to roll down from the mountain and become entrenched in the Old Bhoothathankettu

Bhoothathankettu has the potential of becoming one of the must-visit places in Kerala. Periyar river flows like a waist chain in the lush green valley that spreads over several acres. The rocks here are hindering the smooth flow of the river, which continues its journey through the big gap between the rocks. Lower down, at Malayatoor the river takes a meandering course and flows calmly and majestically through Kalady. The length of the Periyar river from Bhoothathankettu barrage to Kalady bridge is estimated as 30 km. During this course, the river touches Pindimana, Vengoor, Koovappady and Okkal grama-panchayats on left bank and Malayatoor and Kalady grama-panchayats on right bank. On right bank, from Bhoothathankettu to Mulamkuzhy is the Malayatoor reserve forest.

1.2 Religious and cultural significance

There are several places of religious significance along the banks of the Periyar river. Kalady is a town located on the banks of the Periyar river(figure 1.2). It is the birthplace of Sri. Adi Shankara, the Hindu philosopher who consolidated the doctrine of Advaita Vedanta. The Kalady Kadavu is the place where the river took its turn, and where Kalady was born. It was also the place where Shankara had first performed Aarattu (a river bath of an idol) for his ancestral deity before installing it at its current location. For centuries, during the festival at Sree Krishna temple, the Aarattu has been carried out at this ghat. The "Muthala Kadavu" or Crocodile Ghat, is where Shankara's life turned to sannyasa .

The Malayatoor church is situated atop the Malayatoor hill. The church is dedicated to St. Thomas, who is believed to have prayed at this shrine. Being one of the most important Christian pilgrim centers in Kerala, this holy shrine attracts devotees in very large numbers, not only from Kerala but also from the neighboring states. This famous church is situated at Kurisumudi, a verdant hill in the Western Ghats girdled partially by the Periyar river. This shrine has now been accorded as an international pilgrimage station.

Figure 1.2: Kalady Manappuram

Fig 1.3 Bhoothathankettu Barrage

The main river course was formed years back by the deposition of Alluvial soil and the main stream of Periyar river is detailed in this report.

Table 1.1 - Salient Features

1	Local body	LHS - Pindimana GP, Koovapady GP, Vengoor west GP, Okkal GP RHS – Kalady GP , Malayatoor/Neeleeswaram GP,
2	Length	30 km
3	Width (varying)	220m, 353 m, 173 m, 402m, 597m, 345 m, 209 m, 160m, 280m, 210m, 220m, 330m.
4	Average depth of water	3m, 6m
5	Water spread area	30km x 0.29km = 8.70 sq.km
6	Islands in main river	Vembooram island

2.1 From Ch.179.550 km to 209.550 km

This reach of Periyar river starts from Bhoothathankettu barrage (figure 1.3) and ends at Kalady Bridge (figure 1.10). A land surrounded by Periyar river is located near Thodakayam, (figure1.4) 6.91 km downstream of Bhoothathankettu barrage. This land comes under Kombanad village and as per the details collected from Kombanad village office, this dry land has an area of 12.0715 hectares. An island, named Vembooram (figure 1.5 a&b) is located 12 km downstream of Bhoothathankettu barrage. It is a notified reserve forest and comes under the Natiural Study Centre, Kalady. This island extends upto 1.5 km from Kanjoorkkaram Kadavu to Panamkuzhi and has an area of 50 hectares. Earlier teak plantation was there in this island and now it is a natural forest with all species of trees and wild animals. There are many eco-tourism places along the banks of the Periyar river. Paniyeliporu, Kodanadu elephant training center, Mahagony-thottam are some of them. Figure 1.5 & 1.6 shows thick vegetation and deposits in the river. The world famous Malayatoor church is also situated on the right bank of Periyar river. From Bhoothathankettu Barrage the right bank of the river is forest land up to 20 km. Another main structure across the river is Kodanadu bridge (figure 1.7) at Ch. 201.550 km, connecting Kodanadu and Malayatoor - Neeleeswaram Grama Panchayat. Kodanadu elephant training center and Malayatoor forest division Office are located upstream of Kodanadu bridge. There are two Check Dams (figure 1.8) downstream of the Kodanadu bridge .This reach ends at Kalady bridge (figure 1.9) at Ch. 209.550 km, very near to Kalady Manappuram. Seven KWA pump houses are located in this reach, one at Pindimana and the others at Kottappady, Panankuzhy, Cheranellur, Illithodu , Neeleeswaram and Kalady.

Figure 1.5 (b) Vembooram island

Figure 1.5 (a) Vembooram island

Figure 1.7 Thick vegetation and deposit inside the river

Figure 1.4 : Land near Thodakayam

Figure 1.6 Thick vegetation in the river

Figure 1.8: Kodanadu Bridge

Figure 1.9: Check dam at downstream of Kodanadu Bridge

Figure 1.10: Kalady Bridge

Tributaries

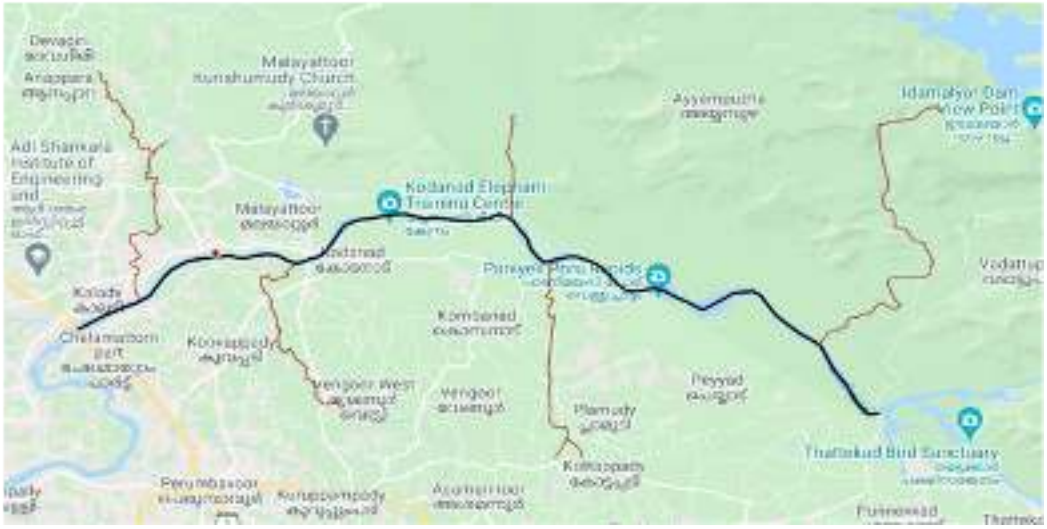


Figure 1.11. Periyar river and its tributaries from Bhoothathankettu barrage to Kalady bridge

The various natural tributaries joining the Periyar river, during its course from Bhoothathankettu to Kalady bridge are, Thundam Thodu, Illithodu, Palluppetta Thodu and Mukkadai Thodu on the right bank and Krariyeli Thodu & Thottuva Thodu on the left bank (figure 1.10). The joining points of these tributaries with the river are shown in the schematic diagram. The Thundam thodu and Illithodu flows completely through the reserve forest. The length of these tributaries is mentioned below *(Refer , Pg:1256)*

1	Thundam Thodu	12.800 km
2	Illithodu	3.560 km
3	Pallupetta Thodu	3.835 km
4	Mukkadai Thodu	15.108 km
5	Krariyeli Thodu	7.290 km
6	Thottuva Thodu	7.775 km

1.5 After effects of flood in 2018

According to a study by the Central Water Commission, during the time period of 3 days from 15th to 17th August 2018, the rainfall depth realized in the Periyar basin was 588 mm. Bhoothathankettu barrage during this period can be seen in figure 1.11. The maximum discharge passing through the Periyar river at Neeleeswaram was 8800 m3/sec, recorded at 16th August 15:00 hrs, as per the CWC's Neeleeswaram G&D site and the discharge at Neeleeswaram on 17th August 2018 was 8600 m3/sec.

A few days after receiving one of the highest rainfalls in the century, Kerala was caught under the threat of severe drought. Water level in wells, ponds and rivers have recorded lowest levels and some wells even collapsed., As per the study conducted by Centre for Water Resource Development Management (CWRDM), an autonomous research institution under the State government, heavy run-off of the top soil in the upland areas and the siltation in the rivers were the reasons for the falling water level.

Figure 1.12 Bhoothathankettu Barrage (Flood 2018)

1.6.2 Deposits in the stream

After the flood, deposits are formed in many stretches of the river. A comprehensive study has been conducted by the Tropical Institute of Ecological Sciences department and silt auditing is done. Total available silt of Periyar river comes to 2103410.53 m3.*(Refer , Pg:1392, 1407)*

Table 1.2 Available silt deposits in Main River

Sl. No:	Name of Panchayath	Available Silt(m3)
1	Pindimana	153105.20
2	Vengoor	804190.42
3	Koovappady	451069.165
4	Malayatoor- Neeleeswaram	557176.49
5	Okkal	79847.505
6	Kalady	58021.75
TOTAL		**2103410.53**

The following activities have to be carried out to make room for river in this reach,

- Clearing light, thick and thorny jungle including vegetation growths on LHS and RHS of river
- Pruning branches of trees grown into the river
- De-silting and removal of debris from river bed as well as banks
- Regular maintenance & upkeep of river and banks is necessary
- Survey of river to evict any types of encroachments with consensus of revenue and concerned local bodies *(Refer , Pg:1256)*

TRIBUTARIES OF PERIYAR RIVER

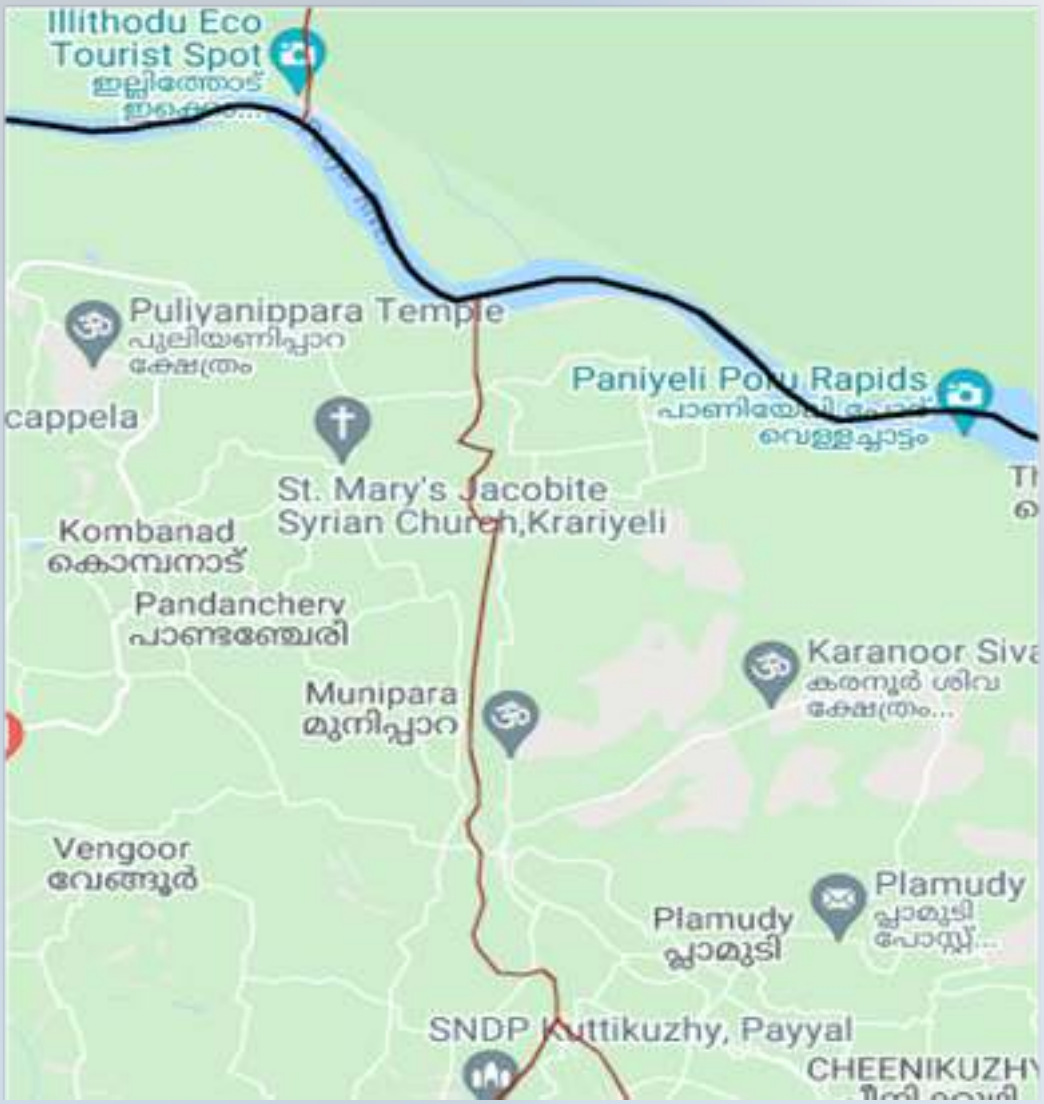


Figure L1.1. Map profile of Krariyeli thodu

L1.1 General

The Periyar river tributary named Krariyeli thodu confluence with Periyar river at Ch. 192.05 km and 12.5 km downstream from Bhoothathankettu barrage on the left bank. This can be seen from the above figure L1.1. The Krariyeli tributary is also known as Paniely thodu at some reaches. It has two major 1st order branches having width greater than 3m. The left branch has a length of 2.744 km and right branch has a length of 1.933 km. The remaining all other 1st order branches are having width less than 3m and is not considered in this study. The salient features of Krariyeli thodu is given in Table L1.1

Table L1.1 Salient features of Krariyeli Thodu

1	Right/Left bank of Periyar river	Left bank
2	Local Body	Vengoor GP and Asamannur GP
3	Length	1st order stream(left) – 2.744 km 1st order stream (right) – 1.933 km 2nd order stream(main) – 7.29 km
4	Width (Varying)	16m, 15m, 12m, 11m, 10m, 8m,7m, 5m, 4m, 3m
5	Average depth of water	3m, 2.5m, 2m,1.5m, 1m, 0.8m

L1.2 1st Order Krariyeli Tributary (Left branch)

The first order left tributary have a length of 2.744 km and it flows through Vengoor and Asamannur Grama Panchayat. Kuthukuzhy-Kadakanathodu road bridge is situated across the 1st order Left Krariyeli tributary at a distance of 1.3 km from the confluence point of 1st order and 2nd order stream (figure L1.2.1). The sides are partially protected with rubble at the bridge location and the remaining stretches are unprotected. Water weed grown in the stream obstruct the free flow of water at this location. There is a pump house at the upstream side of the bridge (figure L1.2.2).

Figure L1.2.1: U/S view of Kuthukuzhy-Kadakanathodu Road Bridge

Figure L1.2.2: Pump House at U/S of Kuthukuzhy-Kadakanathodu Road Bridge

Figure L1.2.3: U/S and D/S view ofKottapady-Payyal link road culvert

Kottapady- Payyal link road culvert is situated at a distance of 604 m upstream of Kuthukuzhy-Kadakanathodu road bridge. The upstream and downstream views from the bridge is shown in Figure L1.2.3. Water weeds can be seen at this location and it obstructs the free flow of water. The sides of the stream are not protected.

Figure L1.2.4: U/S and D/S view from the Panichayam – Moonamthodu Road Culvert

L1.3 1st Order Krariyeli Tributary (Right branch)

The first order right tributary has a length of 1.933 km and it flows through Vengoor and Asamannur Grama Panchayat. Figure L1.3.1 and L1.3.2 shows the U/S and D/S view of Kuttykuzhy Plamudy road culvert. The sides of the stream near the culvert portion are protected on both U/S and D/S. The remaining sides of the stream are unprotected. Water weeds are seen on both U/S and D/S portion of culvert.

Figure L1.3.1: U/S view of Kuttykuzhy Plamudy road culvert

Figure L1.3.2 D/S view of Kuttykuzhy Plamudy road culvert

L1.4 2nd Order Krariyeli Tributary

The visual observations of 2nd order Krariyeli thodu having length of 7.29 km are explained below. Mainly there are 11 numbers of structures across the main thodu and the details are explained in the remaining sections.

Figure L1.4.2: Foot Bridge near U/S of Punjakara – Moonamthodu Road Bridge

Figure L1.4.1 D/S view of Punjakara – Moonamthodu Road Bridge

L1.4.1 From Ch. 0 m to Ch. 761.5 m

Punjakara – Moonamthodu road bridge is at a distance of 6.53 km from the mouth of Krariyeli thodu and both sides of the stream is protected with rubble on U/S and D/S near the bridge. There is a foot bridge at a distance of 26 m upstream of this bridge and is shown in figure L1.4.2. It is seen that the left D/S of bridge have silt deposition for a length of 8m (figure L1.4.1)

Figure L1.4.3: U/S and D/S areas of the Kuttykuzhy Plamudy Culvert

Figure L1.4.3 shows the U/S and D/S areas of the Kuttykuzhy Plamudy Culvert and it is clear that the water weeds obstruct the free flow of water. The sides of the stream are protected with rubble near the culvert area only and rest are unprotected.

L1.4.2 From Ch. 1914 m to Ch. 3096 m

Figure L1.4.4 and L1.4.5 shows the D/S and U/S view of Kanichattupara bridge. Water weeds are observed at the U/S left side of Kanichattupara bridge and the U/S right bank is protected for a length of 200 m and U/S left side is not protected. There is no obstruction to flow on downstream of culvert.

Figure L1.4.5: U/S view of Kanichattupara Bridge

Figure L1.4.4: D/S view of Kanichattupara Bridge

In this reach Krariyeli thodu bifurcates at a distance of about 1.2 km D/S of Punjakara – Moonamthodu Road Bridge near Meykappala-Chooramudy road and flows right (figure L1.4.7) and left (figure L1.4.8) for a length of 200 m downwards and again joins and flow as a single stream . There is enough vertical clearance for both right and left culvert at this location. The sides are partially protected with rubble on both sides. It is observed that presence of water weeds obstructs the free flow of water at the bifurcating point of the stream (figure L1.4.6). There is a pump house at this location on the left branch (figure L1.4.9)

Figure L1.4.9: Pumphouse near the left culvert

Figure L1.4.6: Bifurcating point near Meykappala-Chooramudy Road

Figure L1.4.7: U/S and D/S view of Right Culvert

Figure L1.4.8: D/S view of Left Culvert

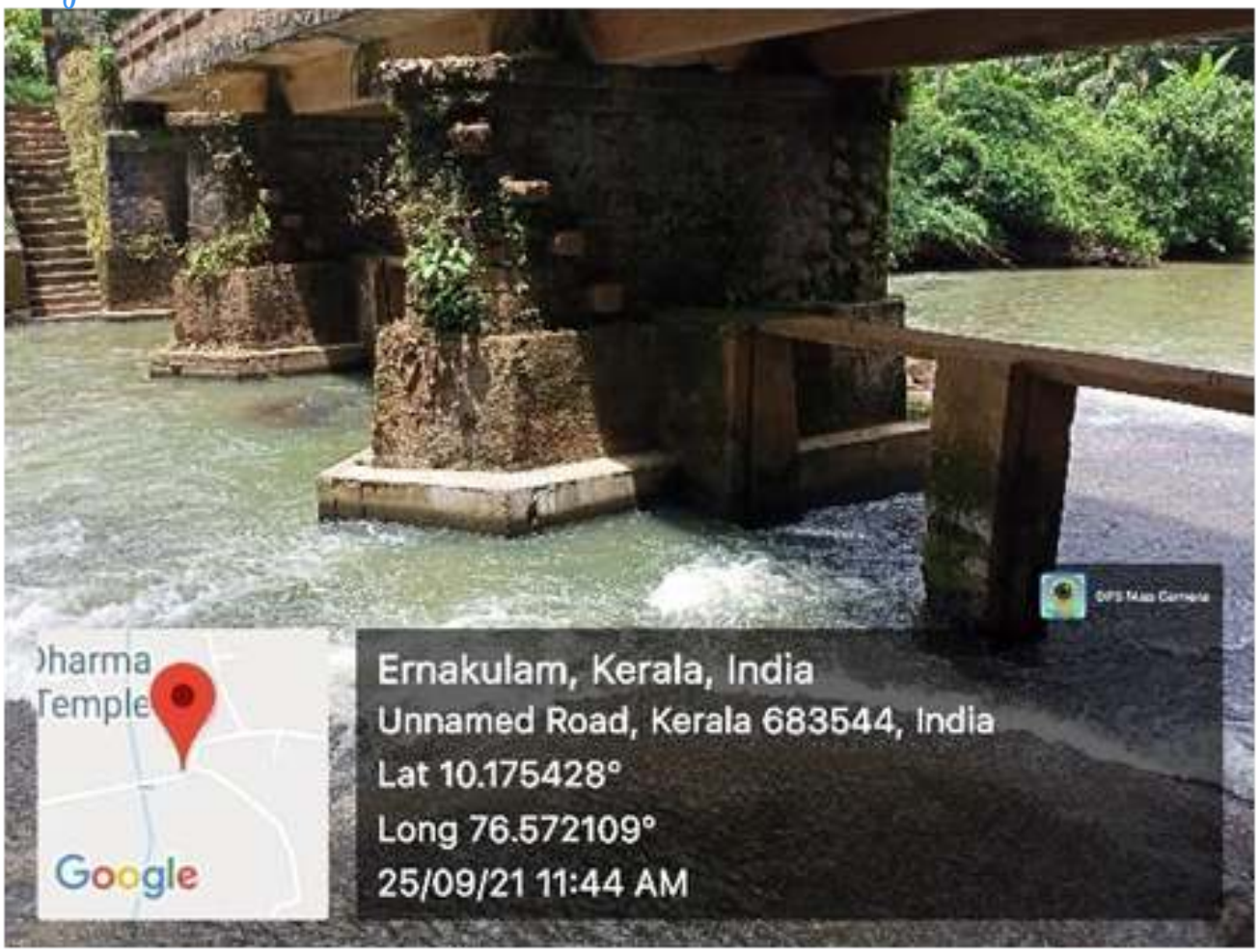


Figure L1.4.10: U/S and D/S view of Krariyeli Kochupurakkankadavu Road Bridge

Figure L1.4.11 Check Dam near Krariyeli Kochupurakkankadavu Road Bridge

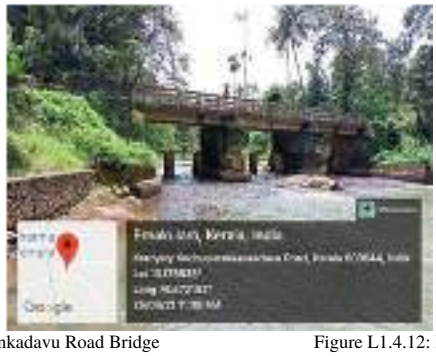


Figure L1.4.12: D/S view of Krariyeli Kochupurakkankadavu Road Bridge

L1.4.3 From Ch. 4468 m to Ch. 6673 m

Krariyeli Kochupurakkankadavu road bridge is situated at a distance of 617 m from the mouth of the stream. The upstream and downstream views of bridge are shown in Figure L1.4.10. The channel has an average width of 15 m at the bridge location. A Cross bar having length of 20 m and 1m height is situated 5 m upstream of the bridge (Figure L1.4.11). The upstream and downstream right bank of the channel is protected with rubble for a length of 10 m. The downstream left bank is not protected and considerable erosion can be seen there. There is a drainage pipe outlet leading to the stream on the right downstream side of bridge (Figure L1.4.12). Silt deposition can be seen downstream of the bridge and considerable vegetation is seen to have grown on both sides of the stream, obstructing the natural flow of water.

Figure L1.4.13: Perumbavoor Paniely Road bridge

Figure L1.4.14 D/S and U/S view of Perumbavoor Paniely Road bridge

Perumbavoor Paniely road bridge is situated at a distance of 2.3 km from the mouth of the Krariyeli thodu (figure L1.4.13 & figure L1.4.14) . Considerable silt deposition and delta formation is seen on the upstream right bank of the bridge and also vegetations are seen to have grown into the stream course and disturbing the natural flow of water. It is observed that some waste disposal pipes are leading from nearby establishment into the stream on the right bank. The sides of the stream are not protected.

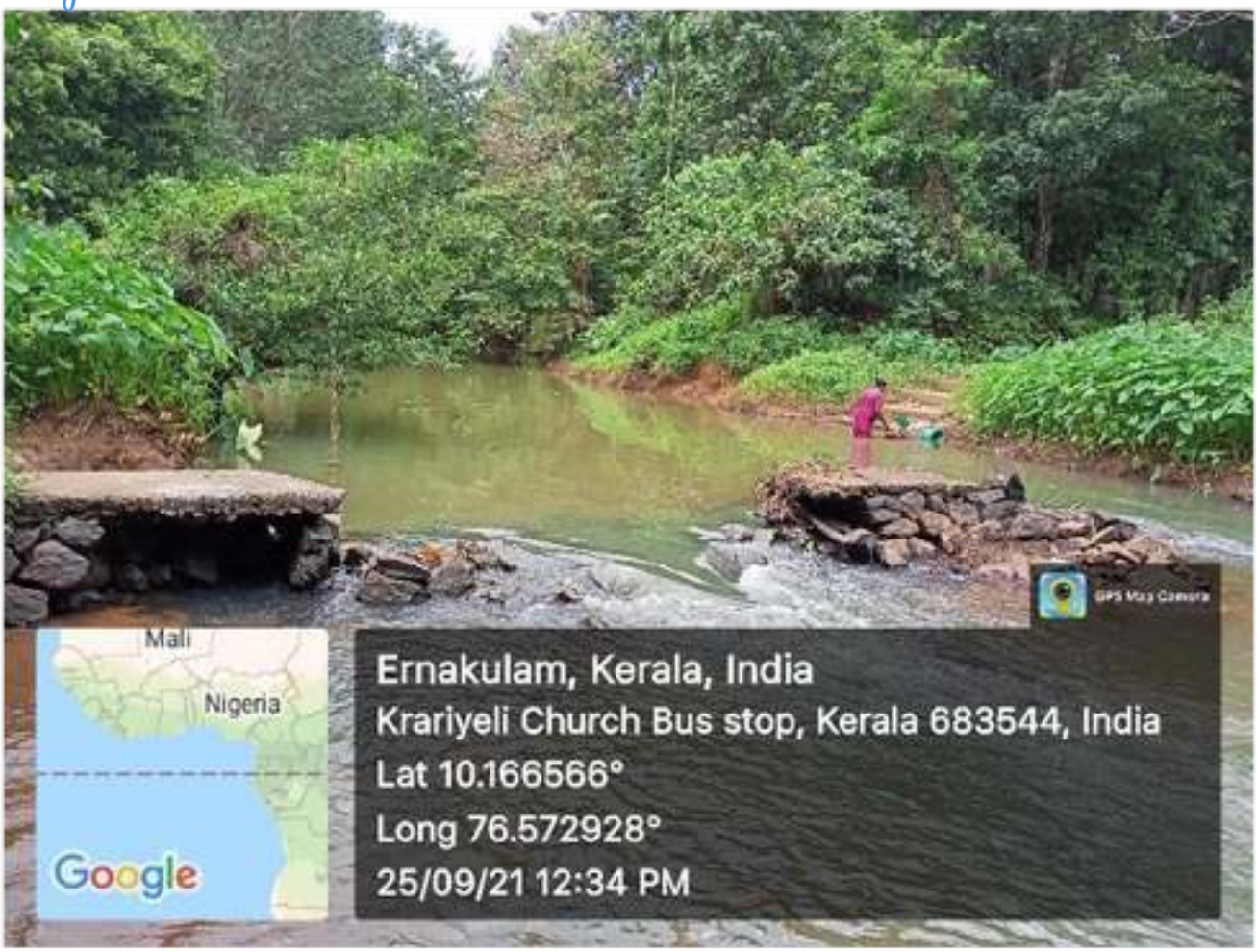


Figure L1.4.15: Damaged Cross bar

A destroyed Cross bar is seen at a distance of 513 m from the U/S of Perumbavoor Paniely Road Bridge (Figure L1.4.15). The remains of the destroyed Cross bar should be removed for the free flow of water.

L1.4.4 At Ch. 7290 m

At the confluence point of Krariyeli thodu on left bank of Periyar, the tributary has sufficient width of 11 m and depth of 4m for the free flow of water.The confluence view of Krariyeli thodu is shown in Figure L1.4.16. There are no obstructions to the flow of water like delta, water weeds and accumulation of solid wastes. Periyar is locally named as Aravante thodu at the mouth of Krariyeli tributary. The Vembooram island is located on the right bank of Periyar opposite to the confluence point of Krariyeli thodu.

Figure L1.4.16: Confluence of Krariyeli thodu with Periyar river

L2. THOTTUVA (KODANADU-PUZHUKKAD) TRIBUTARY (PRB LHS2) at Ch. 201.98 km

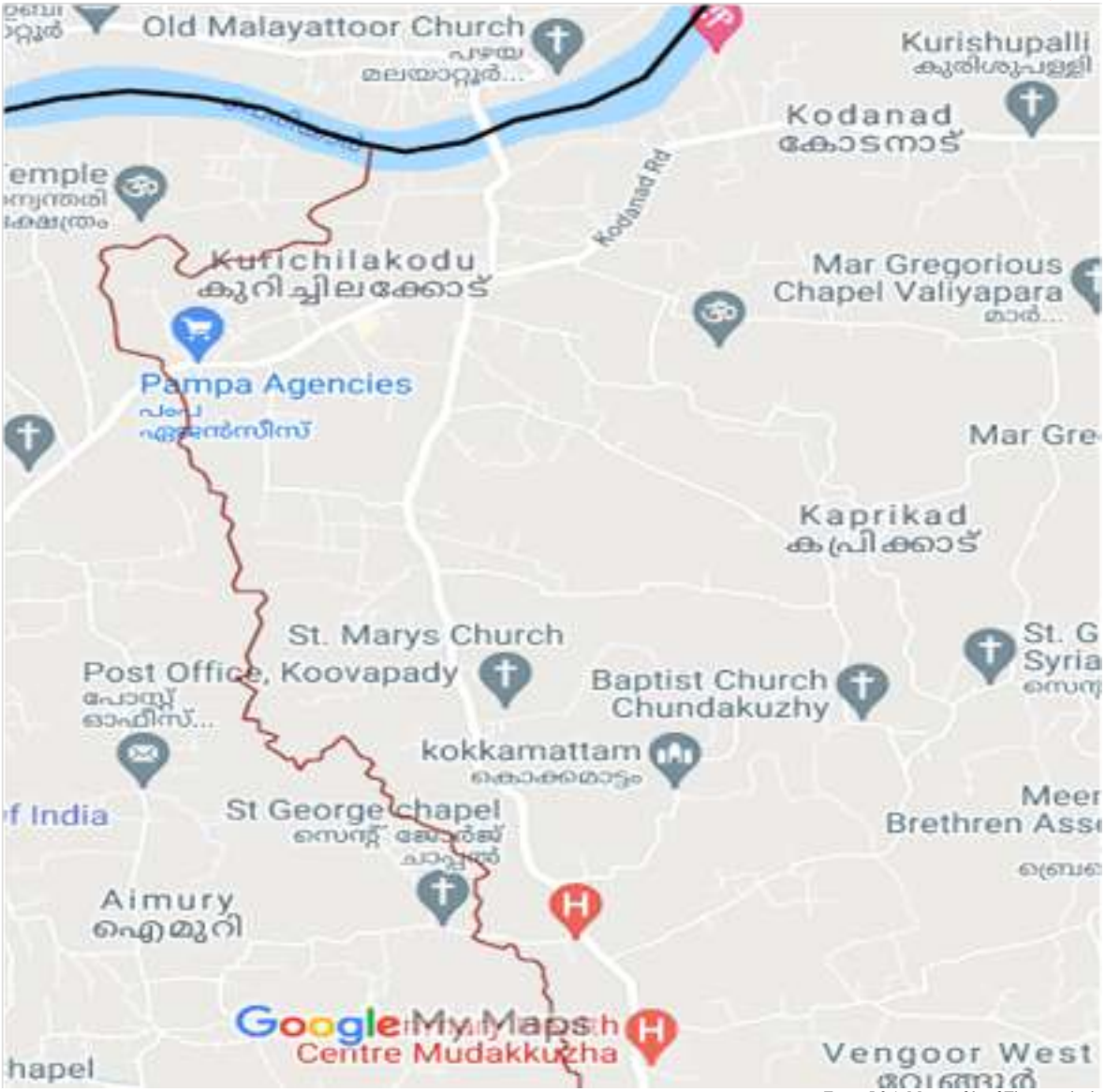


Figure L2.1. Map profile of Thottuva thodu

L2.1 Salient features

Table L2.1: Salient features of tributary

1	Right/Left bank of river	Left
2	Local Body	Koovappady, Mudakkuzha &Vengoor West GP
3	Length	7775 m (7.775 km)
4	Width (Varying)	20m, 15m, 10m, 12m, 8m, 6m, 5m, 4m, 3m,2.5 m
5	Average Depth of Water	2.5m ,2m, 1m,1.5 m, 0.8m, 0.5m

Figure L2.1.1: Satellite view of Thottuva thodu ending in Periyar river

The visual observations of Thottuva thodu are explained below. The immediate and necessary actions to be taken up are also explained in the concluding report. The tributary named Thottuva ends at Ch. 7.775 km, downstream of Periyar Cross bar near Kurichilakkode bridge at the left bank of Periyar river. Figure L2.1 & L2.1.1 shows the aerial view of Thottuva thodu. The salient features of the tributary are shown in Table L2.1.

Figure L2.2.1: U/S and D/S of Pandikkad bridge

L2.2 At Ch. 0 m

Keezhillam-Kurichilakkode road bridge is situated at a distance of 7775 m from the mouth of the channel. The upstream and downstream views of bridge are shown in Figure L2.2.1. It is clear that the upstream of bridge contains vegetation which obstructs the flow of water.

The sides of the channel are partially protected with rubble and locally available stones for small distances. The depth of water is about 0.6m and silt deposit is about 0.3m. There are some visible waste deposits on the banks. The channel is having an average width of about 2.5m on U/S and 3 m width on D/S near Puzhukkad Toddy shop. Thick vegetation is seen on both sides of the stream

Figure L2.3.1: Water Authority pump house at Anakkallu (U/s and D/s)

L2.3 From Ch.0 m to Ch. 1500 m

In Keezhillam-Kurichilakkode road at Anakkallu, a bridge is situated at Ch.200 m. A pump house of Kerala Water Authority (Mudakkuzha GP) is located near to it. Also, there is a cross bar across the thodu having 12 m width and 1.5 m height. By local enquiry it was revealed that a lot of people enjoying the benefits of this tributary. 20 HP pump set and a filtering unit was included in the Lift Irrigation scheme. The upstream and downstream views of bridge is shown in figure L2.3.1. It is clear that the upstream of bridge contains vegetation. The depth of water at U/S of crossbar is about 1.6 m and 0.5 m at D/S, with silt deposit about 0.3 m. There are some visible waste deposits and vegetation on the banks.

The two sides of the channel are protected with rubble and a good bathing ghat was situated there. The channel is having an average width of about 12 m, width reducing up to 8 m on D/S.

Figure L2.3.2: Kuruppampady Panamkuzhy road bridge

At the chainage of 1480 m there is another bridge called as Nalupalam Bridge (figure L2.3.2), of span 10 m with thick vegetation and siltation found on U/S and D/S sides. Side protection was found on upstream. The depth of water is about 0.8m and silt deposit was about 0.5m.

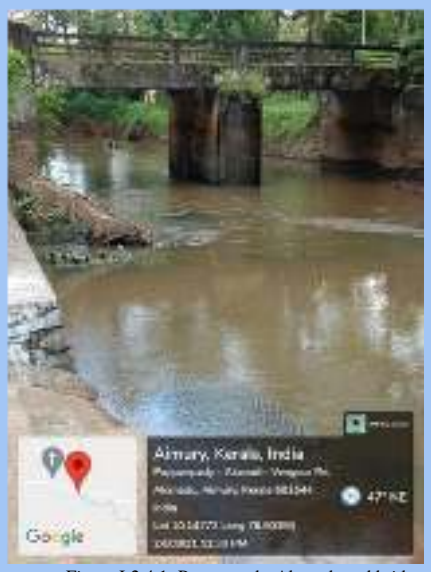


Figure L2.4.1: Pappanpady-Akanad road bridge

Figure L2.4.2: Damaged foot bridge

L2.4 From Ch.1500 m to 5515 m

In Pappanpady- Akanad Road (Mudakkuzha panchayat) at Akanad there is a bridge of span. 10 m. An old 1.50 m wide foot bridge was fallen down into the thodu, obstructs the flow of water to downstream. The view of bridge is shown in Figure L2.4.1. No side protection works, siltation and vegetation on upstream and downstream. The depth of water at u/s is about 1.m and D/S 0.7 M silt deposit is about 0.3m. There are some visible waste deposits on the banks.

At Kurichilakkode, in Koovappady grama Panchayat (Kodanadu –Vallam road) there is a 35m wide bridge across the thodu. Also, an old damaged foot bridge exists nearby of the road bridge. There is a panchayat Lift Irrigation scheme working in this reach, two 5HP pumps are used for the same. A metal crush unit is working on the left bank. Out of 35 m span, nearly 27m width comes under marshy land of 8m wide thodu. Vegetation and silt deposit was found in upstream and downstream. Figure L2.4.2 shows the details.

Figure L2.5.1: Foot bridge at Kurichilakkode

L2.5 From Ch. 5515m Ch: 7775 m

On 87 m from end point there is a foot bridge of 12m span with private lands on both sides of foot bridge. This reach belongs to Koovappady Grama Panchayat. Waste pipes from private lands has been found connected to the thodu. Deposits and vegetations has found inside the thodu on upstream of the foot bridge. The bed of the thodu is rock. Figure L2.5.1 shows the foot bridge and the premises.

L2.6 At Ch. 7775 m

At 7.775 km Thottuva thodu meets Periyar river on 21.70 km on left bank. Here Thottuva thodu has a width of 15 to 20 m and depth of water is about 2.5m. There are no obstructions to the flow of water like delta, water weeds and accumulation of solid wastes. Kurichilakkode Lift Irrigation scheme is situated on the mouth (RHS) of the channel. The right bank of thodu is protected up to 87 m from the meeting point to river. There were no obstructions found in this 87m length. In the right bank, there is a Water Authority pump house. The bed of thodu is rock. Figure L2.6.1 shows the meeting point of river. The mouth is having sufficient width and depth for the free flow of water.

Figure L2.6.1: Confluence of Thottuva thodu with Periyar river

R1. THUNDAM TRIBUTARY (PRB RHS1) at Ch. 182.76 km

R1.1 Salient Features

1	Local Body	Kuttampuzha GP
2	Length	12.8 km
3	Width(mouth)	58 m
4	Average depth of water	2 m
5	Water spread area	Inaccessible

Table R1.1: Salient features of Thundam thodu

Thundam thodu starts from reserved forest area and joins with Periyar river at ch.182.76 km on the right bank. It flows completely through forest land. Hence the details of this thodu is completely unknown. Figure R1.1 is the map profile of Thundam thodu and figure R1.1.1 shows a part of Thundam tributary at Ayyampuzha region From the forest officials we can learn that the total length of the thodu is about 12.8 km and width at the mouth is about 58 m. There is an Aqueduct of IIP main canal at a distance of 180 m from the mouth of the thodu. The forest road crosses the thodu at a distance of 120 m from mouth which is provided with a pipe culvert. Due to the shallow depth of this pipe culvert, it is obstructing the free flow of water through the thodu very much and is to be reconstructed at the earliest. Silt deposit of about 1.5 m height and thick vegetations are found in the mouth of the thodu which also obstructs the flow of water. Large number of stone boulders are seen in the visible area of the thodu. It came to know from forest department that many small tributaries join the Thundam thodu at different places in the forest. Any activity in the forest area requires permission of forest department.

Figure R1.1.1: Part of Thundam Tributary at Ayyampuzha region

R2. ILLITHODU TRIBUTARY (PRB RHS2) at Ch. 194.06 km

Figure R2.1. Map profile of Illithodu

R2.1 Salient features

Illithodu starts from Malayatoor forest area and joins with Periyar at Ch.194.06 km on its right bank. Figure R2.1 is the map profile of Illithodu. It flows completely through forest land. Hence the details of this thodu are unknown. From the forest officials it is learnt that the total length of this tributary is about 3.56 km and width at the mouth is about 16 m. There is an Aqueduct of IIP main canal at Ch 2.77 km of this tributary. Near Perumthode forest station, tributary crosses forest road having a bridge of shallow vertical clearance at Ch 3.1 km. Due to the shallow depth, this culvert is an obstruction for the free flow of water through the thodu and has to be reconstructed. Any activity in the forest area requires permission of forest department.

R2.1 Salient features

Illithodu starts from Malayatoor forest area and joins with Periyar at Ch.194.06 km on its right bank. Figure R2.1 is the map profile of Illithodu. It flows completely through forest land. Hence the details of this thodu are unknown. From the forest officials it is learnt that the total length of this tributary is about 3.56 km and width at the mouth is about 16 m. There is an Aqueduct of IIP main canal at Ch 2.77 km of this tributary. Near Perumthode forest station, tributary crosses forest road having a bridge of shallow vertical clearance at Ch 3.1 km. Due to the shallow depth, this culvert is an obstruction for the free flow of water through the thodu and has to be reconstructed. Any activity in the forest area requires permission of forest department.

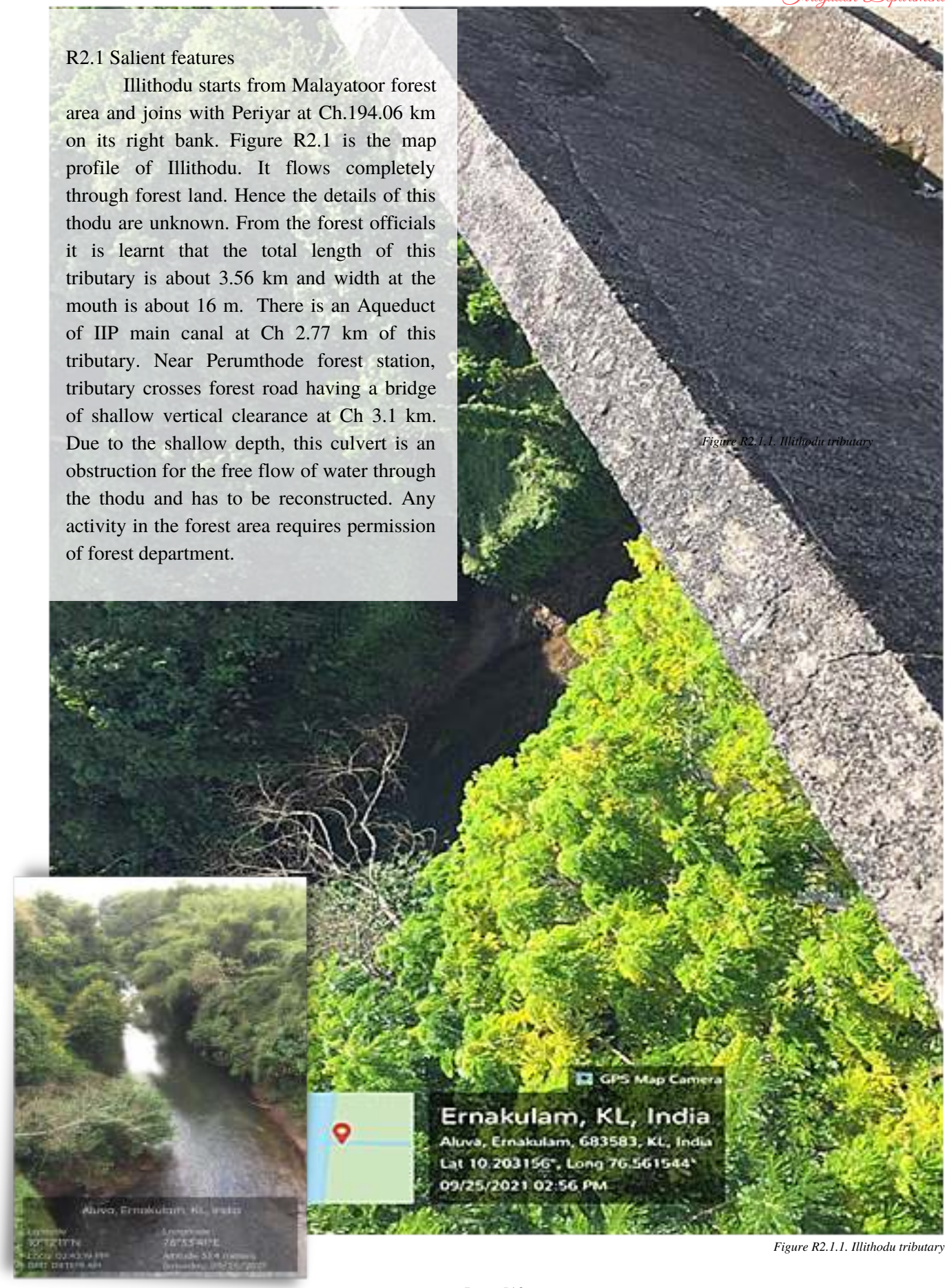
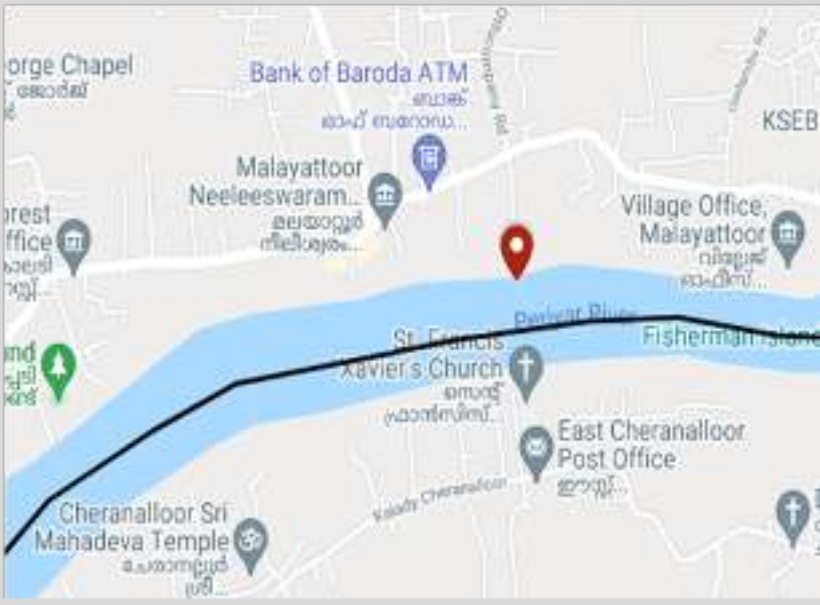


Figure R2.1.1. Illithodu tributary

Figure R2.1.1. Illithodu tributary

R3. PALLUPETTA TRIBUTARY (PRB RHS3) at Ch. 203.76 km



R3.1 Salient Features

Table R3.1 Salient features of Pallupetta thodu

1	Local Body	Malayatoor-Neeleeswaram and Ayyampuzha GP
2	Length	3835 m(3.835km)
3	Width(varying)	8 m, 5 m, 3 m
4	Average depth of water	0.5 m,1 m, 1.8 m, 3 m
5	Water spread area	0.02 Sq.km

The Pallupetta tributary originates from Malayatoor mountains and it joins with Periyar river at Ch. 203.76 km at right side.As seen in figure R3.1, this tributary flows through highly populated area in Malayatoor-Neeleeswaram and Ayyampuzha Grama panchayat. The total length of the tributary is 3.835 km and width vary from 3m to 8m. Some portions of this thodu are having silt deposit at a shallow depth and is not causing any disturbance to the free flow of water. The depth of water in the joining portion is about 3m and the width of the thodu at the mouth is sufficient to cause free flow. During the flood in 2018, this tributary overflowed causing flood in nearby areas.

Figure R3.2.1. Pallupetta thodu at Malayatoor IIP canal bund road

R3.2 At Ch. 0.00 m

The starting point of this tributary is in Ayyampuzha GP near IIP main canal where the small tributaries from Malayatoor mountains join together to form this thodu. The starting point of the thodu is fully covered with vegetation on either side of the thodu and the sides are not protected. This can be clearly seen from the figure R3.2.1. The average width of the thodu in this portion is about 3m. and depth is 2m. The depth of water in this portion is 1m (average.)

Figure R3.3.1: Pallupetta thodu at Laksham veedu and Vellappara road

R3.3 From Ch.10 m to Ch. 1480m

The thodu flows through rubber plantation up to Ch. 1480 m. The sides of the thodu is partially protected by rubble masonry. Then it flows about 600m through Paddy field. One small sub tributary join at this portion. The average width of this portion is about 4 m and the average depth is about 1.5 m and having an average water depth of 0.65 m. Some boulders are laying in some stretches of the thodu. Figure R3.3.1 shows the part of Pallupetta thodu at Laksham veedu and Vellappara road

Figure R3.4.1: Pallupetta thodu near Ottu company at Neeleeswaram.

R3.4 At Ch. 2660 m

At this chainage there is a damaged culvert near Ottu company at Neeleeswaram as shown in figure R3.4.1. The vertical clearance of this culvert is very low and is obstructing the free flow of water. So, this damaged culvert needs to be reconstructed with sufficient vertical clearance. It is seen that the sides of the thodu is partially protected. The average width of the thodu in this portion is about 4 m. The water depth in this area is about 0.75 m. The upstream side of the culvert is having encroachment, which reduces the width of the thodu to a great extent and is a reason for flooding of this area.

The sides of the thodu near burial ground are protected by rubble masonry. The average depth of water in this portion is about 0.6 m. The width of the thodu in this portion is reduced considerably due to the construction of crematorium (figure R3.4.2) which obstruct the flow of water through the thodu.

Figure R3.4.2: Pallupetta thodu near Smasanam, Neeleeswaram

R3.5 Ch. 2993 m to Ch. 3400 m

It is noted that from Ch. 2993 m to 3400 m the thodu flows through thick vegetation and the sides are slipped down as shown in figure R3.5.1 and is to be protected. The average width of the thodu in these portions is about 5 m and the depth is 2.5 m. The average depth of water is 0.70 m. The thick vegetation obstruct the free flow of water to a great extent and has to be removed at the earliest.

Figure R3.5.1: Pallupetta thodu at Neeleeswaram

Figure R3.6.1: Pallupetta bridge

R3.6 Ch. 3493 m

At Ch. 3493 m there is a bridge named Neeleeswaram bridge (figure R3.6.1). The bridge is in good condition and the upstream and downstream of the bridge is having some vegetation which is to be removed for the free flow of water through the thodu. The width of the thodu at this portion is about 5 m and depth about 1.8 m. The average depth of water in this portion is about 0.5m.

R3.7 At Ch. 3835 m

The Pallupetta tributary joins with Periyar river at Ch. 203.76 km on its right bank (figure R3.7.1). The width of the thodu in the joining portion is about 8m and depth of water is about 3m. It is seen that thick vegetation in this portion obstruct the flow of water which is to be removed for the free flow of water from thodu to the Periyar river.

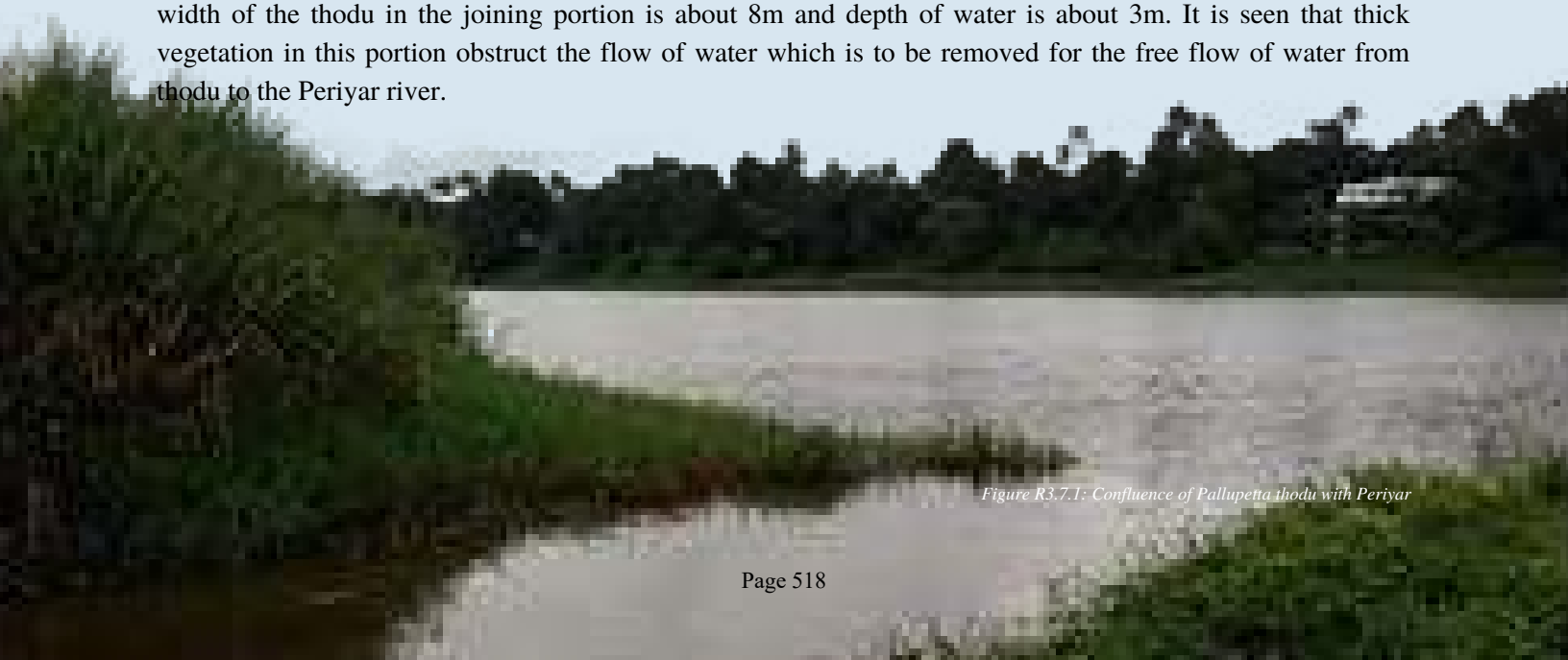


Figure R3.7.1: Confluence of Pallupetta thodu with Periyar

R4. MUKKADAI TRIBUTARY (PRB RHS4) at Ch. 206.61 km

Figure R4.1. Map profile of Mukkadai thodu

R4.1 Salient Features

1	Local Body	Ayyampuzha, Mookkannoor, Manjapra, Malayatoor-Neeleeswaram, Kalady Grama Panchayat
2	Length	15108 m (15.108 km)
3	Width (Varying)	3 m,10.5 m,12 m,13 m,8 m,4 m,10 m,11 m,7 m,15 m,23 m, 6 m,14 m,27 m,17 m,23.5 m
4	Average Depth of water	0.80 m,1.00 m,120 m,1.60 m,1.85 m
5	Water spread area	0.019 Sq.km

Table R4.1: Salient features of Mukkadai thodu

The figure R4.1 is the map profile of Mukkadai thodu and visual observations of the same is explained below. The immediate and necessary actions to be taken up are also explained in the concluding report.

Figure R4.2.1: Mukkadai thodu at Ch. 0 m

R4.2 At Ch. 0.00 m

The starting point of Mukkadai thodu is at Kallala Estate, Block No. 90 of Plantation cooperation, Kerala Ltd (figure R4.2.1). In this starting point two tributaries are joining together to form this thodu. These tributaries are Kuliramthodu, starting from the back of Kuliramthodu Mahadeva temple near forest and the thodu starting from near Kallala estate office. The width of the thodu at the starting point is about 4.00 m and the depth of water is 75 cm. The sides of the thodu are not protected at this starting point. This thodu is used as a main source of water for irrigation purposes for the local bodies through it is flowing. This thodu helps to maintain the water table at a reasonable level around the area through it flows which in turn helps to get sufficient water for drinking purpose. So proper upkeep of this thodu is very much essential.

R4.3 At Ch. 1650 m

It is clearly shown in the photograph (figure R4.3.1) that the presence of thick silt deposits along the right-side protection wall. The depth of silt deposit is about 1 m. This portion is near KSEB Substation Chully. Most of the area near substation is partially filled with silt and this area was flooded during the 2018 food. So, de-silting of this portion is very much essential. Depth of thodu in this portion is 2.5 m, but almost 1 to 1.5 m depth is filled with silt deposit. The side of the thodu is partially protected with DR masonry. Encroachments are seen in the thodu. Encroachments and silt deposit obstruct the free flow of water. Width of thodu in this portion is about 8.00 m and depth of water is 60cm.

Figure R4.3.1: Silt deposit

Figure R4.4.1: Kuttipara bridge

R4.4 At Ch. 2958 m

Kuttipara bridge is situated in Mukkadai thodu at Ch. 2958 m (figure R4.4.1). The photographs clearly show the presence of vegetation and water weeds that obstruct the natural flow of water. In the downstream of bridge, we can see delta formation on either side of thodu and is obstructing free flow of water. The width of delta formation is about 3m and length is 10m. Landslides are also present in some portions of the thodu. Width of the thodu near the bridge is 20m and is reducing to downstream side as 6m due to the delta formation on either side of the thodu. The protected side of the thodu was partially damaged in the 2018 flood. The delta formation is to be removed and the damaged sides are to be reconstructed for the smooth flow of water.

Figure R4.5.1: Muringedathpara bridge

This Muringedathpara bridge is situated in Mukkadai thodu at Ch. 4380 km (figure R4.5.1). Construction of a vented cross bar is going on 15 m upstream of the bridge for purpose of getting irrigation water to the nearby area. The construction is not yet completed. From the figure R4.5.1 attached; we can see the present stage of construction. The downstream side of the thodu is obstructed with silt formation having a width of 6 m and length of 25 m. This silt formation and vegetation is obstructing the free flow of water. This is shown in figureR4.5.1 The sides of the thodu are not protected. There is a reduction in the width of the thodu from the bridge to its downstream due the silt formation and this can be seen in the attached figure R4.5.1. The removal of this accumulated silt is very much essential for the free flow of water.

Figure R4.6.1: Marygiri bridge

R4.6 At Ch. 4745 m

Marygiri bridge, having a span of 14 m, is situated in Mukkadai thodu at Ch. 4745 m. In the downstream of bridge, both sides of the thodu is seen damaged. It is clear from the figure R4.6.1 that vegetation obstructs the natural flow of water. The width of the thodu near bridge is 14m. But it reduces to 6 m as shown in figure R4.6.1 to the down streamside. There are some visible encroachments that obstruct the free flow of water. In the upstream side of bridge, we can see the presence of silt deposit on the both banks. The width of the silt deposit is approximately 5 m and 20 m in length. The height of the thodu in this portion is 2.50 m and depth of water is 1.50 m. The removal of the accumulated silt and the vegetation is very much essential for the free flow of water.

Figure R4.7.1: IIP Aqueduct crossing Mukkadai thodu

R4.7 At Ch. 5201 m

Idamalayar Irrigation aqueduct is crossing the Mukkadai thodu at Ch. 5201 m (figure R4.7.1). Protection works on the right bank of the thodu were damaged during the flood in 2018. IIP already arranged a work for protection of this area and is already started. The vegetation in the right and left bank of the thodu obstruct the natural flow of water. The width of the thodu in this portion is about 10 m and depth of the water is 2 m.

Figure R4.8.1: VCB at Ch. 7090 m

Figure R4.9.1: Mukkadai thodu at Ch. 8700 m

R4.8 At Ch 7090 m

A vented cross bar is situated in the Mukkadai thodu at Ch. 7090 m. The width of the thodu in this portion is about 13.00 m and depth of the water is 1.3 m. There are no obstructions to the flow of water. The sides of the thodu on either side of the VCB is properly protected (figure R4.8.1)

R4.9 At Ch. 8700 m

This portion of the thodu is at Ch. 8700 m and the sides of the thodu in this area is not protected. Some portions of this unprotected sides are slipped in to the thodu and is obstructing the free flow of water through the thodu. These landslides cannot be seen clearly in the figure R4.9.1 attached because of the growth of vegetation over it. In order to retain the thodu in its original width and to ensure free flow of water, the slipped earth is to be removed and the sides are to be protected. The width of the thodu in this portion is about 9 m and depth of the water is 1 m.

Figure R4.10.1: Manjapra Mini dam

Figure R4.11.1: Naduvattom- Chandrappura bridge

R4.10 At Ch. 8804 m

Manjapra Mini dam is situated in Mukkadai thodu at Ch. 8804 m, (figure R4.10.1). In this portion, the width of the thodu is about 8 m and depth of the water is 2 m. This dam helps to get sufficient water for the irrigation purpose around its vicinity. Both sides on the upstream and downstream of the thodu is well protected. There are no obstructions for the free flow of water.

R4.11 At Ch. 9814 m

Naduvattom - Chandrappura bridge is situated in the Mukkadai thodu at Ch 9814 m. The upstream and downstream views of bridge is shown in figure R4.11.1. The thodu in this portion is having sufficient width and depth for the free flow of water. The width of the thodu is about 10.00m and depth of the water is 1.5 m. There is no obstruction for the free flow of water through this portion.

Figure R4.12.1: Left branch of Mukkadai thodu

Figure R4.13.1: Mukkadai bridge

R4.12 At Ch. 9858 m

Mukkadai thodu has a left branch having a length of 415m on its left side at Ch. 9858 m (figure R4.12.1). There is no silt deposits and obstructions in this first order branch. From the photographs attached, we can see the growth of vegetation and trees along the sides of the thodu which obstructs the natural flow of water. The width of the thodu in this portion is about 4.3 m and depth of the water is 1.5 m. The sides are not protected. In order to ensure the free flow of water, removal of vegetation and cutting of trees are very much essential.

R4.13 At Ch. 12928 m

Mukkadai bridge is situated at Ch.12928 m of Mukkadai thodu (figure R4.13.1). During the construction of the bridge, the width of the thodu reduced considerably and this obstructs the free flow of water through the thodu. From the figure R4.13.1 attached we can see this problem clearly. The width of the thodu in this portion is about 27 m and depth of the water is 1.1 m. If an increased vent way is constructed for the bridge, we can ensure free flow of water through the thodu.

Figure R4.14.1: Kottamam bridge

Figure R4.15.1: Confluence of Mukkadai thodu with Periyar river

R4.14 At Ch. 14385 m

Kottamam Bridge is situated 723 m upstream of Mukkadai thodu joining point with Periyar. The upstream and downstream views of bridge are shown in figure R4.14.1. We can see clearly the remaining of the old bridge in the thodu in its upstream side which obstructs the flow of water to a large extend. Some of these old portions are situated in the middle of the channel. Steps provided in the left bank of the thodu also obstruct the natural flow of water. Dilapidated protection works on the right bank of the thodu obstruct the easy flow of water. The photograph clearly shows the growth of vegetation and trees which obstruct the natural flow of water. The width of the thodu is about 17 m and depth of the water is 1 m. For the free flow of water, it is essential to remove the existing portions of the old bridge from the thodu. Protection works to the damaged sides, removal of vegetation and cutting of trees etc. will ensure free flow of water through the thodu.

R4.15 At Ch. 15108 m

The tributary named Mukkadai thodu ends at Ch. 206.61 km at Mekkalady on the right bank of Periyar river. Mouth of the tributary is shown in figure R4.15.1. The mouth is having sufficient width and depth for the free flow of water. The width of the mouth is 23.5 m and depth of the water is about 3 m and there are no obstructions to the flow of water like delta, water weeds and accumulation of solid waste etc. The sides of the joining portion are not protected.

Conclusion

The free flow of water through the tributaries+ can be ensured by executing the following activities in a phased manner.

- Clearing light, thick and thorny jungle including vegetation growths on LHS and RHS of tributaries
- Pruning branches of trees grown into the tributary
- De-silting and removal of debris from stream bed as well as banks at periodic intervals
- Removal of water weeds from various stretches of the tributaries
- Dismantling old concrete remains of foot bridge in Thottua thodu
- Removal of partially destroyed Cross bar near the U/S of Perumbavoor Paniely Road bridge in Krariyeli tributary
- Removal and reconstruction of damaged culvert in Palluppetta thodu
- Protection of the slipped sides in Palluppetta thodu
- Removal of concrete remainings of the demolished bridge in Mukkadai thodu
- Dismantling and reconstruction of Kottamam bridge to restore the width of the Mukkadai thodu
- Survey of tributaries to fix the boundaries

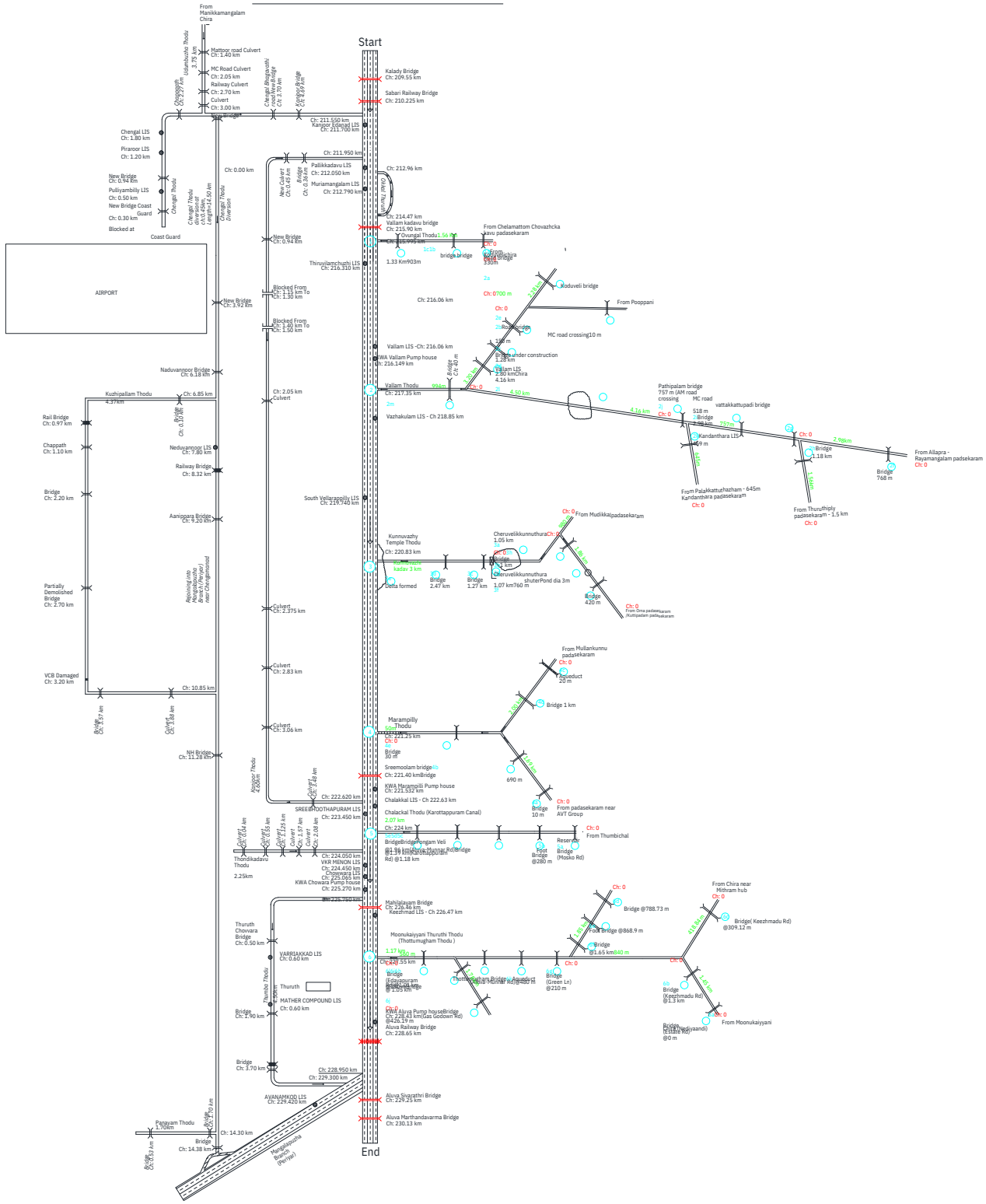
Periyar fromKalady Bridge to Marthandavarma Bridge (Aluva)

From Ch. 209.55 km to 230.13 km

Brief Overview- Reach from Kalady bridge to Marthanda Varma bridge (Chainage 209.55km to 230.13km)*(Refer , Pg:1257)*

The reach of Periyar between Kalady and Aluva was the most affected area during the 2018 floods. The local bodies along this stretch are Kalady Panchayat, Kanjoor Panchayat, Sreemoolanagaram Panchayat, Okkal Panchayat, Vazhakulam Panchayat, Perumbavoor Municipality, Keezhmad Panchayat, Nedumbassery Panchayat, Chengamanad Panchayat and Aluva Municipality.Many significant places like Cochin International Airport , Aluva Palace etc are located in this stretch. There are several places of religious significance alsoin this reach. Kalady , a town located on the banks of the Periyar river,is the birthplace of Sri Adi Shankara, the Hindu philosopher who consolidated the doctrine of Advaita Vedanta. The Siva temple on the sand bank of Periyar River at the upstream side of Marthanda Varma bridge, is famous for Aluva Sivarathri festival.There are eight bridges crossing Periyar in this stretch, which are Kalady bridge, Sabari Railway Bridge, Vallam kadavu bridge, Sreemoolam bridge /Marampally Bridge, Mahilalayam thuruth river Bridge, Aluva railway Bridge, Manappuram Foot Over bridge, which is also known as Aluva Shivarathri bridge and Marthanda Varma old and new Bridge. The major tributaries of Periyar in this reach are Chengal Thodu ,Kanjoor Thodu, Ovunkal Thodu, Vallam Thodu, Kunnuvazhi Thodu , Marampilly thodu, Chalakkal thodu, Thondikadavu thodu, Thumpa thodu and Moonukaiyyani thuruthi thodu. There are twelve MI Lift Irrigation Schemes, which fetch water directly from Peiyar along this stretch. The general details and identified problems related to Periyar river and its tributaries in this reach are detailed in this section.

PERIYAR - KALADY - MARTHANDAVARMA BRIDGE



Schematic Diagram
Not to Scale

- Bridge across Periyar
- Bridge across Thodu
- Railway Bridge across Periyar
- LIS & KWA Pump house

1.2GENERAL

1.2.1BRIDGES

There are eight bridges crossingPeriyar in this stretch. They are Kalady bridge, Sabari Railway Bridge, Vallamkadavu bridge, Sreemoolam bridge /Marampally Bridge, Mahilalayamthuruth river Bridge, Aluva railway Bridge, Manappuram Foot Overbridge, which is also known as AluvaShivarathri bridge and MarthandaVarma old and new Bridge. All the bridges crossing Periyarriver is well above high flood level except Manappuram foot over bridge. All bridges are in good condition and there is no need of reconstruction. New Kaladybridge is also proposed by government to avoid traffic blocks in Kalady town area.

(Refer , Pg:1447)

Sl No.	Detail of Structure Chainage (Km)	chainage	Length (m)	Local Body
1	Kalady Bridge	209.550	377.00	Kalady/Okkal
2	SabariRaiway Bridge	210.225	370.00	Kanjoor/Okkal
3	VallamKadavu Bridge	215.900	316.00	Kanjoor/Okkal
4	SreemoolamBridge	221.400	377.00	Sreemoolanagaram/Aluva
5	MahilalayamThuruth River Bridge	226.460	420.00	Sreemoolanagaram/Keezhmad
6	Aluva Railway Bridge	228.650	240.00	Aluva Municipality
7	Manappuram Foot Bridge	229.250	204.00	Aluva Municipality
8	AluvaMarthandavarma Bridge (New and Old)	230.130	140.00	Aluva Municipality

1.2.2LIFT IRRIGATION SCHEMES

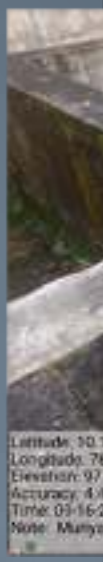
There are twelve MI Lift Irrigation Schemes, which fetch water directly from Peiyar along this stretch. Out of that, four from left bank and eight from right bank. Two panchayat schemes also fetch water from right bank. The either bank of the Periyarriver from Kalady to Aluva is agricultural land and highly yielding cash crops and paddy fields. *(Refer , Pg:1195)*

LIST OF MI LIFT IRRIGATION SCHEMES IN PERIYAR

Sl. No	Name of Scheme	Latitude	Longitude	Chainage (Km)
1	KanjoorEdanad LIS	10.147295	76.428338	211.700
2	Pallikadavu LIS	10.143552	76.430610	212.050
3	Muriamangalam LIS	10.145042	76.438040	212.790
4	Vallam LIS	10.138394	76.450791	216.060
5	Thiruvilamchuzhi LIS	10.136852	76.450158	216.310
6	Vazhakulam LIS	10.118514	76.445833	218.850
7	South Verappilly LIS	10.123145	76.432788	219.740
8	Chalakkal LIS	10.120093	76.403435	222.630
9	Sreebhoothapuram LIS	10.122980	76.404242	223.450
10	VKR Menon LIS	10.125403	76.393642	224.450
11	Chowwara LIS	10.125403	76.393642	225.065
12	Keezhmad LIS	10.115668	76.376918	226.470

KANJOOR EDANAD LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 211.70Km of Periyar River right bank having a canal length of 11.365km and irrigating ayacut of 359.27 hectares in KanjoorGramaPanchayat.



PALLIKADAVU LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 212.05Km of Periyar River right bank having a canal length of 1.24km and irrigating ayacutof 95.69hectares in KanjoorGramaPanchayat.

MURIAMANGALAM LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 212.79Km of Periyar River right bank having a canal length of 1.795km and irrigating ayacut of 96.80hectares in KanjoorGramaPanchayat.

THIRUVALANCHUZHI LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 216.31 km of Periyar River right bank having a canal length of 5.531km and irrigating ayacut of 299.70 hectares in KanjoorGramaPanchayat.

SOUTH VERAPPILLY LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 219.74 km of Periyar River right bank having a canal length of 3.504 km and irrigating ayacut 139.90hectares in SreemoolanagaramGramaPanchayat.

SREEBHOOTHAPURAM LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 223.45Km of Periyar River right bank having a canal length of 3.39km and irrigating ayacut of 143.08 hectares in SreemoolanagaramGramaPanchayat.

VKR MENON LI SCHEME

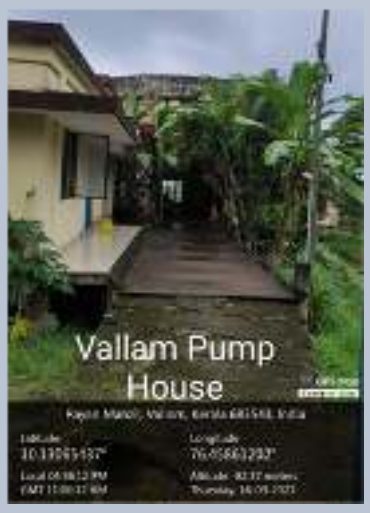
This is MI, lift irrigation scheme with pumping station at Ch: 224.45Km of Periyar River right bank having a canal length of 2.074 km and irrigating ayacut of 116.952 hectares in SreemoolanagaramGramaPanchayat.

CHOWWARA LI SCHEME

This is MI, lift irrigation scheme with pumping station at Ch: 225.065 km of Periyar River right bank having a canal length of 2.262 km and irrigating ayacut of 116.952 hectares in Sreemoolanagaram Grama Panchayat.

LIST OF OTHER PUMPING SCHEMES IN PERIYAR *(Refer , Pg:1478)*

Sl. No	Name of Scheme	Latitude	Longitude	Chainage (Km)	Remarks
1	Vallam KWA	10.131110	76.458414	216.149	Left Bank
2	Marambilly KWA	10.113584	76.418479	221.532	Left Bank
3	Chowwara KWA	10.105451	76.359930	225.270	Right Bank
4	Aluva KWA	10.111503	76.361502	228.430	Left Bank



1.2.3IRRIGATION DEPARTMENT HYDROLOGY STATIONS AT ALUVA

Automatic Rain Guage Station (Tipping Bucket Rain Gauge) At PVTP Office Compound

1.2.4OKKAL THURUTHU

Nearly 20 years ago, the river, which flows eastwards along the stretch, was not as wide. As the river kept growing wider on the eastern side, the flow of water nearly stopped on the opposite side facing Okkal region. OkkalThuruth is a 60-acre landmass left extremely vulnerable by years of indiscriminate sand mining. Despite its location several metres above the river level, has faced heavy flooding. Every monsoon, more land erodes, especially in the absence of a protective outer wall. It was only 12 years ago that a small bridge came up at the island connecting it to neighbouring Okkal. During the monsoon, when water rises in the Periyar, the low-lying bridge is the first to be submerged, leaving the residents marooned. The islanders demand for the reconstruction of bridge.

The Bridge Connecting The Island To Neighbouring Okkal. The Low-Lying Structure, Which Was Constructed 12 Years Ago, Is The First To Get Submerged When Water Rises In The Periyar During Monsoon, Leaving Residents Of The Island Marooned.

Satellite View OfOkkalThuruth

The island abounds with nutmeg trees, and on the courtyards of most houses are batches of nutmegs and maces laid out for drying. The islanders are also engaged in cultivating plantain and various vegetables. Earlier, most people on the island and nearby okkal were involved in bamboo and reed weaving. “traders from far and near would arrive here with their bamboo and reed. It became a place where they would get together (‘orumikkuka’ in malayalam), gradually, the word ‘orumikkuka’ was shortened to ‘okkal’ and that is how the region earned its name and the island nearby became okkalthuruth,”.

There is on the island a SreeNarayana Guru Temple, near the spot where the spiritual leader and social reformer is believed to have sat in meditation. The island also hosts the okkalSivarathri festival annually, a tradition begun 27 years ago “to help protect the riverbanks from sand mining”.

OkkalThuruth

A part of Periyar divert at Ch:212.96km and flows around the thuruthu and joins with Periyar at Ch:214.47 km. But this channel is nowheavly deposited with silt and thick growth of vegetation has obstructed the free flow of channel. Okkal was one of the worst 2018 flood hit places and in this thuruthu 1.5 m high, 200 m long and 100 m wide sand bars were formed. The soil here became blackish and the nature of the soil has changed and has become like a marshy place (Impact of flood in biodiversity).

Delta at Marampilly

Delta formed at
Purappurum kadavu

Delta formed after
2018 flood at
Parappuram
kadavu

Sreemoolam bridge
view

Delta near Aluva
palace

Kalady bridge d/s

formed after
flood at
eothan

Chowara jetty

ita formed near
ava Shivarathri
dge

Kuttammassery

Puranthuranchi
Delta

CONCLUSION

The following activities have to be carried out to make sure the smooth flowof river in this reach,

- Clearing the thick growth of vegetation along the sides of the Periyar.
- Cut down branches of trees grown into the river.
- De-siltation and removal of debris from river bed as well as banks.
- Regular maintenance & upkeep of river and banks is necessary.
- Large deltas were identified at some locations, which needs to be removed to ensure the smooth flow of water
- Proper maintenance of stuctures across the river has to be done.

TRIBUTARIES OF PERIYAR RIVER

2.1TRIBUTARIES

- There are seven primary streams, which empties to Periyarriver. And three primary streams starts from Periyar river and joins back to Periyar river at downstream. *(Refer , Pg:1257)*
- • List Of Primary Tributaries OfPeriyar

Sl No.	Name of Primary Tributary	Chainage (Km)	Length (Km)	Bank
1	ChengalThodu	211.550	17.70	Right
2	KanjoorThodu	211.950	4.60	Right
3	OvunkalThodu	215.995	1.56	Left
4	VallamThodu	217.350	21.78	Left
5	KunnuvazhiThodu	220.835	5.84	Left
6	MarampillyThodu	221.250	3.74	Left
7	ChalakkalThodu	224.000	2.07	Left
8	ThondikadavuThodu	224.050	2.25	Right
9	ThumpaThodu	225.750	4.50	Right
10	MoonukaiyyaniThuruthiThodu	227.550	8.07	Left

2.1.1LEFT BANK

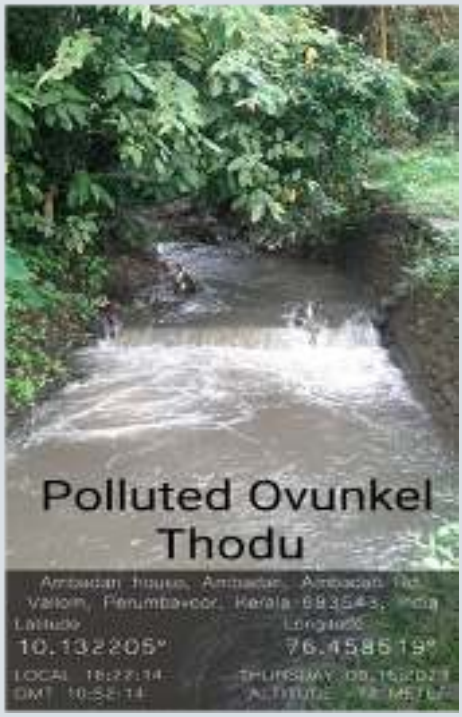
The local body institutions at left side bank of Periyar are OkkalPanchayat, VazhakulamPanchayat, PerumbavoorMuncipality, KeezhmadPanchayat, and AluvaMuncipality.

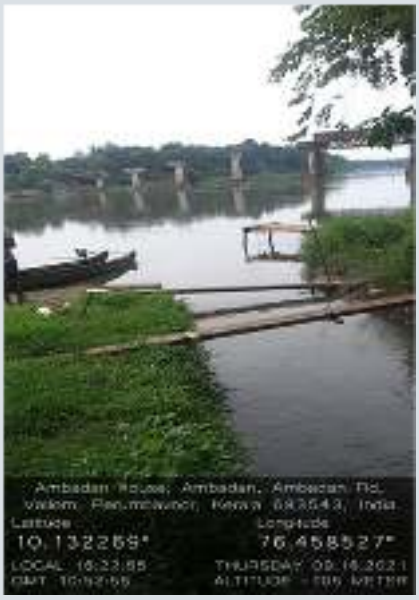
• MAIN STREAMS JOINING PERIYAR

1. OVUNKAL THODU

The stream empties to Periyar at Ch.215.995 km .Total length of this stream is 1.56km. It flows through 8th and 9th wards of OkkalPanchayat.

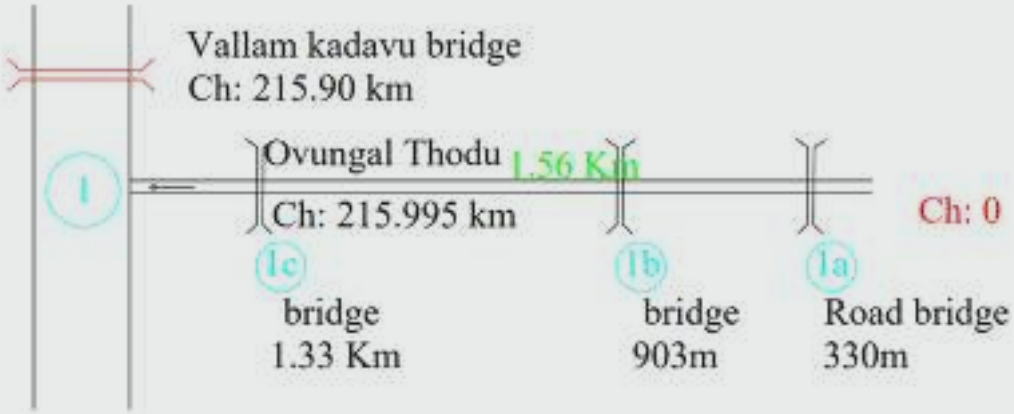
Several industries like rice mills, cocoa company and plastics company discharge treated effluents to this stream. Local people always raise complaints against the pollution caused by these industries and colour change and foul smell of the stream.





OvunkalThodu Empties ToPeriyarThick Vegetation Obstruct The Free Flow OvunkalThodu

• SCHEMATIC SKETCH



2. VALLAM THODU

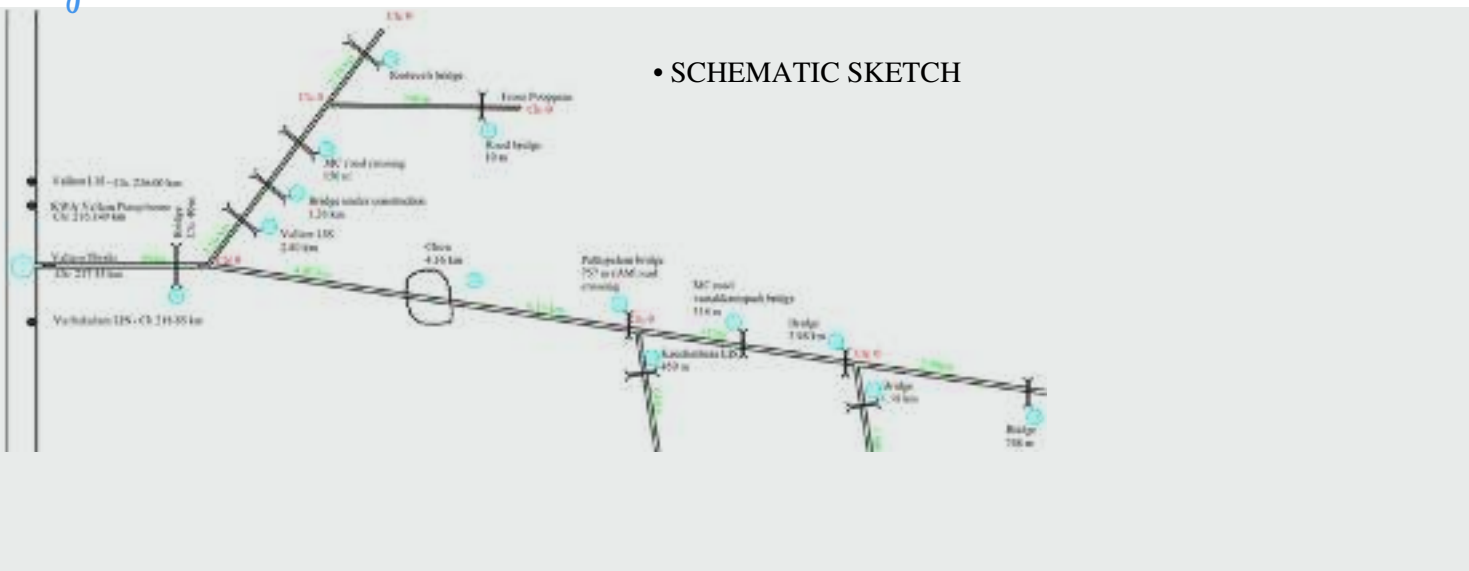
The sources of this streams are Allapra-Rayamangalampadasekaram, Thuruthiplypadasekaram, Palakkattuthazhampadasekaram and Koduvelichira .The streams from the above padashekarams and a sream from Poopani joins to form the main stream VallamThodu and this main stream empties to Periyar at Ch.217.35km in VazhakulamPanchayat.The total length of this stream and its five branches is 21.78km.Vallom thodu and its branches flow through Okkal, Rayamangalam, Vengola, VazhakulamPanchayats and Perumbavoor Municipality.

Two LI schemes of irrigation department fetches water from Vallamthodu. They are

1. East Okkal LIS
2. Kandamthara LIS.

Vegetation InPalakkattuthazhamThodu

Vegetation And Delta Near Pump House At VallamThodu



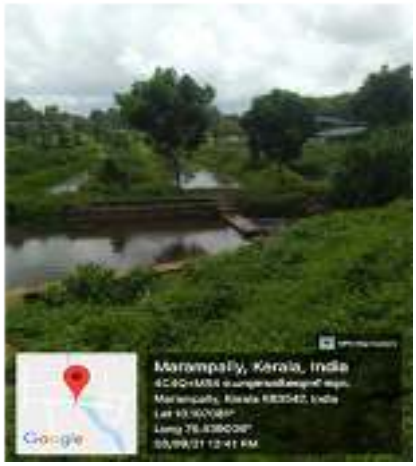
3. KUNNUVAZHI THODU

The source of the stream is Mudikkalpadasekaram and OrnaPadasekaram .Two streams of length 0.62km and 1.81 km from the above padasekarams joins the main stream, Kunnuvazhithodu .The total length of the stream and its two branches is 5.84km.The main stream joins Periyar at Ch.220.83km.The main stream and its branches pass throughVazhakulampanchayat.

There is a check dam across Cheruvelikkunnuthura which is situated along the stream form Mudikkal field in ward no.12 of Vazhakulampanchayath. A drinking water project is functioning in the bank of chira owned and runned by Gramapanchayath for supplying drinking water to Cheruvelikkunnu SC colony. There is plywood company located near the chira and stream from Orna field. Local people complaints about the pollution caused by these industries.

During 2018 flood, the direction of main stream diverted from its natural course near its tail end and a delta is formed along the stream near the mouth of the stream. A foot bridge across the main stream was destroyed during the flood and remains of the structure deposited in the stream that obstructs the free flow shall be removed. Silt deposit is noticed at various stretches of main stream and its branches.

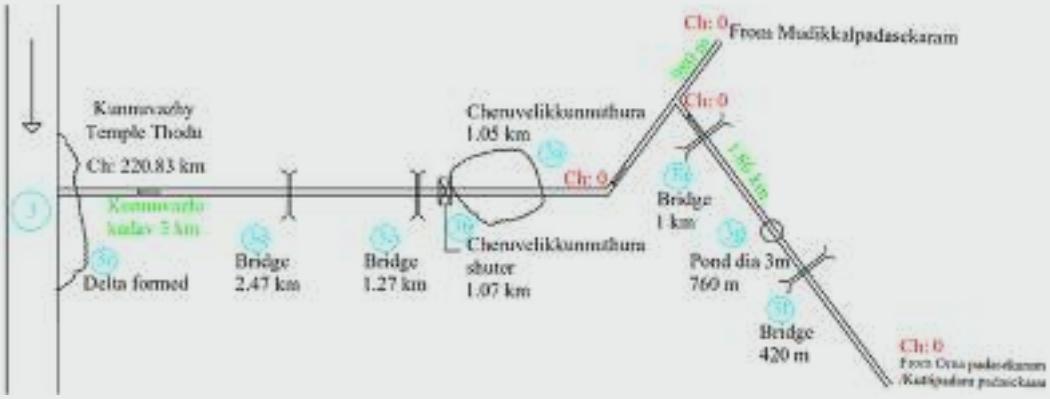
Remains Of Foot Bridge Washed Away In 2018 Flood



Check Dam AtCheruvelikkunnuthura

Delta Formed After 2018 Flood At Tail End Of KunnuvazhiThodu. The Flow Of Water Is Diverted From Its Original Course

• SCHEMATIC SKETCH

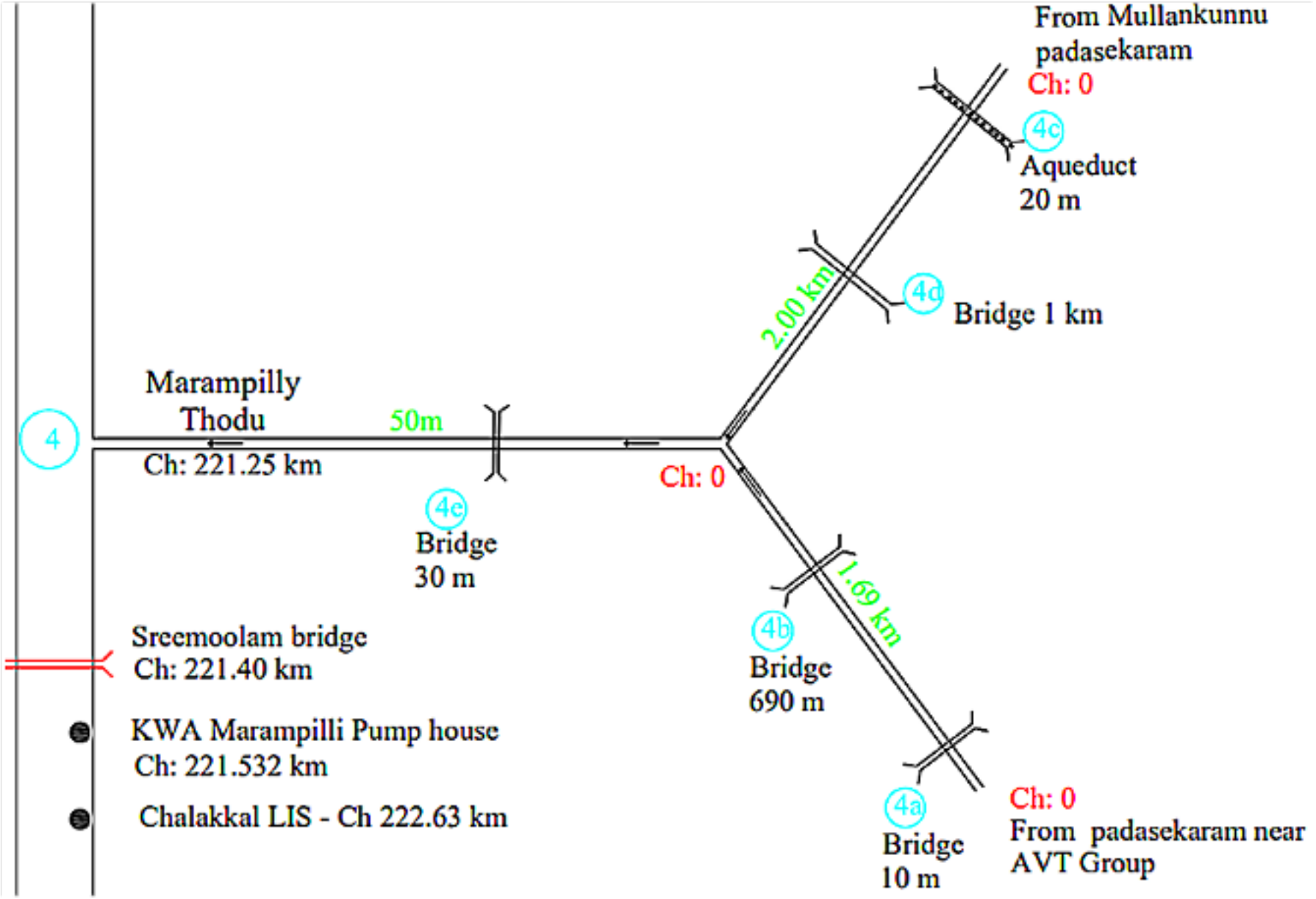


1. MARAMPILLY THODU

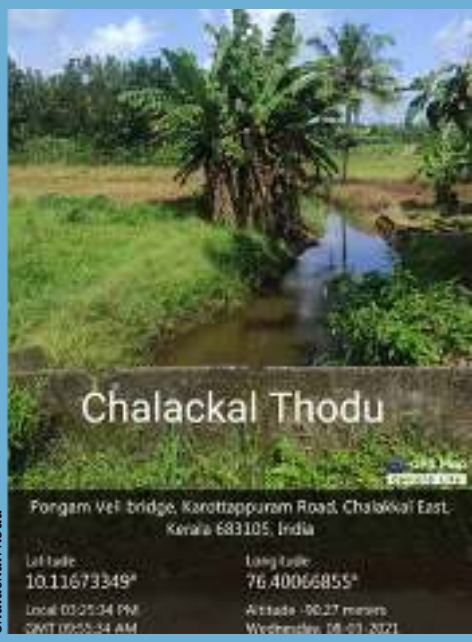
The source of the stream is Arakkathazhampadasekaram (Alappillithodu) and MullankunnuPadasekaram The local name of the main stream is Thoombaithodu. The lotal length of the main stream and its two branches is 3.74km. The main stream empties to Periyar at Ch:221.25km.The stream passes throughVazhakulam and VengolaPanchayat. AVT company is located on the banks of Alappillithodu. General cleaning and silt removal is required for main stream and its branches.

MarampillyThodu

SCHEMATIC SKETCH



Thumbichal Reservoir



ChalackalThodu

5. CHALACKAL THODU

The source of the thodu is Thumbichal reservoir. It joins with Periyar at Ch: 224 km. It is also known as Karottappuram canal. The length of the stream is 2.08 km. It does not have any branches. It flows through 6th and 7th ward ofKeezhmadPanchayat.

Mainly 5 bridges are there, crossing this stream. During 2018 flood, 2 bridges get destroyed in 6th ward and one in 7th ward. One bridge gets sanction for reconstruction. Thumbichal reservoir is surrounded by industrial area. Hence, the main problem identified in this region is waste disposal from industries.

• SCHEMATIC SKETCH

MOONUKAIYYANI THURUTHI THODU

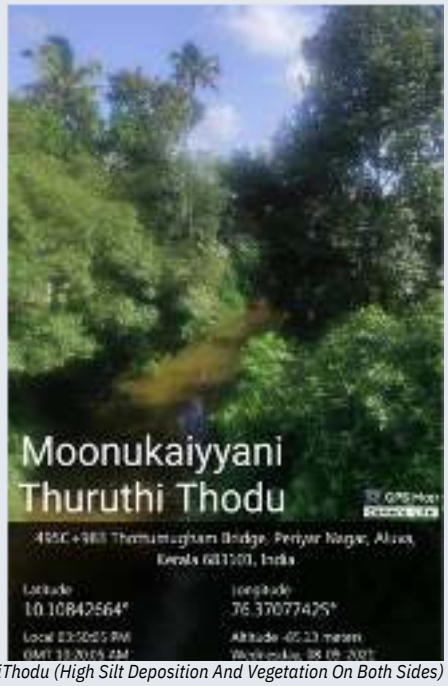
The source of the stream is Moonukaiyyanichira, chira near Mithram hub and Padasekaram near Thachanampara Temple. It is also known as ThottumughamThodu. The main stream joins with Periyar at Ch: 227.55 km. The total length of main stream and its four branches are 8.07 km. It flows through 2nd, 15th and 17th ward of KeezhmadPanchayat.

High silt deposition and a thick growth of vegetation is noticed in the main stream and its branches. During 2018 flood, a bridge across the stream gets destroyed, and it was reconstructed. Majority of this stream passes through ward no. 15 of KeezhmadPanchayat. Usually, water flows from this thodu and empties into periyar. But during rainy season, when the water level in Periyar rises, the back flow of water occurs from Periyar to Moonukaiyyanithuruthithodu. During 2018 flood, water level rises by more than 5 m in these wards.

During water distribution in Periyar Valley canals, water gets leaked from Paravoor Branch Canal and enters into Moonukaiyyanichira.

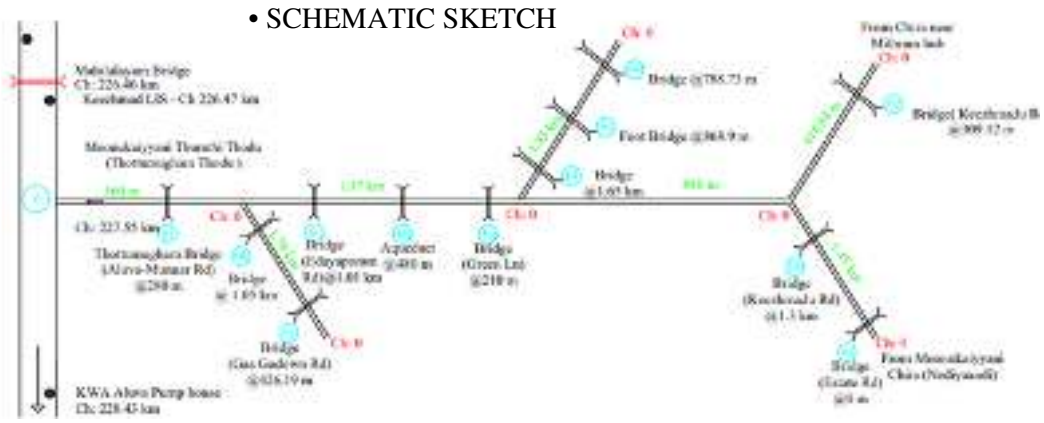
Due to thick growth of vegetation, the stream gets narrowed and water flow gets obstructed at some locations. Hence, the vegetation needs to be removed.

Moonukaiyyani Chira



MoonukaiyyaniThuruthiThodu (High Silt Deposition And Vegetation On Both Sides)

• SCHEMATIC SKETCH


Bridge
Aqueduct
Bridge
Bridge
Bridge

2.1.2RIGHT BANK

The neighbouring local body institutions at right side banks from Kalady Bridge to AluvaMarthandaVarma Bridge are KaladyPanchayat, KanjoorPanchayat, SreemoolanagaramPanchayat, NedumbasseryPanchayat, ChengamanaadPanchayat and AluvaMuncipality.

• MAIN STREAMS JOINING PERIYAR

1. CHENGAL THODU

The ChengalThodu starts near Kalady of length 17.70 km and flows through Kanjoor, Nedumbassery, Sreemoolanagaram and ChengamanaadPanchayats and joints with Periyar near Desom. Chengamanaad and has average 40 m width.

TRIBUTARIES OF CHENGAL THODU

a) UDUMBUZHA THODU

This tributary starts from Manikyamangalamchira and flows through KaladyPanchayat and joins with Chengalthodu near airport after crossing MC road. The udumbuzhathodu is nearly 40m wide at ch 0.00km at meeting place with chengalthodu. However, the water stream is small and there is heavy deposit of silt on either side of the thodu up to 1 km from meeting place. The udumbuzhathodu is nearly 3.70 km long and 5m average width. There are a few small culverts, which are obstructing the flow of water in udumbuzhathodu. The thodu is protected with banks by providing DR walls for 600m on either side starting from Manikyamangalamchira.

b) KUZHIPPALLAM THODU

This tributary starts from chengalthodu near Edanadu and flows through the boundaries of Sremoolanagaram or ChengamanaadPanchayat and NedumbasseryPanchayats and joins back to chengalthodu near Desom. The average width of the thodu is about 40m but the width of the thodu near the entry towards Chengalthodu near Desom is less than 4m.

RIGHT BANK

Normally chengal tributary flows from coast guard to Periyar. Udumbuzhathodu starts from manikyamangalamchira, also joins with chengalthodu. During flood, Chengalthodu flows back towards coast guard. Since the chengalthodu is partially blocked at this location, it is flooding Airport, Nedumbassery and KanjoorPanchayat.

IRRIGATION STRUCTURE

There is one unused regulator cum bridge, which is obstructing the smooth flow of water in this thodu causing flooding in nearby houses. It has to be demolished and new bridge need to be constructed for commuting either side.

There is one bridge, which was demolished and its foundation and debris were not cleared hence blocking the clear flow of water. The debris to be removed and a new bridge needs to be constructed at this location for commuting either side. There is also one chappath of width 6m constructed for a thodu of width 40m need to be demolished and new bridge to be constructed.

Kalady, Kanjoor and Sreemoolanagaramis famous for clay tile industry. Due to clay mining in paddy fields the levels of paddy fields have gone below water level of chengalthodu and land nearby Kuzhippally has become marshy and proper flow of the water got obstructed. This is irreversible and deepening of the bed level of the thodu will not make any use. These marshy lands can be utilized to fill silt and mud from soil from Periyardesilting.

At the mouth of the thodurejoiningChengalthodu, the width is reduced to 4m from 40m. The width of the thodu reduced due to thodu splitting and diversion. There is encroachment on either side towards the tail end of the thodu. It is necessary to increase the width of the thodu at this location. The reason for flood in this location is due to the unused VCB, unremoved debris of demolished bridge and the narrow waterway at the tail end. The waterways of the chengalthodu and Kuzhippallamthodu were very easy and economical than travelling through Periyarriver. Now the water is almost stagnant and muddy.

DETAILED REPORT

- Name of Thodu:CHENGAL THODU FROM COAST GUARD TO PERIYAR
- Location Details: COAST GUARD TO PERIYAR
- Length: 5.02 km
- Average Width: 40m
- Problems identified:
- There are 5 bridges in this thodu, out of that 3 chappaths reconstructed by CIAL and one chappath of low height and small width to be re-constructed. Both the sides of the chengalthodu is not protected and the actual width of flow now reduced, so silt and clay formed at both banks of the thodu.

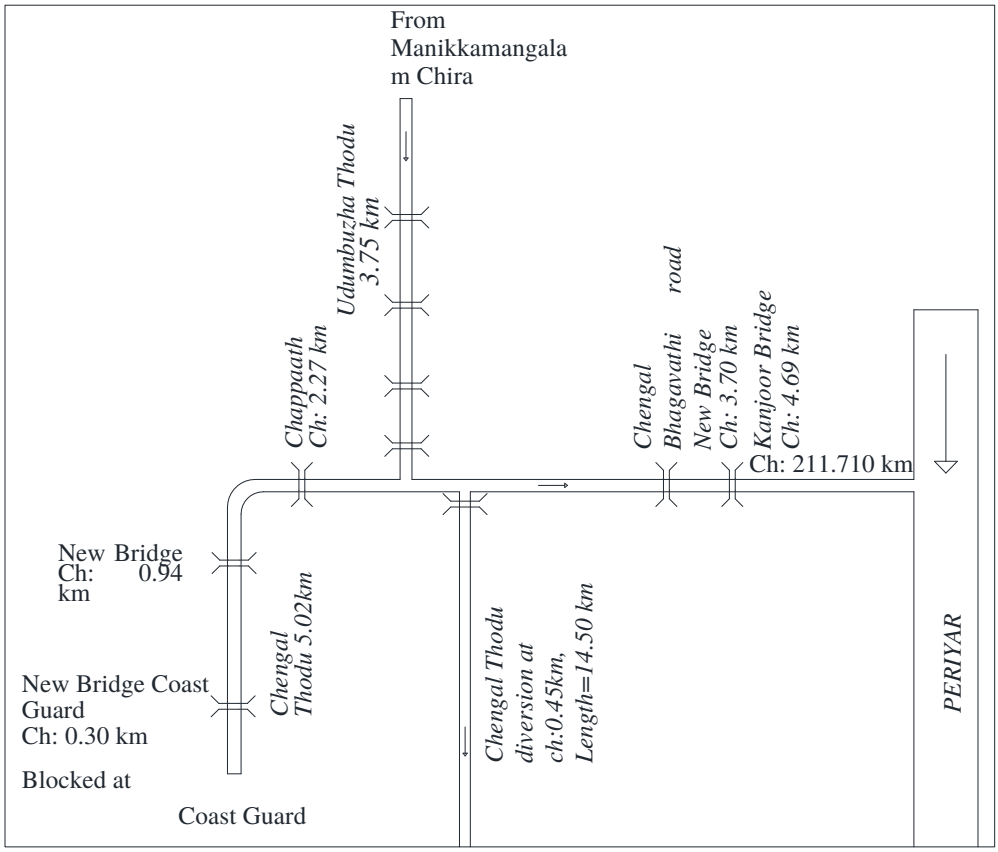
REMEDY AND NATURE OF WORK TO BE INCLUDED TO SOLVE:

- Clay Banks should be removed and width of flow to be increased. Water holding capacity of the thodu will then be increased substantially.
- Vegetations are to be cleared including cultivations near the banks of the river. Smooth flow of water to be made.
- Since Chengalthodu is blocked near coast guard, diversion of Chengalthodu is being done by CIAL.
- Also, a regulator is proposed at the mouth of Periyar, to control flow into Chengalthodu during flood.
- The new diversion canal is also under construction from chengalthodu to chengalthodu after blocked chainage during airport construction. This is under construction and in completed state.
- There are 4 LI Schemes stations in Chengalthodu. Even though direct waste deposits are not visible.

LIST OF LI SCHEMES IN CHENGAL THODU

Sl No.	Name of the Scheme	Chainage (Km)	Latitude	Longitude	Ayacut (Hectares)
1	Neduvannoor LIS	7.800	10.134363	76.377211	124.50
2	Puliyambilly LIS	0.500	10.158429	76.404791	78.37
3	Piraroor LIS	1.200	10.158189	76.418549	144.32
4	Chengal LIS	1.800	10.159564	76.419314	54.77

- SCHEMATIC SKETCH:



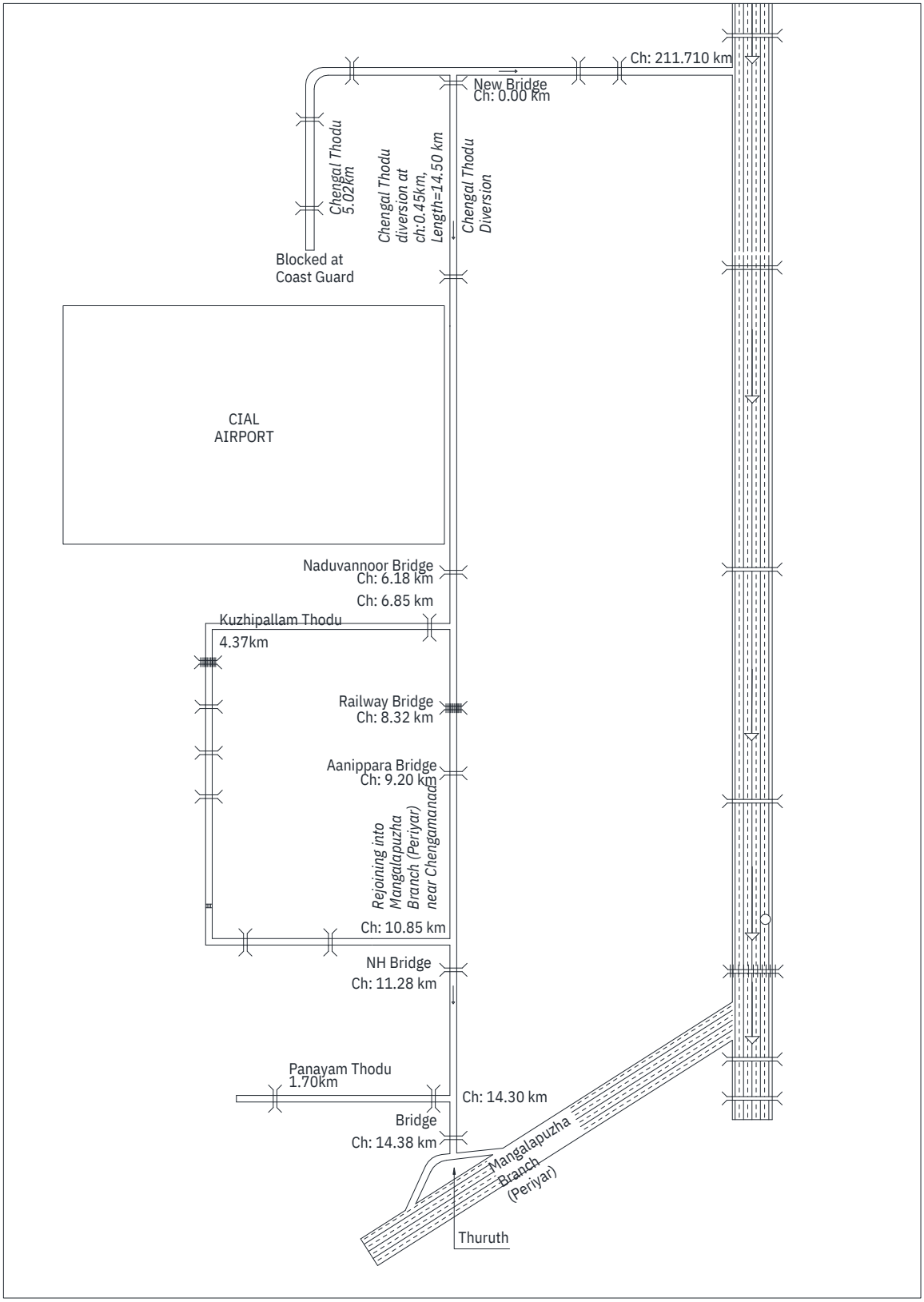
CONCLUSION:

- Chappath of low height to be re-constructed.
- Both the sides of the chengalthodu are not protected and the actual width of flow reduced and silt and clay formed banks on both sides of the thodu to be removed.
- Regulator is to be provided at the bell-mouth of Periyar to stop flood water entry to ChengalThodu during flood.
- The silt and clay at the mouth of the Periyar to be removed.

- Name of tributary:CHENGAL TRIBUTARY FROM AIPORT DIVERSION CANAL
- Location Details: CANAL DIVERTS FROM CHENGAL TRIBUTARY REJOINS IN CHENGAL TRIBUTARY AND JOINS WITH PERIYAR NEAR CHENGAMANAAD, ALUVA
- Length: 14.50 Km
- Average Width: 40m
- PROBLEMS IDENTIFIED:
- There is one new Bridge constructed in this tributary to avoid blockage by CIAL. Also, there are 5 bridges in this tributary including one railway bridge in good condition.
- Both the sides of the Chengal tributary are not protected. The average height of the bank is 4m. Illegal mining of clay has done on either bank of the tributary in paddy fields in Kuzhippallam area. The levels of paddy fields near to chengal tributary is either same or lesser than level of chengal tributary at nearby paddy fields.
- There is silt deposit and huge vegetations in chengal tributary, which is to be cleared for smooth passage of water.

- REMEDY AND NATURE OF WORK TO BE INCLUDED:
- Side Protection of the chengal tributary need to be done. The excavated clay in the paddy fields can be replaced with clay and silt from the deltas in Periyarriver. There are many marshy pond like areas at the banks of this tributary.
- Vegetations are to be cleared including cultivations near the banks of the river. Smooth flow of water to be made.
- Diversion canal towards blocked Chengal tributary need to be completed as soon as possible.
- Regulator need to be constructed at the mouth of the chengal tributary near Kalady to avoid entry of flood water into the tributary.

SCHEMATIC SKETCH:



- CONCLUSION:

Both the banks of the Chengal Tributary is not protected and the actual width of flow reduced and silt and clay formed banks on both sides of the tributary to be removed.The paddy fields near by the tributary need to be reclaimed properly by the clay and silt at deltas in the Periyar.

The silt and clay in Chengal tributary to be removed and side protection wall to be provided at required locations.

Name of tributary:UDUMBUZHA TRIBUTARY

- Location Details: MANIKYAMANGALAM CHIRA TO KANJOOR
- Length: 3.75 Km
- Average Width: 15m

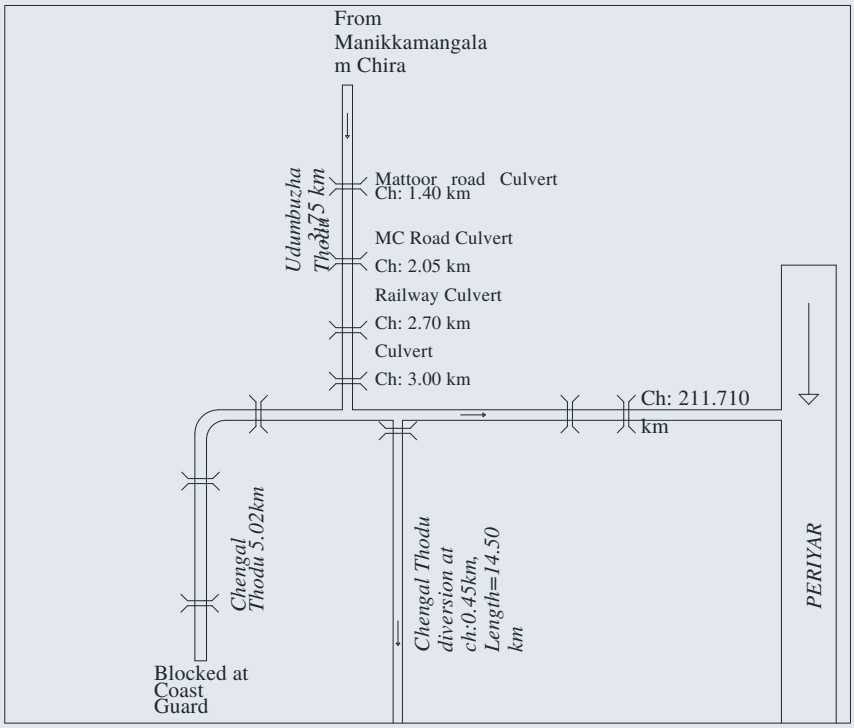
PROBLEMS IDENTIFIED:

- There are 4 Culverts in this tributary, Minor Irrigation canal aqueduct crosses the tributary near Kalady Town.
- Both the sides of the Udumbhuzha tributary are protected 600m from ManikyaMangalamChira with DR masonry. The Udumbuzha Tributary is wide after it crosses MC road. The actual width of flow now reduced, so silt and clay formed at both banks of the tributary. There is vegetation also in this tributary.
- During 2018 flood the low-lying land of Udumbuzha tributary affected with flood. During flood Chengal tributary flows back towards coast guard. Since the chengal tributary is partially blocked the flood water will enter Udumbuzha Tributary.

REMEDY AND NATURE OF WORK TO BE INCLUDED:

- Clay Banks should be removed and width of flow to be increased. Water holding capacity of the tributary then will increase substantially.
- Vegetations are to be cleared including cultivations near the banks of the river. Smooth flow of water to be made.
- The new diversion canal is also under construction from chengal tributary to chengal tributary after blocked chainage during airport construction. This is under construction and in completed state.
- The Udumbuzha tributary passes through Kalady town, the thorough checking to be done to check drainage release to tributary in Kalady town. The members of KaladyGramapanchayat to be included in the joint inspection of these tributaries for any drainage or waste water flow to Udumbuzha tributary.

SCHEMATIC SKETCH:



CONCLUSION:

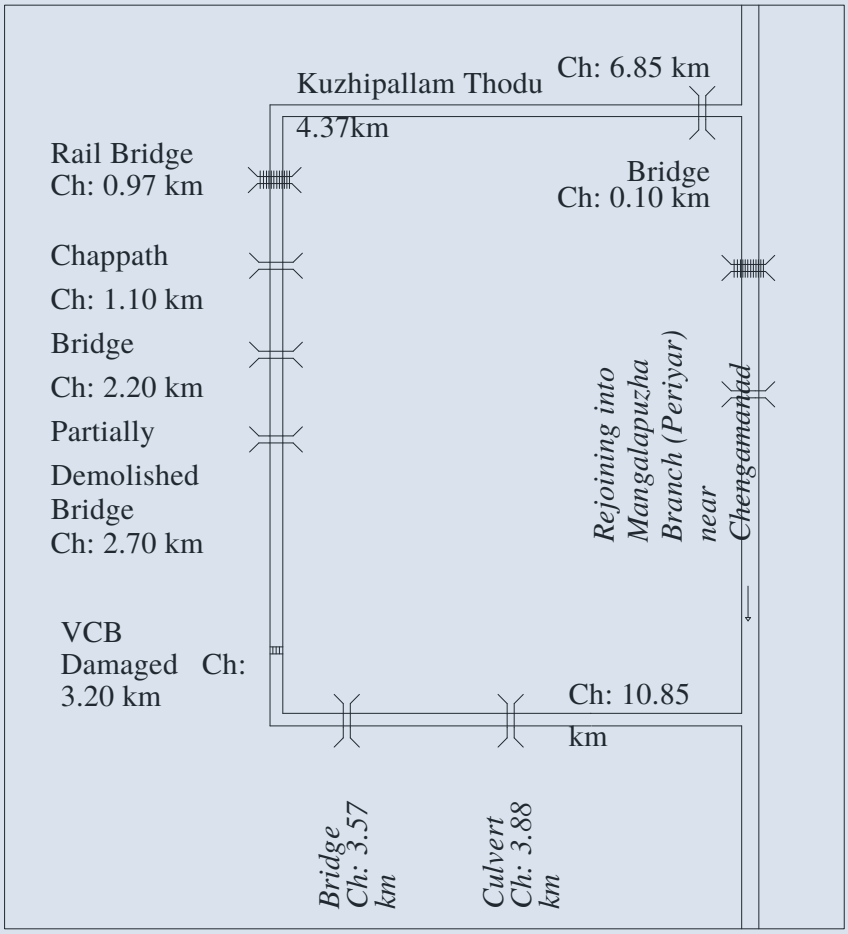
- Both the sides of the Udumbuzha tributary are not protected and the actual width of flow reduced and silt and clay formed banks on both sides of the tributary to be removed.
- Regulator is to be provided at the bell-mouth of Periyar to stop entry of flood water to Chengal Tributary during flood.
- The silt and clay in Udumbuzha tributary to be removed and side protection wall to be provided at required locations.
- Name of tributary:KUZHIPPALLAM TRIBUTARY
- Location Details: STARTS FROM CHENGAL TRIBUTARY AND JOINS BACK IN CHENGAL TRIBUTARY NEAR NH CROSS BRIDGE DESOM, ALUVA
- Length: 4.37 Km
- Average Width: 30m

PROBLEMS IDENTIFIED:

- The both entry and exit of the tributary is very narrow and difficult to drain water during flood season. There are three bridges in good condition in this tributary. One bridge is partially demolished and the foundation and debris is blocking flow of water. Also, there is one VCB in this tributary which is not used now. This VCB need to be replaced by a bridge.
- Both the sides of the Kuzhippallam tributary are not protected. The average height of the bank is 4m to 5m and it is also required to protect the banks from further falling and blocking the flow.

- REMEDY AND NATURE OF WORK TO BE INCLUDED:
- Vegetations are to be cleared including cultivations near the banks of the river. Smooth flow of water to be made.
- The narrow reaches at the start and end of the tributary need to be widened and proper protection to be provided at both the banks of the tributary.
- There are clay and silt deposits in this tributary and to be removed for smooth flow of water.
- The paddy fields on either side of the tributary near Kuzhippallam now turned in to a swamp by clay mining and the ground level of this paddy fields is now lower than water level of tributary.

SCHEMATIC SKETCH:



CONCLUSION:

- Both the banks of the Kuzhippallam tributary are not protected and the actual width of flow reduced and silt and clay formed banks on both sides of the tributary to be removed.
- The tributary need to be reclaimed at blocked locations and properly formed so that water can flow without any block during flood.
- The shallow chappath need to be replaced with a new bridge to ease water flow during flood season.

The shallow chappath need to be replaced with a new bridge to ease water flow during flood season.

The vegetation, silt and clay in Kuzhippallam tributary to be removed and side protection wall to be provided at required locations.

The VCB not in use to be replaced with new bridge to avoid water blockage during flood season.

The partially demolished bridge to be replaced with new bridge to avoid water blockage during flood season.

2. KANJOOR THODU

The KanjoorThodu starts near Kanjoor of length 4.60km and flows through Kanjoor and SreemoolanagramPanchayats and joints with Periyar near Sreemoolanagaram and has average 10m width. There is no irrigation construction across Kanjoorthodu. There is silt deposits in this and its small tributaries. There are thick vegetations or trees are there at the banks obstructing the flow of water. The Kanjoorthodu is blocked completely at two locations and now this land is used for agricultural and commercial purposes

- Name of Thodu:KANJOOR THODU
- Location Details: STARTS FROM PERIYAR AND JOINS AT PERIYAR
- Length: 4.60 Km
- Average Width: 9m
- PROBLEMS IDENTIFIED:
- There are 2 new Bridges under construction in this thodu to avoid blockage. Also, there are 6 culverts in this thodu. All the culverts are in good condition.

PROBLEMS IDENTIFIED:

- There are 2 new Bridges under construction in this thodu to avoid blockage. Also, there are 6 culverts in this thodu. All the culverts are in good condition.
- Both the sides of the Kanjoorthoduis not protected. The average height of the bank is 5m and it is also required to protect the banks from further falling in to the tributary and later blocking the flow.
- The portions of Kanjoorthodu between ch 1.15 km to ch 1.30 km and ch 1.40 km to ch 1.50 km forming it into agricultural land or commercial plot. During flood, the water from Periyar will stop at these locations hence flooding banks nearby.

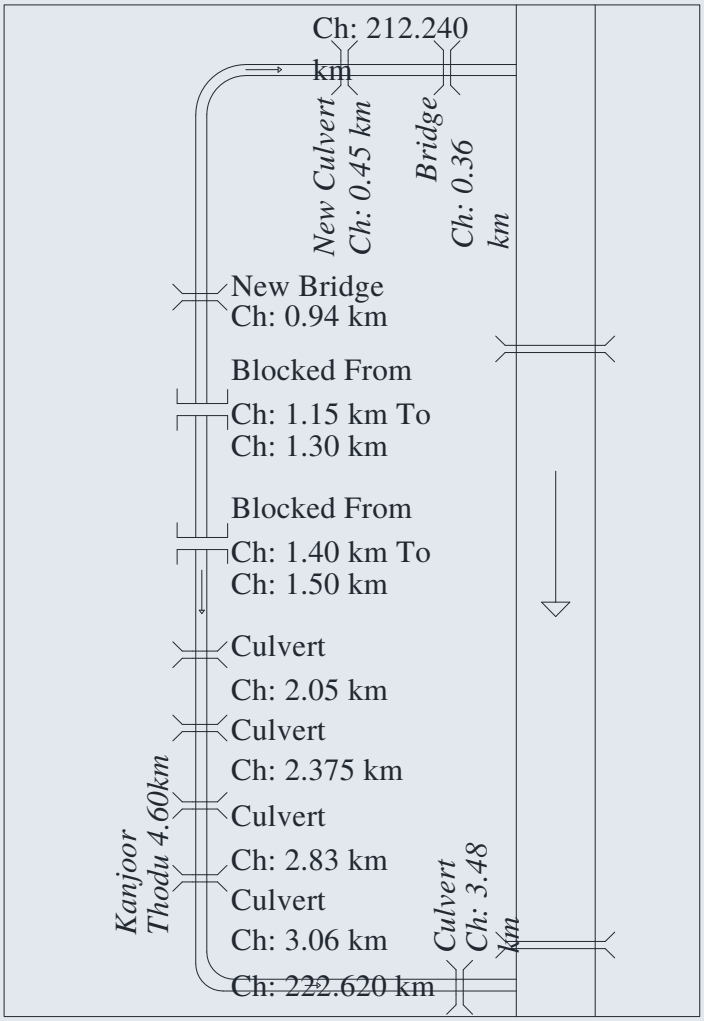
REMEDY AND NATURE OF WORK TO BE INCLUDED:

- Clay Banks should be removed and width of flow to be increased. Water holding capacity of the thodu will then be increased substantially.
- Vegetations are to be cleared including cultivations near the banks of the river. Smooth flow of water to be made.
- There are two reaches in between the thodu between ch 1.15km to 1.30km and 1.40km to 1.50km, which are blocked completely with cultivated agricultural or commercial land.

Latitude: 10.142068
Longitude: 76.420862
Elevation: 110.35m
Accuracy: 2.3m
Time: 09-09-2021 18:06
Note: Kanjoor thodu restart

Latitude: 10.14184
Longitude: 76.42143
Elevation: 102.95m
Accuracy: 2.1m
Time: 09-09-2021 18:02
Note: Kanjoor thodu stop

o SCHEMATIC SKETCH:



CONCLUSION:

- Both the banks of the Kanjoorthodu is not protected and the actual width of flow reduced and silt and clay formed banks both sides of the thodu to be removed.
- The thodu need to be reclaimed at blocked locations and properly formed so that water can flow without any block during flood.
- The silt and clay in Kanjoorthodu to be removed and side protection wall to be provided at required locations.

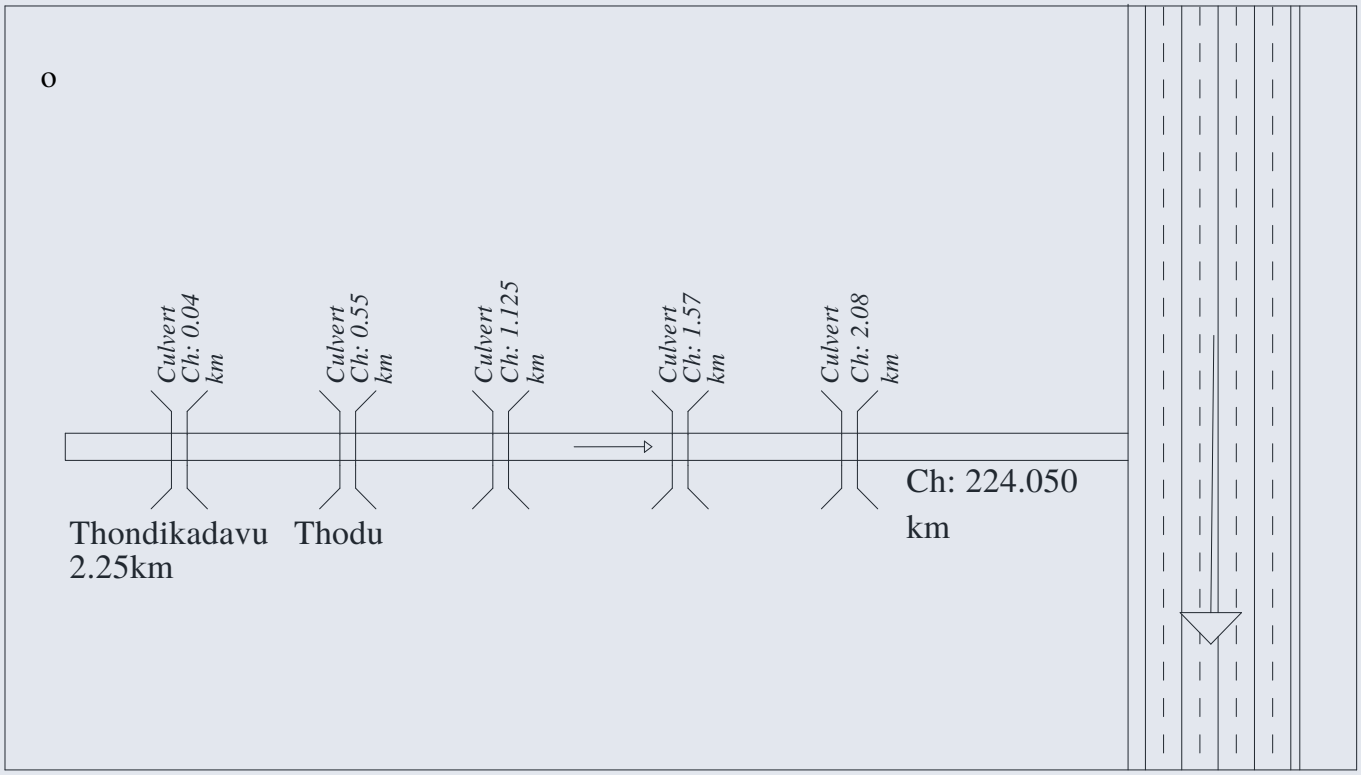
- 3. THONDIKADAVU THODU
- Thondikadavuthodu starts from Sreemoolanagaram and joins with the Periyar. The total length of the thodu is 2.25km and the average width of the thodu is 7m only. There are silt deposits and vegetations throughout the course of the thodu. There are no irrigation structures in this thodu except the banks, which were protected with DR wall in few locations.
- Name of tributary:THONDIKADAVU TRIBUTARY
- Location Details: SREEMOOLANAGARAM TO PERIYAR
- Length: 2.25 Km
- Average Width: 5m

PROBLEMS IDENTIFIED:

- There are 5 Culverts in thondikadavutributary, all these culverts are in good shape and not obstructing any water flow. Hence no need to reconstruct and maintains good clearance.
- Thondikadavu tributary is partially protected in some area. Providing protection with DR masonry is important to avoid future encroachment and for the smooth flow of water.

- REMEDY AND NATURE OF WORK TO BE INCLUDED:
- Clay accumulation at the bed should be removed and width of flow to be increased. Water holding capacity of the tributary then will increase substantially.
- Vegetations are to be cleared including cultivations near the banks of the river at bell mouth. Smooth flow of water to be assured.

SCHEMATIC SKETCH:



CONCLUSION:

- The sides of the Thondikadavu tributary are protected partially only. To avoid flood, protection work to be done for entire stretch of the tributary hence there will not be any encroachment in future.
- Silt and clay in these tributaries need to be cleared for smooth flow of the water.
- There are a lot of full grown vegetations and trees at the mouth of the tributary. These vegetations to be removed and smooth flow of water to be attained.

4. THUMBA THODU

ThumbaThodu starts from Periyarriver near Chovvara and joins with Mangalampuzha branch of Periyar near AluvaManappuram. The total length of the thodu is 4.50km and it is one of the thodu providing irrigation water in ChengamanadPanchayat. The average width of the thodu is 40m and there are silt deposits to be removed immediately to avoid flood. There are two LI Schemes in this thodu,

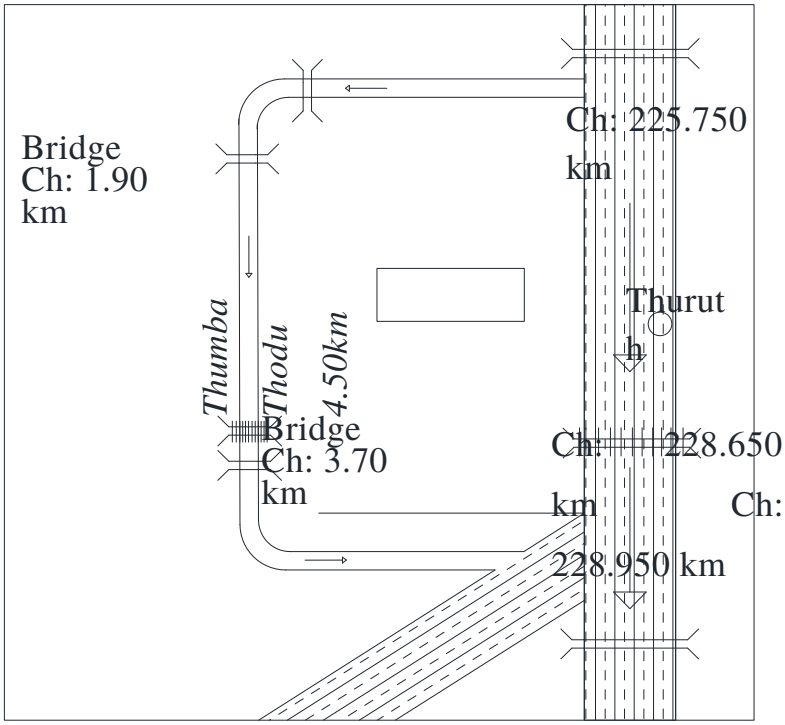
- Name of tributary:THUMBA TRIBUTARY
- Location Details: PERIYAR CH: 225.75KM AND JOINS BACK IN PERIYAR NEAR ALUVA
- Length: 4.50 Km
- Average Width: 50m

- PROBLEMS IDENTIFIED:
- There are 5 Bridges in this tributary, one of this is railway bridge. All the bridges are in good shape and no obstruction is found.
- Both the sides of the Thumba tributary are not protected. There is vegetation also in this tributary. The accumulation of silt and clay observed in this tributary.
- During 2018 flood the low-lying land of Aluva affected with flood.

REMEDY AND NATURE OF WORK TO BE INCLUDED:

- Vegetations are to be cleared including cultivations near the banks of the river. Smooth flow of water to be made.
- There are no major problems of waste deposit in Thumba Tributary identified.

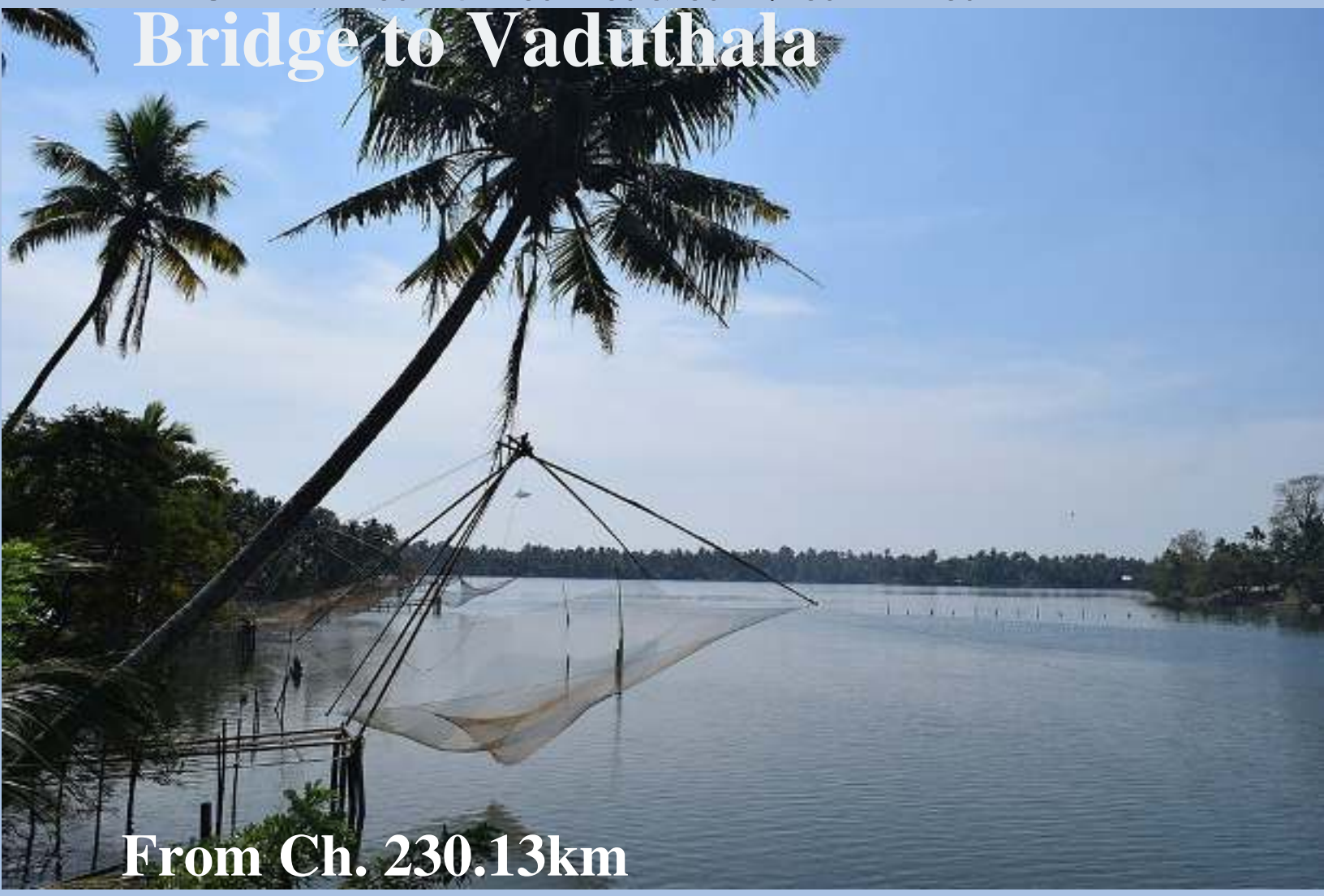
SCHEMATIC SKETCH:



CONCLUSION:

- Both the sides of the Thumba tributary are not protected and the actual width of flow can be increased by silt and clay removal at banks.
- The vegetations in Thumba tributary to be removed to increase the smooth flow of water.
- Bridges are not obstructing any flow in normal flood level.

Periyar fromMarthanada Varma Bridge to Vaduthala



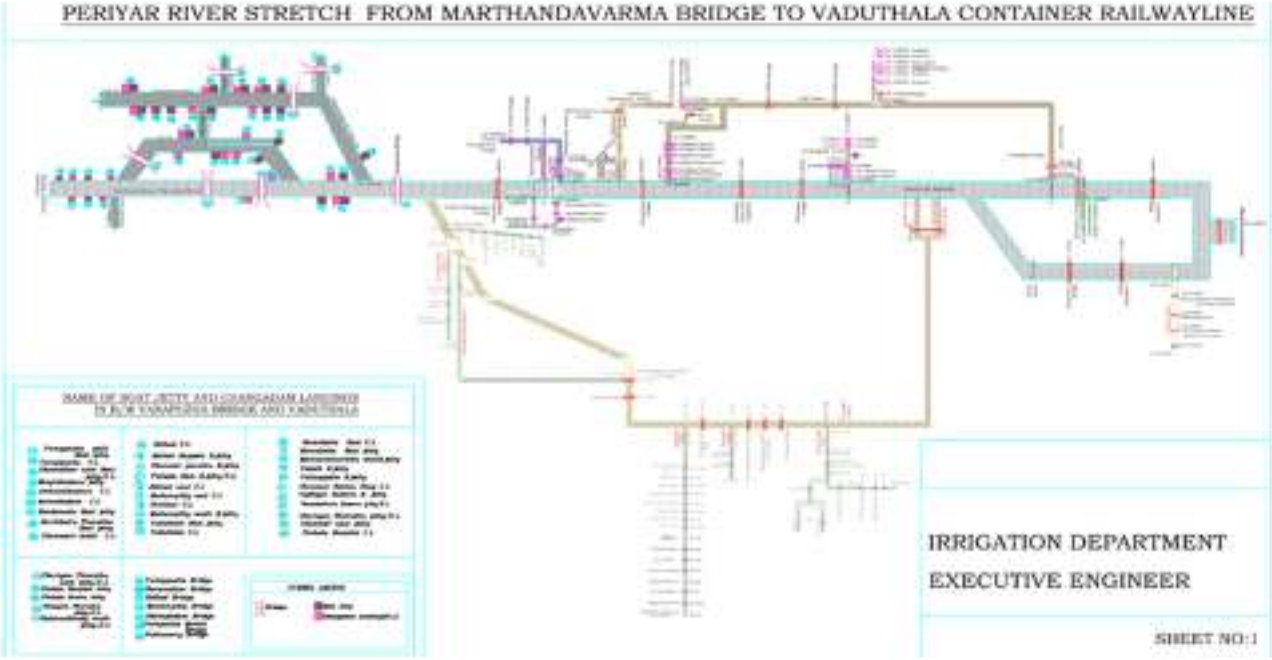
From Ch. 230.13km to 247.42km

Brief overview-

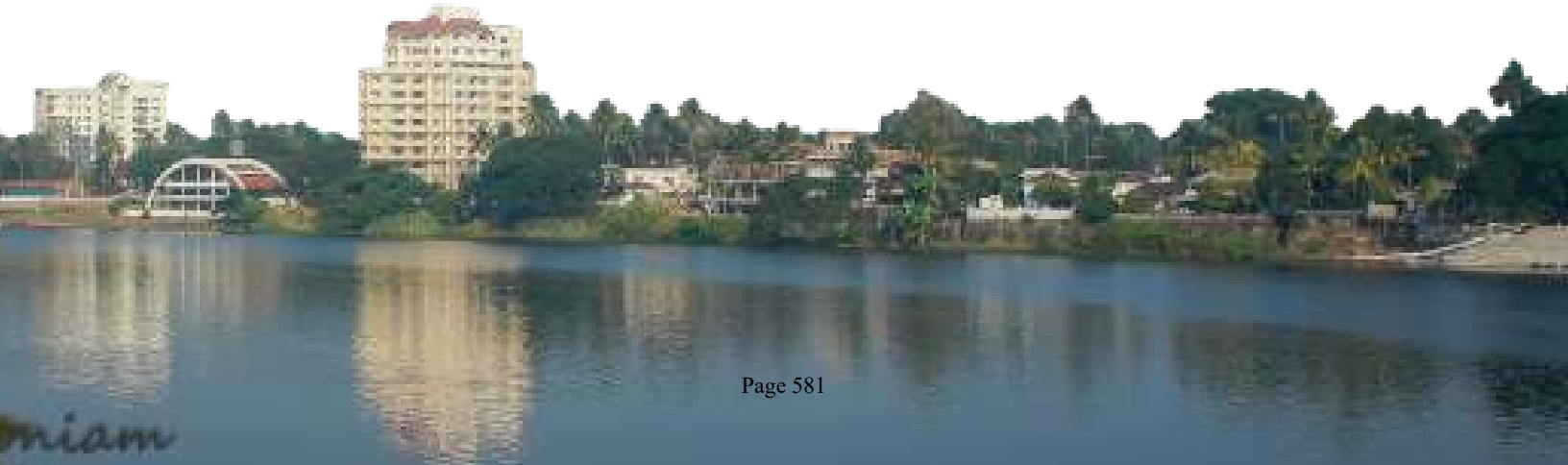
From AluvaMarthandavarma Bridge, Periyar splits into two as Edayar and Muttar river stretch near Edamulawhich again joins in the lower reach. At the joining point there is a delta formation. After the delta it flows towards Varapuzha. This stretch is known as Varattar Stretch. Another stretch diverting from Varattar branch is Edamula-Manjummel-Muttarstretch. It is also flows towards Varappuzha. These two stretches finally join near Varappuzha Bridge and drains into Kochi backwaters.This stretch having a total length of 17.29 Km. The local bodies along this stretch are Aluva Muncipality, Choornikkara Panchayath, Kalamassery Muncipality , Cheranalloor Panchayath,Kadungalloor Panchayath and EloorMuncipality. Vaduva thodu, Idamula thodu, Muttar thodu , Karippayil thodu, Edappally thodu, Oonthi thodu are the major tributaries in this reach. Pathalam regulator bridge across Periyar is located in this stretch. Manjummel regulator is located across the Muttar tributary .*(Refer, Pg:1258)*
This reach of Periyar is heavily polluted. Industries in the Eloor industrial zone discharge waste into the river. The ecosystem of the river is greatly affected in this stretch. The reaches of Periyar adjacent to Eloor Municipality usually witnesses massive fish death and change in water colour. The main problems identified in this stretch other than pollution are delta formation, silt deposition and encroachment.

4. PERIYAR STRETCHES FROM ALUVA
At Aluva in Ernakulam, the river bifurcates into the Marthandavarma and the Mangalapuzha branches. The Mangalapuzha branch joins Chalakudy River near Purapillikavu and flows into Arabian Sea. The Marthandavarma branch flows southwards, again dividing into two as Edayar and Muttar river stretch near Edamula, surrounding the Eloor area and finally draining into the Cochin backwater system.
From AluvaMarthandavarma Bridge, Periyar splits into two for a length of 3.90km. At the joining point there is a delta formation of length 336m and average width of …m. After the delta it flows towards Varapuzha. This stretch is known as Varattar Stretch. Another stretch diverting from Varattar branch is Edamula-Manjummel-Muttarstretch. It is also flows towards Varappuzha. These two stretches finally join near Varappuzha Bridge.

Periyar river ends at Varappuzha in Vembanadu lake and from there a branch flow through Cherannalloor, Chittoor, Vaduthala and joins NW III at Thevara. Kothadu - Moollampilly - Pizhala branch joins Vaduthala branch at chainages 1500 m and 4380 m. Kadamakkudy branch joins Vaduthala branch at chainage 250 m. All these are boat routes. Moolampilly, Pizhala, Kothad, Chennoor, Cheriyanthuruth and Kadamakudy are islands situated in the banks of the Vembanadu lake which joins Periyar river at Varappuzha. From Varappuzha Bridge Periyar extended towards Vaduthala. It is known as Vaduthala Chittoor cheranalloor branch. In thisstretch there is another two branches, they are Kadamakkudy branch and Kothad Moolampilly Pizhala branch.



MuttarVarattar Branches



2.1 Varattar stretch

The stretch of Periyar starts from Marthandavarma Bridge and ends at Varapuzhabridge. The Periyarpassess through Eloor Municipality Aluva Municipality Kadungalloor Grama panchayath Alangad Grama panchayath and Varapuzha Grama panchayath. The total length of this stretch of the river is 14.36 km.From the starting of this stretch of Periyar after Marthandavarma Bridge at Aluva there is an aqueduct built by Periyar Valley Irrigation Project at chainage 230.613kms which conveys water to the areas of Kadungaloor Grama Panchayath Paravur Municipality and Aluva Municipality for irrigation and domestic purposes. At the chainage 231.44km there is a damaged wall at the right side of the river which has to be rectified immediately. At Ch. 231.96km there is waste deposit near the right bank of the river. Near Ch. 232.70km there is lot of vegetation at both banks of Periyar which causes hindrance to the flow of water. At Ch. 232.78km there is Elookkara bridge which connects Uliyanoor and Elookkaraand it is situated in Kadungaloor Grama Panchayath. At Ch.233.26 km Muppathadam pump house can be seen at the rights side which is owned by the KWA. Onjithode which is the longest stream originates from Periyar at ch: 233.44km and has got a length of 236.68kmand rejoins periyar at ch:241.67km. Encroachment is seen at ch:233.67 km towards the right side at this area is covered with vegetations. This encroachment will be a hindrance to the Periyar upto ch:234.07km. The Periyar river takes a diversion at Ch 234.52km as Edamula branch which leads the river Periyar through Kalamassery, Manjummel and rejoinsat the Pathalam branch of Periyar nearVarappuzha Bridge. Thick vegetations found on both banks near 235.03km and on the left sideis IACbanglow and right side is a portion of Kayantikkara. Pathalam PWD bridge is situated at Ch. 236.33km. From this chainageat the right side of the river the industrial area begins this consists a lot of companies and factories which disposes lot of liquid waste directly into the river and the left side of the bank is a residential area. At 237.07km a pump house of M/s CMRL exists and this company has been constantly taking a huge quantity of water for the industrial purposes. Over more than 247 industrial institutions are situated towards the downstream of the area and is called the Industrial Belt of Periyar. At Ch. 237.46km there is an effluent chanel connected to the periyar it disposes liquid waste also at Ch:237.69 km there is an outlet inslalled by M/s CMRL for discharging industrial effluent and this is purely unofficial.

The Pathalam Lock cum regulator situated at Ch.237.87km. This regulator was constructed in 2016 in order to prevent salt water intrusion to the periyar. At the right bank of the regulator near the lock portion at ch: 237.79km, a concrete pipe of 90 cm diawas laid for a length of 600m to the Edayattuchal paddy field in order to facilitate supply of water for agricultural purposes.The invert level of the pipe is at higher level near the river bank thus presently water cannot flow through the pipe to the Edayattuchal paddy field. Also polluted water from different companies is flowing through this pipe to the river causing severe pollution hence now this pipe has been closed with concrete to block the flow of industrial effluent to the Periyar. Towards the downstream on the left side factories owned by M/s FACT and M/s TCC are situated and at ch: 238.29km the official outlet of TCC factory can be seen. At the right side of the river a company named 'Sudchemi' is situated at ch: 238.43km. The factories from this company expells the effluent through pipes and drains at ch.238.43km andvch: 238.49km. The largest fertilizer factory in India M/s FACT is situated at the right bank of periyar from Ch 238.67 to ch: 238.93 km. Effluent is discharged at ch: 238.74km from this company. From Ch.238.97km to 239.23km on the right side of the river the Binani Zinc factories are located which is just opposite to the FACT area and those factories are not in working condition and locked down. At Ch.239.07km and there is an unauthorized pipe laid from the waist pond of BinanaiZic to the Periyar.Also, at Ch. 239.23km there is an unauthorized outlet laid from the same company to the Periyar. At Ch.239.29km effluent outlet from IRE company is also seen. The Methanam bridge is situated at ch: 240.58km which connectsAlangad Panchayath and EloorMuncipality. From Ch. 239.5km to 241.67km huge quantity of silt is accumutated at both the river banks.At ch: 241.85km delta formation and water hyacinth is formed at the left side of the bank. On the right side at Ch.242.17km, Varapuzhathodu originates. Encroachment is seen towards the right side of periyar at ch: 242.41km. At ch: 242.82km and ch: 242.95km near the Eloor depot huge quantity of delta formation and water hyacinth is formed at the left side of the bank. At Ch.243.34kmdelta formation and water hyacinth is found at the left side.At Ch.244.06km delta formation and water hyacinth is found at the right side.At Ch.244.19km and at ch: 244.31km water hyacinth is found at the left and right bank of the river. The Varappuzha Bridge is situated at ch: 244.49km towards the end of this stretch of periyar.

Connecting thodu

1. Onjithode(Kadungallor and ALANGADU panchayath)

(i) KaripuzhaAngadikadavuthode (AlangaduPanchayath)

(ii) Karukathode(AlangaduPanchayath)

2. KakkunniMethanamthode(AlangaduPanchayath)

3. Manavalathode(AlangaduPanchayath)

4. Periyar to Periyarthode(AlangaduPanchayath)

(i) .PlackkatamppillyChirayamThode(AlangaduPanchayath)

5. Vembalathode(KadungalloorPanchayath)

6. Panachithode(Eloor Municipality)

7. Kolavelipadamthode(KadungalloorPanchayath)

8. Varapuzhathode(VarapuzhaPanchayathThode)

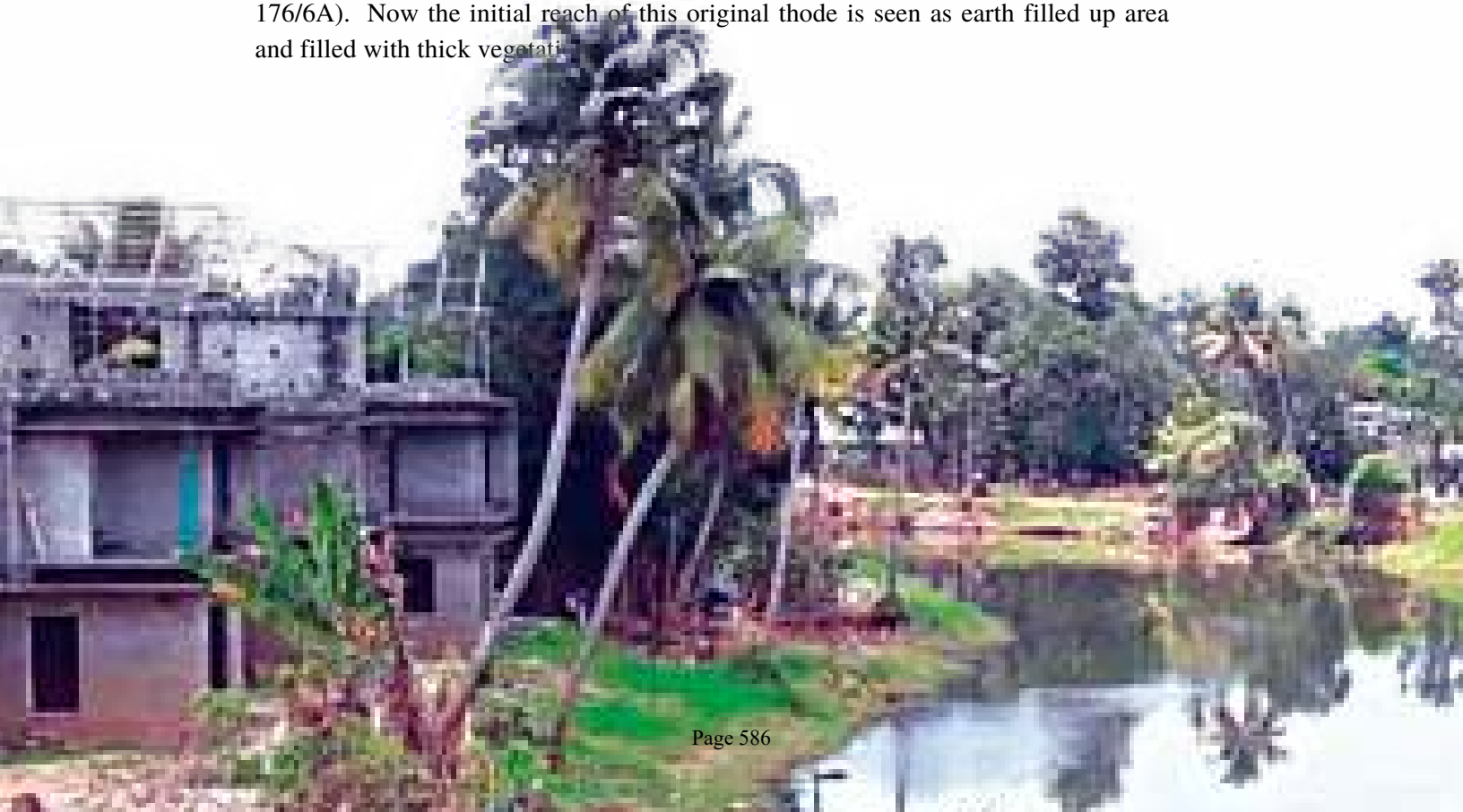
(i) Kachappillythode(VarapuzhaThode)

(ii) Punathilthode(VarapuzhaThode)

Onjithode
Starts from: Varattayar at ch. 234.43km
Ends to varattayar at ch 240.50km
Total length: 6550m (as per present alignment)
Shares Kadungalloor and Alangaadgramapanchayath

Onji Thode is one of the very important natural tributary originating from Varattayar at Elanjichuvadu(ward No.9, Lat :- 10.094545, Long :-76.334339) and ends very near to upstream of Methanam (Chirayam) bridge, passing through Kadungalloor (in ward nos.9,11,20 and 21) and Alangad (ward nos.12 and 13) GramaPanchayath.. Years back both Panchayathshad its own place in the agricultural industry. AlangaduGramaPanchayath and Kadungallor GramaPanchayath were scenic with itsgreenery and were covered almost entirely with vast expanses of paddy fields and coconut trees. Later on the advent of red brick manufacturing business made the paddy fields almost vanish literally. These Panchayaths were blessed with fertile soil, which gave good crops for all types of agriculture. The place is situated on the banks of River Periyar, which is called as "Muttupuzha"(knee river) in this area as it used to have knee deep water during summers and people could cross it on foot. But since huge amount of sand is taken from the river bed it is no more shallow or safe to walk through even in summers.Onjithode is a main water resources of Kadungalloor and Alangadu Panchayaths. The former rulers of Alangand was known as "AlangaduKarthakal". It is also home to two famous and oldest religious sites in Kerala "St Mary's Church" Alangad and "AlangadJumamusjid". The industrial estates of Muppathadam and Edayar are located in Kadungalloor. The temple at Uliyannoor is believed to be built by Perumthachan.

In olden days this thode was one of the very important means of water way for transportation of goods to Markets connecting Aluva and rural areas of Kadungallor, Alangadu, Karumalloor, Elenthikkara. Elookkara, Methanametc for which two crafts at a stretch could have been moved together through this thode for trades. Originally this thode was originating from Varattayar at Elanjichuvadu very near to present comprehensive water supply schemeKadungalloor - Karumaloor – AlangadPanchayath (commissioned on 09.12.1993- Kadungalloor village Sy no. 176/6A). Now the initial reach of this original thode is seen as earth filled up area and filled with thick vegetati



Now Anganavadi building is also seen constructed along the alignment of original Onjithode at Elenjichuvadu and deviates the natural flow of the stream to artificially constructed inlet points at location of Lat 10.095241, long 76.334559 to a width of about 5m against the original width of about 50m. Width of thode is seen reduced through out the entire length bychanging the alignment and is varying from 5m,10m,50m,80m,4m,90cm dia pipe ,12m 7m and finaly ending to7m to 15m at mouth near MethanamChirayam bridge. Since all the cross drainage structures are constructed to effect contraction in width of thode or arrest the flow of water by raising bed at vent way portion,water is is now stagnated without flow.and is getting polluted and the ponds and well near by areas are also getting polluted due to recharging of such dirty water.Hence it may generate many health issues and epidemic diseases.To put it briefly, encroachment might have happened through the entire length of the thode and width of thode have been contracted and squeezed to a pipe culvet of 90 cm dia.at certain location.

Vide order no.D1-5633/95 dtd 18/08/2021 Thahsildar of ParavurThaluk has ordered to conduct resurvey for demarkatingboundaries ofOnjithode in respect of orders of Hon,High court vide WP(C)9562/21 on petition filed by Onjithodesamrakshanasamithi.Alangadu and Kadungallorpanchayath were the most affected places in Ernakulam district in the rain and subsequent flooding during 2018. Total length of the thode as per present alignment is measured to be 6550m.Actual length can be arrived only on demarcation of boundary and fixing original alignment.

starting point of original Ongi thode,now filled with earth,banana tree and thick vegetation
Elinjichuvadu Bus Stop, Elookkara Kaynikkara Rd, Kadungalloor, Kerala 683110, India
Latitude 10.094527°
Longitude 76.334351°
LOCAL 11:10:36 SATURDAY 08.14.2021
GMT 05:40:36 ALTITUDE -78 METER

starting point of artificially created Ongi thode
Elookkara Rd, Kadungalloor, Aluva, Kerala 683110, India
Latitude 10.095230°
Longitude 76.334558°
LOCAL 11:57:16 SATURDAY 08.14.2021
GMT 06:27:16 ALTITUDE -79 METER

Attempt for blocking Ongi thode from Periya
Elinjichuvadu Bus Stop, Elookkara Kaynikkara Rd, Kadungalloor, Ker
683110, India
Latitude 10.094639°
Longitude 76.33452
LOCAL 11:24:32 SATURDAY 08.14.2
GMT 05:54:32 ALTITUDE -77 ME

Attempt for blocking Ongi thode from Periyar
Elookkara Rd, Kadungalloor, Aluva, Kerala 683110, India
Latitude 10.095241°
Longitude 76.334559°
LOCAL 11:58:32 SATURDAY 08.14.2021
GMT 06:28:32 ALTITUDE -80 METER

Encroachment at original starting point of Ongi thode
Elinjichuvadu Bus Stop, Elookkara Kaynikkara Rd, Kadungalloor, Kerala 683110, India
Latitude 10.094640°
Longitude 76.334516°
LOCAL 11:25:51 SATURDAY 08.14.2021

Anganavadi along the original alignment of Ongi thode at Elinjichuvadu
Elinjichuvadu Bus Stop, Elookkara Kaynikkara Rd, Kadungalloor, Ker
683110, India
Latitude 10.094675°
Longitude 76.33391
LOCAL 11:32:26 SATURDAY 08.14.2

2. Problems identified

1. Ch 0m

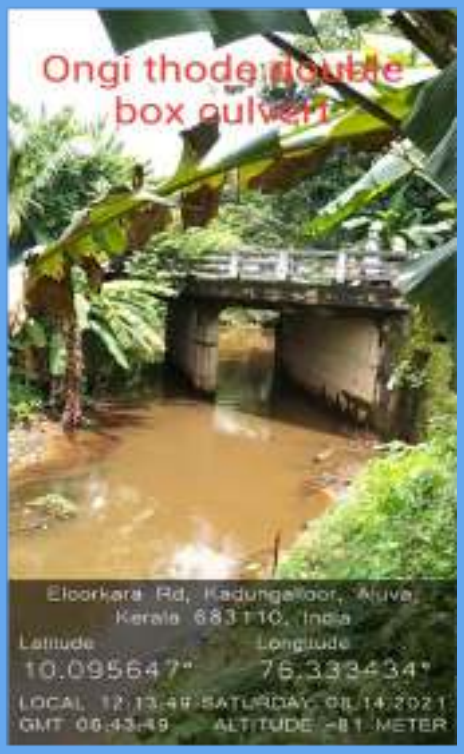
Starting point of original Ongithode is having about 50m width but it is blocked By filled up earth, thick vegetation and banana trees at Elengichuvaduvery near to present comprehensive water supply schemeKadungalloor - Karumaloor – AlangadPanchayath (commissioned on 09.12.1993-Kadungalloor village Sy no. 176/6A) whereas present Ongithode is starting from artificially created location having only 5m width and bed raised by laying cement concrete.

2. Ch 80M

flow of water blocked and Original Ongi thode is deviated here

3. Ch 160M Double box culvert

Flow is deviated towards east direction against east to west ,both the abutments are inside of stream, width is reduced and ventway of only one span is functioning ,eventhough 13.4m for both the ventway is available , bed level is seen as raised by cement concrete,Middle pillar causes hindrance to flow of water Hence waste and debries will be gathered here and causes hindrance to flow of water.



5, Ch812m Bridge at Keerampilly.

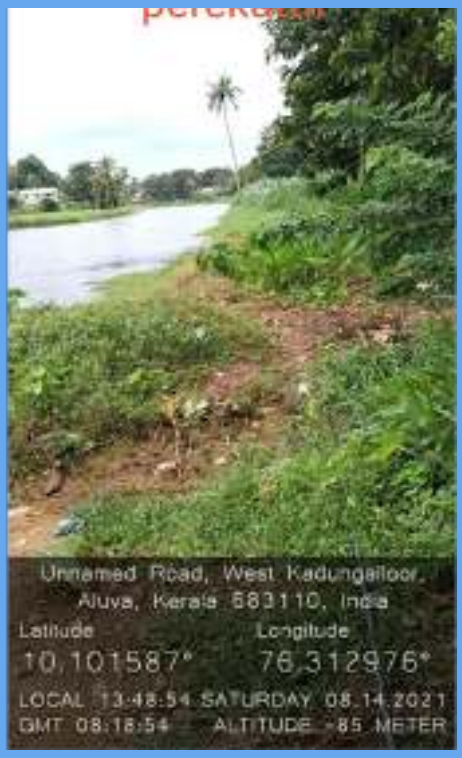
11.30m width (double box) Central pillar in the stream causes hindrance to flow of water

4. Ch 650m

Width of the thode is measured as 23m ,no flow due to growth of bulbus plant of hyacinth ,down stream and upstrem portion is not functioning properly. Bed of thode is raised and have no sufficient depth.

7) Ch. 2370 Bridge 67m width(Muppathadam) - Deposit of food waste

6). Ch.2360 Bridge 40m width (Muppathadam) Upstream and downstream of thode filled with bulbus plant of hyacinth and floww obstructed heavy silt deposit for long run. Flow of water blocked

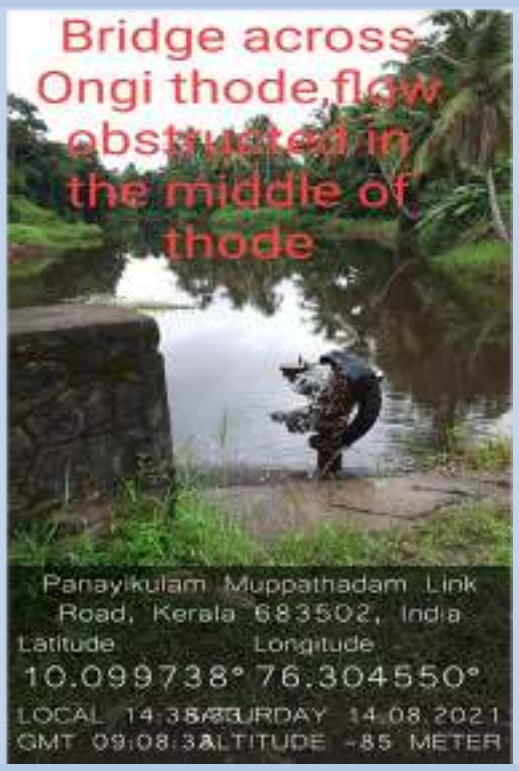


8) Ch.3020m thode 70m width at Pere kattil
Bed raised due to heavy deposit of silt and hyacinth

9) Ch.3300m bridge (Karipuzha) width of thode is reduced to 21.40m from 55m width heavy silt deposit,bed raised by cement concrete

10) Ch.3802m

12)Ch.4700m thode 8m width . heavy silt deposit,polluted water

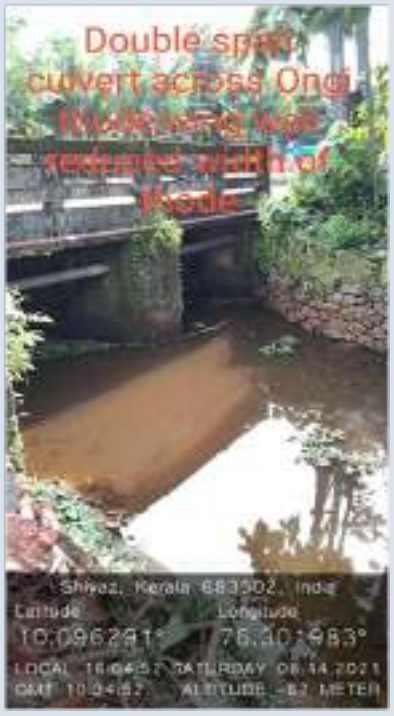


11)Ch. 4400m Bridge Near Juma Masjith . Width of the thode is reduced to 8m from 50m width of thode and abutment is constructed in the middle of the thode. Flow obstruction,

13)Ch.4870m Foot slab 8m width Flow of water obstructed water is getting polluted,Heavy silt deposit

14)Ch.5000m Double span culvertg wal

Width of thode is reduced ,Central pillar causes hindrance to flow of water Heavy silt deposit, Bed is raised by laying cement concrete.



15)Ch.5100m Thode near Lodge stop 2.50m width Width of thode is reduced

16) Ch5150m Culvert 2.50m width
Width of thode is reduced to narrow , heavy silt deposit and thick growth of hyacinth flow of water obstructed

17) Ch 5620m culvrt 2.50m span Heavy silt deposit Bed level is raised by laying Cement concrete width of thode is reduced and not sufficient

18) Ch.5800m Pipe culvert 90cm dia. at Meenkuzhikandam. Ongi thode is seen as shrinked to 90cm dia pipe culvert. Fully blocked,no fkw and too insufficient

19) Ch.5880m thode 4m width and is not sufficient for effective flow of water

20) Ch.6020mCulvert 2.50m span No flow Bed is raised by Cement concrete, Heavy silt deposit

21) Ch.6220m thode 6m width, Karukathode starts, no flow of water Heavy silt deposit

22) Ch.6260m Foot bridge 2.50m span (Poonthuruth) width of thode is reduce

Width of thode is reduced,Heavy silt deposit, bed is raised

23)Ch.6360m thode 7m width ,Width of thode is reduced,heavy silt deposit no flow of water

24)Ch.6370m Culvert bed is raised by laying concrete,no flow of water

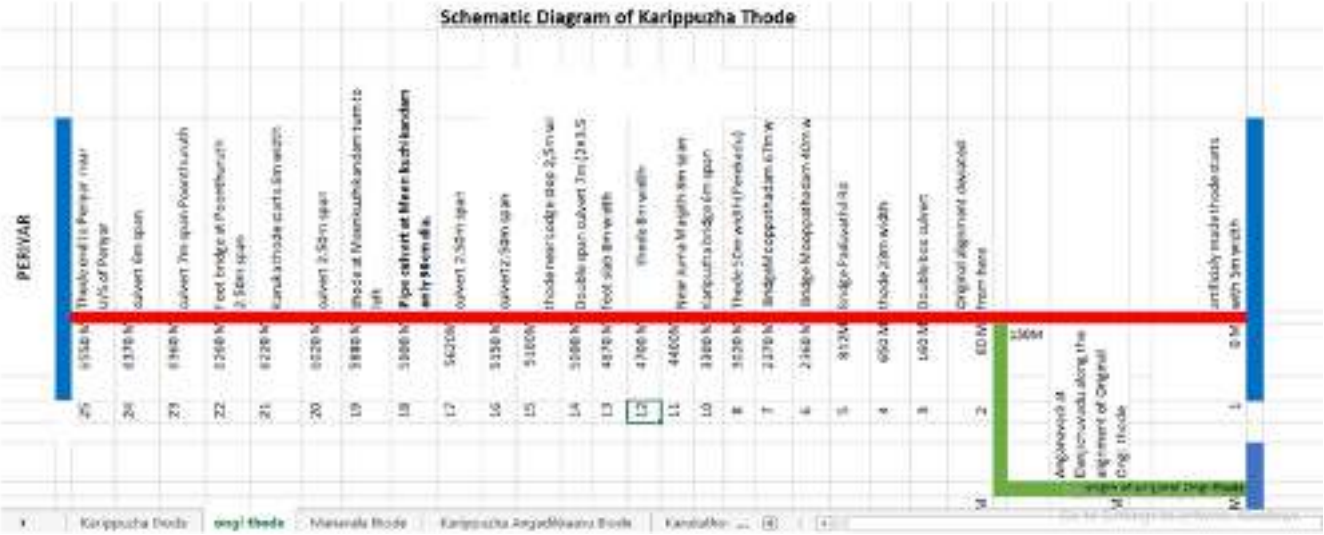
25)Ch.6550m 7m width Ongi thode ends to Periyare Heavy silt deposit

From the above field study it is noticed that polluted water is stagnated and the flow is obstucted flow of water through this thode is obstructed at many location .

Remedial measures

- Demarcate boundary of thode and restore the natural flow of Ongithode to its original alignment and shape
- Reconstruct all bridges and culverts covering entire width so that abutments shall not obstruct flow of
- water or reduce width of the thode from its original shape
- Bed of the thode at initial and end point of theOngithode is to be deepened in accordance with the
- Bed level of Varattayar at relevant locations. Remove accumulated silt and thick vegetation from the thode.
- Give side wall protection works
- Periodic desilting and cleaning of the thode is necessry
- Lowering of bed of the thode and Cross drainage structures so that increased quantity of water can be accommodated and restored free flow of water

4 Schematic sketch



Remedy

Alignment of original Ongithode throughout entire length is seen as shifted, deviated or encroached. Restoration of Ongithode to its original natural alignment is very important and essential for restoring the drainage system of Ongithode, for facilitating sustainable agricultural development and food security for the people, improving flow of underground water table and recharging well, prosperity of Kadungalloor and Alangadu GramaPanchayaths in all respects. S nce flow of water is obstructed at many reaches by reducing the width up to 90cm quantity of silt or earth work can be finalised only after demarcation of boundary and finalisation of original alignment of the thode .How ever in consideration of maintaining free flow of water based on the existing width of thode in the middle reaches ,an average width of 30m is taken for the purpose arriving quantity of silt. As such Quantities are arrived as noticed below

- Silt
- Vegetation
- Structure to be removed
- Encroachment, It can be finalized only on demarcation of boundary

(i) Karipuzha Angadikadavu thode

Starting point: from Angadikadavu bridge through Koduvazhanga

Ending point: at ch3300m of Onjithodu

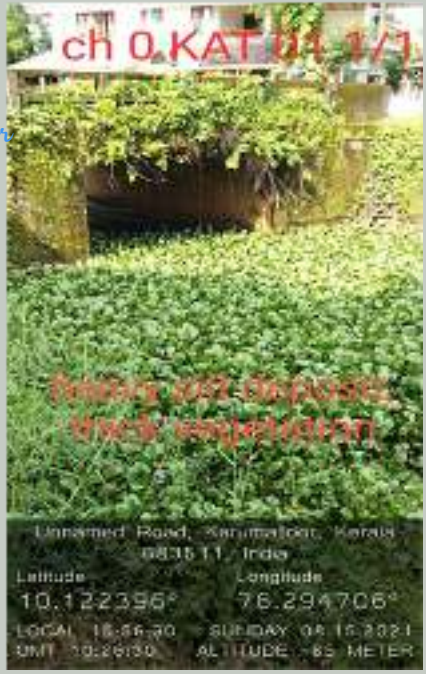
Total length: 3920m (as per present alignment)

Shares : Alangaadgramapanchayath

Karipuzha Angadikadavu thode with a total length of 3920m flows along Alangaad Grama Panchayath. It Shares boundary of Kadungalloor Panchayth at Karippuzha and Karumaloor Panchayth at Angadikadavu. It starts from Angadikadavu bridge through large area of paddy field in Koduvazhanga, Kallupaalam, Ezhuvichira and meets with Karippuzha at ch 3300m of Onji thodu. In olden days this thode was one of the important means of waterway connecting then famous market located in angadikadavu eloor methanam, Eloorkkara, varappuzha,aluva market etc. Also it connects the very important viz Periyar to Periyar which was also one of the most important mode of transportation in south Periyar and north Periyar (Manjalipuzha) adjacent to kollam kottapuram national waterway 3. Years back this Panchayath had its own place in the agricultural industry and this place was scenic with itsgreenery and were covered almost entirely with vast expanses of paddy fields and coconut trees.

Periyar

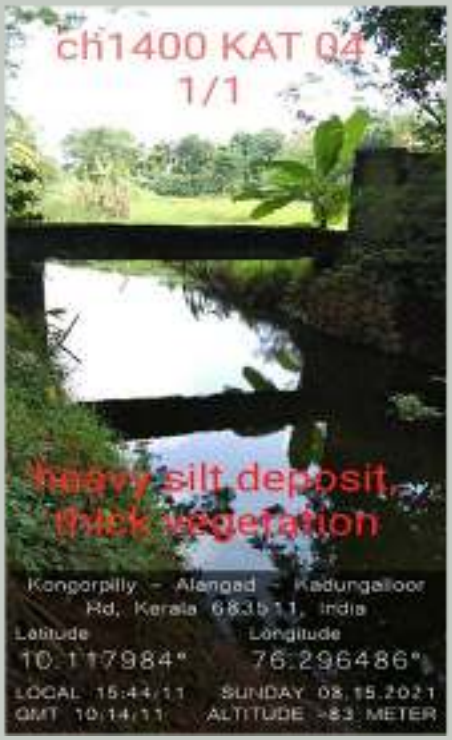
2. Problems identified



1. Ch 0M
Fully blocked,no flow,heavy silt deposit,Thick vegetation,Less ventway of 4.6m -width of thode 20m

3. Ch 560M
Fully blocked, no flow heavy silt deposit.

2. Ch 337M
Fully blocked,no flow,heavy silt deposit, thick vegetation

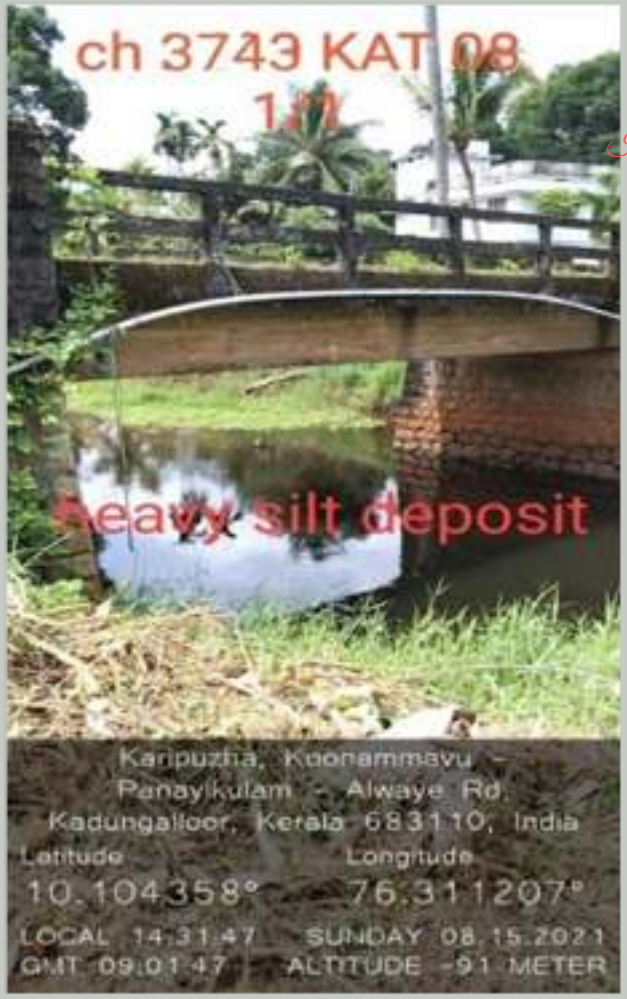


4. Ch 1400M
Fully blocked,no flow,heavy silt deposit,thick vegetation

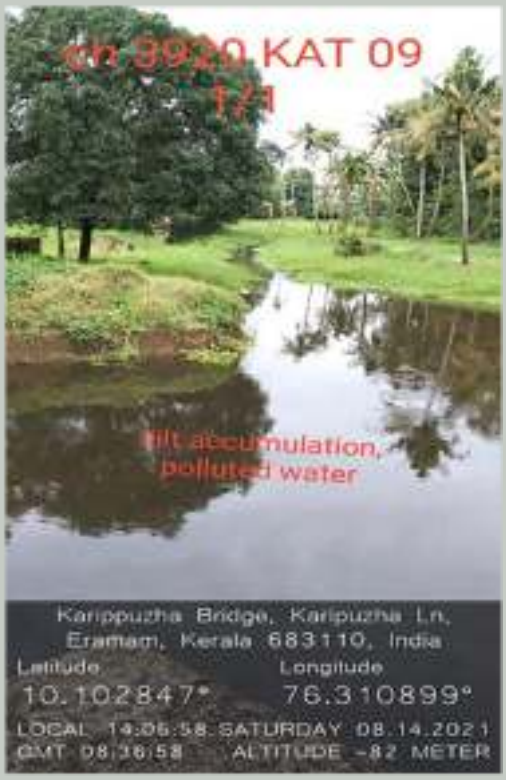
5) Ch 1500m
Fully blocked, no flow, heavy silt deposit, thick vegetation.

6) Ch 1870m
No flow,heavy silt deposit, both abutments are inside the stream-reduced vent way,Too insufficient structure,Polluted water.

7) Ch1814M
Fully blocked, no flow, heavy silt deposit, thick water hyacinth.



8) Ch3743M
Less flow, Polluted water, heavy silt deposit, width of thode reduced



9) Ch.3920m
Polluted water, heavy silt deposit, No flow, thick vegetation.

ii. Karukathode

Starting point: from onjithodu at 6220m

Ending point: at ch920m of Kakkunnimethanamthode

Total length: 360m (as per present alignment)

Shares :Alangaadgramapanchayath

2. Kakkunni Methanam thode

Starting point: from onjithodu at ch4700m

Ending point: atch 11350m of varattayar

Total length:2435m (as per present alignment)

Shares :Alangaadgramapanchayath

Prob

1.Ch 0M

Karukathode starts from Ongithodeat ch 6220m,Heavy silt deposit and thick vegetation

1. Ch 40M

Thode(8m width) heavy silt deposit,thick vegetation

2. Ch 65M

Thode(8m width) heavy silt deposit,thick vegetation

5. Ch 155M

1. Ch 0M

Starts from Ongithode at ch 4700m,Heavy silt deposit and thick vegetation

double span culvert 11m span(2nos). Flow obstructed due to: silt accumulation, 1 span portion blocked by rubble work,2 intermittent pillars in the stream obstruct the flow.

3. Ch 793M

Foot slab 8m span,heavy silt accumulation,water hyacinth and Intermittent support obstruct flow of water

blems identified

3. Manavala thode

4. Ch 1835M
Methanam bridge,Heavy silt accumulation and Heavy growth of Hyacinth obstruct flow of water

5. Ch 2305m
thode,10m width thode meets Periyar

1. Ch 0M
Starts from 1680m of KakkunniMethanamthode, heavy silt deposit
Starting point: from KakkunniMethanamthoduat ch1640m
Ending point: at ch 11560m of Varattayaar at Manavala
Total length:389 m (as per present alignment)
Shares : Alangaadgramapanchayath

2. Ch 195M
heavy silt deposit

3. Ch 310M
VCB, no shutter,not functioning,heavy silt deposit, intermittent pillars obstruct flow.

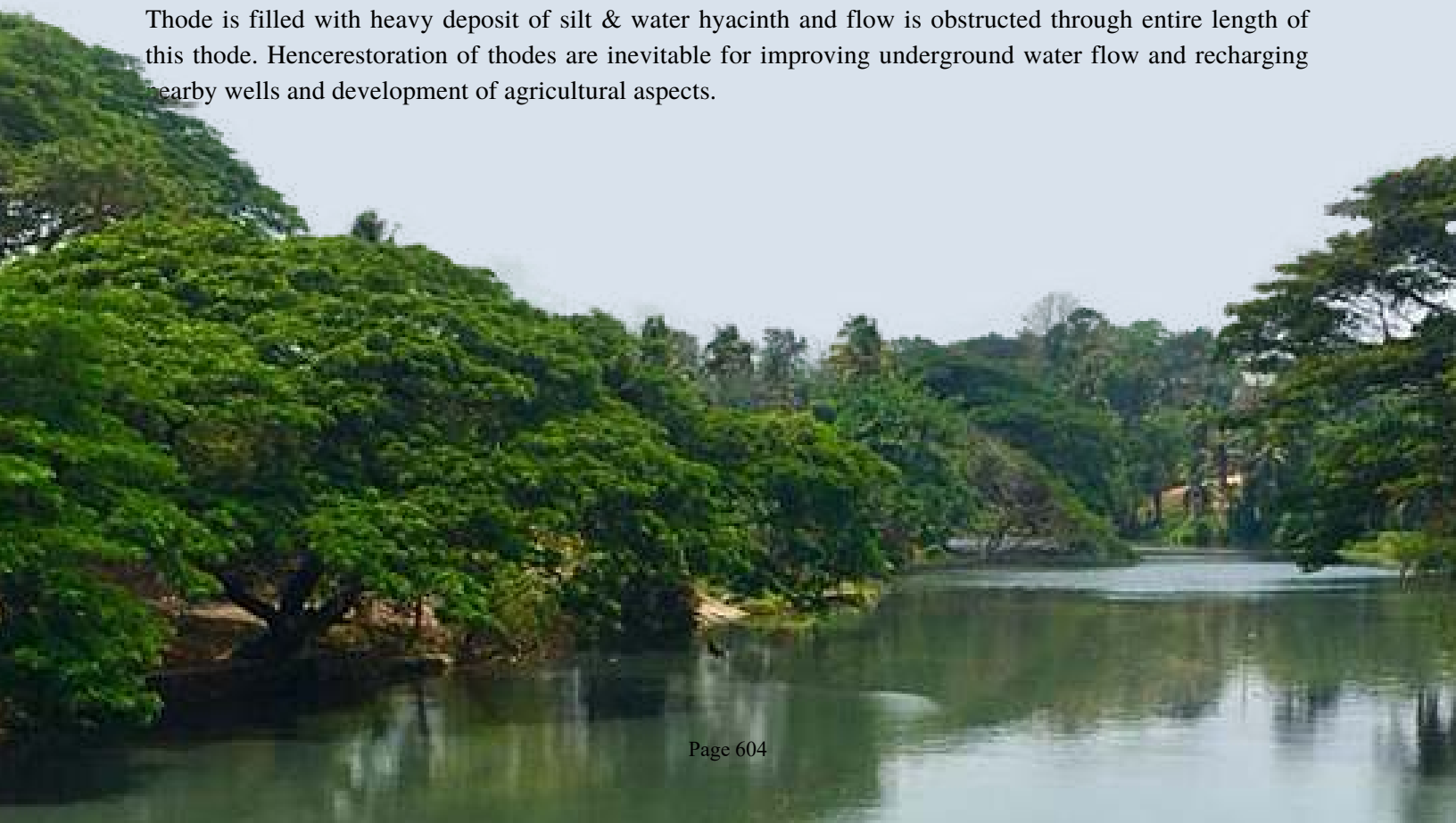
1. Ch 389M
heavy silt deposit

Periyar

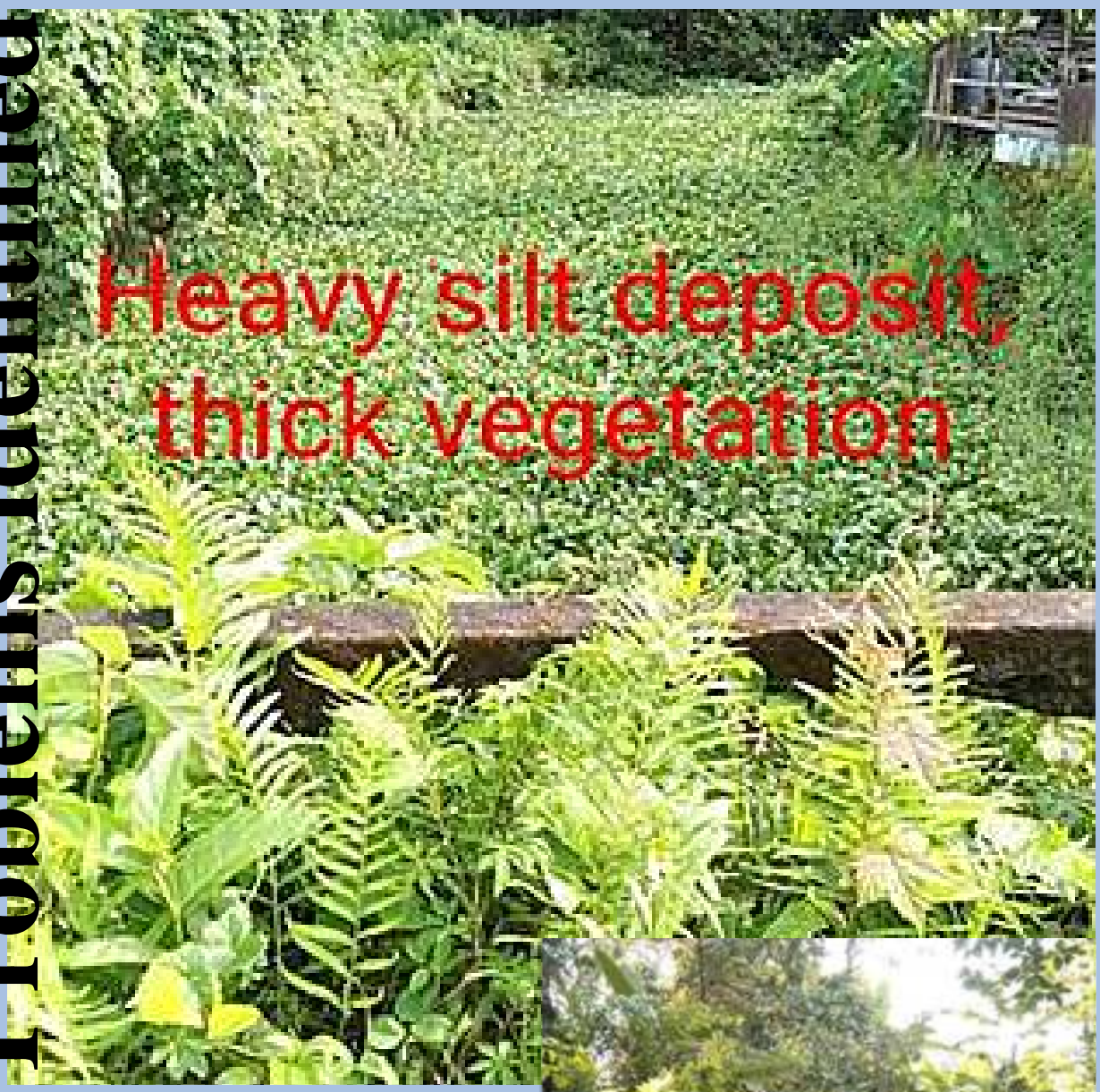
Periyar to Periyar thode
Starting point: from Angadikadavu (connect with Manbra north Periyar)
Ending point: at ch12100m of Varattayaar
Total length:6550 m (as per present alignment)
Shares: Alangaadgramapanchayath

History

It is one of the very important thode connecting south periyar & north periyar passing through Alangad panchayath and Karumaloor Grama panchayath. In olden days this thode was a very important means of water way connecting Eloor Market, Methanam, Angadikkadav Market ,and Mempra in Karumaloor Grama panchayath adjacent to the Manjalipuzha and Kollam Kottappuram national water way -3. After a long run a thuruth has been formed at plackattumpilli in Alangad Panchayath. Plackattumpilli is a major junction, wherein a thode having width of 40 to 50 M from Neerkkode, thode from South Periyar, thode from North Periyar and Pazhamthode from a vast area of paddy field viz.Mundon padam. Long years back Mundon Padam played an impotant role in growth of Alangadu Grama Panchayath in agricultural development.Now a wast area of paddy field of about 100 acres is idoling stage.More over people near to Koduvazhanga complained that certain lift irrigation system is now totally failed for want of flow of water through thodes in this area. During flood 2018 flood a vortex was formed as the water raised from North & South Periyar was flowing with heavy intensity of velocity around the thuruth at Plackkattampilly and flooded in and around of Karumaloor,Alangadu Kadungalloor Grama Panchayath . All the cross drainages are seen as constructed in reduced thode width.It is suspected that banks of the entire length of the thode has been encroached. Thode is filled with heavy deposit of silt & water hyacinth and flow is obstructed through entire length of this thode. Henceresto ration of thodes are inevitable for improving underground water flow and recharging nearby wells and development of agricultural aspects.

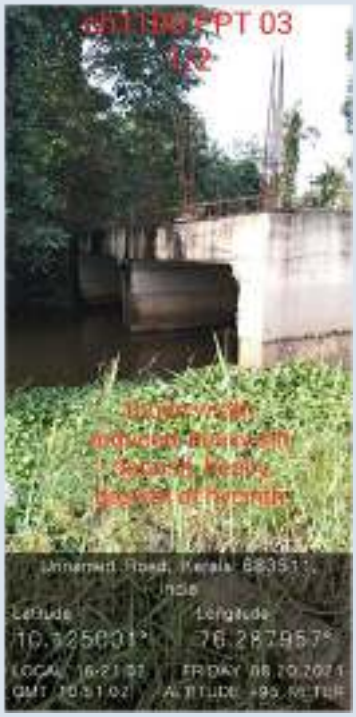


Problems identified



1. Ch 0m, Angadikkadavu
Heavy silt deposit & thick vegetation.

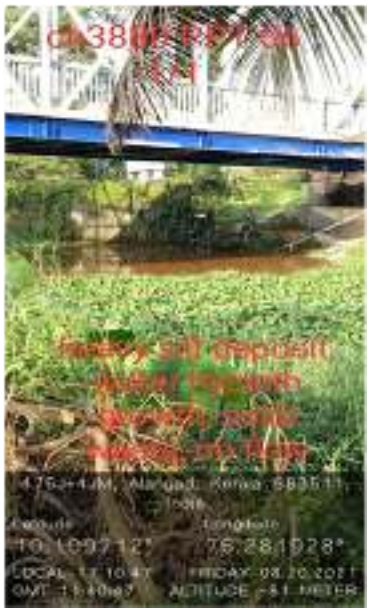
2. Ch 300M Koduvazhanga
Heavy silt deposit & thick vegetation.



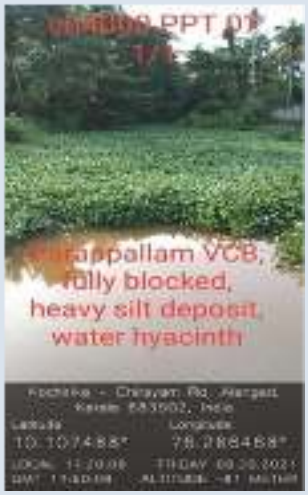
4. Ch 2110m Width of the thode is reduced ,no flow due to growth of bulbusplant of hyacinth ,heavy silt deposit

3. Ch 1100M Metheripalam
Heavy silt deposit, heavy growth of hycinth, thode width is reduced, no flow of water.

5 Ch 3680 M
Varattupady colony
Varattupady colony bridge, 17 m width of thode is blocked by earth filling and flow is allowed through 5 nos of 90 cm dia pipe, no flow

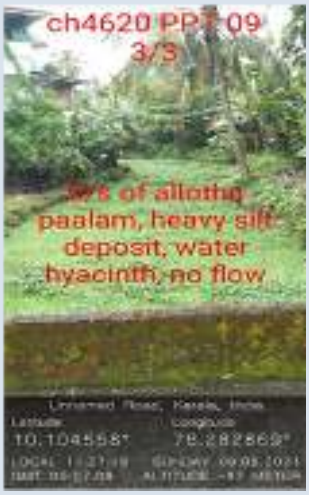


6).Ch.3880 Neerkode new bridge private Upstream and downstream of thode filled with bulbus plant of hyacinth and flow obstructed heavy silt deposit, solid waste. Flow of water blocked.



7) Ch.4000 M Parappalam Parappalam VCB fully blocked, heavy silt deposit, water hyacinth

8) Ch.4570 m
Plackattumpilly
Heavy silt deposit, water hyacinth, no flow



9 Ch 4620 Allothu Bridge
Heavy silt deposit, thick vegetation, no flow

10 Ch 5080 M Kongoorppilly

11. 5390 M Adakkattukuzhi Footbridge at Adakkattukuzhi, reduced width of thodu, thick vegetation,heavy silt deposit, no flow

13. Ch 5890 Pettapalam Heavy silt deposit,thode width reduced, thick vegetation, waste deposit, polluted water

12. Ch. 5730 M. Chingathara Footslab at Chingathara, heavy silt deposit,thick vegetation, no flow, thode width reduced

14. Ch 6190 Pallathunadu Reduced ventway, heavy silt deposit, polluted water, no flow

15. Ch.6550 M Pallathunadu south meets with Periyar Heavy silt Deposit & Vegetation

4. (i) Plackkatamppilly ChirayamThode
Starting point: from angadikadavubridge
Ending point: at ch12100m of varattayar
Total length: 930m (as per present alignment)
Shares :Alangaadgramapanchayath

Problems identified

1. Ch 0M

Plackattampilly Chirayamthode, bed raised, thode width reduced, thick water hyacinth growth, Heavy silt deposit and thick vegetation

3. Ch 150M
Triple span VCB, thode width 7m, flow blocked by earth filling in the thode, VCB not functional, Heavy silt deposit and thick vegetation, polluted water
4. Ch 340M
Double span culvert 2X 2.5m span, thode width 8m contracted to 5m, heavy silt deposit,no flow.

5) Ch 800m Foot slab, thode width reduced to 3.5m from 8m,heavy silt deposit,no flow,polluted water,heavy growth of water hyacinth,flow blocked

6) Ch 930m Thodu width reduced,heavy silt deposit, thick growth of water hyacinth, no flow, polluted water

4. (ii)Pazhamthode
Starts from: Pazhamthodu project
Ends to Periyar to Periyarthode at ch 4570M
Total length: 1370m
Alangaadgramapanchayath

2. Problems identified
1. Ch 0M
Pazhamthode project -a large water body

VCB-no Shutter arrangements

2. Ch 40M
VCB with no shutter arrangements, thode 4.7m width

3. Ch 80M culvert
Thode 5m wide reduced
to 1.5m and again
increased to 7m

4. Ch 185Mfoot slab-Kottapilly kunnu
Thode width 4m

5) Ch 530m culvert mundon paadam
Thode width 6m no suuficient free board .To be reconstructed

6) Ch 820m-culvert
Thode width reduced to 3.7m from 8m.No suuficient ventway and free board.

7) Ch 1035m-
Thode width reduced to 4.3m from 15m, abutment inside the ventway,obstruct the ventway

8) Ch. 1130M -triple span VCB not functioning,heavy silt deposit, no shutter arrangements

9) Ch.1370m
from plackattampilly bridge thode width 30m,heavy silt deposit, water hyacinth, no flow

5. VEMBALA THODU

Vembalathodu is a thodu of length 1.57 km that flows through wards 14 and 15 of KadungallurGramaPanchayat. Venmanithodu, Kannacherithodu and ParayilPadithodu are collectively known as Vembalamthodu. The thodu starts from the right bank of the Periyar @ Chainage 0 km and ends @ chainage 235.08 km opposite to the the IAC kadavu.

The thodu is more than 3 meters wide at the beginning. As it progresses, the width of the reef appears to decrease. The end of this ravine ends in a series of tributaries and streams. Therefore, Vembalam is a stream which is suitable for cultivation. Due to the fact that this stream and its tributaries pass through the countryside, both sides are rich in greenery. At the beginning of the ravine, both sides are protected by a granite wall. But when it enters its end, it is reduced to about 1 meter wide and no protective wall is built in those parts. As a result of this project, it is possible to cultivate effectively in wards 14 and 15 of KadungallurPanchayath if properly cleaned and both sides are well maintained. In addition, when there is flooding in the paddy fields due to heavy rains, it helps the water to drain into the river and thus prevent the farmland from flooding.

Starts from: Vembalam

Ends to varattayar at ch: 235.08 km

Total length: 1570m

Kadungalloor Gramapanchayath

PROBLEMS & REASONS

1) Ch 0 to 2

Silt accumulation:-The main problem faced in this thodu and the areas in the vicinity is

flooding during the monsoon season.The main reason for this is silting up of the thodu.

Periodical cleaning is not done since long,hence the depth of flow is reduced considerably.

Waste dumping also has lessened the quality of water in the thodu.The main problem for

flooding up of water is due to blockage of flow of water

2) Ch 2 to 5

PROBLEMS & REASONS

Encroachment:-

Encroachments of the thodu is suspected from Ch:0m upto Ch.5m Silt accumulation:-The problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

3) Ch 5 to 200

PROBLEMS & REASONS

Encroachment:-

Encroachments of the thodu is suspected from Ch:0m upto Ch.5m Silt accumulation:-The problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for floodingup of water is due to blockage of flow of water.

Ch 1319.71 to 1326.13

PROBLEMS & REASONS

Silt accumulation:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 1326.13 to 1343.66

Silt accumulation:- The main reason for this is silting up of the thodu. The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

6. PANACHI THODU

Panachithodu starts from Ch 0km of Periyarriver and ends at Ch. km in Periyar. The total length of the thodu is1.65km. This thodu passes fully through EloorMuncipality. The thodu is completely filled up with silt in most of the reaches. At Ch. there is a culvert crossing the thodu.

Starts from: ch 242.86km of Periyar

Ends to : Varattayar at ch 243.47km

Total length: 1275m

Panachithodu @ Chainage 242.86km

Panachithodu is a stream of length 1.287 km that starts from the depot area in the first ward of Eloor municipality and flows through wards 2,5,31 and 30 and ends at Palliyattu Mutt in the 29th ward. Its tributaries are Kuzhikandamthodu, Unthithodu and PallippuramChalthodu. The canal starts near the Eloor Government Timber Depot and joins the IRE-Muttinakam Road. Kuzhikandamthodu is full of industrial waste and will have a lot of impact on the neighbors and the environment. The canal will carry industrial effluents from IRE, HIL, Merchem and FACT. About 250 meters from here, the canal is known as PallippuramChalthodu. The PallippuramChalThod has a tributary to the Periyar. From there it was later known as Unthithode. The thodu ends 200 m east of the Verappuzha Bridge and ends at the Muttar River, a tributary of the Periyar. In short, all these streams together are known as the Panachithodu. It is covered with bushes on both sides. It was formerly cultivated in the vicinity of the stream, such as Amanthuruthu, Depot and North. However, due to the accumulation of industrial effluents in this stream, it is not possible to cultivate at present. This is stated in the directions issued by the National Green Tribunal. It is very important to clean the palm and its appendages and to protect both sides.

Ch 0 to 2

Silt accumulation:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 2 to 340

Silt accumulation:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 340 to 728.41

Silt accumulation:- The main reason for this is silting up of the thodu.The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 728.41 to 764.57

Silt accumulation:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably.

Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 764.57 to 1050.10

Silt accumulation:- The main reason for this is silting up of the thodu.The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 1050.10 to 1071.33

Silt accumulation:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably.

Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch 1071.33 to 1217.16

Silt accumulation:- Silt accumulation:- The main reason for this is silting up of the thodu.The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably. Waste dumping also has lessened the quality of water in the thodu.The main problem for flooding up of water is due to blockage of flow of water.

Ch1217.16 to1333.25
Problems :-Silt and No Flow
Ch1333.25 to 1411.09
Problems :-Silt and No Flow
Ch1411.09 to 1541.82
Problems :-Silt and No Flow

Ch 1541.82 to 1642.5
Problems :- Silt and No Flow

Ch 1642.5 to 1646
Problems :- Silt and No Flow

Ch 1646 to 1650

Problems :- Silt and No Flow

7. Kolavelipadam @ Chainage 232.63 KM

Starts from: Kadungalloor

Ends to : Varattayar at ch 232.63km

Total length: 505m

Kolavelipadamthodu is a stream of length 1.417 km that flows only through the 8th ward of KadungallurGramaPanchayath. The thodu starts at AringuKolavelipadam and ends at Periyar @ chainage 232.63 Km. The thodu is located at a distance of 1 km. The creek is almost completely muddy and the flow is nominal. About 700 meters of the starting point is filled with mud and debris. Both the sides are covered with forests and greenery. The rest of the 300 m section is characteristic of the reef, albeit by name. The river is 3 m wide in this area. It is located in the village of Uliyannur in the KadungallurGramaPanchayat. Uliyannur is an area where agriculture is very active. Uliyannur is an area where paddy cultivation and vegetable production are very effective. The Uliyannur Temple is located in this area and is made of the legendary Perunthachan. Paddy is cultivated extensively in the western part of the temple. Uliyannur is an island surrounded by Periyar on all four sides. The area was flooded in 2018. Complete cleaning of the Kolavelipadamthodu, removal of silt and protection of the retaining wall are essential for the complete elimination of waterlogging from Uliyannur Island and for the development of the agricultural sector

Ch 0 to 63.7

Problemd Identified:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably.Waste dumping also has lessened the quality of water in the thodu.The main problem forflooding up of water is due to blockage of flow of water From Chainage 63.70 completely filled with vegetation and earth. The main reason for this is silting up of the thodu.

7. Kolavelipadam @ Chainage 232.63 KM

Starts from: Kadungalloor

Ends to : Varattayar at ch 232.63km

Total length: 505m

Kolavelipadamthodu is a stream of length 1.417 km that flows only through the 8th ward of KadungallurGramaPanchayath. The thodu starts at AringuKolavelipadam and ends at Periyar @ chainage 232.63 Km. The thodu is located at a distance of 1 km. The creek is almost completely muddy and the flow is nominal. About 700 meters of the starting point is filled with mud and debris. Both the sides are covered with forests and greenery. The rest of the 300 m section is characteristic of the reef, albeit by name. The river is 3 m wide in this area. It is located in the village of Uliyannur in the KadungallurGramaPanchayat. Uliyannur is an area where agriculture is very active. Uliyannur is an area where paddy cultivation and vegetable production are very effective. The Uliyannur Temple is located in this area and is made of the legendary Perunthachan. Paddy is cultivated extensively in the western part of the temple. Uliyannur is an island surrounded by Periyar on all four sides. The area was flooded in 2018. Complete cleaning of the Kolavelipadamthodu, removal of silt and protection of the retaining wall are essential for the complete elimination of waterlogging from Uliyannur Island and for the development of the agricultural sector

Ch 0 to 63.7

Problemd Identified:-The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably.Waste dumping also has lessened the quality of water in the thodu.The main problem forflooding up of water is due to blockage of flow of water From Chainage 63.70 completely filled with vegetation and earth. The main reason for this is silting up of the thodu.

8. VARAPPUZHA THODU

VarappuzhaThodu @ Chainage 242.76 KM

Starts from: Varappuzha

Ends to : Varattayar at ch 242.76km

Total length: 1284m

Varapuzhathodu is one of the main distributory according to the Periyar river starts from Periyar and passes through Muttinakam, Puthenpally,Varapuzha and ends at the river again. At the starting Varapuzhathodu meets with Punathilthodu and Muttinakamthodu. Muttinakamthodu starts from Mannanthuruth and it comes to meets with Varapuzhathodu and Punathilthodu starts from Muttinakam slushy areas and that conveys the rain water to the Varapuzhathodu and that flows towards Kadamakudy. The width of Varapuzhathodu varies from 1 m to 12 m at various places.

At Chainage 1142.40

Problems identified:- Silt clay and vegetation

At Chainage 1152.25
Problems identified:- Silt clay and vegetation

At Chainage 1157.70
Problems identified:- Silt clay and vegetation

At Chainage 1168.05
Problems identified:- Silt clay and vegetation

At Chainage 1192.95
Problems identified:- Silt clay and vegetation
Structure :Culvert

At Chainage 1202.10
Problems identified:- Silt clay and vegetation

At Chainage 1211.40
Problems identified:- Silt clay and vegetation

At Chainage 1226.45
Problems identified:- Silt clay and vegetation

At Chainage 1238.65
The main problem for flooding up of water is due to blockage of flow of water.
Structure :Culvert

At Chainage 1239.00
Problems identified:- Silt clay and vegetation

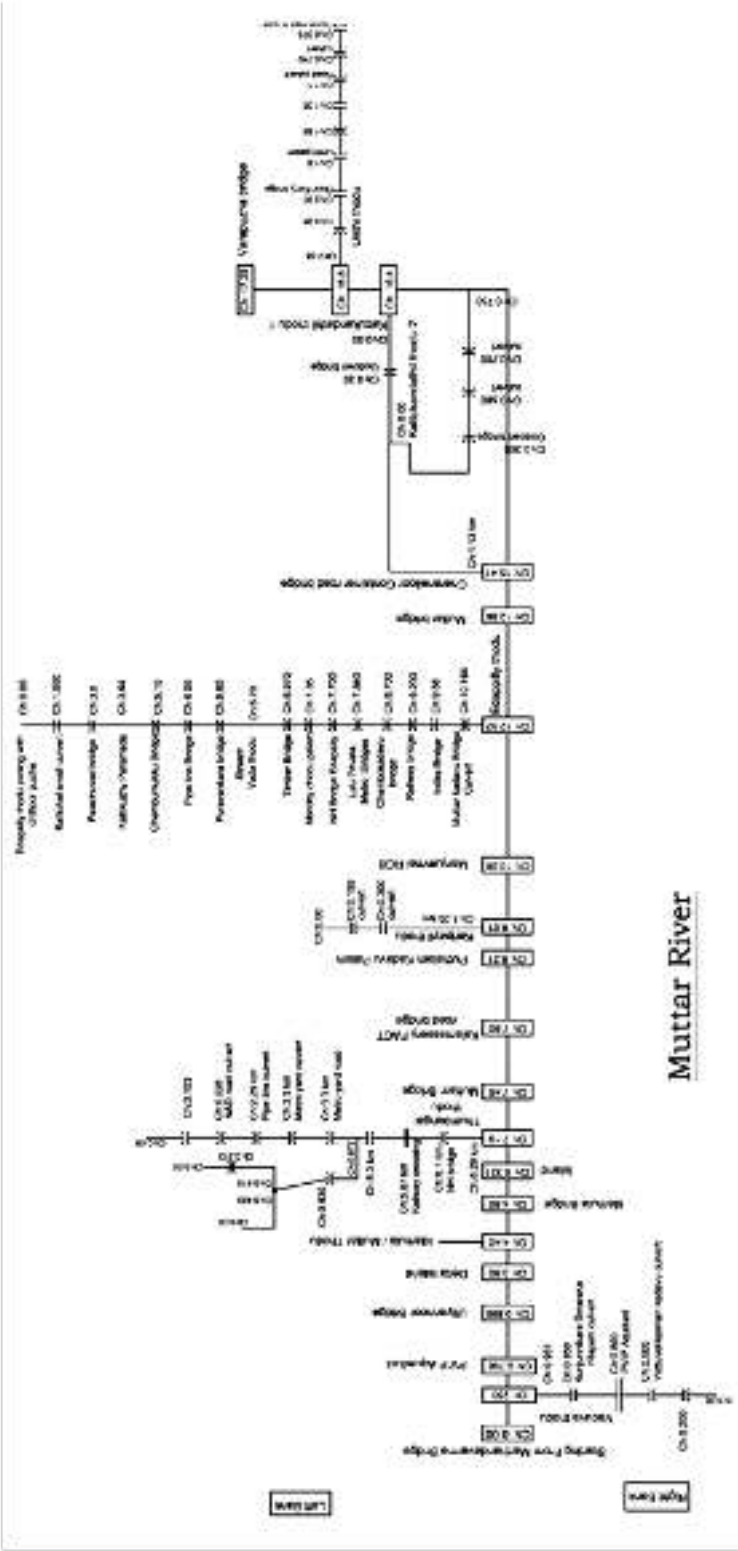
At Chainage 1247.10

Problems identified:- Silt clay and vegetation

At Chainage 1252.30

Silt accumulation:- The main problem for flooding up of water is due to blockage of flow ofwater. The main problem faced in this thodu and the areas in the vicinity is flooding during the monsoon season.The main reason for this is silting up of the thodu. Periodical cleaning is not done since long,hence the depth of flow is reduced considerably.Waste dumping also has lessened the quality of water in the thodu.

2.2 Muttar stretch



Periyar Aluva Edamula-Manjummel-Muttar stretch starts from Aluva Marthandavarma Bridge and ends at Varappuzha Bridge. This stretch having a length of 17.29 Km. The left bank of this stretch shares Aluva Muncipality, Choornikkara Panchayath, Kalamassery Muncipality and Cheranalloor Panchayath. Similarly, its right bank shares Kadungalloor Panchayath and EloorMuncipality.

In this stretch, at ch: 250m vaduva thodu is joins to the periyar. PVIP Aqueduct is crossing at ch: 756m and at ch: 890m Uliyannoor bridge is crossing. There is a delta island can be seen at ch: 3.90km. After this delta the stretch is again join to the Varattar stretch. Then Idamula thodu is diverting at ch: 4.4km and another Muttar thodu is diverting towards the left side of Varattar stretch. At ch: 4.80km Edamula Bridge crosses both these thodu. After that it joins and then it flows as single stretch towards Varappuzha. Edamula thodu and Muttar thodu is diverting towards the left side of Varattar stretch. At ch: 4.80km Edamula Bridge crosses both these thodu. After that it joins and then it flows as single stretch towards Varappuzha.Delta formation can be seen at ch: 6.30km. Thumbungal thodu is joining the muttar stretch at ch: 7.19km. Muttam Bridge is crossing at ch: 7.46km. Kalamassery FACT- Road Bridge is crossing at ch: 7.60km. Another Puthalam kadavu bridge is crossing at ch: 8.21km. At ch: 9.01km Karippayil thodu is joining to the river. Manjummel Regulator Cum Bridge is existing at ch: 10.00km. At ch: 12.52km Edappilly thodu is diverting. Muttar bridge crosses the river at ch: 12.86km. Another Cheranalloor Container road bridge is crossing at ch: 15.41km. From this same chainage Kattukandathil Thodu 1 is starting and this thodu is ending to the Muttar river at ch: 16.40km. Kattukandathil thodu 2 is another thodu starting from Kattukandathil thodu 1 and it is having a length of 750m and this thodu ends at Muttar river. At ch: 16.80km Oonthi thodu is starting. It is the last connecting thodu in the Muttar stretch and near Varappuzha Bridge this Muttar stretch is join to the Varattar stretch.

The main problems identified in this stretch are delta, silt deposition and encroachment. By the removal delta formation and desiltation of the entire muttar stretch can improve the water carrying capacity of the river. It ensures the free flow of water.

Delta atch: 6300m

Delta at ch: 9645m

Delta at ch: 6450m

Delta at ch: 11.81 km

Delta at ch: 11.10 km

Delta at ch: 12.91 km

From this stretch, water is abstracting for the industrial purposes and for the drinking water purpose. The industries are Kinfra and Amrutha. For the drinking water purpose choornikkara Panchayath is abstracting the water.

Kinfra Pump house at Ch: 8.44 km

Amirtha pump house at Ch: 6131m

Pump houses of Choornikara Panchayath at Ch: 6.00 km

Amirtha pump house

KRL Pump house at Ch: 4880m

There are 10 cross structures exist along this stretch. One PVIP Aqueduct, eight bridges and one regulator cum bridge at Manjummel. The connecting thodu identified in this stretch are 7 nos. They are

i. Vaduvathodu
ii. Idamulathodu/Muttar thodu,
iii. Thumbungalthodu
iv. Karipayilthodu
v. Edappallythodu
vi. Kattukandathilthodu 1&2
vii. Unnthithodu.

Local bodies sharing are Vaduvathodu in Kadungalloor Panchayath, Idamulathodu/Muttart hodu, Thumbungalthodu and Edappallythodu in Kalamassery Muncipality and Unnthithodu in Eloor Muncipality. The industrial area coming under in this stretch is FACT (UD) at Eloor.

i.Vaduvathodu

In this stretch, the first connecting thodu is Vaduvathoduand it joins at ch: 250m. This thodu is coming under kadungalloor panchyath. Vaduva thodu having a length of 937m There is four cross structures existing in this thodu. First culvert is at ch: 200m

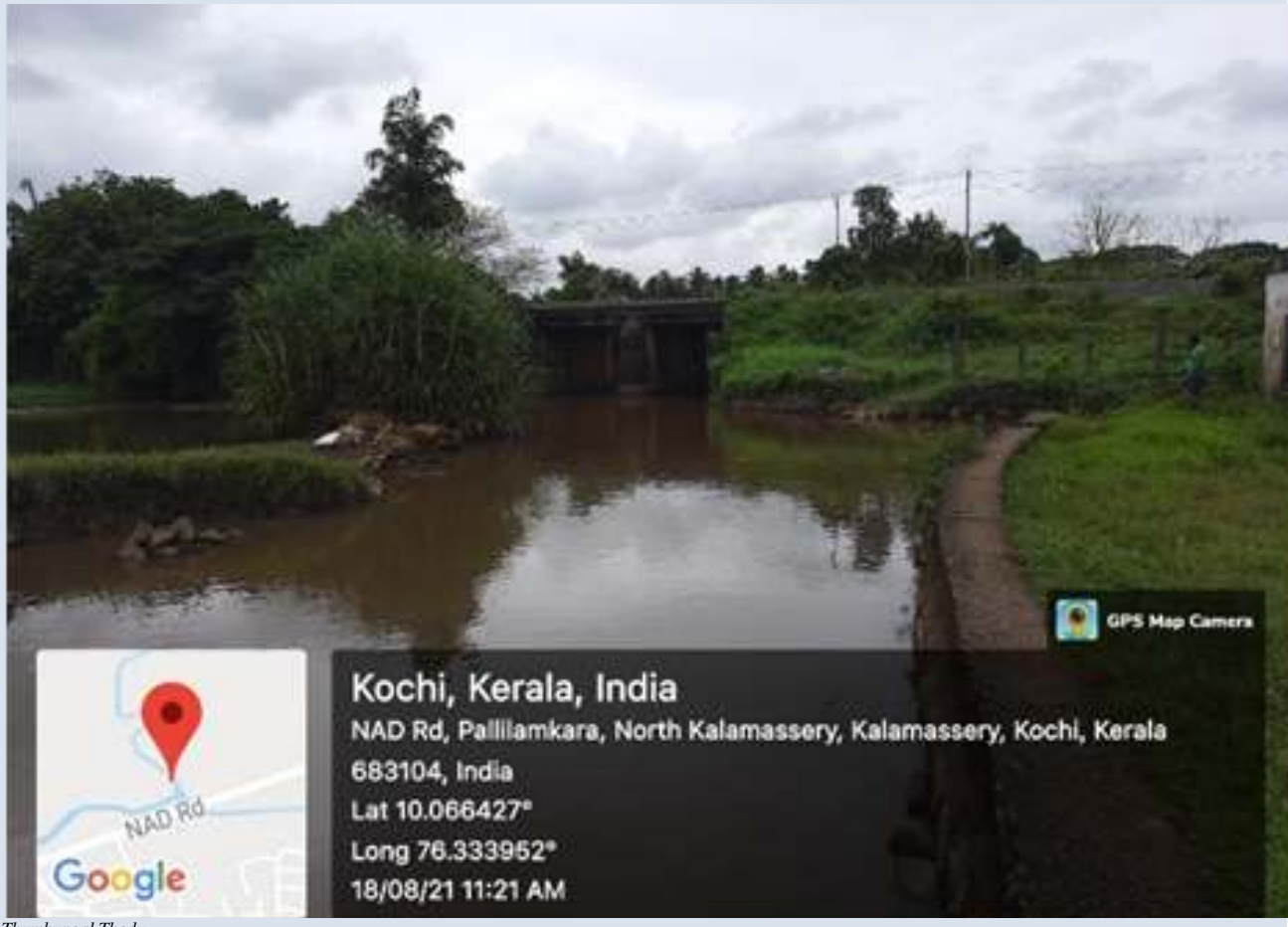
Edamula thodu

Edamula thodu

The second connecting thodu is Idamulathodu/Muttarthodu and it joins at ch: 4.40km from the left bank.

ii. Edamula Thodu/ Muttar thodu

The Idamula thodu is diverting from Varattar stretch at ch: 4.4km and another Muttar thodu is also diverting towards the left side of Varattar stretch. At ch: 4.80km Edamula Bridge crosses both these thodu. These two thodu flowing parallel for a length of ……m, after that it joins and then it flows as single stretch towards Varappuzha.



Thumbungal Thodu

iii. Thumbungal thodu

Thumbungal thodu is merging to Muttar stretch at its chainage 7.19km.Thumbungalthodu has a length of 6.2Km. After 3.3km of Thumbungal thodu, one small branch of length 872m is joining.

Karipayilthodu

iv. Karipayil thodu

Karipayil thodu is having a length of 1.05km and it joins to Muttar stretch at its ch: 9.01km. This thodu have two culvert at ch: 155m and at ch: 300m.

V. Edappally Thodu

Edappally Thodu is the longest connecting thodu of Muttar stretch. This thodu is starting from champakkara canal near Eroor bridge,flows through Eroor, Vennala, Palachuvadu, pipeline, Edappally, Muttar and joins Periyar at Edamula. The tranversing length of 10.20km through the west side of Kalamassery Muncipalilty east side of Cochin Corporation, west side of Thrikkakkara Municipality and north side of Thripunithura Municipality and it joins to muttar at its ch: of 12.52Km. The canal was used by the Royal family and ancient people for the transportation of goods and people. Earlier famous Edappally market situated adjacent to this thodu. Since the flow of water through the thodu is not smooth, flooding is observed at the banks of the thodu causing damages to the crops on the side of the thodu. If the flow is reestablished this problem can be solved and the land can be used effectively for agricultural purpose. Although the thodu was the main means of transportation of"Kettuvallam" in olden times, the width of thodu is seen reduced to 13m to 18m at major portions now a days. Accordingly the depth of the thodu is also considerably reduced due to the deposition of silt with the passage of time coupled with lack of proper maintenance.

Several small water bodies of the locality were joined manually to form the so called "Edappillythodu" as seen today. There is no access to the bund portion except at the road crossing areas. Thus disposal of waste happens only at the bridge portion. The dumping of waste to the water body from the bridge can be put to an end by fencing the bridge portion on either side.

The thodu has been cleaned by Kochi Corporation recently and therefore there is no visible obstruction for the flow. However at some stretches of the thodu, the trees are seen over hanging into the water body which is a major cause for accumulation of dumped waste & may cause obstruction of flow. Therefore trees along the side of the thodu, which raises such issues, have to be cleared off.

9 bridges and 3private culverts and a metro sky bridge exists within the entire stretch of thodu.Paruthelithodu, Vadathodu, Kadamakkerythodu, Kallikuzhywaterbody and Kalachal are water sources connected to Edappallythodu.

There is no doubt in the fact that there is encroachment in the width of thodu on either side, as is made clear from the picture of conveyance of Kettuvallam during ancient time to that of the present width of 13.50 – 18 m. Edappally thodu being connected to two main water bodies on either side, experience drastic low tide, high tide and therefore the central portion of the thodu is seen to be almost stagnant. The desiltation of the thodu not only facilitates the flow of water through the canal but also puts forward an opportunity to convey passengers and goods at minimum cost and least pollution status.

Because of its alignment through the outskirts of Cochin city, it also acts as a drainage canal. Since the canal discharges at Muttar in the Edamula Branch of Periyar , this can be connected to Udyogamandal Canal. Thus we can connect the two fertilizer plants of FACT, ieUdyogamandal & Ambalamedu.

Edapally thodu Chainage wise details

(a) Chainage 0.00: Starting point of Edapally thodu

Starting point of Edapally thodu From Periyar- CH 0.00

(d) Chainage 1500: Chambokadav Bridge

(b) Chainage 36: Muttar kadavu Bridge culvert

Chainage 36: Culvert have less vertical clearence, reconstruction of existing bridge is essential

Chainage 1000: Covered with vegetation on both banks,Disposal of waste and silt deposition

(c) Chainage 1000: Railway Bridge

(e) Chainage 2360: Lulu Private Bridge

Chainage 1500: Disposal of waste,Covered with vegetation on both banks,Water is polluted and appears to be oily in appearance.

(f) Chainage 2500: NH bridge Edapally

Chainage 2360: Fully covered with hyacinth & Silt deposited

Chainage 2500: KWA pipe located over the beam of old bridge which is a major obstruction, fully covered with hyacinth, silt deposition and waste disposal

Chainage 2850: Trees grown to the bank of thodu,the disposal of waste is noticed

(g) Chainage 2850: Marotty chodu palam

1" water line pipe laid across the thodu is found to obstruct the flow ,deposition of silt is noticed.

(h) Chainage 3230 : Timber Bridge

Chainage 3230 : Covered with vegetation on both banks, accumulation of silt

Chainage 5100: Unauthorized waste disposal in between the bridges

(k) Chainage 5100: Chembumukku Bridge

(l) Chainage6560: Kallikuzhy Paramada

(m) Chainage7200: Palachuvad bridge

Chainage7200: Vegetation on both banks, accumulated with floating wastes and is covered with hyacinth.

n) Chainage9200: Kalachal small culvert

Chainage9200: Small culvert across the thodu

Chainage6560: Fully covered with hyacinth and water weeds.

(n) Chainage10200: Edapally thodu outlet point

Vi.Kattukandathil thodu 1

Chainage10200: Fully covered with water hyacinth,desiltation is required

Kattukandathil thodu 1 is another connecting thodu. The length of thodu is 1.13km. this thodu is starting from Muttar branch of ch: 15.41km and also ends at muttar Branch of ch: 16.40km. Another thodu is formed from kattukandathil thodu 1 and it ends at muttar stretch. It is named as Kattukandathil Thodu 2 and having length of 750m.

KattukandathilThodu 2

2.3 VADUTHALA – CHITTOOR – CHERANELLOOR BRANCH

This branch starts from Varappuzha and passes through Cherannalloor Panchayath, Varappuzha Panchayath, Kadamakkudy Panchayath and Vaduthala of Cochin Corporation. It is having a length of 8 Km.Through out the length, no waste deposites are noticed. The stretch is not silted up except at the portion of Vaduthala, near Container Terminal Railway Bridge. After construction of the bridge, non removal of bund caused the silt deposits in the upstream and downstream area of the bridge had resulted in formation of small Island. While in the 2018 and 2019 flood in Kerala this lake area was severly deposited with silt and clay. It resulted in reduction of the water depth and growth of the trees and vegetation near to the pillar of the bridge. This caused to reduce the water carrying capacity of the river which resulted flooding in the upsream area of Kalamasserry, Aluva area in the monsoon time. Also, this silt deposit has caused big problem for the movement of fishing boat, SWTD passenger boats travelling to nearby islands.Most of the side banks of the entire stretch are protected and some stretches covered with vegetation.

Varappuzha Panchayath

Varappuzha is a Northern suburb of Kochi city. Its specialty is that considerably large-scale paddy cultivating area is situating western part of Varapuzha which is called Devaswompadam, specialised with Pokkali paddy cultivation and interim crop as fish cultivation locally called 'Kettu'. The common work of the natives are fishing and agriculture. The Varappuzha Bridge (Near Historical Varapuzha Island) connects Varapuzha (Mannantturuthu) with the neighboring Cheranelloor. The jetties and changadam Landings situated in this panchayath are as follows:-

1.Varappuzha Palli Boat Jetty

2. Varappuzha Palli Changadam Landing

VARAPPUZHA BRIDGE

The Varappuzha Bridge on NH17 is a cantilever bridge spanning the Periyar River between Varappuzha and Cheranelloor in Kochi having a length of .Varapuzha Bridge is the first bridge in Kerala to be constructed using Balanced Cantilever technique (120m span).Bridge which allows vehicular traffic is in good condition and does not require any reconstruction. This structure does not affect the smooth flow of water. 10.072175 & 76.279667 is the Latitude and longitude of the bridge.

Cheranelloor Panchayath

Cheranelloor is a suburb of Kochi City.It is a place surrounded by backwaters, and brackish lagoons which are commonplace in Kerala. Before people depended on Ferry service and Boat service for Transportation. As a result of which, Jetties and Changadam Landings were built on the banks. But now since there are bridges, people use these less frequently. Presently only Cheranelloor – Varappuzha Pally Ferry Service & Chittoor Moolampilly Ferry service are functioning. Lots of peoples use this service. Because of this ferry service, the people can reach the Islands easily without the hassle of travelling kilometers. The following Jetties and Changadam Landings are located in Cheranelloor Panchayath.

1. Cherannalloor west Boat Jetty /Changadam Landing

2. Blaikkadavu Boat Jetty

3. Ambalakkadavu Changadam Landing

4. Chittoor Changadam Landing

CHERANELLOOR BRIDGE

The Cheranelloor Bridge on Container Terminal road is a bridge connecting the lake between Cheranelloor and Korambadam , Kothad in Kochi.It is located @ ch.2.60 Km of Vaduthala- Chittoor - Cheranelloor branch from Varappuzha.This bridge helps in reaching Ernakulam City faster. Cheranelloor Bridge, which allows vehicular traffic in good condition and does not require any reconstruction. This structure does not affect the smooth flow of water. 10.05188& 76.27951 is the Latitude and longitude of the bridge.

1. Moolampilly East Changadam Landing

2. Moolampilly South Boat Jetty

Kadamakkudy Panchayath

Kadamakudy Panchayath is a cluster of fourteen islands: Valiya Kadamakudy (the main island), Murikkal, Palyam Thuruth, Pizhala, Cheriya Kadamakudy, Pulikkapuram, Moolampilly, Puthussery, Cheriyamthuruth, Chennur, Kothad, Korambadam, Kandanad and Karikkattu Thuruthu.In this branch,Chittoor - Moolampilly East Ferry service is functioning now. Lots of peoples use this service for travelling and transporting vehicles. Because of these ferry service, the people can reach the Islands easily without the hassle of travelling kilometers. The following are the Boat jetty and Changadam Landing situated in the bank of Kadamakkudy Panchayath.

MOOLAMPILLY BRIDGE

The Moolampilly Bridge on Container Terminal road is a bridge connecting the lake between Kothad and Moolampilly in Kochi.It is located @ ch.4.35 Km from Varappuzha. This bridge helps in reaching Ernakulam City faster. Bridge, which allows vehicular traffic in good condition and does not require any reconstruction. This structure does not affect the smooth flow of water. 10.046310 & 76.267020 is the Latitude and longitude of the bridge.

Cochin Corporation.

It is the municipal corporation that manages a portion of city of Kochi . It consists of 74 divisions. It is the most densely populated city corporation in the state. Vaduthala and Korankotta are situated in the banks of Varappuzha- Cheranelloor- Vaduthala Branch.

1. Vaduthala boat Jetty

2. Korankotta East Changadam Landing

2. Vaduthala Changadam Landing

3. Korankotta boat Jetty

2.3.1 KOTHAD – MOOLAMPILLY – PIZHALA BRANCH.

This branch joins Vaduthala - Chittoor – Cheranelloor branch of ch. 1500m and 4380m and having a length of 2.80 km. Kothad, Moolampilly, Pizhala, Chennur islands are situated in the banks of this branch in Kadamakudy panchayath. Throughout the length, no waste deposits and silt deposits are noticed. Most of the side banks are protected and some stretches covered with vegetation.

In this tributary, the following Boat Jetties and Changadam Landings are located on the banks of Kadamakkudy Panchayath. Presntly there are Chennur South – Kothad Ferry service and Pizhala East – Kothad West Ferry service functioning. Lots of peoples use this service for travelling and transporting vehicles. Because of this ferry service, the people can reach the Islands easily without the hassle of travelling kilometers.

2. Kandanadu BoatJetty

1. Korampadam Changadam Landing

4. Chennur South Changadam Landing

3. Karikkattu thuruth Boat Jetty

5. Kothad Changadam Landing

8. Pizhala East Changadam Landing and Boat Jetty

7. Chennur Paruthy Boat Jetty

6. Kothad Kappela Boat Jetty

9. Kothad west Changadam Landing

2.3.2 KADAMAKKUDY BRANCH

Kadmakudy branch which joins Vaduthala branch at ch. 250 m and having a length of 6 Km. Kadamakkudy, Pizhala, Chennur, Cheriyamthuruth, Varappuzha are the islands situated in the banks of this branch. Throughout the entire length, no waste deposits and silt deposits are noticed. Most of the side banks are protected and some stretches covered with vegetation.

EDAMPADAM BRIDGE

The Edampadam Bridge is a bridge connecting the lake between Varappuzha and Edampadam in Kochi.It is located @ Ch.1.34Km of Kadamakkudy branch.This bridge, which allows vehicular traffic in good condition and does not require any reconstruction. This structure does not affect the smooth flow of water. 10.069370 & 76.27390 is the Latitude and longitude of the bridge.

1. Mannamthuruth West Boat Jetty 2. Thundathumkadavu Jetty and Changadam Landings.

Varappuzha Panchayath

In this branch, the Boat Jetties and Changadam Landings situated on the banks of Varappuzha Panchayath, namely

1. Valath Boat Jetty,

Kadamakkudy Panchayath

In this tributary, the following Boat Jetties and Changadam Landings are located on the banks of Kadamakkudy Panchayath. Presntly there are Chennur –Thundathukadavu- Cheriyamthuruth ,Chennur – Pizhala-Cheriyamthuruthu and Paliyamthuruthu – Kadamakkudy South Ferry servicesare functioning. Lots of peoples use this service for travelling and transporting vehicles. Because of this ferry service, the people can reach the Islands easily without the hassle of travelling kilometers.

2. Vattapotta Changadam Landing

3. Chennur Ration shop Jetty

4. Cheriyamthuruth Jetty and Changadam Landing

4. Cheriyamthuruth Jetty and Changadam Landing

6. CheriyamthuruthWest Jetty and Changadam Landing

7. Pizhala hospital Jetty

8. Pizhala Hospital Changadam Landing

9. Pizhala Centre Jetty

10. Paliyamthuruth Jetty and Changadam Landing

11. Kadamakkudy South Jetty and Changadam Landing

DETAILS OF TRIBUTARIES

(1). KOLARIKKAL THODU

This thodu joins the Vaduthala – Chittoor branch @ ch. 500 mnear Chittoor Ferry andhaving of length 1800 m flows through Cheranelloor Panchayath. It is starting from the Thanneerthadam near Edayakkunnam. The average width of the thodu is 15m. After 30m length of theChittoor-Cheranelloor bridge, it is fully covered with water hyacinth and vegetaion. Entire length of the thodu is silted up and no waste deposits are noticed.Clearing jungle, Removing the water hyacinth and desilting thodu improves the smooth flow of water and decrease the water logging.

Starting point near Edayakkunnam.

Kolarikkal Thodu Joins near Chittoor Ferry

At South Chittoor road

Thick vegetation at South Chittoor road

At Chittoor- Cheranelloor Bridge

Pizhala Thodu joins at Kothad Branch.

(2) PIZHALA THODU.

Pizhala thodu having length of 550 m connecting Kadamakudy branch and Kothadu branch.It joins @ ch.3.40Km Kothad branch and starts from Ch. 4.15Km of Kadamakkudy branch near Chennur – Pizhala- Cheriyamthuruth Ferry. It passes throughKadamakkudy Panchayath. The average width of the thodu is 35m. The thodu is not heavily silted up.So, it is not needed for desiltation.

(3). KANDANADU THODU.

This thodu joins Kothad branch @ ch.1.95Km near Kandanadu Jetty and starting from ch. 1.90Km of Vaduthala branch near Korampadam Changadam Landing. It is 500m long and an average width of 5m. The entire length of the thodu is heavily silted up and at some stretches there is thick vegetation. Hence it is very necessary for clearing jungle and desilting the thodu for the easy flow of water.

Starting Pt. near Korampadam Changadam Landing.

Kandanadu Thodu joins near Kandanad Jetty

(4). KOTHADU THODU.

This thodu joins Kadamakkudy branch @ ch.2.27Km near Kothad - Chennur Ferry and starting from ch. 2.35Km of Vaduthala branch. It is 950m long and an average width of 8m. The entire length of the thodu is silted up and at some stretches there is thick vegetation. Hence it is very necessary for clearing jungle and desilting the thodu for the easy flow of water.

(5). PUTHUSSERY THODU.

This thodu joins Kadamakkudy branch @ ch.2.72m and starting from Veeran Puzha near Chathanadand passes through Kadamakudy Panchayath. Thundathumkadavu and Cheriyamthuruthu are situated on the left and right banks of Puthussery Thodu. The average width of Puthussery thodu is 45 m at various places and having length of 3.60Km. Puthussery bridge at ch.1.25Km from Kadamakkudy branch. The thodu has not silted up, hence there is no need for desiltation

(5). PUTHUSSERY THODU.

This thodu joins Kadamakkudy branch @ ch.2.72m and starting from Veeran Puzha near Chathanadand passes through Kadamakudy Panchayath. Thundathumkadavu and Cheriyamthuruthu are situated on the left and right banks of Puthussery Thodu. The average width of Puthussery thodu is 45 m at various places and having length of 3.60Km. Puthussery bridge at ch.1.25Km from Kadamakkudy branch. The thodu has not silted up, hence there is no need for desiltation

Pathalam Regulator

Manjummel Regulator

3. IRRIGATION STRUCTURES

The regulators of Periyar river are closed during summer and opened to reduce the salinity intrusion in freshwater. Closing of the regulators leads to stagnation of water which in turn causes the deposition of nutrients especially phosphates and nitrates in the river bed. Excessive deposition of nutrients causes algal bloom. The same later decays and putrify changing the colour of river into black and it causes the oxygen depletion causing Eutrophication". This causes fish death in the river. The regulators need to be operated routinely as per the tidal chart so as to prevent Eutrophication. The algal bloom is noted in both stretches of Edamula and Edayar stream. Thoompunkalthodu which joins river Periyar at Edamula carries high concentration of organic load generated due to decayof vegetation from nearby wetland at NAD, Kalamassery. The main source of this organic load is originated from the decay of the grases of wetland and unauthorised septage dumping is also suspected in these areas. The unauthorised dumping needs to be prevented by night surveillances pumping stations are located at the Edamula stream, more priority needs to be given to the pollution control of this stretch. Hence, the actions plan for rejuvenation of polluted stretch of Periyar, Aluva - Kalamassery - Eloor ferry has to be prepared considering all the above facts and control of all types of pollutant sources.

4. PRESENT SCENARIO

VARATTAR STRETCH

Periyar, is the longest river and the river with the largest discharge potential in the Kerala state of India. It is one of the few perennial rivers in the region and provides drinking water for several major towns. The Periyar is of utmost significance to the economy of Kerala. It generates a significant proportion of Kerala's electrical power via the Idukki Dam and flows along a region of industrial and commercial activity. The river also provides water for irrigation and domestic use throughout its course besides supporting a rich fishery. Due to these reasons, the river has been named the "Lifeline of Kerala". Kochi city draws its water supply from Aluva, in the vicinity of the river mouth, an upstream site sufficiently free of seawater intrusion.

Twenty five percent of Kerala's industries are situated along the banks of river Periyar. These are mostly crowded within a stretch of 5 kilometres in the Eloor-Edayar region (Udhyogamandal), about 10 kilometres north of Kochi harbour. In the EloorEdayar region, the aquatic life is severely affected due to the pollution from the industries on the banks of Periyar. Hundreds of fishes were found to be dead along the banks of periyar. This has become quite frequent over the past years which raises concerns about the pollution levels in the waterbodies. Numerous protests by environment activists as well as the fishing community ishappening often. Pollution in Periyar river has always been a problem for the people living in the Eloor-Edayar industrial belt. The Pathalam Regulator cum bridge controled by the Irrigation Department, regulates the quantity of water in Muttarpuzha. In order to ensure the regular environmental flow in the river, the Irrigation Department have been operating the shutters intermittently as and when required. Water from the Periyar is used by people in the vicinity of the regulator for drinking and other purposes. The Pathalam Regulator cum Bridge also facilitates blockage of salt water intrusion from the sea into the stream thereby ensuring the quality of water.

Angamaly to Kochi come under the most industrialised zone of the Periyar river basin.There are 50 large and medium industries and over 2500 small scale industries in this region.About 83 red category industries are located in Greater Kochi area.Out of that 79 industries fall within the industrial clusters at Eloor -Edayar and Ambalamughal which together constitute 17.40 km2 or 2.8% of greater Kochi area.AsEloor and Edayar are sutuated on the left and right banks of Periyarriver,Eloor -Edayar area is considered together.

These companies have been producing harmful pesticides and other materials which are hazardous to humans. The factories are releasing both treated and untreated effluents into the water bodies. Also, domestic wastes from houses is carried away through drains into the small streams and finally deposited in Periyar.The Muncipalities on the banks of Periyarie, North Paravoor, Aluva, Kalamassery, Angamaly, Perumbavoor doesnot have modern sewage disposal system till now. This adds on to the pollution of Periyar river further.

Sand mining is another major problem which is happening in Periyar. This has to be stopped urgently. Large quantity of waste material is dumped into the river from the markets, even instances are observed of throwing septic tank wastes directly into the stream. Also, a lot of silt has been deposited in the banks and bed of Periyar river near Eloor and Edayar which contains the said industrial belt. Mostly the silt deposition is found in Ward No.31 & 1 of Eloor municipality. A number of deltahas formed at different locations in the periyar river. This delta formation reduces the width of the river considerably hindering the smooth flow of river.

Five major companies are disposing of effluents from their factories at different locations on the right bank of periyar river. These companies are namely India Rare Earth, Sud-chemi, TMS Leathers, FACT, CMRL.

Outlet of IRE

Sud-Chemi

TMS Leathers

Outlet of CMRL d/s of Pathalam

Latitude: 10.082888
Longitude: 76.322493
Elevation: 93.84m
Accuracy: 1.8m
Time: 08-15-2021 13:43
Note: PERIYAR 223 encroach right

The abatement of pollution in Periyar river is taken up in pursuant to the directions issued on OA 673/2018 and 395/2013 filed before the National Green Tribunal.A direction was issued for the abatement of pollution in 351 river stretches in the country as identified by the CPCB ,in OA 673/2018.It is well depicted in the OA that the river water is considered to be fit for bathing only when it meets the criteria of having BOD less than 3 mg/l,dissolved oxygen more than 5m g/l and e coli bacteria to be less than 500 MPN/100ml.Thus the river strech of Periyar in Alwaye from Eloor to Kalamassery is ascertained as the polluted river stretch in Priority V (i.e. BOD between 3-6 mg/l)and is to be rejuventaed at the earliest not only for the sake of improvement of water quality but also for the subsistence of mankind itself. Accordingly, this stretch is taken for the rejuvenation of Periyar as a preliminary step for the same.

PERIYAR/STRETCHES/DRAINBASEDON KSPCBPRELIMINARYMONITORING RESULTS
Ernakulam Stretch (Marampilly – Aluva - Edamula) Muttar Branch

RIVER			
SAMPLING POINT	BOD(MG/L)	COLIFORM (CFU/100 ML)	LOCAL BODY
NEAR OLD MALAYATTOOR CHURCH	3.2	380	Malayattoor Neeleeshwaram
MEKKALADY	0.2	6200	Kalady
CHEMBAKASSERY KADAV	1.1	8000	Aluva
ALUVA MANAPPURAM	0.3	8000	Aluva
STREAM/TRIBUTARIES			
SAMPLING POINT	BOD(mg/L)	COLIFORM (Cfu/100 ml)	LOCAL BODY
NEAR TO GLASS FACTORY ROAD	10.5	150000	Kalamassery
EDAPALLY THODU	0.2	4000	Kalamassery, Kochi Corpn
RIVER KALAMASSERY BRIDGE	1.1	7800	Kalamassery
DRAINS			
SAMPLING POINT	BOD(mg/L)	COLIFORM (Cfu/100 ml)	LOCAL BODY
MALAYATTOOR THAZHE PALLI THODU	0.7	4000	Malayattoor Neeliswaram
NEELEESWARAM THODU	1.4	5200	Malayattoor Neeliswaram
MOOKKADA THODU	0.25	3850	Aluva
CHENGAL THODU	1.3	4000	Kalady
NEAR ULIYANNOOR BRIDGE	10.6	40000	Aluva
ARATTUKADAVU THODU KALAMASSERY	4.8	800000	Kalamassery
ARRAKKA CANAL	0.6	3600	Aluva
ASHRAMAM ROAD	0.4	7400	Aluva
ALUVA MARKET/JEWEL RIVER WOODS FLAT	1.8	4400	Aluva
NEAR HOTEL PERIYAR	13.5	260000	Aluva

LOTUS SHANTI LOTUS	0.1	350	Aluva
PUTHALAM KADAVU	44.5	250000	Kalamassery
NEAR TO GLASS FACTORY ROAD	10.5	150000	Kalamassery
EDAPALLY THODU	0.2	4000	Kalamassery, Kochi Corpn

ELOOR STRETCH (ALUVA– VARAPPUZHA) VARATTAR BRANCH

SAMPLING POINT	BOD(mg/L)	COLIFORM (Cfu/100 ml)	LOCAL BODY/OCCUPIER
Eloor ferry	1.1	2900	Eloor
Unthithodu confluence point	1.9	4200	Eloor
Methanam Bridge	0.9	2600	Eloor and Kadungaloor
Vettukadavu	1.1	3200	Kadungaloor
Pathalam bund down stream	1.2	3000	Eloor and Kadungaloor

STREAM/TRIBUTARIES

SAMPLING POINT	BOD(mg/L)	COLIFORM (Cfu/100 ml)	LOCAL BODY/OCCUPIER
Manjummal bund down stream	1.9	2500	Eloor and Kalamassery Municipality
Puthalamkadavu	1.3	2700	Kalamassery Municipality

DRAINS

SAMPLING POINT	BOD(mg/ L)	COLIFORM (Cfu/100 ml)	LOCAL BODY/OCCUPIER
Drain between alpha crumb rubber and Malaya rubtec	420	7000	Eloor Industrial Development area
Drain joining at upstream near to navigation channel of pathalam bund	180	2400	Under Irrigation department
Drain near to Marksmen marine products		3000	Eloor Industrial Development area

Storm water drain of Indogerman	440		Indogerman
Edayattuchal	500	1700	Kadungallur Grama Panchayath
Stream joining upstream of methanam bridge	500	3600	Kadungallur Grama Panchayath
Ongithodu	220	1700	Kadungallur Grama Panchayath & Alangad Grama Panchayath
Stream near Adichilikadavu	420	3500	Eloor Muncipality
D-Drain Fact UD	420		FACT UD
C-Drain Fact UD	320	3800	FACT UD
O4-TCC ,Storm water drain	540		TCC
Drain at Pathalam bridge	240	4100	Eloor Muncipality
E-drain Fact PD	640	2600	FACT PD
B-drain Fact PD	120	1900	FACT PD
IRE Drain	560		IRE
Drain at Manjaly Bridge	200	900	Puthenvelikkara Grama Panchayth
Drain at Pazhampillythuruthu bridge	360	2100	Puthenvelikkara Grama Panchayth
Drain near to Ryan school	160	200	Puthenvelikkara Grama Panchayth
Unthithodu	80	1900	Eloor Muncipality,(Its under Kuzhikandamthodu Remediation)
Drain at Amrutha sag pharma - Eloor	120	5000	Eloor Muncipality
Drain at Eloor ferry road near to ferry	140	4300	Eloor Muncipality
Drain at Periyarroad,Verapoli	180	3600	Eloor Muncipality
Palliyattukarakadavu	120	4700	Eloor Muncipality
Drain near to Popular lime shell	160	3200	Eloor Muncipality

WATER LEVEL IN THE RIVER GAUGE STATIONS

Name of Dam/Regulator	Rain/River Gauge Station	Date	Reporting Time	Water Level
River Gauge Station				
	Marthandavarma	7/10/2021	8.00 AM	0.7450M
			12.00PM	0.725M
			4.00PM	0.825M
		7/11/2021	8.00AM	0.925M
			12.00PM	0.825M
			4.00PM	0.855M
		7/12/2021	8.00AM	0.325M
			12.00PM	0.315M
			4.00PM	0.665M
		7/13/2021	8.00AM	0.225M
			12.00PM	0.675M
			4.00PM	1.255M
		7/14/2021	8.00AM	0.815M
			12.00PM	0.725M
			4.00PM	0.825M
		7/15/2021	8.00AM	0.975M
			12.00PM	0.985M
			4.00PM	1.075M
		7/16/2021	8.00AM	0.855M
			12.00PM	1.175M
			4.00PM	1.425M
		7/17/2021	8.00AM	1.175M
			12.00PM	1.025M
			4.00PM	1.075M
		7/18/2021	8.00AM	0.825M
			12.00PM	0.875M
			4.00PM	0.975M
		7/19/2021	8.00AM	0.775M
			12.00PM	0.725M
			4.00PM	0.675M
		7/20/2021	8.00AM	0.375M
			12.00PM	0.525M
			4.00PM	0.455M
		7/21/2021	8.00AM	0.255M
			12.00PM	0.475M
			4.00PM	0.455M
		7/22/2021	8.00AM	0.175M

			12.00PM	0.575M
			4.00PM	0.555M
		7/23/2021	8.00AM	0.475M
			12.00PM	0.875M
			4.00PM	1.075M
		7/24/2021	8.00AM	1.325M
			12.00PM	1.325M
			4.00PM	1.575M
		7/25/2021	8.00AM	1.325M
			12.00PM	1.225M
			4.00PM	1.235M
		7/26/2021	8.00AM	0.925M
			12.00PM	0.825M
			4.00PM	1.075M
		7/27/2021	8.00AM	0.575M
			12.00PM	0.375M
			4.00PM	0.825M
		7/28/2021	8.00AM	0.505M
			12.00PM	0.425M
			4.00PM	0.455M
		7/29/2021	8.00AM	0.555M
			12.00PM	0.425M
			4.00PM	0.625M
		7/30/2021	8.00AM	0.325M
			12.00PM	0.225M
			4.00PM	0.425M
		7/31/2021	8.00AM	0.325M
			12.00PM	0.125M
			4.00PM	0.325M
		8/1/2021	8.00AM	0.225M
			12.00PM	0.225M
			4.00PM	0.325M
		8/2/2021	8.00AM	0.085M
			12.00PM	0.305M
			4.00PM	0.675M
		8/3/2021	8.00AM	0.545M
			12.00PM	0.335M
			4.00PM	0.215M
		8/4/2021	8.00AM	0.125M
			12.00PM	0.385M
			4.00PM	0.625M

		8/5/2021	8.00AM	0.315M
			12.00PM	0.525M
			4.00PM	0.525M
		8/6/2021	8.00AM	0.815M
			12.00PM	0.775M
			4.00PM	0.675M
		8/7/2021	8.00AM	0.905M
			12.00PM	1.085M
			4.00PM	1.065M
		8/8/2021	8.00AM	0.775M
			12.00PM	0.695M
			4.00PM	0.665M
		8/9/2021	8.00AM	0.975M
			12.00PM	0.875M
			4.00PM	0.675M
		8/10/2021	8.00AM	0.275M
			12.00PM	0.625M
			4.00PM	0.825M
			8.00AM	0.225M
			12.00PM	0.335M
			4.00PM	0.335M
			8.00AM	0.375M
			12.00PM	0.425M
			4.00PM	0.575M
			8.00AM	0.375M
			12.00PM	0.275M
			4.00PM	0.475M
			8.00AM	0.325M
			12.00PM	0.325M
			4.00PM	0.425M
			8.00AM	0.525M
			12.00PM	0.375M
			4.00PM	0.355M
			8.00AM	0.335M
			12.00PM	0.325M
			4.00PM	0.375M
			8.00AM	0.325M
			12.00PM	0.375M
			4.00PM	0.375M
			8.00AM	0.115M
			12.00PM	0.125M

			8.00AM	0.265M
			12.00PM	0.385M
			4.00PM	0.245M
			8.00AM	0.035M
			12.00PM	0.385M
			4.00PM	0.555M
			8.00AM	0.655M
			12.00PM	0.675M
			8.00AM	0.335M
			12.00PM	0.365M
			4.00PM	0.425M
			8.00AM	
				0.155M
			12.00PM	0.315M
			4.00PM	0.515M
			8.00AM	
				0.335M
			12.00PM	0.315M
			4.00PM	0.395M
			8.00AM	
				0.475M
			12.00PM	0.465M
			4.00PM	0.555M
			8.00AM	
				0.545M
			12.00PM	0.485M
			4.00PM	0.545M
			8.00AM	
				0.715M
			12.00PM	0.625M
			4.00PM	0.765M
			8.00AM	
				0.455M
			12.00PM	0.415M
			4.00PM	0.515M
		8/29/2021	8.00AM	0.655M
			12.00PM	0.725M
			4.00PM	0.725M
		8/30/2021	8.00AM	0.585M
			12.00PM	0.505M
			4.00PM	0.615M

		8/31/2021	8.00AM	0.335M
			12.00PM	0.305M
			4.00PM	0.325M
		1/9/2021	8.00AM	0.285M
			4.00PM	0.255M
		2/9/2021	8.00AM	0.335M
			12.00PM	0.345M
			4.00PM	0.355M
		3/9/2021	8.00AM	0.345M
			12.00PM	0.325M
			4.00PM	0.305M
		4/9/2021	8.00AM	0.145M
			12.00PM	0.305M
			4.00PM	0.275M
		9/5/2021	8.00AM	0.165M
			12.00PM	0.345M
			4.00PM	0.375M
		9/6/2021	8.00AM	0.195M
			12.00PM	0.285M
			4.00PM	0.385M
		9/7/2021	8.00AM	0.085M
			12.00PM	0.305M
			4.00PM	0.505M
		9/8/2021	8.00AM	0.195M
			12.00PM	0.285M
			4.00PM	0.465M
		9/9/2021	8.00AM	0.285M
			12.00PM	0.235M
			4.00PM	0.425M
	Mangalapuzha	7/10/2021	8.00AM	0.90M
			12.00PM	0.85M
			4.00PM	0.855M
		7/11/2021	8.00AM	0.95M
			12.00PM	0.803M
			4.00PM	0.807M
		7/12/2021	8.00AM	0.30M
			12.00PM	0.29M
			4.00PM	0.64M
		7/13/2021	8.00AM	0.28M
			12.00PM	0.65M
			4.00PM	1.27M

			8.00AM	0.77M
		7/14/2021	12.00PM	0.68M
			4.00PM	0.91M
		7/15/2021	8.00AM	1.03M
			12.00PM	0.97M
			4.00PM	0.96M
		7/16/2021	8.00AM	0.807M
			12.00PM	1.13M
			4.00PM	1.40M
		7/17/2021	8.00AM	1.13M
			12.00PM	1.00M
			4.00PM	1.05M
		7/18/2021	8.00AM	0.80M
			12.00PM	0.80M
			4.00PM	0.95M
		7/19/2021	8.00AM	0.70M
			12.00PM	0.70M
			4.00PM	0.60M
		7/20/2021	8.00AM	0.35M
			12.00PM	0.5M
			4.00PM	0.4M
		7/21/2021	8.00AM	0.20M
			12.00PM	0.45M
			4.00PM	0.4M
		7/22/2021	8.00AM	0.15M
			12.00PM	0.55M
			4.00PM	0.50M
		7/23/2021	8.00AM	0.45M
			12.00PM	0.90M
			4.00PM	1.05M
		7/24/2021	8.00AM	1.35M
			12.00PM	1.30M
			4.00PM	1.55M
		7/25/2021	8.00AM	1.30M
			12.00PM	1.20M
			4.00PM	1.20M
		7/26/2021	8.00AM	0.90M
			12.00PM	0.80M
			4.00PM	0.95M
		7/27/2021	8.00AM	0.45M
			12.00PM	0.35M

			4.00PM	0.70M
		7/28/2021	8.00AM	0.40M
			12.00PM	0.30M
			4.00PM	0.35M
		7/29/2021	8.00AM	0.45M
			12.00PM	0.30M
			4.00PM	0.5M
		7/30/2021	8.00AM	0.20M
			12.00PM	0.1M
			4.00PM	0.30M
		7/31/2021	8.00AM	0.20M
			12.00PM	0.10M
			4.00PM	0.20M
		8/1/2021	8.00AM	0.10M
			12.00PM	0.10M
			4.00PM	0.15M
		8/2/2021	8.00AM	0.0M
			12.00PM	0.40M
			4.00PM	0.55M
		8/3/2021	8.00AM	0.65M
			12.00PM	0.35M
			4.00PM	0.25M
		8/4/2021	8.00AM	0.15M
			12.00PM	0.45M
			4.00PM	0.60M
		8/5/2021	8.00AM	0.40M
			12.00PM	0.55M
			4.00PM	0.55M
		8/6/2021	8.00AM	0.80M
			12.00PM	0.75M
			4.00PM	0.70M
		8/7/2021	8.00AM	0.80M
			12.00PM	0.950M
			4.00PM	0.900M
		8/8/2021	8.00AM	0.600M
			12.00PM	0.650M
			4.00PM	0.600M
		8/9/2021	8.00AM	0.700M
			12.00PM	0.800M
			4.00PM	0.750M
		8/10/2021	8.00AM	0.350M

			12.00PM	0.50M
			4.00PM	0.70M
		11/8/2021	8.00AM	0.30M
			12.00PM	0.25M
			4.00PM	0.25M
		12/8/2021	8.00AM	0.25M
			12.00PM	0.300M
			4.00PM	0.450M
		8/13/2021	8.00AM	0.250M
			12.00PM	0.150M
			4.00PM	0.350M
		8/14/2021	8.00AM	0.300M
			12.00PM	0.250M
			4.00PM	0.400M
		8/15/2021	8.00AM	0.450M
			12.00PM	0.250M
			4.00PM	0.250M
		8/16/2021	8.00AM	0.250M
			12.00PM	0.20M
			4.00PM	0.250M
		8/17/2021	8.00AM	0.300M
			12.00PM	0.350M
			4.00PM	0.250M
			8.00AM	0.040M
			12.00PM	0.150M
			8.00AM	0.20M
			12.00PM	0.30M
			4.00PM	0.30M
			8.00AM	0.20M
			12.00PM	0.25M
			4.00PM	0.40M
			8.00AM	0.550M
			12.00PM	0.550M
			8.00AM	0.200M
			12.00PM	0.300M
			4.00PM	0.300M
			8.00AM	0.050M
			12.00PM	0.350M
			4.00PM	0.50M
			8.00AM	0.250M
			12.00PM	0.250M

			4.00PM	0.300M
			8.00AM	0.400M
			12.00PM	0.350M
			4.00PM	0.50M
			8.00AM	0.400M
			12.00PM	0.450M
			4.00PM	0.450M
			8.00AM	0.85M
			12.00PM	0.60M
			4.00PM	0.70M
			8.00AM	0.40M
			12.00PM	0.35M
			4.00PM	0.45M
			8.00AM	0.55M
			12.00PM	0.70M
			4.00PM	0.65M
			8.00AM	0.50M
			12.00PM	0.40M
			4.00PM	0.550M
			8.00AM	0.30M
			12.00PM	0.25M
			4.00PM	0.30M
			8.00AM	0.25M
			4.00PM	0.20M
			8.00AM	0.30M
			12.00PM	0.30M
			4.00PM	0.25M
			8.00AM	0.25M
			12.00PM	0.20M
			4.00PM	0.20M
			8.00AM	0.05M
			12.00PM	0.3M
			4.00PM	0.20M
		9/5/2021	8.00AM	0.05M
			12.00PM	0.35M
			4.00PM	0.30M
		9/6/2021	8.00AM	0.05M
			12.00PM	0.30M
			4.00PM	0.350M
		9/7/2021	8.00AM	0.0M
			12.00PM	0.30M

			4.00PM	0.40M
		9/8/2021	8.00AM	0.10M
			12.00PM	0.30M
			4.00PM	0.40M
		9/9/2021	8.00AM	0.20M
			12.00PM	0.25M
			4.00PM	0.40M
		7/10/2021	8.00AM	1.025M
			12.00PM	1.035M
			4.00PM	1.955M
		7/11/2021	8.00AM	2.255M
			12.00PM	1.995M
			4.00PM	1.755M
		7/12/2021	8.00AM	1.215M
			12.00PM	1.215M
			4.00PM	1.335M
		7/13/2021	8.00AM	1.515M
			12.00PM	0.875M
			4.00PM	3.255M
		7/14/2021	8.00AM	2.135M
			12.00PM	2.315M
			4.00PM	2.215M
		7/15/2021	8.00AM	2.835M
			12.00PM	2.555M
			4.00PM	2.255M
		7/16/2021	8.00AM	2.715M
			12.00PM	3.195M
			4.00PM	3.375M
		7/17/2021	8.00AM	2.595M
			12.00PM	2.595M
			4.00PM	2.455M
		7/18/2021	8.00AM	2.055M
			12.00PM	2.355M
			4.00PM	2.555M
		7/19/2021	8.00AM	1.895M
			12.00PM	1.795M
			4.00PM	1.795M
		7/20/2021	8.00AM	1.355M
			12.00PM	1.255M
			4.00PM	1.215M
		7/21/2021	8.00AM	0.955M

			12.00PM	1.035M
			4.00PM	1.195M
		7/22/2021	8.00AM	1.135M
			12.00PM	1.135M
			4.00PM	1.255M
		7/23/2021	8.00AM	2.255M
			12.00PM	2.595M
			4.00PM	2.815M
		7/24/2021	8.00AM	3.355M
			12.00PM	3.305M
			4.00PM	3.575M
		7/25/2021	8.00AM	3.155M
			12.00PM	2.815M
			4.00PM	2.855M
		7/26/2021	8.00AM	2.455M
			12.00PM	2.315M
			4.00PM	2.155M
		7/27/2021	8.00AM	1.575M
			12.00PM	1.535M
			4.00PM	1.555M
		7/28/2021	8.00AM	1.515M
			12.00PM	1.355M
			4.00PM	1.355M
		7/29/2021	8.00AM	1.415M
			12.00PM	1.355M
			4.00PM	1.215M
		7/30/2021	8.00AM	0.855M
			12.00PM	0.815M
			4.00PM	0.775M
		7/31/2021	8.00AM	0.755M
			12.00PM	0.735M
			4.00PM	0.715M
		8/1/2021	8.00AM	0.615M
			12.00PM	0.615M
			4.00PM	0.595M
		8/2/2021	8.00AM	0.495M
			12.00PM	0.555M
			4.00PM	0.655m
		8/3/2021	8.00AM	0.735M
			12.00PM	0.615M
			4.00PM	0.535M

		8/4/2021	8.00AM	0.455M
			12.00PM	0.555M
			4.00PM	0.655M
		8/5/2021	8.00AM	0.505M
			12.00PM	0.655M
			4.00PM	0.655M
		8/6/2021	8.00AM	1.575M
			12.00PM	1.455M
			4.00PM	1.355M
		8/7/2021	8.00AM	2.215M
			12.00PM	2.255M
			4.00PM	2.155M
		8/8/2021	8.00AM	1.855M
			12.00PM	1.575M
			4.00PM	1.475M
		8/9/2021	8.00AM	2.455M
			12.00PM	2.075M
			4.00PM	1.755M
		8/10/2021	8.00AM	1.695M
			12.00PM	1.755M
			4.00PM	1.775M
		11/8/2021	8.00AM	1.255M
			12.00PM	1.115M
			4.00PM	1.115M
		12/8/2021	8.00AM	1.535M
			12.00PM	1.355M
			4.00PM	1.495M
		8/13/2021	8.00AM	0.995M
			12.00PM	0.855M
			4.00PM	0.855M
		8/14/2021	8.00AM	1.155M
			12.00PM	1.055M
			4.00PM	0.855M
		8/15/2021	8.00AM	1.315M
			12.00PM	1.055M
			4.00PM	0.975M
		8/16/2021	8.00AM	0.755M
			12.00PM	0.835M
			4.00PM	0.815M
		8/17/2021	8.00AM	0.825M
			12.00PM	0.775M

			4.00PM	0.715M
		8/18/2021	8.00AM	0.595M
			12.00PM	0.595M
		8/19/2021	8.00AM	1.175M
			12.00PM	0.955M
			4.00PM	0.775M
		8/20/2021	8.00AM	0.655M
			12.00PM	0.655M
			4.00PM	0.655M
		8/21/2021	8.00AM	0.705M
			12.00PM	0.755M
		8/22/2021	8.00AM	0.655M
			12.00PM	0.495M
			4.00PM	0.435M
		8/23/2021	8.00AM	0.515M
			12.00PM	0.555M
			4.00PM	0.595M
		8/24/2021	8.00AM	0.635M
			12.00PM	0.175M
			4.00PM	0.195M
		8/25/2021	8.00AM	0.775M
			12.00PM	0.595M
			4.00PM	0.525M
		8/26/2021	8.00AM	0.815M
			12.00PM	0.675M
			4.00PM	0.535M
		8/27/2021	8.00AM	1.155M
			12.00PM	1.515M
			4.00PM	1.435M
		8/28/2021	8.00AM	1.195M
			12.00PM	1.175M
			4.00PM	1.135M
		8/29/2021	8.00AM	1.755M
			12.00PM	1.855M
			4.00PM	1.495M
		8/30/2021	8.00AM	1.395M
			12.00PM	1.315M
			4.00PM	1.255M
		8/31/2021	8.00AM	0.955M
			12.00PM	0.875M
			4.00PM	0.955M

		1/9/2021	8.00AM	0.815M
			4.00PM	0.675M
		2/9/2021	8.00AM	0.755M
			12.00PM	0.655M
			4.00PM	0.655M
		3/9/2021	8.00AM	0.615M
			12.00PM	0.575M
			4.00PM	0.615M
		4/9/2021	8.00AM	0.495M
			12.00PM	0.375M
			4.00PM	0.375M
		9/5/2021	8.00AM	0.555M
			12.00PM	0.455M
			4.00PM	0.475M
		9/6/2021	8.00AM	0.575M
			12.00PM	0.515M
			4.00PM	0.575M
		9/7/2021	8.00AM	0.595M
			12.00PM	0.855M
			4.00PM	0.815M
		9/8/2021	8.00AM	0.655M
			12.00PM	0.595M
			4.00PM	0.635M
		9/9/2021	8.00AM	0.595M
			12.00PM	0.255M
			4.00PM	0.495M

Rainfall in the Catchment of Periyar Basin

Name of Dam/Regulator	Rain/River Gauge Station	Date	Reporting Time	Rainfall
Periyar Basin				
	Aluva	7/10/2021	8.30AM	63.5MM
		7/11/2021	8.30AM	98.2MM
		7/12/2021	8.30AM	5.0MM
		7/13/2021	8.30AM	50.0MM
		7/14/2021	8.30AM	32.6MM
		7/15/2021	8.30AM	23.6MM
		7/16/2021	8.30AM	114MM
		7/17/2021	8.30AM	55.6MM

		7/18/2021	8.30AM	42.5MM
		7/19/2021	8.30AM	7.7MM
		7/20/2021	8.30AM	10.5MM
		7/21/2021	8.30AM	15.4MM
		7/22/2021	8.30AM	32.4MM
		7/23/2021	8.30AM	7.8MM
		7/24/2021	8.30AM	27.1MM
		7/25/2021	8.30AM	51.0MM
		7/26/2021	8.30AM	16.4MM
		7/27/2021	8.30AM	6.7MM
		7/28/2021	8.30AM	6.6MM
		7/29/2021	8.30AM	4.0MM
		7/30/2021	8.30AM	3.5MM
		7/31/2021	8.30AM	5.8MM
		8/1/2021	8.30AM	3.4MM
		8/2/2021	8.30AM	2.1MM
		8/3/2021	8.30AM	0.5MM
		8/4/2021	8.30AM	4.8MM
		8/5/2021	8.30AM	0.4MM
		8/6/2021	8.30AM	63.8MM
		8/7/2021	8.30AM	67.9MM
		8/8/2021	8.30AM	27.2MM
		8/9/2021	8.30AM	0.4MM
		8/10/2021	8.30AM	18.3MM
		11/8/2021	8.30AM	0MM
		12/8/2021	8.30AM	0.6MM
		8/13/2021	8.30AM	9.20MM
		8/14/2021	8.30AM	10.2MM
		8/15/2021	8.30AM	9.5MM
		8/16/2021	8.30AM	2.6MM
		8/17/2021	8.30AM	2.4MM
		8/18/2021	8.30AM	5.6MM
		8/19/2021	8.30AM	0.6MM
		8/20/2021	8.30AM	2.8MM
		8/21/2021	8.30AM	0MM
		8/22/2021	8.30AM	0.3MM
		8/23/2021	8.30AM	4.8MM
		8/24/2021	8.30AM	0MM
		8/25/2021	8.30AM	0.1MM
		8/26/2021	8.30AM	7MM
		8/27/2021	8.30AM	107MM

		8/28/2021	8.30AM	30.40MM
		8/29/2021	8.30AM	39.4MM
		8/30/2021	8.30AM	26.4MM
		8/31/2021	8.30AM	0.1MM
		1/9/2021	8.30AM	12.5MM
		2/9/2021	8.30AM	5.5MM
		3/9/2021	8.30AM	8.5MM
		4/9/2021	8.30AM	0MM
		9/6/2021	8.30AM	2.6MM
		9/7/2021	8.30AM	14.1MM
		9/8/2021	8.30AM	9MM
		9/9/2021	8.30AM	5.2MM
	Bhoothathankettu	7/10/2021	8.30AM	56.5MM
		7/11/2021	8.30AM	45.00MM
		7/12/2021	8.30AM	24.3MM
		7/13/2021	8.30AM	58.3MM
		7/14/2021	8.30AM	46.9MM
		7/15/2021	8.30AM	51.2MM
		7/16/2021	8.30AM	74.5MM
		7/17/2021	8.30AM	28.6MM
		7/18/2021	8.30AM	68.9MM
		7/19/2021	8.30AM	17.2MM
		7/20/2021	8.30AM	11.3MM
		7/21/2021	8.30AM	22.8MM
		7/22/2021	8.30AM	30.5MM
		7/23/2021	8.30AM	25.8MM
		7/24/2021	8.30AM	62.3MM
		7/25/2021	8.30AM	44.4MM
		7/26/2021	8.30AM	28.3MM
		7/27/2021	8.30AM	1.2MM
		7/28/2021	8.30AM	17.5MM
		7/29/2021	8.30AM	1.6MM
		7/30/2021	8.30AM	3.1MM
		7/31/2021	8.30AM	8.2MM
		8/1/2021	8.30AM	3.5MM
		8/2/2021	8.30AM	7.9MM
		8/3/2021	8.30AM	12.2MM
		8/4/2021	8.30AM	10.8MM
		8/5/2021	8.30AM	5.8MM
		8/6/2021	8.30AM	79.3MM
		8/7/2021	8.30AM	62.2MM

		8/8/2021	8.30AM	38.2MM
		8/9/2021	8.30AM	56.4MM
		8/10/2021	8.30AM	25.5MM
		8/11/2021	8.30AM	0.6MM
		12/8/2021	8.30AM	0.6MM
		8/13/2021	8.30AM	49.9MM
		8/14/2021	8.30AM	12.8MM
		8/15/2021	8.30AM	21.9MM
		8/16/2021	8.30AM	4.9MM
		8/17/2021	8.30AM	9.5MM
		8/18/2021	8.30AM	5.2MM
		8/19/2021	8.30AM	48.5MM
		8/20/2021	8.30AM	0MM
		8/21/2021	8.30AM	0MM
		8/22/2021	8.30AM	0MM
		8/23/2021	8.30AM	2.9MM
		8/24/2021	8.30AM	0MM
		8/25/2021	8.30AM	11.3MM
		8/26/2021	8.30AM	4.8MM
		8/27/2021	8.30AM	81.30MM
		8/28/2021	8.30AM	37.80MM
		8/29/2021	8.30AM	72.5MM
		8/30/2021	8.30AM	40.2MM
		8/31/2021	8.30AM	5.6MM
		1/9/2021	8.30AM	16.1MM
		2/9/2021	8.30AM	27.4MM
		3/9/2021	8.30AM	1.9MM
		4/9/2021	8.30AM	10.1MM
		9/6/2021	8.30AM	19.20MM
		9/7/2021	8.30AM	26.9MM
		9/8/2021	8.30AM	2.8MM
		9/9/2021	8.30AM	0MM
	Neriyamangalam	7/10/2021	8.30AM	84.6MM
		7/11/2021	8.30AM	86.6MM
		7/12/2021	8.30AM	12.4MM
		7/13/2021	8.30AM	62.6MM
		7/14/2021	8.30AM	42.6MM
		7/15/2021	8.30AM	85MM
		7/16/2021	8.30AM	80.2MM
		7/17/2021	8.30AM	33MM
		7/18/2021	8.30AM	65.2MM

		7/19/2021	8.30AM	12.4MM
		7/20/2021	8.30AM	12.00M
		7/21/2021	8.30AM	19.8MM
		7/22/2021	8.30AM	26.6MM
		7/23/2021	8.30AM	37.6MM
		7/24/2021	8.30AM	47.8MM
		7/25/2021	8.30AM	49.8MM
		7/26/2021	8.30AM	33.8MM
		7/27/2021	8.30AM	1.2MM
		7/28/2021	8.30AM	22.6MM
		7/29/2021	8.30AM	4.4MM
		7/30/2021	8.30AM	0.6MM
		7/31/2021	8.30AM	8.0MM
		8/1/2021	8.30AM	11.2MM
		8/2/2021	8.30AM	9.2MM
		8/3/2021	8.30AM	5MM
		8/4/2021	8.30AM	4.4MM
		8/5/2021	8.30AM	5.6MM
		8/6/2021	8.30AM	52.8MM
		8/7/2021	8.30AM	64.00MM
		8/8/2021	8.30AM	63.8MM
		8/9/2021	8.30AM	56.8MM
		8/10/2021	8.30AM	28.0MM
		8/11/2021	8.30AM	0MM
		12/8/2021	8.30AM	0MM
		8/13/2021	8.30AM	54.6MM
		8/14/2021	8.30AM	38MM
		8/15/2021	8.30AM	27.2MM
		8/16/2021	8.30AM	4.00MM
		8/17/2021	8.30AM	13.8MM
		8/18/2021	8.30AM	2.2MM
		8/19/2021	8.30AM	36MM
		8/20/2021	8.30AM	0MM
		8/21/2021	8.30AM	0MM
		8/22/2021	8.30AM	0MM
		8/23/2021	8.30AM	54MM
		8/24/2021	8.30AM	4.0MM
		8/25/2021	8.30AM	42.0MM
		8/26/2021	8.30AM	1.6MM
		8/27/2021	8.30AM	74.60MM
		8/28/2021	8.30AM	19.20MM

		8/29/2021	8.30AM	45.6MM
		8/30/2021	8.30AM	28.2MM
		8/31/2021	8.30AM	2.8MM
		1/9/2021	8.30AM	0MM
		2/9/2021	8.30AM	23.8MM
		3/9/2021	8.30AM	11MM
		4/9/2021	8.30AM	0.2MM
		5/9/2021	8.30AM	
		9/6/2021	8.30AM	31.40MM
		9/7/2021	8.30AM	31.00MM
		9/8/2021	8.30AM	20MM
		9/9/2021	8.30AM	0MM

Stations of Dams and Barrages (Bhoothathankettu Barrage)

Name of Dam/Regulator	Date	Reporting Time	Water Level	Discharge
Bhoothathankettu Barrage	7/10/2021	8.00AM	30.20M	475.01 CUMECS
		6.00PM	30.20M	1574.25 CUMECS
		8.00PM	29.10M	1951.85CUMECS
	7/11/2021	8.00AM	28.00M	1951.85 CUMECS
		8.00PM	27.90M	1079.36CUMECS
	7/12/2021	8.00AM	27.90M	1079.36CUMECS
		8.00PM	27.90M	764.28CUMECS
	7/13/2021	8.00AM	28.50M	1079.36CUMECS
		8.00PM	28.50M	1079.36CUMECS
	7/14/2021	8.00AM	27.90M	1079.36CUMECS
		8.00PM	28.00M	1079.36CUMECS
	7/15/2021	8.00AM	28.20M	1079.36CUMECS
		8.00PM	28.00M	1079.36CUMECS
	7/16/2021	8.00AM	28.10M	1079.36CUMECS
		8.00PM	28.00M	1079.36CUMECS
	7/17/2021	8.00AM	28.00M	1079.36CUMECS
		4.00PM	28.00M	1079.36CUMECS
		10.00PM	28.00M	1079.36CUMECS
	7/18/2021	8.00AM	28.10M	1155.69CUMECS
		4.00PM	28.10M	1155.69CUMECS
		10.00PM	28.10M	1155.69CUMECS
	7/19/2021	8.00AM	27.00M	760.00CUMECS
		4.00PM	27.00M	760.00CUMECS
		10.00PM	27.00M	760.00CUMECS

	7/20/2021	8.00AM	26.80M	720.00CUMECS
		4.00PM	26.80M	720.00CUMECS
		10.00PM	26.75M	710.00CUMECS
	7/21/2021	8.00AM	26.75M	710.00CUMECS
		4.00PM	26.75M	710.00CUMECS
		8.00PM	26.80M	720.00CUMECS
		10.00PM	26.80M	720.00CUMECS
	7/22/2021	8.00AM	26.80M	720.00CUMECS
		4.00PM	26.80M	720.00CUMECS
		8.00PM	27.00M	760.00CUMECS
		10.00PM	27.00M	760.00CUMECS
	7/23/2021	8.00AM	27.40M	850.00CUMECS
		4.00PM	27.70M	940.00CUMECS
		5.00PM	27.70M	940.00CUMECS
		10.00PM	28.10M	1155.00CUMECS
	7/24/2021	8.00AM	28.10M	1155.00CUMECS
		4.00PM	28.50M	1459.00CUMECS
		10.00PM	28.60M	1535.00CUMECS
	7/25/2021	8.00AM	28.10M	1155.00CUMECS
		5.00PM	28.20M	1231.00CUMECS
		10.00PM	27.80M	970.00CUMECS
	7/26/2021	8.00AM	27.60M	910.00CUMECS
		4.00PM	27.40M	850.00CUMECS
		10.00PM	27.40M	850.00CUMECS
	7/27/2021	8.00AM	27.30M	820.00CUMECS
		4.00PM	27.30M	820.00CUMECS
		10.00PM	27.40M	850.00CUMECS
	7/28/2021	8.00AM	27.35M	835.00CUMECS
		4.00PM	27.30M	820.00CUMECS
		10.00PM	27.30M	820.00CUMECS
	7/29/2021	8.00AM	27.20M	800.00CUMECS
		4.00PM	26.80M	720.00CUMECS
		8.00PM	26.70M	700.00CUMECS
		10.00PM	26.70M	700.00CUMECS
	7/30/2021	8.00AM	26.40M	640.00CUMECS
		4.00PM	26.30M	550.00CUMECS
		10.00PM	26.30M	550.00CUMECS
	7/31/2021	8.00AM	26.30M	550.00CUMECS
		4.00PM	26.30M	550.00CUMECS
		10.00PM	26.35M	595.00CUMECS
	8/1/2021	8.00AM	26.35M	595.00CUMECS

		4.00PM	26.20M	460.00CUMECS
		05.00PM	26.20M	460.00CUMECS
		8.00PM	26.15M	425.00CUMECS
		10.00PM	26.15M	415.00CUMECS
	8/2/2021	8.00AM	26.20M	460.00CUMECS
		4.00PM	26.15M	415.00CUMECS
		10.00PM	26.10m	370.00CUMECS
	8/3/2021	8.00AM	26.20M	460.00CUMECS
		4.00PM	26.10M	370.00CUMECS
		10.00PM	26.10M	370.00CUMECS
	8/4/2021	8.00AM	26.20M	460.00CUMECS
		4.00PM	26.10M	370.00CUMECS
		10.00PM	26.10M	370.00CUMECS
	8/5/2021	8.00AM	26.16M	415.00CUMECS
		4.00PM	26.20M	460.00CUMECS
		10.00PM	26.20M	460.00CUMECS
	8/6/2021	8.00AM	26.50M	660.00CUMECS
		8.00PM	26.90M	740.00CUMECS
		10.00PM	26.90M	740.00CUMECS
	8/7/2021	8.00AM	27.40M	850.00CUMECS
		4.00PM	27.20M	800.00CUMECS
		10.00PM	27.40M	850.00CUMECS
	8/8/2021	8.00AM	27.10M	780.00CUMECS
		4.00PM	27.00M	760.00CUMECS
		10.00PM	27.50M	880.00CUMECS
	8/9/2021	8.00AM	27.40M	850.00CUMECS
		4.00PM	27.00M	760.00CUMECS
		8.00PM	27.00M	760.00CUMECS
		10.00PM	27.00M	760.00CUMECS
	8/10/2021	8.00AM	27.00M	760.00CUMECS
		4.00PM	27.10M	780.00CUMECS
		10.00PM	27.00M	760.00CUMECS
	8/11/2021	8.00AM	26.95M	750.00CUMECS
		4.00PM	26.90M	740.00CUMECS
		8.00PM	26.90M	740.00CUMECS
		10.00PM	26.90M	740.00CUMECS
	8/12/2021	8.00AM	27.20M	800.00CUMECS
		4.00PM	27.05M	760.00CUMECS
		8.00PM	27.00M	760.00CUMECS
		10.00PM	26.90M	740.00CUMECS
	8/13/2021	8.00AM	26.85M	730.00CUMECS

		2.00PM	26.85M	730.00CUMECS
		8.00PM	26.80M	720.00CUMECS
		10.00PM	26.85M	730.00CUMECS
	8/14/2021	8.00AM	26.95M	750.00CUMECS
		4.00PM	27.00M	760.00CUMECS
		10.00PM	27.25M	810.00CUMECS
	8/15/2021	8.00AM	26.95M	750.00CUMECS
		4.00PM	26.60M	680.00CUMECS
		10.00PM	26.80M	720.00CUMECS
	8/16/2021	8.00AM	26.80M	720.00CUMECS
		4.00PM	26.70M	700.00CUMECS
		10.00PM	26.80M	720.00CUMECS
	8/17/2021	8.00AM	26.80M	720.00CUMECS
		8.00PM	26.50M	660.00CUMECS
		10.00PM	26.50M	660.00CUMECS
	8/18/2021	8.00AM	26.60M	680.00CUMECS
		8.00PM	27.00M	780.00CUMECS
		10.00PM	27.10M	780.00CUMECS
	8/19/2021	8.00AM	26.90M	740.00CUMECS
		4.00PM	26.60M	680.00CUMECS
		10.00PM	26.70M	720.00CUMECS
	8/20/2021	8.00AM	26.60M	680.00CUMECS
		5.00PM	26.40M	640.00CUMECS
		8.00PM	26.60M	660.00CUMECS
		10.00PM	26.50M	660.00CUMECS
	8/21/2021	8.00AM	26.50M	660.00CUMECS
		8.00PM	26.10M	580.00CUMECS
	8/22/2021	8.00AM	26.20M	460.00CUMECS
		8.00PM	26.10M	370.00CUMECS
	8/23/2021	8.00AM	26.30M	550.00CUMECS
		4.00PM	26.30M	460.00CUMECS
		8.00PM	26.25M	505.00CUMECS
	8/24/2021	8.00AM	28.40M	34.50CUMECS
		4.00PM	28.40M	472.36CUMECS
		8.00PM	29.20M	460.56CUMECS
	8/25/2021	8.00AM	29.40M	478.36CUMECS
		4.00PM	29.25M	355.76CUMECS
		8.00PM	29.35M	637.36CUMECS
	8/26/2021	8.00AM	29.15M	478.76CUMECS
		4.00PM	29.10M	371.70CUMECS
		8.00PM	29.15M	478.76CUMECS

	8/27/2021	8.00AM	28.20M	1234.30CUMECS
		4.00PM	26.95M	750.00CUMECS
		8.00PM	26.90M	740.00CUMECS
		10.00PM	26.90M	740.00CUMECS
	8/28/2021	8.00AM	27.10M	760.00CUMECS
		4.00PM	26.90M	740.00CUMECS
		8.00PM	26.90M	740.00CUMECS
		10.00PM	26.95M	750.00CUMECS
	8/29/2021	8.00AM	27.20M	800.00CUMECS
		4.00PM	26.95M	750.00CUMECS
		8.00PM	27.00M	760.00CUMECS
		10.00PM	27.20M	800.00CUMECS
	8/30/2021	8.00AM	27.00M	760.00CUMECS
		4.00PM	26.85M	730.00CUMECS
		8.00PM	26.80M	720.00CUMECS
	8/31/2021	8.00AM	26.70M	700.00CUMECS
		8.00PM	26.70M	700.00CUMECS
		10.00PM	26.80M	720.00CUMECS
	9/1/2021	8.00AM	26.70M	700.00CUMECS
		8.00PM	26.80M	720.00CUMECS
		10.00PM	26.80M	720.00CUMECS
	9/2/2021	8.00AM	26.60M	680.00CUMECS
		8.00PM	26.70M	700.00CUMECS
		10.00PM	26.80M	720.00CUMECS
	9/3/2021	8.00AM	26.50M	660.00CUMECS
		8.00PM	26.60M	680.00CUMECS
	9/4/2021	8.00AM	26.30M	550.00CUMECS
		8.00PM	26.25M	505.00CUMECS
	9/5/2021	8.00AM	26.30M	550.00CUMECS
		8.00PM	26.55M	670.00CUMECS
	9/6/2021	8.00AM	26.40M	640.00CUMECS
		8.00PM	28.00M	160.00CUMECS
	9/7/2021	8.00AM	29.20M	640.00CUMECS
		8.00PM	28.90M	580.00CUMECS
	9/8/2021	8.00AM	29.00M	580.00CUMECS
		8.00PM	29.15M	580.00CUMECS
	9/9/2021	8.00AM	29.00M	340.00CUMECS
		8.00PM	28.90M	260.00CUMECS

Stations of Dams and Barrages (Idamalayar Dam)

Name of Dam/Regulator	Date	Reporting Time	Water Level	Discharge	Rainfall
Idamalayar Dam	7/10/2021	7.00 AM	143.86m	2.685 MCM	53.20MM
		1.00PM	143.98M	0.620MCM	
		7.00PM	144.20M	0.6638MCM	
	7/11/2021	7.00AM	144.52M	2.634MCM	91.00MM
		1.00PM	144.64M	0.2306MCM	
		7.00PM	144.70M	0.5176MCM	
	7/12/2021	7.00 AM	144.84M	1.947MCM	14.40MM
		1.00PM	144.91M	0.678MCM	
		7.00PM	144.99M	0.684MCM	
	7/13/2021	7.00 AM	145.26M	2.589MCM	104.60MM
		1.00PM	145.50M	0.126MCM	
		7.00PM	145.69M	0.0MCM	
	7/14/2021	7.00 AM	146.00M	0.126MCM	64.80MM
		1.00PM	146.17M	0.0MCM	
		7.00PM	146.36M	0.0MCM	
	7/15/2021	7.00 AM	146.66M	0.0MCM	40.20MM
		1.00PM	146.78M	0.0MCM	
		7.00PM	146.91M	0.0MCM	
	7/16/2021	7.00 AM	147.34M	0.0MCM	62.40MM
		1.00PM	147.54M	0.106MCM	
		7.00PM	147.66M	0.4368MCM	
	7/17/2021	7.00 AM	147.88M	1.948MCM	35.20MM
		1.00PM	148.02M	0.7032MCM	
		7.00PM	148.12M	0.733MCM	
	7/18/2021	7.00 AM	148.38M	2.889MCM	39.20MM
		1.00PM	148.57M	0.684MCM	
		7.00PM	148.70M	0.665MCM	
	7/19/2021	7.00 AM	148.94M	2.697MCM	20.20MM
		1.00PM	149.05M	0.706MCM	
		7.00PM	149.15M	0.756MCM	
	7/20/2021	7.00 AM	149.31M	2.972MCM	10.60MM
		7.00PM	149.42M	0.8217MCM	
	7/21/2021	7.00 AM	149.52M	3.001MCM	8.00MM
		1.00PM	149.58M	0.7227MCM	
		7.00PM	149.66M	0.6843MCM	
	7/22/2021	7.00 AM	149.83M	2.849MCM	16.60MM
		1.00PM	149.92M	0.7159MCM	
		7.00PM	150.02M	0.658MCM	

	7/23/2021	7.00 AM	150.35M	2.687MCM	33.40MM
		1.00PM	150.64M	0.000MCM	
		7.00PM	150.91M	0.080MCM	
	7/24/2021	7.00 AM	151.68M	1.536MCM	94.40MM
		1.00PM	151.91M	0.723MCM	
		7.00PM	152.24M	0.479MCM	
	7/25/2021	7.00 AM	152.68M	2.577MCM	33.00MM
		1.00PM	152.85M	0.699MCM	
		7.00PM	153.03M	0.695MCM	
	7/26/2021	7.00 AM	153.47M	2.782MCM	45.80MM
		1.00PM	153.60M	0.6865MCM	
		7.00PM	153.68M	0.6787MCM	
	7/27/2021	7.00 AM	153.89M	2.724MCM	8.00MM
		1.00PM	153.96M	0.679MCM	
		7.00PM	154.05M	0.520MCM	
	7/28/2021	7.00 AM	154.18M	4.130MCM	23.20MM
		1.00PM	154.22M	1.3417MCM	
		7.00PM	154.27M	1.313MCM	
	7/29/2021	7.00 AM	154.38M	5.138MCM	5.00MM
		1.00PM	154.41M	1.344MCM	
		7.00PM	154.44M	1.099MCM	
	7/30/2021	7.00 AM	154.47M	5.078MCM	0.00MM
		1.00PM	154.49m	1.3176mcm	
		7.00PM	154.53m	1.2798MCM	
	7/31/2021	7.00 AM	154.55M	5.148MCM	17.4MM
		1.00PM	154.55M	1.087MCM	
		7.00PM	154.57M	1.120MCM	
	8/1/2021	7.00 AM	154.58M	4.799MCM	10.40MM
		1.00PM	154.58M	1.1435MCM	
		7.00PM	154.59M	1.209MCM	
	8/2/2021	7.00 AM	154.58M	4.889MCM	7.60MM
		1.00PM	154.59M	0.682MCM	
		7.00PM	154.60m	1.105mcm	
	8/3/2021	7.00 AM	154.58M	4.237MCM	10.60MM
		1.00PM	154.59M	0.9295MCM	
		7.00PM	154.59M	1.174MCM	
	8/4/2021	7.00 AM	154.59M	4.689MCM	19.00MM
		1.00PM	154.59M	1.025MCM	
		7.00PM	154.59M	1.328MCM	
	8/5/2021	7.00 AM	154.57M	4.856MCM	2.40MM
		1.00PM	154.56M	1.2986MCM	

		7.00PM	154.57M	1.3054MCM	
	8/6/2021	7.00 AM	154.73M	5.075MCM	56.80MM
		1.00PM	154.77M	1.191MCM	
		7.00PM	154.82M	1.187MCM	
	8/7/2021	7.00 AM	155.04M	4.828MCM	71.60MM
		1.00PM	155.11M	1.3201MCM	
		7.00PM	155.20M	1.2416MCM	
	8/8/2021	7.00 AM	155.31M	5.217MCM	15.40MM
		1.00PM	155.34M	1.153MCM	
		7.00PM	155.39M	1.1783MCM	
	8/9/2021	7.00 AM	155.80M	4.960MCM	96.40MM
		1.00PM	155.83M	1.288MCM	
		7.00PM	155.90M	1.257MCM	
	8/10/2021	7.00 AM	156.05M	5.176MCM	41.40MM
		1.00PM	156.12M	1.2623MCM	
		7.00PM	156.18M	1.3082MCM	
	8/11/2021	7.00 AM	156.23M	5.213MCM	2.60MM
		1.00PM	156.23M	1.322MCM	
		7.00PM	156.25M	1.327MCM	
	8/12/2021	7.00 AM	156.30M	5.302MCM	20.60M
		1.00PM	156.32M	1.007MCM	
		7.00PM	156.35M	1.471MCM	
	8/13/2021	7.00 AM	156.37M	5.362MCM	9.20MM
		1.00PM	156.37M	1.4463MCM	
		7.00PM	156.37M	1.3997MCM	
	8/14/2021	7.00 AM	156.41M	5.582MCM	14.60MM
		1.00PM	156.43M	1.425MCM	
		7.00PM	156.47M	1.380MCM	
	8/15/2021	7.00 AM	156.58M	5.022MCM	24.40MM
		1.00PM	156.60M	0.828MCM	
		7.00PM	156.64M	0.622MCM	
	8/16/2021	7.00 AM	156.69M	3.599MCM	15.40MM
		1.00PM	156.72M	0.9965MCM	
		7.00PM	156.75M	1.1446MCM	
	8/17/2021	7.00 AM	156.74M	4.908MCM	16.20MM
		1.00PM	156.73M	1.4038MCM	
		7.00PM	156.73M	1.3872MCM	
	8/18/2021	7.00 AM	156.72M	5.536MCM	5.40MM
		1.00PM	156.72M	1.058MCM	
		7.00PM	156.76M	1.074MCM	
	8/19/2021	7.00 AM	157.04M	4.934MCM	24.40MM

		1.00PM	157.07M	1.384MCM	
		7.00PM	157.08M	1.396MCM	
	8/20/2021	7.00 AM	157.10M	5.213MCM	7.80MM
		1.00PM	157.10M	0.8977MCM	
		7.00PM	157.12M	1.0370MCM	
	8/21/2021	7.00 AM	157.12M	4.480MCM	0.00MM
		1.00PM	157.15M	0.183MCM	
		7.00PM	157.20M	0.052MCM	
	8/22/2021	7.00 AM	157.28M	0.916MCM	5.60MM
		1.00PM	157.31M	0.00MCM	
		7.00PM	157.36M	0.000MCM	
	8/23/2021	7.00 AM	157.48M	0.00MCM	8.20MM
		1.00PM	157.51M	0.4714MCM	
		7.00PM	157.53M	0.6758MCM	
	8/24/2021	7.00 AM	157.53M	3.558MCM	3.40MM
		1.00PM	157.53M	1.0426MCM	
		7.00PM	157.52M	0.9831MCM	
	8/25/2021	7.00 AM	157.49M	4.945MCM	1.00MM
		1.00PM	157.47M	1.143MCM	
		7.00PM	157.50M	1.077MCM	
	8/26/2021	7.00 AM	157.47M	4.810MCM	52.80MM
		1.00PM	157.45M	1.395MCM	
		7.00PM	157.47M	0.496MCM	
	8/27/2021	7.00 AM	157.55M	4.033MCM	45.60MM
		1.00PM	157.60M	0.7993MCM	
		7.00PM	157.60M	1.2531MCM	
	8/28/2021	7.00 AM	157.64M	4.627MCM	37.60MM
		1.00PM	157.66M	1.229MCM	
		7.00PM	157.68M	1.304MCM	
	8/29/2021	7.00 AM	157.93M	4.388MCM	44.40MM
		1.00PM	158.00M	0.083MCM	
		7.00PM	158.08M	0.067MCM	
		7.00 AM	158.26M	0.947MCM	
		1.00PM	158.30M	1.6525MCM	
		7.00PM	158.36M	0.0770MCM	
		7.00 AM	158.44M	2.205MCM	
		1.00PM	158.45M	0.0939MCM	
		7.00PM	158.50M	0.222MCM	
		7.00 AM	158.56M	2.453MCM	
		1.00PM	158.60M	0.00MCM	
		7.00PM	158.67M	0.372MCM	

		7.00 AM	158.74M	1.683MCM	
		1.00PM	158.78M	0.052MCM	
		7.00PM	158.82M	0.687MCM	
		7.00 AM	158.87M	1.960MCM	
		1.00PM	158.88M	0.748MCM	
		7.00PM	158.90M	0.678MCM	
		1.00PM	158.96M	0.000MCM	
		7.00PM	159.02M	0.1499MCM	
		7.00 AM	159.10M	1.008MCM	
		1.00PM	159.14M	0.00MCM	
		7.00PM	159.19M	0.1041MCM	
		7.00 AM	159.34M	0.269MCM	
		1.00PM	159.40M	0.00MCM	
		7.00PM	159.46M	0.223MCM	
		7.00 AM	159.60M	0.554MCM	
		1.00PM	159.67M	0.00MCM	
		7.00PM	159.75M	0.00MCM	
		7.00 AM	159.85M	0.480MCM	
		1.00PM	159.91M	0.00MCM	
		7.00PM	159.97M	0.217MCM	
		7.00 AM	160.01M	1.477MCM	
		1.00PM	160.03M	0.2315MCM	
		7.00PM	160.08M	0.109MCM	

5. CONCLUSION

Through the field surveys conducted by our team has collected basic details about the main streams and the connecting thodu. Also the main problems affecting the flow of river are identified. There Periyar Stretch passing through industrial area so the causes of pollution are identified. (Refer, Pg:696)

Periyar Mangalapuzha branch from

Aluva Manappuram to Munambam

From Ch: 0km to 27.47km

Brief overview-

Reach from Aluva Manappuram to Munambam (Mangalappuzha branch- Chainage 0km to 27.47km)

The Periyar River bifurcates into two near Aluva Shivaratri Manappuram and flows in Northern and Western directions. The details regarding the Northern Branch towards Mangalappuzha is dealt with under this section. The length of this reach from Aluva Manappuram to Munambam Azhimugham is 27.47 km. The starting chainage at Aluva Manappuram is taken as 0km. The local bodies along the banks of Periyar in this stretch are Aluva Municipality, Chengamanad Panchayat, Karumallur Panchayat, Chendamagalam Panchayat, Kunnukara Panchayat, Puthenvelikara ,Vadakkekkara, Pallippuram and Kodungalloor Municipality . The major tributaries in this reach are Thoomba thodu,Karinthiri Aar, Periyar to Periyar thodu,Naduvilathara thodu, Korakkara thodu, Paravurpuzha, Kallikuzhy thodu, Manjali thodu, Cheriyathekkanam thodu, Chalakudypuzha, Thekkethuruth thodu, Vijayan thodu, Thuruthipuram thodu and Kurumbathuruthu-Akathuchal thodu. Purappillykavu regulator bridge,intended for preventing salt water intrusion into the agricultural lands adjacent to river, is situated across Periyar at Ch 11.35km. The Chalakkudy River joins with Periyar River near Elanthikkara , Puthenvelikkaraat chainage 14.3 km of Mangalappuzha branch. This reach is most critical regarding flooding as Chalakudy river discharges its catchment area collection also into Periyar River at this confluence point.The Periyar drains into Arabian sea at Munambam. The salient features and identified problems in Mangalappuzha branch of Periyar and its tributaries are detailed in this section. *(Refer , Pg:1259)*

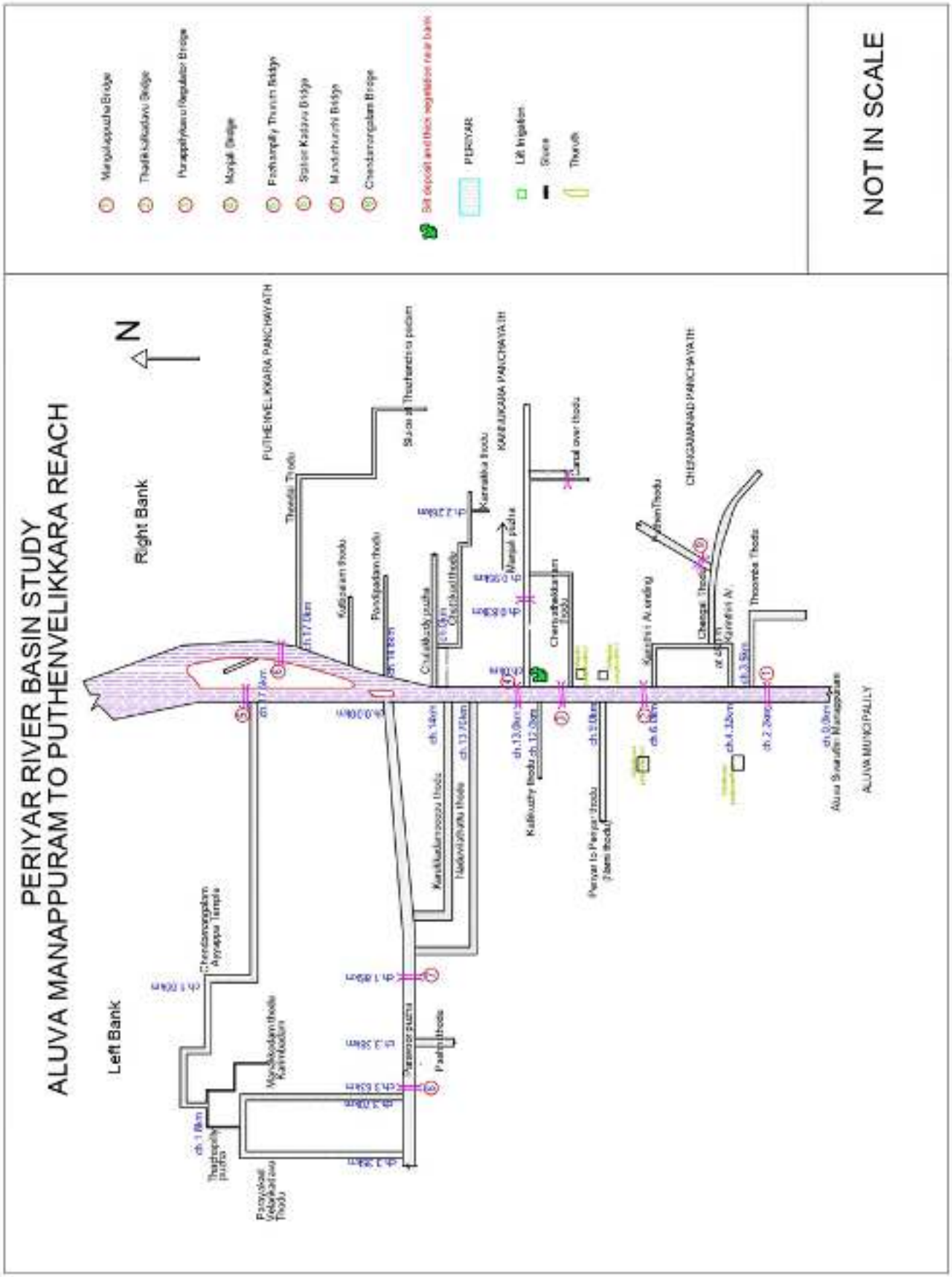
Introduction:

Kerala is rich in water resources and has 44 major rivers. Periyar is the longest river in Kerala having a total length of 244 km. The river Periyar originates from Sivagiri peaks in Western Ghats . Themajor tributaries of Periyar are Muthirappuzha, Edamalayar, Mullayar, Perunthurayar, Kattapanayar, Cheruthoniyar, Muthayar, Chinnar, Cheruthoni and Thottiyar. The Peryar river basin hasa total area of5398 km2 out of which 5284 km2 l ies in Kerala and 114 km2 l ies in Tamil Nadu. The river is perennial in nature and is the largest in the state in terms of water carrying capacity. The river supplies water for irrigation, domestic purposes and industrial use. Most of the major hydroelectric projects in our State are situated in this river. The river traverses through Idukki and Ernakulam districts . Two major Irrigation Projects- Periyar Valley Irrigation Project and Idamalayar Irrigation Project Near Aluva Shivaratri Manappuram in Ernakulam, the river bifurcates into two. viz Mangalapuzha branch towards north and Marthanda Varma branch towards south.

The North trending Mangalapuzha branch joins Chalakudy river and discharges into Arabian sea at Munambam, whereas the Marthanda Varma branch discharges into Vembanad lake near Varapuzha in Ernakulam district.

Reach from Aluva Manappuram to Puthenvelikkara

Length of reach	17.5km
Local bodies concerned Along Left Bank	Aluva Municipality, Karumallur Panchayat, Chendamangalam Panchayat, Alangad Panchayat, Paravoor Municipality,Chittattukara Panchayat
A long Right Bank	Chengamanad Panchayat, Kunnukara Panchayat, Puthenvelikkara Panchayat
No.of bridges across main river	6 (Mangalapuzha bridge, Thadikkalkadavu bridge, Purappillykavu Regulator bridge, Manjaly bridge,Pazhampillythuruth bridge & Station Kadavubridge)


PERIYAR RIVER BASIN STUDY
ALUVA MANAPPURAM TO PUTHENVELIKKARA REACH
Left Bank
Right Bank
N
Manappuram Bridge
Thottakkadavu Bridge
Purappilikkavu Regulator Bridge
Manjali Bridge
Pachampilly Thuruthi Bridge
Sahar Kadavu Bridge
Mundanthuruthi Bridge
Chandarangalam Bridge
Silt deposit and thick vegetation near bank
PERIYAR
Lift Irrigation
Sluice
Thoduth
NOT IN SCALE
PUTHENVELIKKARA PANCHAYATH
KADUKUTTIKARA PANCHAYATH
CHEVAYANAND PANCHAYATH
ALUVA MUNICIPALITY
Chandarangalam Ayyappa Temple
Thadapally pudhu
Paramyakal (Velankanni) Thodu
Manappuram thodu Kalvert
Panamthodu
Thoothanthra pudhu
Thoothanthra pudhu
Kanakkankandam thodu
Nadavumbathu thodu
Kallikuzhy pudhu
Kallikuzhy thodu
Kanakkankandam thodu
Kallikuzhy thodu
Kallikuzhy pudh

Periyar – Mangalappuzha Branch

Ch 0.000 km

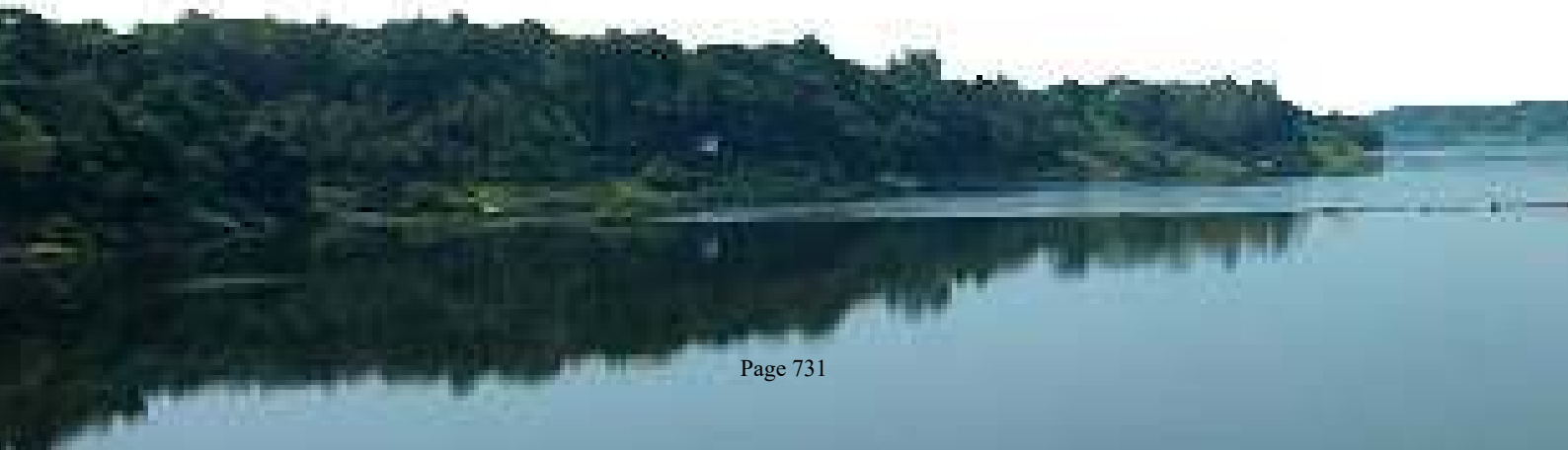
The river Periyar bifurcates into Mangalapuzha branch and Marthandavarma branch near AluvaManappuram.TheMangalapuzha branch of Periyar has a width of approx 230 m at its bifurcation point. At this location ,groynes are seen constructed to protect the AluvaSivarathriManapuram from bank erosion and to ensure safety of the devotees using the bathing ghat for ritual purposes. But the groynes are observed to be partially damaged. Silt accumulation is also observed along the left bank at this location.

Ch 0.485 km

The Harithavanam park is located at chainage 485 m on the left bank of Mangalappuzha branch of Periyar. Silt accumulation is observed here. There is a damaged boat jetty at this location, On the opposite bank of the Harithavanam Park, Avanamkode no.1 Lift Irrigation Scheme is situated along the right bank of Periyar. On Right bank ,Thoombathodu originating from main stream of Periyar near Chowara, discharges into the Mangalappuzha branch of Periyar.

Ch1.350 km

Near the Government Ayurveda hospital , a small stretch of Periyar is engulfed in between land for length of approx 240m forming a small bay like portion having average width 35m.In this area, the water is observed to be stagnant and hence silt deposition is observed .The banks of the bay portion are partially protected.The bank height is about 2.2m from mean water level. The river Periyar flows along the north side of this bay portion and has an approx width of 140m at this location .



Ch 2.260 km

Mangalapuzha bridge acossPeriyar is about 145 m length and is situated at chainage 2260m north of AluvaManappuram. This beautiful bowstring girder Arch bridge forms part of NH 47 Highway passing through Aluva and connects Desom and Aluva town. This bridge is situated 3 km away from MarthandaVarma Bridge. PontificialSeminary ,Aluvais situated near this bridge. There is also a river gauging station monitored by the Hydrology wing of Irrigation departmentlocated near Mangalappuzha bridge.The water level and velocity of flow in Periyar is recorded on a daily basis at this gauging station.

Ch 3.630 km

Carmalgiri seminary area situated on the left bank of Periyar is one of the highest land points along the bank of Periyar. During 2018 floods, this Seminary gave refuge to a large number of flood affected people in KarumallurPanchayat. As the bank height is sufficiently high, there is no risk of flooding from Periyar in this location. However thick vegetation and silt deposition is observed along the river bank near this Seminary . The river Periyar is having an approximate width of 150 m at this location. Also the main river course at this location is observed to be clear and unobstructed.

Ch 4.050 km

There is a small kadavu at this location near Cheriyath temple, Veliyathnadu in KarumallurPanchayat. The

Periyar – near alunkal bhagavathy road karumalloor

Ch 6.300 km

Thadikkalkadavu bridge with a length of 160 meter is constructed across Periyar at chainage 6/300. On banks silt deposits are seen for about 12meter for about 500meter.

Ch 7.18 Km

Periyar nearPallath road towards Thadikadavu bridge is having silt formation of about 11 meter wide and 150 meter long.

Ch 7.80 Km

Periyar near Ashiyanakadav, Karumaloor there is house constructed into the river, which seems to be an encroachment which shall be removed for the smooth flow.

Ch 8.7 Km

Periyar near lashamveedu ground road ,silt deposition is found near kadavu for a length of 250 meter with an average width of 8meters.

Ch 9.32 Km

Periyar near Mambrakadavu road is having silt deposit near banks of about 4meter wide and 150 meter long.

Ch11.39 Km

Purapillikavu Regulator cum bridge is at this chainage.The shutters are regulated to control the entry of salt water into the river .On Left bank about 20meters side protection wall is damaged. Silt deposition is observed on the upstream side towards the banks. Cheriya Thekkanam thodu Joins in the upstream of Purapilikavu Regulator cum bridge, which is a branch of Manjalithodu.

Ch13.12 Km

Manjalibridge is coming at this chainage with a length of 225 meter. Silt deposit of about 12 meter wide and 40meter long is seen at this point. Manjalythodu having a width about 40 meters is joining Periyar at upstream of Manjali bridge.

Ch14.26 Km

Chalakudy river joins periyar at this point.The river is having a width of 260meter here.

Ch15.86 Km

Anchamparuthythodu joins Periyar at Mattupuramkadavu. Thereisasmall island named CR thuruth is situated here.

Ch17.50Km

Pazhampillythuruth bridge is constructed across the Left branch of Periyar with a length of 120meters and Station kadavu bridge across the Right branch with a length of 250meters.

Ch16.62Km

At this chainage the river bifurcates into two branches.An island is formed at this point known as dharmathuruthu.

LIFT IRRIGATION SCHEMES

Left Bank

1.Veliyathunad East
2.Veliyathunad No.1
3.Veliyathunad No.2
4.Krimaloor No.1
5.Krimaloor No.2

Right Bank

6.Avanomkode No.1
7.Desam West
8.Southaduvassery
9.Kuttipuzha no.2
10.Kurisupally
11.Kunnukara

Kunnukara

Veliyathunad 1

Veliyathunad 2

Kuttipuzha 1

Karumaloor No.1

Kuttipuzha no 2

Veliyathunad

Details of Lift Irrigation Schemes from Periyar River under M.I.Section,North Paravur

Veliyathunadu No.1 L I Scheme under M.I.Section,North Paravur

The Veliyathunadu No.1 L I Scheme was implemented and commissioned in 1958 and located on left bank of Periyar River at Ch: 234.54 KM and globally which is located at Lattitude N 10.149922 & Longitude E 76.321048 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 345.14 hectares of ayacut through its 7587 m of canal net work and passes through Karumalloor and Alangad Panchayath .The Veliyathunadu No.1 LI Scheme is designed for maximum discharge 0.542m3/s . The total quantity of water intake from River Periyar in an year is 8.775 MCM.

Veliyathunadu No.2 L I Scheme under M.I.Section,North Paravur

The Veliyathunadu No.2 L I Scheme was implemented and commissioned in 1958 and located on left bank of Periyar River at Ch: 232.24 KM and globally which is located at Lattitude N 10.142428 & Longitude E 76.336222 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 345.14 hectares of ayacut through its 1675 m of canal net work and passes through Karumalloor Panchayath . The Veliyathunadu No.2 LI Scheme is designed for maximum discharge 0.12 m3/s . The total quantity of water intake from River Periyar in an year is 1.944 MCM.

Veliyathunadu East L I Scheme under M.I.Section,North Paravur

The Veliyathunadu east L I Scheme was implemented and commissioned in 1958 and located on left bank of Periyar River at Ch:231.07 KM and globally which is located at Lattitude N 10.131812 & Longitude E 76.337218. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 41.00 hectares of ayacut through its 1050 m of canal net work and passes through Karumalloor Panchayath .The Veliyathunadu east LI Scheme is designed for maximum discharge 0.123m3/s . The total quantity of water intake from River Periyar in an year is 1.998 MCM .

Karumaloor No.1 L I Scheme under M.I.Section,North Paravur

The Karumalloor No.1 L I Scheme was implemented and commissioned in 1949 and located on left bank of Periyar River at Ch:238.26 KM and globally which is located at Lattitude N 10.136637 & Longitude E 76.29123 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 111.82 hectares of ayacut through its 1840 m of canal net work and passes through Karumalloor Panchayath . The Karumalloor No.1 LI Scheme is designed for maximum discharge 0.425m3/s . The total quantity of water intake from River Periyar in an year is 6.885 MCM .

Kuttipuzha No.2 L I Scheme under M.I.Section,North Paravur

The Kuttipuzha No.2 L I Scheme was implemented and commissioned in 1949 and located on right bank of Periyar River at Ch: 236.68 KM and globally which is located at Lattitude N 10.143265 & Longitude E 76.303342 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 372.02 hectares of ayacut through its 2515 m of canal net work and passes through Kunnukara Panchayath . The Kuttipuzha No.2 LI Scheme is designed for maximum discharge 0.216m3/s . The total quantity of water intake from River Periyar in an year is 2.947 MCM .

Kuttipuzha No.1 L I Scheme under M.I.Section,North Paravur

The Kuttipuzha No.1 L I Scheme was implemented and commissioned in 1949 and located
on Right bank of Periyar River at Ch: 235.46 KM and globally which is located at Lattitude N 10.150112 & Longitude E 76.3123266 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 372.02 hectares of ayacut through its 7666 m of canal net work and passes through Kunnukara Panchayath . The Kuttipuzha No.1 LI Scheme is designed for maximum discharge 0.50m3/s . The total quantity of water intake from River Periyar in an year is 8.10 MCM .

South Aduvassery L I Scheme under M.I.Section,North Paravur

The South Aduvassery L I Scheme was implemented and commissioned in 1949 and located on right bank of Periyar River at Ch:234.17 KM and globally which is located at Lattitude N 10.153083 & Longitude E 76.323799 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 16.10 hectares of ayacut through its 1000 m of canal net work and passes through Kunnukara Panchayath . The South Aduvassery LI Scheme is designed for maximum discharge 0.0266m3/s . The total quantity of water intake from River Periyar in an year is 0.432 MCM .

TRIBUTARIES OF PERIYAR FROM ALUVA MANAPPURAM TO PUTHENVELIKKARA

TRIBUTARIES ON RIGHT BANK

1.Thoombathodu
2.Karinthiriyar
3.Cheriyathekkanam Thodu
4.Manjalypuzha
5.Chalakkudy River joins Periyar at Ch 14Km
6.Pandipadamthodu
7.Payikkatupallamthodu
8.Kuttikattupallamthodu
9.Thondalthodu

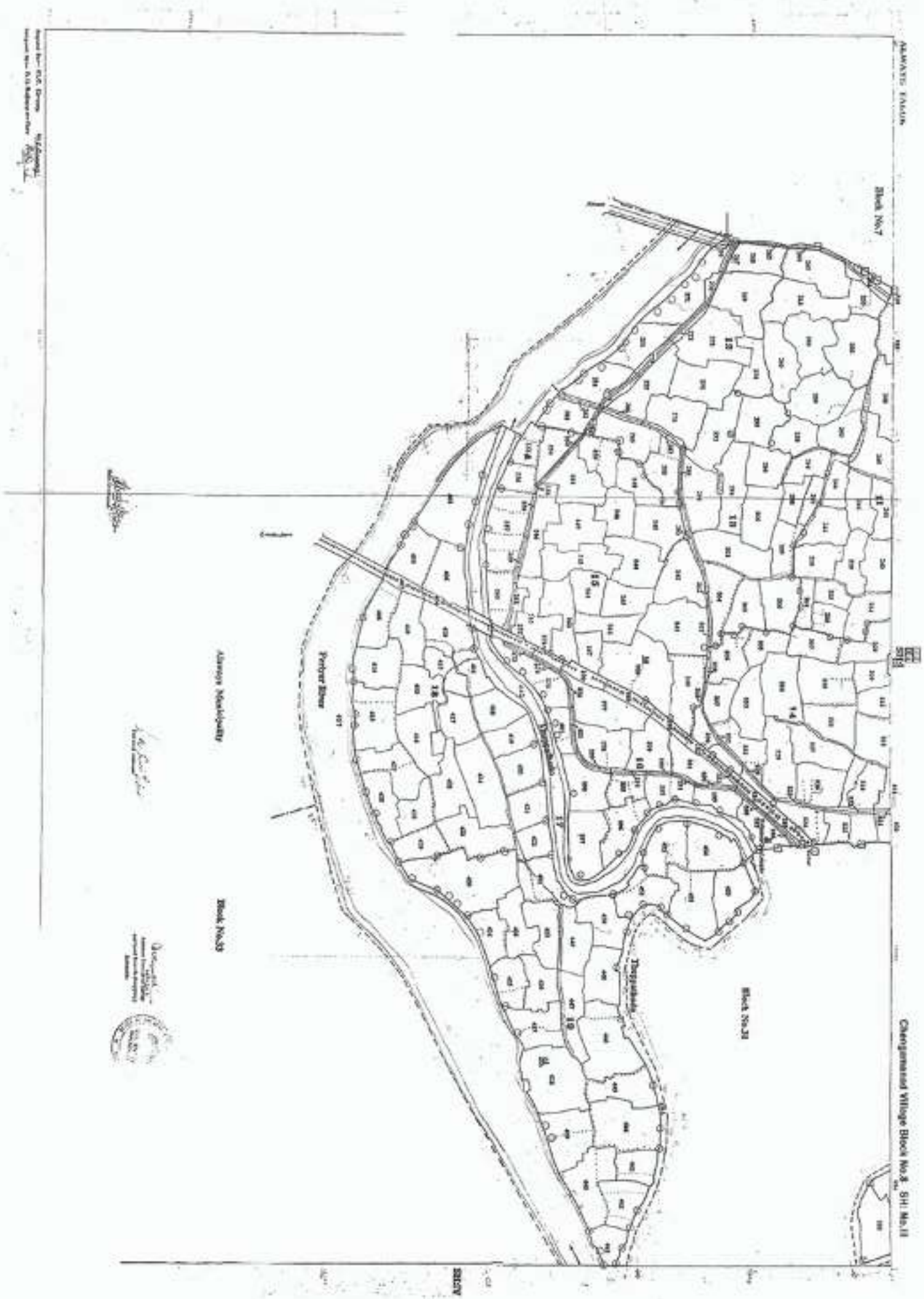
TRIBUTARIES ON LEFT BANK

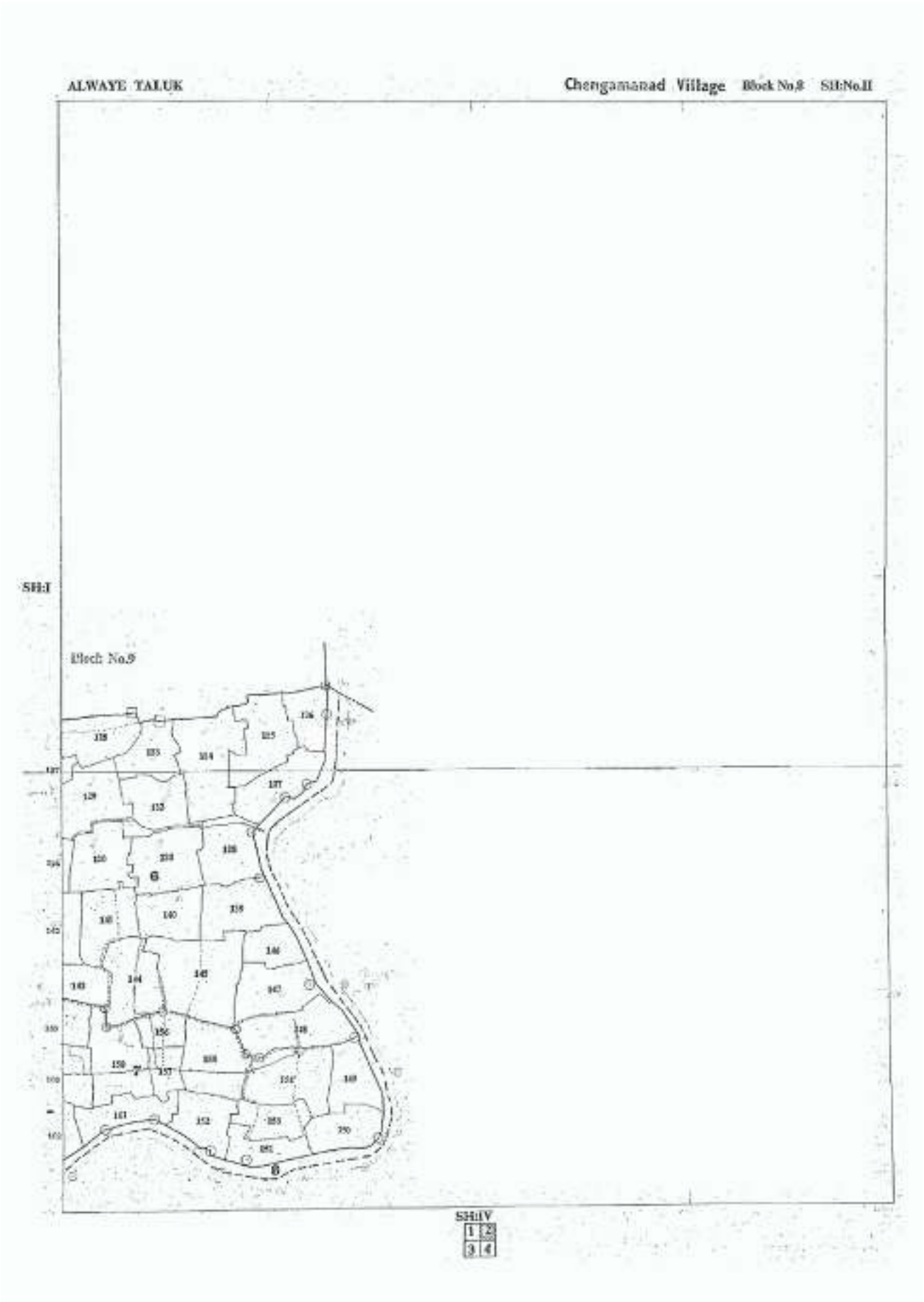
1.Periyar to Periyarthodu
2.Kallikuzhy-Muriyakkalthodu
3.Naduvilathattuthodu
4.Karukadamoopputhodu
5.Paravoorpuzha
6.Korakkarathodu
7.Paliyamthodu
8.V P Thuruthuthodu(Situated in ValiyaPazhampillithuruthu)

POLLUTED STRETCHES OF PERIYAR/TRIBUTARIES/DRAINS IDENTIFIED BY KERALA STATE POLUTION CONTROL BOARD - PRELIMINARY MONITORING RESULTS

Sampling Point	BOD(mg/ltr)	Coliform (Cfu/100ml)	Localbody
Drain at Manjaly Bridge	200	900	Puthenvelikkara Grama Panchayth
Drain at Pazhampillythuruthu bridge	360	2100	Puthenvelikkara Grama Panchayth
Drain near to Ryan school	160	200	Puthenvelikkara Grama Panchayth

DETAILS OF LAND (SY.NO.) ON THE BANKS OF THE PERIYAR IN CHENGAMANAD VILLAGE

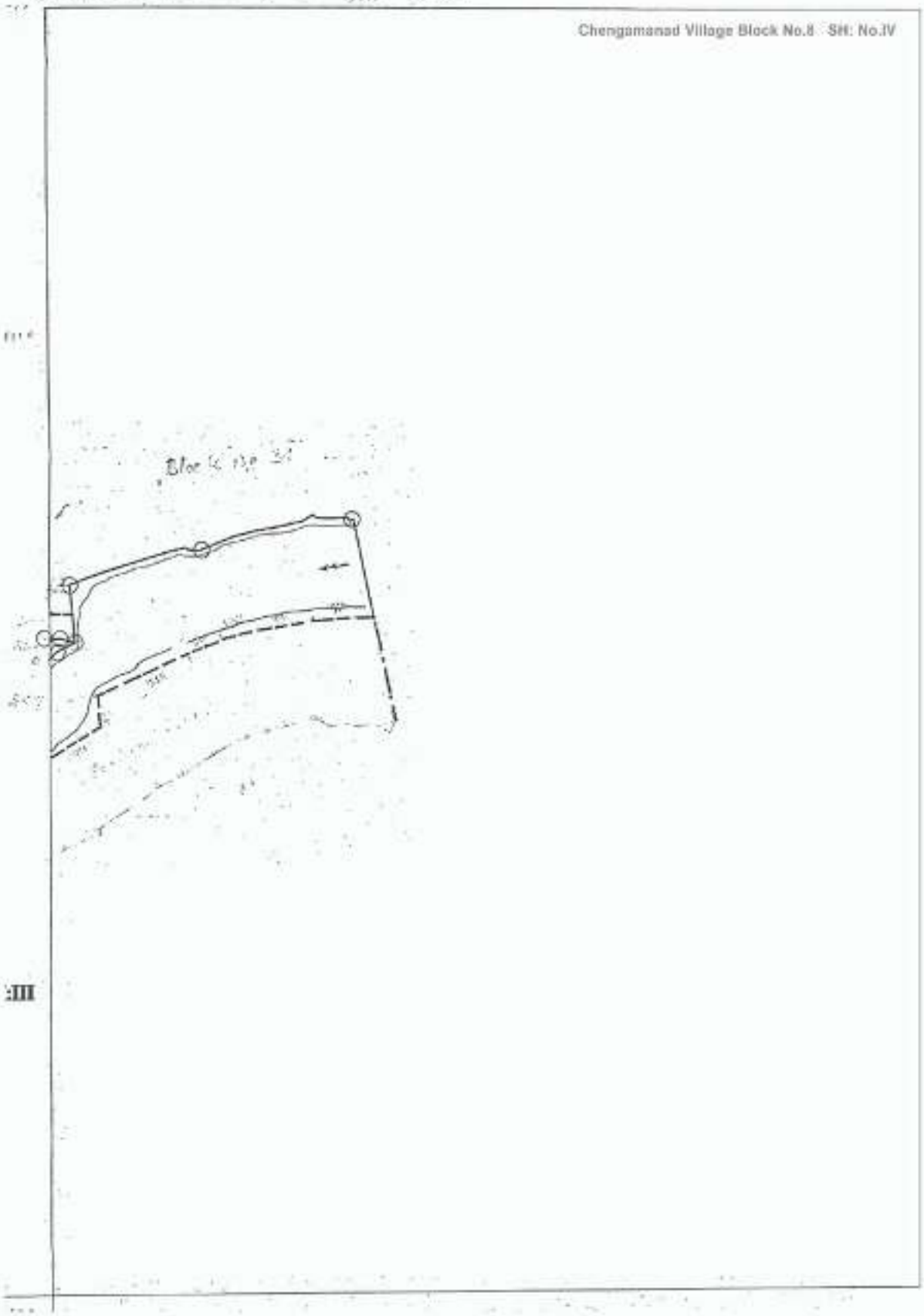

Block No.7
Block No.33
Chengannasseri Village Block No.8 SH No.11
Thrippalanda
Kadalundi River
Alanallur Municipality
Block No.33


ALWAYE TALUK
Chengamanad Village Block No.8 SH:No.II
SH:I
Block No.9
SH:IV
1 2
3 4

ALWAYE TALUK

SH:II

Chengamanad Village Block No.8 SH: No.IV



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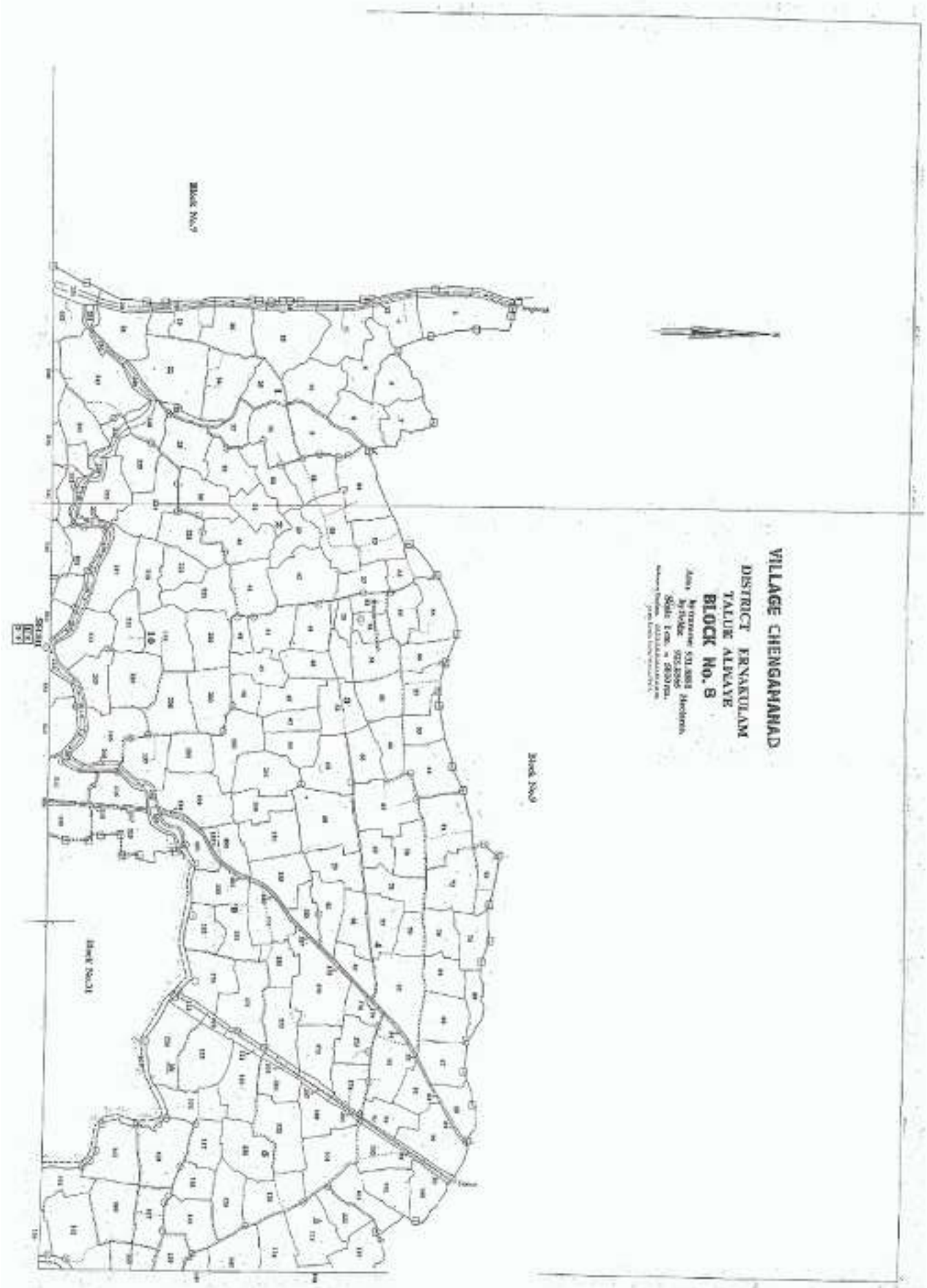
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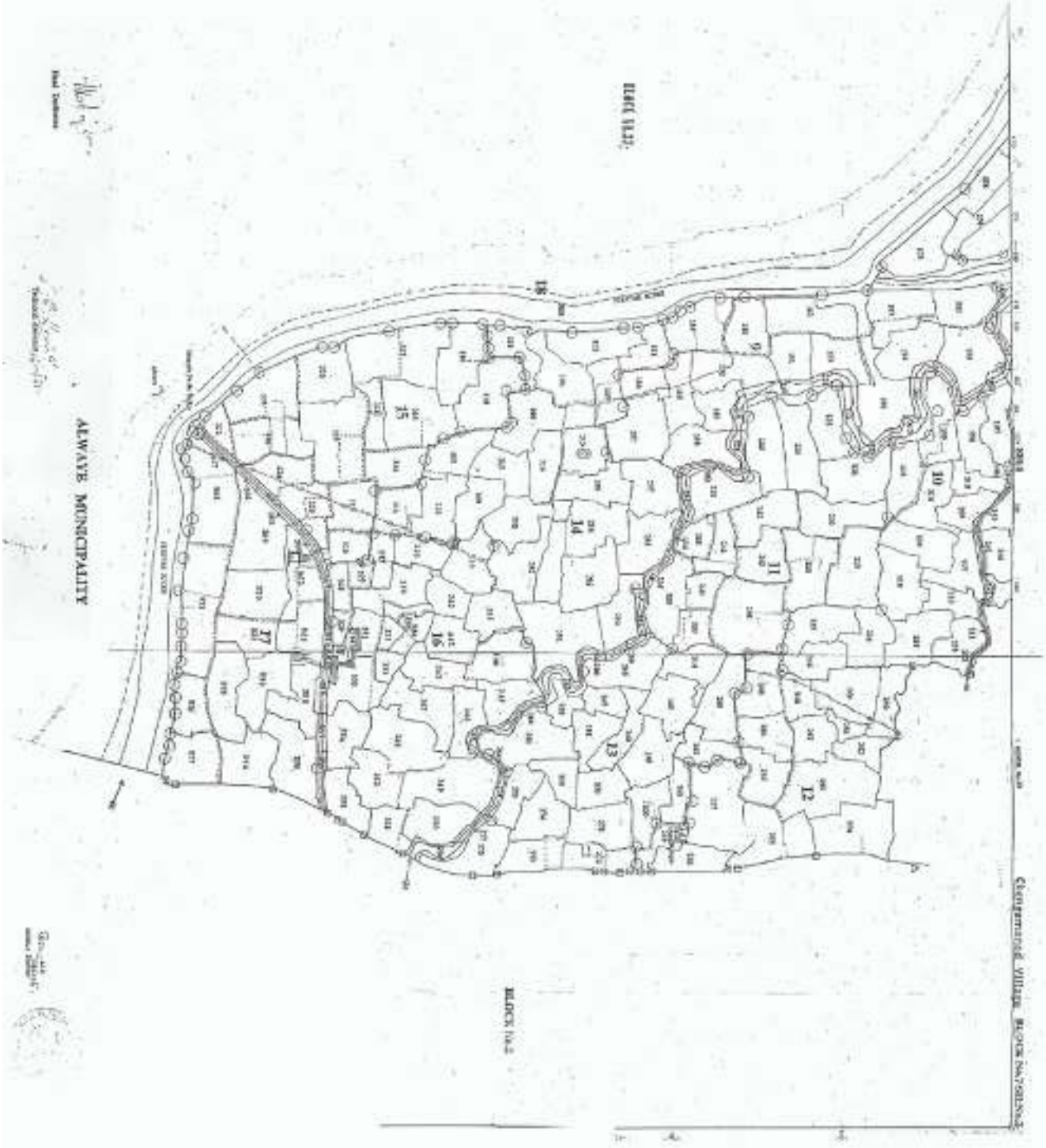
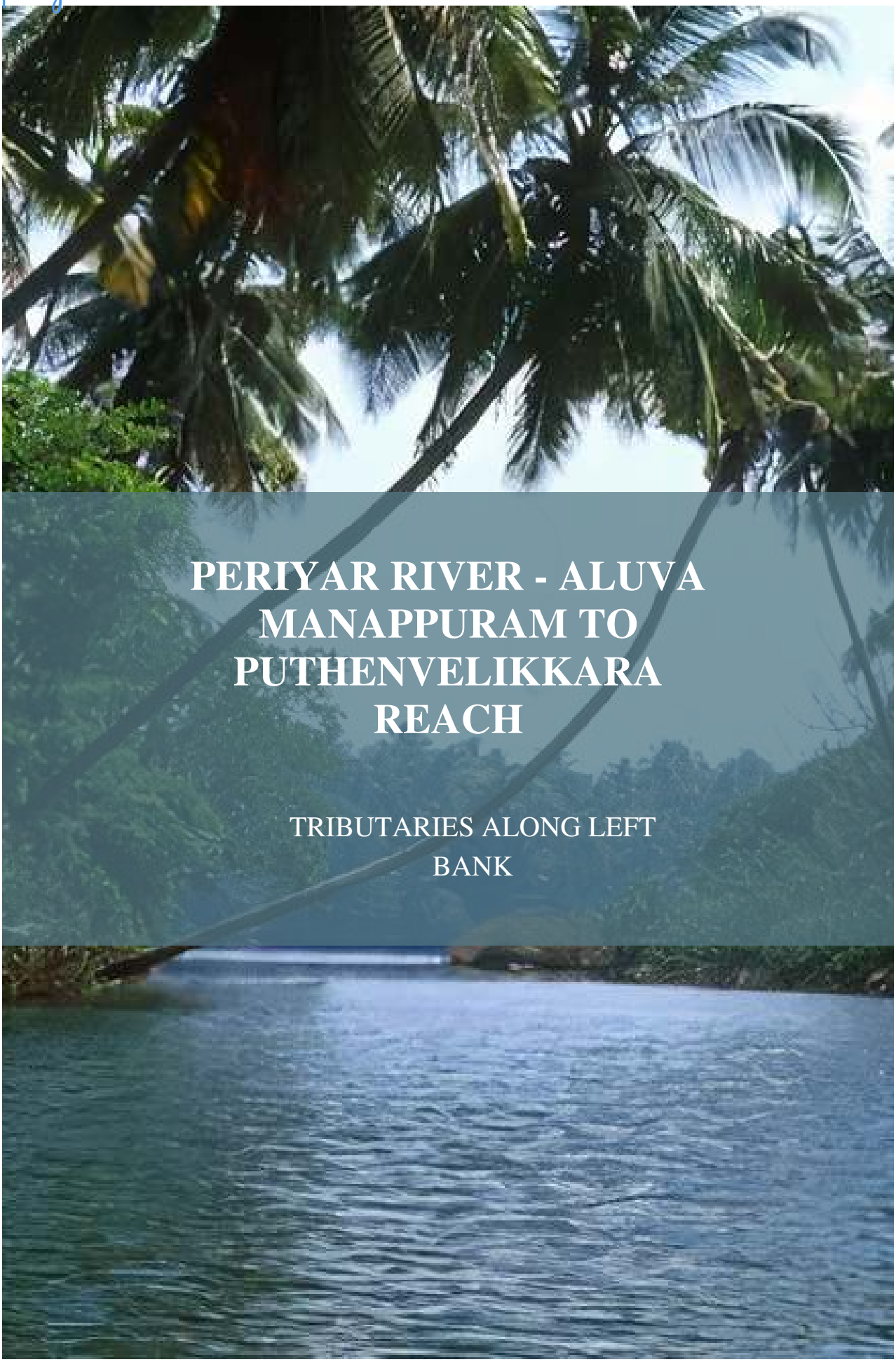
DISTRICT ERNAKULAM
TALUK ALWAYE
BLOCK No. 8
Block No.9
Block No.9
Block No.31


Chorgamma Village BLOCK No.
BLOCK No.
BLOCK NO.
AEWAYE MUNICIPALITY



PERIYAR RIVER - ALUVA MANAPPURAM TO PUTHENVELIKKARA REACH

TRIBUTARIES ALONG LEFT BANK

Tributary of Periyar
(Left Bank)
PERIYAR TO PERIYAR THODU

PERIYAR RIVER / PERIYAR TO PERIYAR THODU

Periyar to Periyarthodu– Introduction

The Periyar to Periyarthoduis an important thodu and as its name indicates has its starting and exit points at Periyar. Locally, the thodu is also known as Narnithodu. The thodu is approximately 8.2 km long and passes through Alangad and Karumallur Panchayats. The course of the thodu is in north-south direction with itssouthern end at Chirayamin Alangad Panchayat and northern end near S river resorts in Karumallur Panchayat. The thodu facilitates irrigation in vast paddy fields situated in Karumallur and Alangad Panchayats.

The thodu facilitates storm water drainage and also helps to replenish and stabilize the ground water table so that in the nearby areas ground water sources such as wells are devoid of any water shortage issues. For the purpose of convenience , the southern end of the thodu at Periyar near Chirayamis taken as Chainage 0km and the northern exit to Periyar near S River resorts in Karumallur is the ending chainage 8.2km. The northern end of this thodu joins Periyar at Ch. 10km along left bank of Mangalappuzha branch of Periyar .Karumallur No.2 Lift Irrigation Scheme is located near the northern end of the thodu at Ch. 7.44 km. *(Refer , Pg:1259)*

SALIENT FEATURES OF PERIYAR TO PERIYAR THODU

LENGTH	8.2 km
WIDTH	VARYINGFROM 6M TO 15M
AVERAGE DEPTH OF WATER	1M TO 2M
LOCAL BODYCONCERNED	KARUMALLOOR &ALANGAD PANCHAYATS

Present status

Due to lack of maintenance, most reaches of the thodu are found infested with water weeds and thick vegetation. This will obstruct drainage of flood water during rainy season and may cause flooding in adjacent areas. There is no side protection in most reaches of the thodu. This increases the chances of encroachments. Though no sort of industrial pollution was observed during site inspection , the water quality is not visually appealing as the thodu is stagnant in most reaches due to the presence of water hyacinth and other types of vegetation.

CROSSINGS ACROSS PERIYAR TO PERIYAR THODU

There are15nos of bridges/crossings across the thodu . They are listed below in the order from starting point of thodu at its southern end at Periyar near Chirayam .

Sl no	Chainage	ChaName of bridge/crossing
1	0.35 km	Culvert at Chirayam
2	0.645 km	Petta bridge
3	0.945 km	Culvert1 onbyelane of ManiyamparambilBhagavathi temple road
4	1.12 km	Culvert 2 on byelane of ManiyamparambilBhagavathi temple road
5	1.45 km	Bridge on Koonammavu- Panayikulam- Aluva road
6	1.98 km	Curved bridge on byelane east side of Plackattampilly Bridge
7	2.04 km	Plackattampilly Bridge
8	2.61 km	Crossing near Snake shrine
9	2.94Km	Pipe culvert at Colonypady- Keerampilly road, Alangad
10	3.47 km	Culvert on Asarypallam road
11	3.77 km	Crossing on byelane
12	4.14 km	Puthiya road culvert
13	5.86 km	Culvert at Angadikadavu
14	6.69 km	Culvert on Priyadarshini road
15	6.97 km	Kanjirakkattu bridge

OBSERVATIONS DURING SITE INSPECTION

During site inspection of the Periyar to Periyarthodu, the following observations were made at variouschainages along the full reach of the thodu.

At Ch 0.00m(Near Chirayam, Alangad Panchayat)

The starting point of the thodu at southern side is near Chirayam in AlangadPanchayat . The southern mouth of thodu at Periyar is about 1.15km downstream side of Methanam Bridge. The thodu is approximately 8m wide at this location. The water in this reach is observed to be clear .

At ch 0.35 km (Culvert at Chirayam)

At ch 0.35 km from starting point of thodu, there is a small culvert across the thodu near lane to Thondikulamroad .The thodu is silted and depth of thodu at this location is only approx. 0.8m . The sides of the thodu are not protected. Thick vegetation is observed along the banks of the thodu.

Chainage 1.45 km (Bridge on Koonammavu- Panayikulam – Aluva road)

The thodu is of average width 10m at this location. The thodu is in heavily silted condition. Thick vegetation is observed along the thodu. Cleaning of the thodu is essential to enhance the carrying capacity of the thodu.

Chainage 1.98 km (Curved bridge on east side of Plackattampilly bridge)

The Periyar to Periyar thodu connects with Plackattampilly thodu,a branch of Neericode puzha, at this location. The thodu is of average width 7m at this location. The thodu is full of water weeds and the water is in almost stagnant condition.

Chainage 2.04km(Plackattampilly bridge, Alangad)

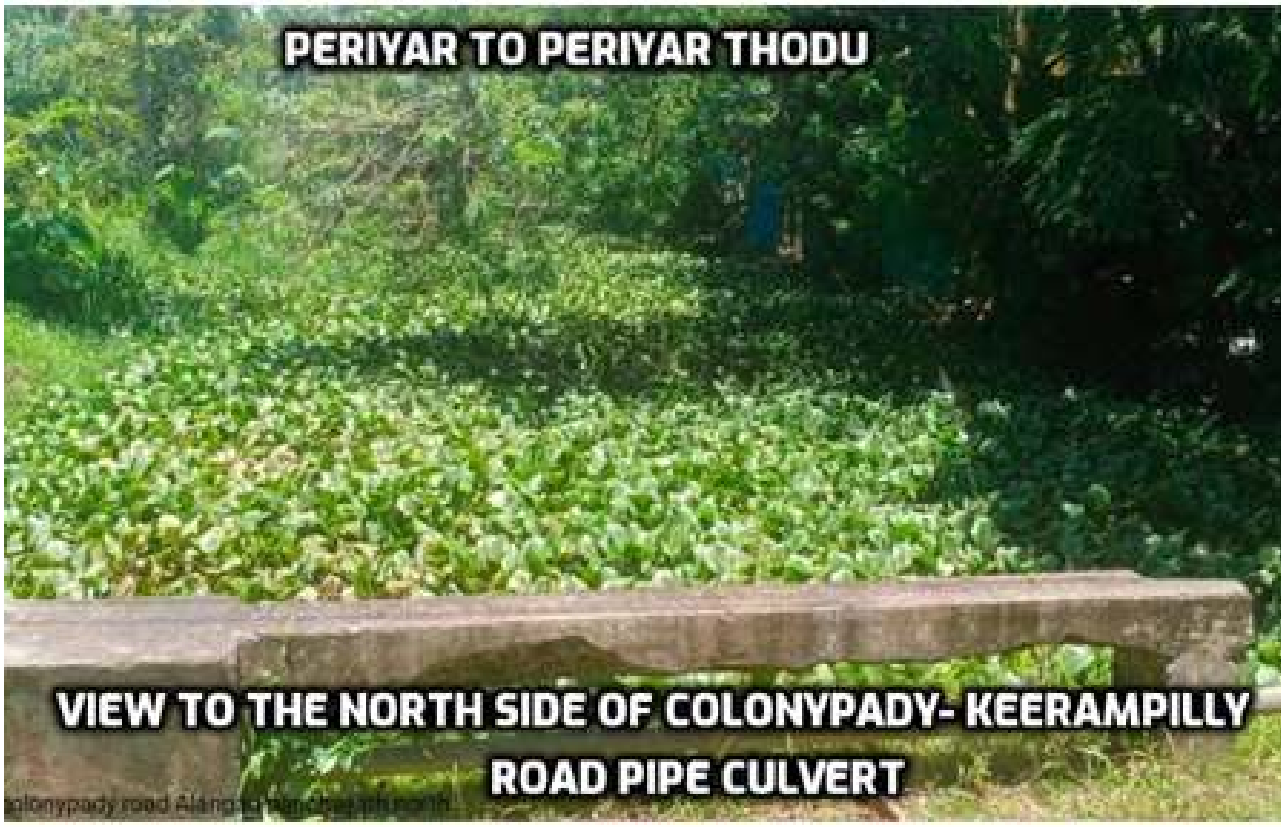
This is an important confluence point of NeericodePuzha,Plackattampillythodu and Periyar to Periyarthodu . A sub thodu of Plackattampillythodunamed as ChirayamMunnolthodualso starts from this location towards east.

Chainage 2.94 km (Pipe crossing across Colonypadi-Keerampilly road, Alangad Panchayat)

The Periyar to Periyarthodu is crossing Colonypadi – Keerampilly road in Alangad Panchayat through 5 pipes laid across the road.The pipes are of approx. 90 cm dia.The intermittent spaces between the pipes is packed with rubble masonry .The thodu is approximately 15m wide at this location and the vent of the pipes is not at all sufficient for smooth discharge of water . Water weeds and other debris are getting blocked on the north side of the culvert. During rainy season, this blocked culvert is causing flooding on the northern upstream areas. A proper culvert needs to be constructed at this location with sufficient vent width and height to ensure unobstructed flow of water through the thodu .

South side view of pipes laid across Colonypady- Keerampilly road, Alangad

North side view of pipe culvert across Colonypady- Keerampilly road, Alangad



Chainage 4.14km (NearPuthiya road bus stop, Alangad)

The Periyar to Periyarthodu crosses Kongorpilly- Alangad- Kadungalloor road near Puthiya road bus stop. The thodu is of average width 8m at this location. The thodu is fully covered with water hyacinth near this chainage. The flow is observed to be obstructed and the thodu is stagnant. The stagnant condition i

in this reach is mainly due to the obstructing culvert across Colonypady- Keerampilly road due to which flow towards south to Periyar is blocked . The problem is illustrated in the previous paragraph.

Waste in plastic bags is also found deposited into the thodu near the Puthiya road bridge . Due to lack of maintenance, thick vegetation including trees are found grown along the banks as well as inside the boundary of thodu. Regular maintenance is essential to relieve the pathetic condition of this waterbody .

Chainage 4.4 km (Near Palm village Villas, Alangad)

The Periyar to Periyarthoduflows along the south west side of Palm Village Villas, Alangad.At this location also, the thodu is observed to be fully obstructed with water hyacinth and thick vegetation. During heavy rain periods, storm water cannot drain off due to these obstructions and causes flooding in its premises. The thodu is also heavily silted up in this location . Cleaning and desilting is essential to restore unobstructed flow in thodu.

Chainage 5.86km (Culvert near Angadikadavu)

The thoduis infested with water weeds and is heavily silted at this location. The eastern bank of this thodu at this location comes under Alangad Grama Panchayat and the western bank forms part of Karumallur Panchayat. Filling along bank is observed on the northwest portion of this thodu which is suspected to be encroachment. This is to be verified by boundary demarcation of the thodu. The thodu is approximately 12m wide at this location. The constricted vent of the culvert is causing water weeds to get accumulated at the culvert .The accumulation of water weeds cause hindrance to smooth flow of water. Cleaning and desilting of the thodu is found inevitable.

Chainage 6.46 km (Near Priyadarshini road)

The condition of Periyar to Periyarthodu near Priyadarshini road in Karumallur Panchayat is very worse. Flow through the thodu is completely obstructed by overgrown vegetation and water weeds. Due to lack of maintenance, small trees are also

seen grown inside the thodu . The course of the thodu is observed to be along Priyadarshini road near Priyadarshini residential colony. Waste deposition is also observed in this location. Complete rejuvenation of the thodu is essential for restoring flow in the thodu.

Chainage 6.97 km Kanjirakkattu bridge

The Kanjirakattubridge across Periyar to Periyarthodu is situated near Karumallur Grama Panchayat Office.Thethodu has an average width of 15m at this location. Just as in the precedent reaches, the thodu at this location is also fully blocked by water hyacinth and thick vegetation. The thodu is stagnant and unhealthy situation prevails in the premises of this thodu. Local residents complained of breeding of mosquitoes due to lack of flow in the thodu. Cleaning and desilting of the thodu is essential.

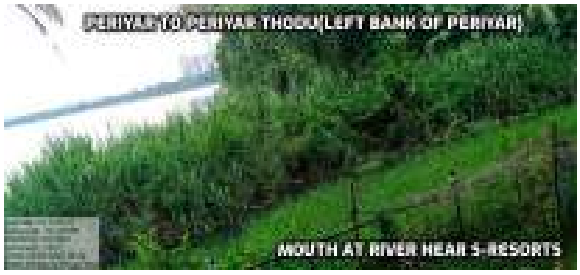
View towards south from Kanjirakattu bridge

View towards north from Kanjirakattu bridge

Pipes and Cables across Kanjirakkattu bridge

Chainage 7.44 km(NearKarumallur Lift Irrigation scheme)

Karumallur Lift Irrigation Scheme is located on the bank of this thodu. The LI scheme envisages irrigation of 111.82 hectare of agricultural land in Karumallur and AlangadPanchayats utilizing the water from this thodu. The thodu in this reach is also completely covered by water hyacinth and thick vegetation.



Chainage 8.2 km (Mouth at Periyar near S River resorts, Karumallur)

The mouth of Periyar to Periyarthodu at its northern end is near S River resorts ,Karumallur. The thodu is of approximately 6m average width at this location. There are obstructing water weeds and vegetation in the thodu at this location also.Silt deposition is also observed in this reach. Cleaning and desilting of thoduis to be done to ensure unobstructed flow in thodu. Towards exit , the width of thodu is found decreasing. Hence boundary demarcation of the thodu is to be carried out to assess the possibility of encroachments.

In general, almost full length of the thodu is obstructed by water hyacinth and thick vegetation. The thodu is also heavily silted up along its whole length due to lack of maintenance. So complete rejuvenation of the thodu is to be carried out to protect this important drainage. After rejuvenation, the thodu is expected to provide speedy drainage of storm water and can play an important role in preventing flooding in the premises of the thodu. The thodu also serves to cater irrigation and drinking water needs of the people living in its vicinity.

PERIYAR TO PERIYAR THODU- ACTION TO BE TAKEN

- Cleaning of water weeds, clearing obstructing vegetation and desilting to be carried out along the full length of the thodu
- The obstructing intermediate pipe culvert on Colonypady-Keerampilly road in Alangad Panchayat is to be reconstructed as a proper Culvert with sufficient ventway to ensure unobstructed flow through the thodu
- Boundary demarcation along the full length of the thodu and eviction of encroachments, if any.
- Regular periodic maintenance of the thodu to be carried out to maintain unobstructed flow in the thodu and to keep the thodu in a healthy condition.

Tributory of Periyar River (Left Bank) - KALLIKUZHY THODU

SALIENT FEATURES

LOCAL BODY	KARUMALLUR GRAMA PANCHAYATH
LENGTH OF THODU	1.40 Km
WIDTH	VARING FROM 6M,5M, 4.5M,3M
AVERAGE DEPTH OF WATER	1M TO 1.5M

The visual observations of Kallikuzhythodu are explained below.

Kallikuzhythodu near Muriyackalpadasekharam

At Ch0.00m

The tributary named as Kallikuzhy thodu starts from Muriyackal padasekharam in Karumallur Panchayat . The thodu is approximately 1.4 km long and discharges into Periyarat Ch.12km of Periyar on its left bank in Karumallur Panchayat. The Kallikuzhy thoduhas an average width of 5 m.The width of the thodu at the mouth portion is approximately 6m.Thethodu has an average depth of 1.5m.The thodu is silted up along its course especially in the initial reach near Muriyackal padasekharam.

From Ch.0m to 1400 m

There are about 2 Cross Drainage Works (Culverts) constructed across the thodu.. Considerable silt is deposited along its course . The sides of the thoduare partially protected.

The photographs of the thodualong various locations along its course are shown below :-

The following works need to be carried out to clear the obstructions in the Kallikuzhythodu torestore the thodu to its original condition.

- Clearinglight jungles on both the sides
- Desilting and removal of debris

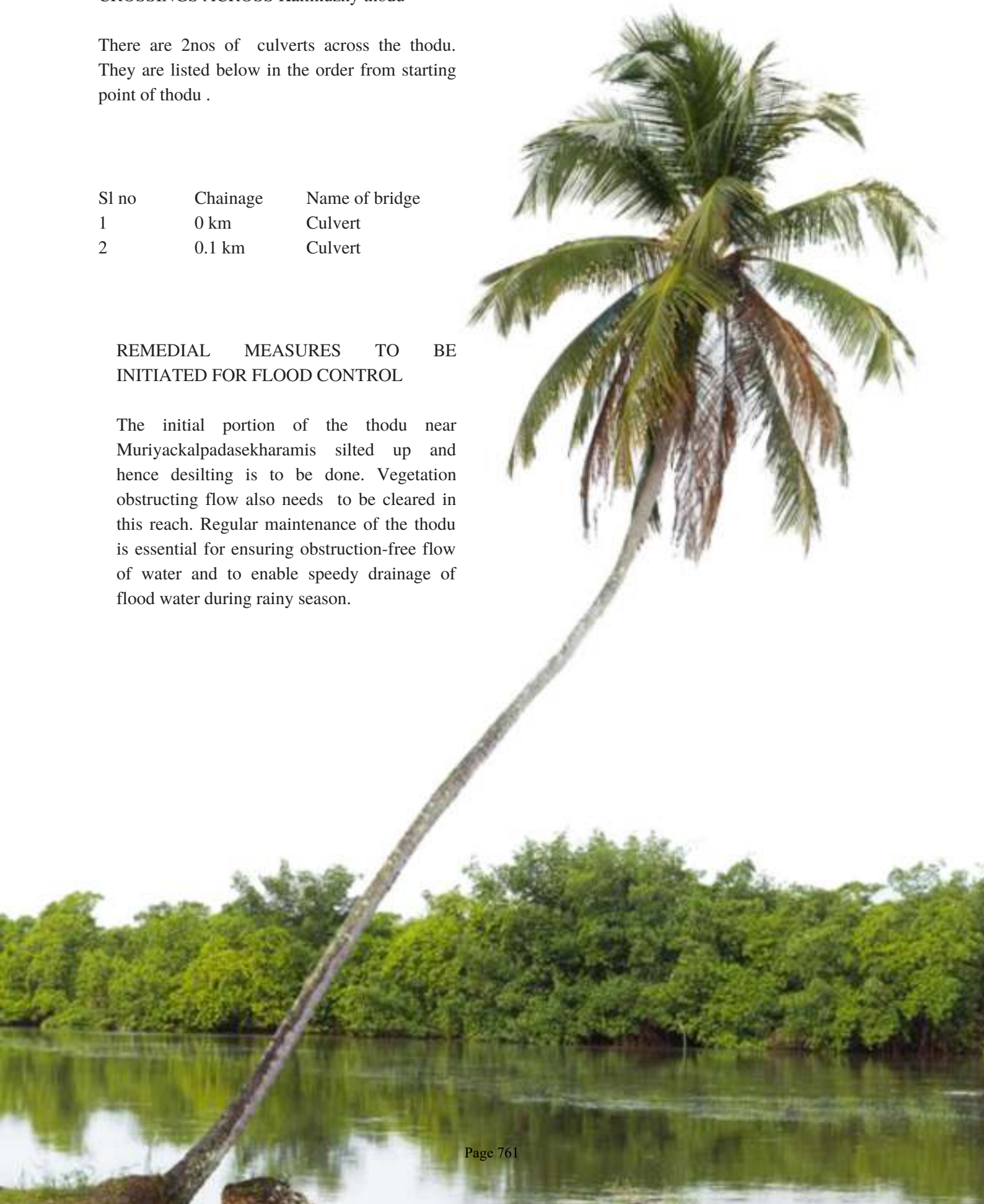
CROSSINGS ACROSS Kallikuzhy thodu

There are 2nos of culverts across the thodu. They are listed below in the order from starting point of thodu .

Sl no	Chainage	Name of bridge
1	0 km	Culvert
2	0.1 km	Culvert

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

The initial portion of the thodu near Muriyackalpadasekharamis silted up and hence desilting is to be done. Vegetation obstructing flow also needs to be cleared in this reach. Regular maintenance of the thodu is essential for ensuring obstruction-free flow of water and to enable speedy drainage of flood water during rainy season.



Tributory of Periyar River (Left Bank) - NADUVILATHATTU THODU

SALIENT FEATURES

LOCAL BODY	KARUMALLUR GRAMA PANCHAYATH
LENGTH OF THODU	1.90 Km
WIDTH	VARING FROM 1M TO 5M
AVERAGE DEPTH OF WATER	1M

The visual observations of Naduvilathattu Thodu are explained below.

Introduction

The tributary named as Naduvilathattu thodu starts from Paravurpuzha (Anchamparuthypuzha) and joins to Periyar River at left bank of Periyar at Ch. 13.70 km . The thodu is approximately 1.9 km long and has an average width of 5 m..Due to lack of maintenance, thethoduis heavily silted and obstructed by overgrown vegetation in most reaches. Trees are seen grown within the boundary of the thodu at many locations. The thodu boundary is not visible in most of the locations and at many locations there is drastic change of width and hence encroachment is suspected. The demarcation of thodu boundary is needed to assess the actual width of thodu by comparing it with original land records. The photographs clearly show the pathetic condition of the thodu at various locations along its course.

Latitude: 10.160817
Longitude: 76.2548
Elevation: 4.81m
Accuracy: 4.6m
Time: 24-08-2021 14:47
Note: Naduvilathattu thodu joining to Anchamparuthy puzha
Naduvilathattu thodu joining to
Anchamparuthy puzha

Latitude: 10.160427
Longitude: 76.256106
Elevation: 1.82m
Accuracy: 4.6m
Time: 24-08-2021 14:42
Note: Naduvilathattu thodu towards east
Naduvilathattu thodu towards east
mattumal road

Latitude: 10.158185
Longitude: 76.258477
Elevation: 12.83m
Accuracy: 4.6m
Time: 24-08-2021 13:47
Naduvilathattu -Anchaamparuthy thodu
west side near Aikya Kerala road
Left bank of Periyar river

Present status of thodu (From Ch0m to 1900 m)

The initial portion of the thodustarting from ParavurpuzhauptoNaduvilathattu-Kambivelikkakam road has an average width of 5m. Beyond Naduvilathattu-Kambivelikkakam road the width of the thodu is seen reducing drastically .The portion of the thodu for a length of approximately 480m near its exit at Periyaris almost in fully filled up condition. The width of thodu is shrunk marginally to about 1m nearits exit at Periyar. Considerable vegetation is seen to have grown in almost full length of thodu obstructing the natural flow of water. There are about 4Cross Drainage Works (Culverts) constructed across the thodu. The vertical and horizontal clearances of all culverts are very less and obstruct the flood flow of water. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. Considerable silt is also deposited in the canal and flow of water is almost nil in this reach. The depth of water is about 0.8m and silt deposited is about 1m depth. The sides of the thoduare partially protected.

The mouth portion of Naduvilathara thodu at Periyar is observed to be obstructedp. The last 480m of Naduvilatharathodu before it exits into Periyar is in filled up condition and fully covered with vegetation and henceproper water drainage is not possible. This is said to be the major cause in causing flooding in Naduvilathara area in Karumallur Panchayat. Following measures are to be taken to clear the obstructions in theNaduvilathattuthodu and bring back the thodu to its original obstruction free condition.

- Clearinglight, thick and throny jungles on both the sides of thodu
- Desilting and removal of debris
- Eviction of encroachments.

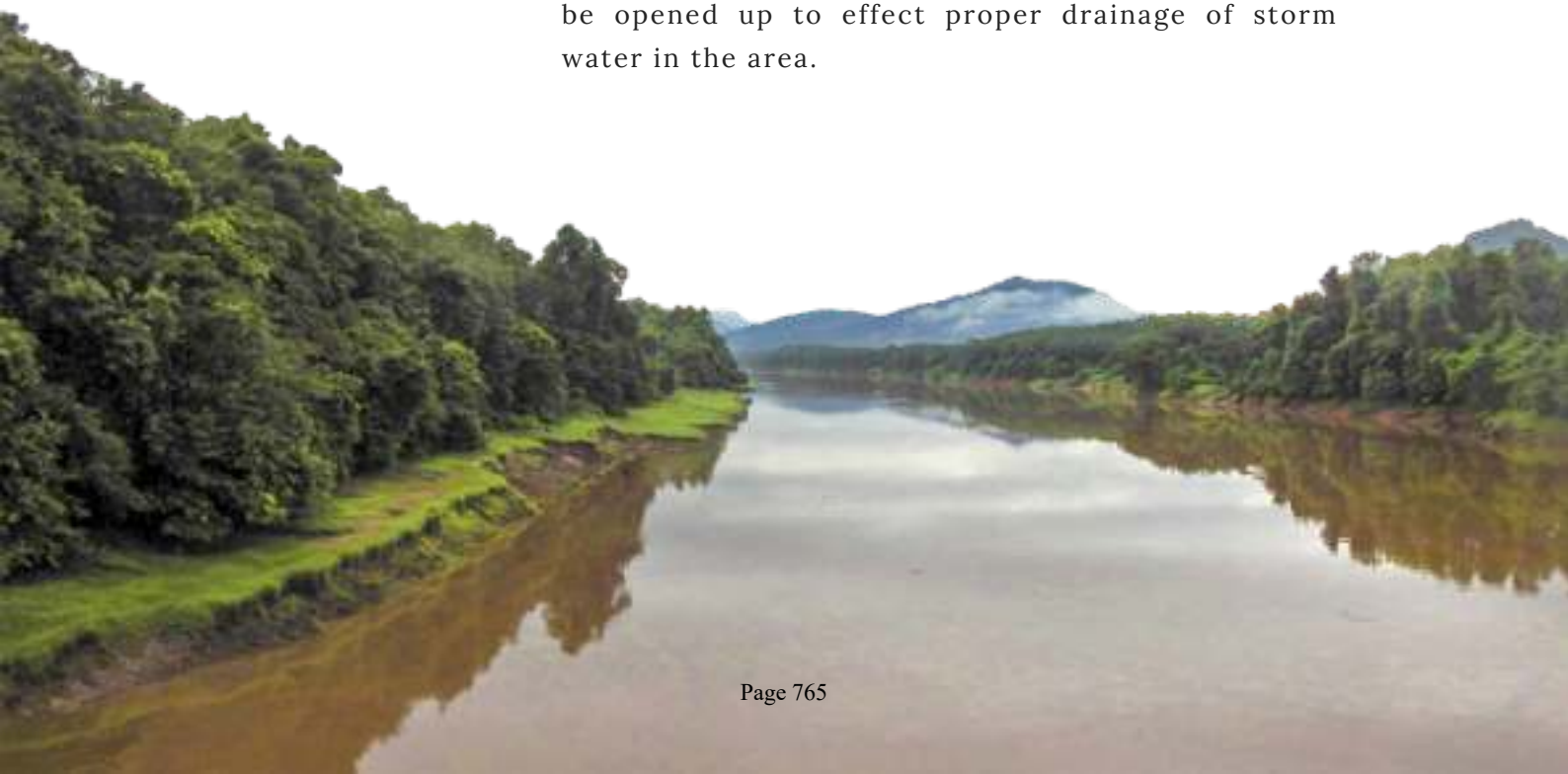
CROSSINGS ACROSS Naduvilathattu Thodu

There are 4nos of culverts across the thodu . They are listed below in the order from starting point of thodufrom Paravurpuzha.

Sl no	Chainage	Name of bridge/Culvert
1	0.15km	Culvert at Mattumal road
2	0.55km	Culvert at Aikya Kerala road
3	0.82km	Culvertnear Mattupuram
4	1.17 km	PipeCulvert on Naduvilathattu Kambivelikkakam road

Naduvilathattuthodu-Action to be taken

- Complete rejuvenation of the thodu is essential for protection of this precious drainage.
- Clearing of thick vegetation including trees inside thodu and desilting is to be done to ensure free flow of water in thodu.
- Width of thodu is seen reducing at various locations and encroachment is suspected. Boundary demarcation of the thodu is to be carried out and the thodu is to be restored to its original width.
- The last 480m obstructed reach of Naduvilatharathodunear its exit to Periyarneeds to be opened up to effect proper drainage of storm water in the area.



Sub Tributory of Periyar River (Left Bank) - ANACHAL THODU

PERIYAR RIVER / NADUVILATHATTU THODU / ANACHAL THODU

SALIENT FEATURES

LOCAL BODY	KOTTUVALLY PANCHAYATH & KARUMALLOOR PANCHAYATH
LENGTH OF THODU	4.92 km
WIDTH	VARING FROM 12m to 2m
AVERAGE DEPTH OF THODU	5M

The visual observations of Anachal thodu tributary are explained below.

At Ch 0.00m

The Tributary named as Anachal thodu starts from Kaipetty puzha near Kottuvally Panchayat and flows in north -south direction. It joins Naduvilathara thodu in Karumallur Panchayat and through Naduvilathara thodu exits into Periyar. The first 4.07 km is under Kottuvally Panchayat and the rest comes under Karumallur Panchayat . The initial portion of the thodu is wider and has sufficient carriage capacity. But many portions of the thodu are infested with water hyacinth due to lack of maintenance.

At Ch 0.00m to 4.92km

To the north of Athani Paravoor road, the width of the thodu is seen reduced for formation of road along its side. This portion comes under ward 20 of Karumallur Panchayat. The thodu at this portion is having average width of 5m and is approx 5m deep. However, the due to overgrown vegetation and deposition of all kinds of wastes into the thodu, the thodu is in a very pathetic state and flow is obstructed. Many private slab crossings are seen constructed over this thodu in this area. At Ch. 4.45km of thodu, the thodu is observed to be filled up for formation of road.

ANACHAL THODU
JOINING TO KAIPETTY PUZHA
NEAR MUNDUPALAM ROAD
KOTTUVALLY PANCHAYATH WARD 8

ANACHAL THODU
INTERMEDIATE VIEW TO SOUTH
KOTTUVALLY PANCHAYATH

ANACHAL THODU
NEAR MUNDUPALAM ROAD
KOTTUVALLY PANCHAYATH

ANACHAL THODU
NEAR ANACHAL VAZHIKULANGARA ROAD
OBSTRUCTING WATER WEEDS

ANACHAL THODU
INTERMEDIATE VIEW TO NORTH
KOTTUVALLY PANCHAYATH

ANACHAL THODU
NEAR CULVERT ON ANACHAL VAZHIKULANGARA ROAD
OBSTRUCTING WATER WEEDS

ANACHAL THODU
INTERMEDIATE VIEW TO SOUTH
KOTTUVALLY PANCHAYATH

ANACHAL THODU
NEAR ANACHAL VAZHIKULANGARA ROAD
OBSTRUCTING WATER WEEDS

ANACHAL THODU
INTERMEDIATE VIEW TO NORTH
KOTTUVALLY PANCHAYATH

ANACHAL THODU
NEAR ANACHAL VAZHIKULANGARA ROAD
OBSTRUCTING WATER WEEDS

The open portion of thodu restarts after a missing link of approx 60m . Thereafter the width of the thodu is seen reduced to 2m . Beyond Aikya Kerala road culvert in Karumallur Panchayat, the thodu is seen full of overgrown vegetation and flow of water is almost completely obstructed. The thodu joins with Naduvilathara thodu in Karumallur Panchayat , but the mouth portion of Naduvilathara thodu at Periyar is obstructed. The last 480m of Naduvilathara thodu before it exits into Periyar is in filled up condition and fully covered with vegetation and hence water drainage is not possible. This is said to be the major cause in causing flooding in Naduvilathara area in Karumallur Panchayat.

The sides of the thodu partially protected .The following works to be carried out to clear the obstructions in the Anachal thodu and bring back the thodu to its original shape.

Complete rejuvenation of the thodu is essential for protection of this precious drainage.
Clearing of thick vegetation including trees inside thodu and desilting is to be done to ensure free flow of water in thodu.
Waste deposition observed inside thodu (especially in Karumallur Panchayat area, ward 20) is to be prevented .
The missing link of thodu from ch 4.45km to ch 4.51km in ward 20 of Karumallur Panchayat is to be restored.
Width of thodu is seen reducing at various locations and encroachment is suspected. Boundary demarcation of the thodu is to be carried out and the thodu is to be restored to its original width.
As the water through this thodu can reach exit at Periyar only through Naduvilathara thodu, the last 480m obstructed reach of Naduvilathara thodu also needs to be opened up to effect proper drainage of storm water in the area.

1	Ch 2.10 km	Bridge on Vazhikulangara
2	Ch 2.52 km	Bridge on Aluva- Paravoor road
3	Ch 3.14 km	Culvert on Athani-Paravoor road
4	Ch. 4.17 km	Slab crossing over thodu to house
5	Ch 4.19 km	Slab crossing over thodu to house
6	Ch 4.20 km	Slab crossing over thodu to house
7	Ch 4.26 km	Slab crossing over thodu to house
8	Ch 4.30 km	Slab crossing over thodu to house
9	Ch 4.37 km	Slab crossing over thodu to mosque
10	Ch 4.55 km	Slab crossing over thodu to house
11	Ch 4.6 km	Slab crossing over thodu to house with pillars inside thodu
12	Ch 4.63 km	Pipe culvert
13	Ch 4.77 km	Culvert on Aikya Kerala road

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing hyacinth weeds, removing thickly grown grass and desilting the thodu are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow. The thodu is stagnant in many reaches causing unhealthy situation .

Tributory of Periyar River (Left Bank) - KARUKADAMOOPPU THODU

SALIENT FEATURES

LOCAL BODY	KARUMALLUR GRAMA PANCHAYATH
LENGTH OF THODU	1.40 Km
WIDTH	VARING FROM 1M,5M, 4.5M
AVERAGE DEPTH OF THODU	1.5M

Kallikuzhythodu near Muriyackalpadasekharam

Karukadamooputhodu- Introduction

The Karukadamoopputhodu is an importantdrainage connecting Paravurpuzha and Periyar and plays an important role in draining off flood water from flood affected Mattupuram area in Karumallur Panchayat. Karukadamoopputhodu starts from Paravurpuzha and discharges into Periyarnear Ch. 14 km along its left bank .The thodu is approximately 1.4km long and is of average width 5 m.The width of the thodu at its exit at Periyaris reduced to 4m.Thethodu has an average depth of about 1.5m.

Present Status of Karukadamoopputhodu (From Ch.0 .00 m to 1400 m)

It is seen that in many reaches of the thodu , vegetation and thick water hyacinth have been grown profusely and their roots firmly grown into the bed of the thodu. Due to this, the water is stagnant in many reaches and this leads to breeding of mosquitoes and unhealthy situation in the premises of the thodu. Being silted up, the capacity of the thodualso has reduced significantly.

There are about 5Cross Drainage Works (Culverts) constructed across the thodu. The vertical and horizontal clearances of all culverts are very less and obstruct the flood flow of water. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. Considerable silt is also deposited in the canal and obstructs the free flow of water . The depth of water is about 0.8m . The sides of the thoduare partially protected.

The photographs showing the status of thoduat various locations along its course are included below:-

The sides of the thoduarepartially protected .Due to lack of regular maintenance,the thodu is silted up and is in a pathetic condition. The following measures are to be taken to clear the obstructions in the Karukadamoopputhoduand restore the thodu to its original unobstructed condition.

- Clearing light,thick and throny jungles on both the sides
- Removing water hyacinth and weeds
- Desilting and removal of debris
- Eviction of encroachments.

Sl no	Chainage	Name of bridge/Culvert
1	0.350km	Culvert at Mattummal Road
2	0.680km	Culvert at Aikya Kerala road
3	1.00km	Culvert 1 at Mattupuram
4	1.2km	Culvert 2 at Mattupuram
5	1.35km	Culvert near Anganawadi

Karukadamooputhodu- Action to be taken

- The thodu needs to be cleaned and desilted to ensure freeflow of water through the thodu.
- The boundaries of the thodushould be demarcated and encroachments ,if any, should be evicted.

CROSSINGS ACROSS Karukadamoopputhodu

There are 5 nos of culverts across the thodu . They are listed below in the order from starting point near Paravurpuzha to exit at Periyar.

Tributory of Periyar River (Left Bank) - PARAVUR PUZHA

SALIENT FEATURES

LOCAL BODY	CHENDAMANGALAM GRAMAPANCHAYATH
LENGTH OF THODU	8 Km
WIDTH	VARING FROM 20m to 45m
AVERAGE DEPTH OF THODU	5M

The visual observations of Paravur tributary are explained below.

At Ch 0.00m

The tributary named as Paravurthodu (Anchamparuthi thodu) starts from Kollam Kodungalloor National water way near Pulikkathara Bhagavathy temple and discharges at Ch. 15.75 km near Chendamangalam Panchayath on left bank of Periyarriver. Width of starting point has 140m and the Paravurpuzha is having an average width of 30m.Thisthodu has a depth of about 5m.

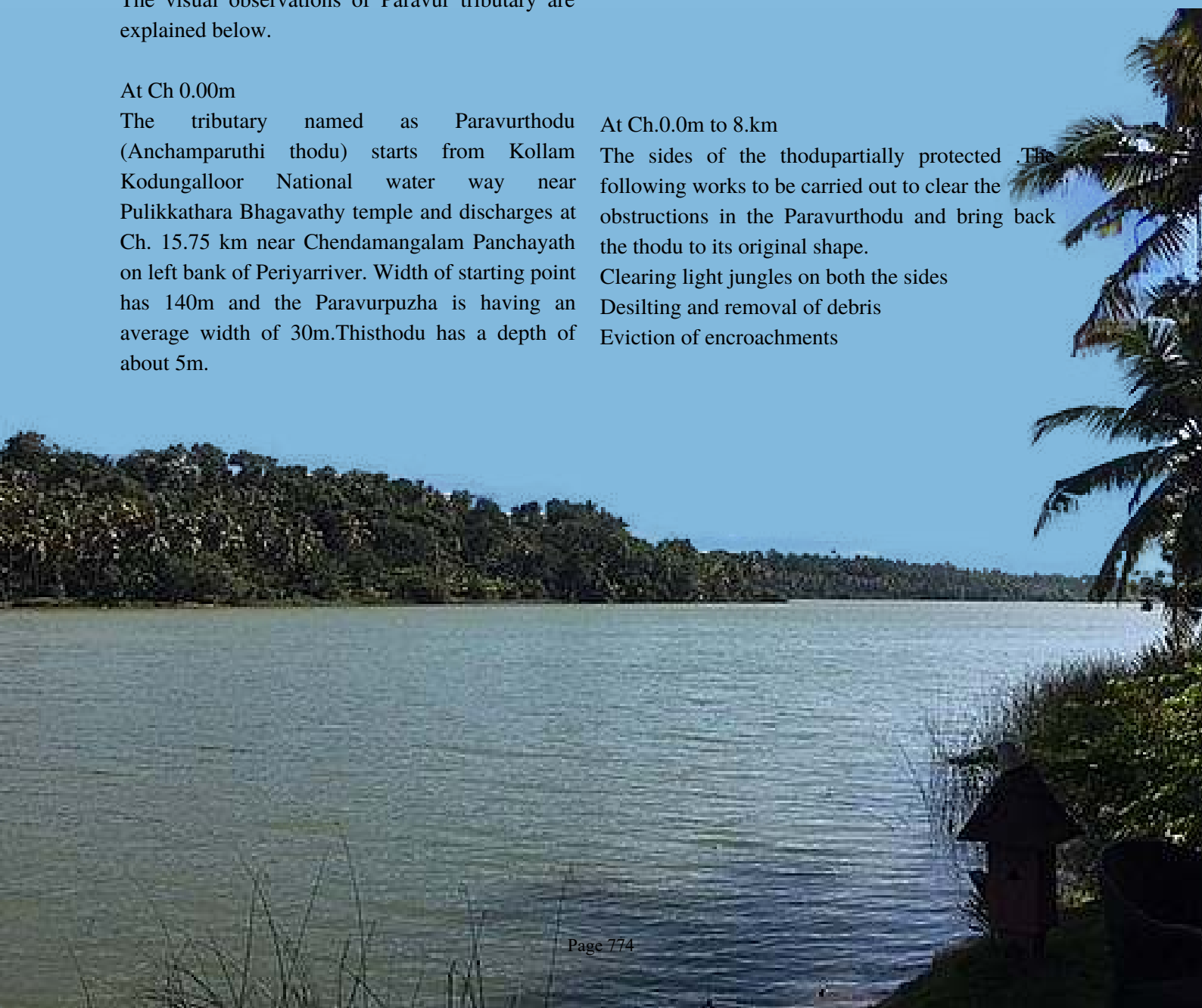
At Ch.0.0m to 8.km

The sides of the thodupartially protected .The following works to be carried out to clear the obstructions in the Paravurthodu and bring back the thodu to its original shape.

Clearing light jungles on both the sides

Desilting and removal of debris

Eviction of encroachments



The photographs of the Paravurpuzha shown below:-

CROSSINGS ACROSS PARAVUR PUZHA (Anchamparuthy)

There are 5 nosof br across the thodu . They are listed below in the order from starting point of Paravurpuzha.

Sl.no	Chainage	Name of crossing
1	1.98km	Paravur bridge
2	2.78km	Kootukadu bridge
3	3.52km	Thattukadavu bridge
4	4.20km	Chendamangalam bridge
5	5.85 km	Munduthurithi bridge

Sub Tributory of Paravur Puzha (Left Bank of Periyar) - PUTHEN THODU

SALIENT FEATURES

LOCAL BODY	EZHIKKARA PANCHAYATH
LENGTH OF THODU	6.9 km
WIDTH	VARING FROM 25M to12m
AVERAGE DEPTH OF THODU	3M

The visual observations of Puthenthodu tributary are explained below.

At Ch 0.00m
The Tributary named as Puthenthodu starts from National waterway near Ezhikkara Panchayath and flows in north -south direction It joins Paravurpuzha at 1.05 km inEzhikkara Panchayat and through Paravurpuzha exits into Periyar.

The sides of the thodu partially protected .The following works to be carried out to clear the obstructions in the puthenthodu and bring back the thodu to its original shape. Clearing light, thick and throny jungles on both the sides

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR PULINGANAD BRIDGE
Latitude: 10.098253
Longitude: 76.228872
Elevation: 106.93m
Accuracy: 1.3m
Time: 09-24-2021 17:23

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR EDATHURUTH,KADAKKARA BRIDGE
Latitude: 10.103707
Longitude: 75.227385
Elevation: 109.82m
Accuracy: 1.2m
Time: 09-24-2021 17:14

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR EDATHURUTH,KADAKKARA BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR PULINGANAD BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR EDATHURUTH KADAKKARA BRIDGE THICK VEGETATION

PUTHEN THODU(PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR LANKA BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR LANKA BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)

PUTHENTHODU(PARAVOOR PUZHA LINK)

PUTHENTHODU(PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)
NEAR CHAKKATHARA BRIDGE

PUTHEN THODU(PARAVOOR PUZHA LINK)
NEAR CHAKKATHARA BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)
NEAR CHAKKATHARA BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)

PUTHENTHODU(PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)
NEAR PERUMPADANNA BRIDGE

PUTHEN THODU (PARAVOOR PUZHA LINK)

PUTHEN THODU(PARAVOOR PUZHA LINK)
NEAR PERUMPADANNA BRIDGE

PUTHEN THODU (PARAVOOR PUZHA LINK)
JOINING AT ETTIYODAM BRIDGE

PUTHENTHODU(PARAVOOR PUZHA LINK)
NEAR PERUMPADANNA BRIDGE

PUTHEN THODU
(PARAVOOR PUZHA LINK)

Sl.no	Chainage	Name of bridge
1	0.850 Km	Pulinganad Bridge at Ezhikkara
2	1.50 Km	Kadakkara Bridge
3	2.85 Km	LankaBridge
4	5.35 km	Thalakkettu culvert
5	5.70 Km	Chakkathara Bridge
6	6.45 Km	Perumbadanna bridge

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing hyacinth weeds, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.

Sub Tributory of Paravur Puzha (Left Bank of Periyar) - KUZHUVELI THODU

SALIENT FEATURES

LOCAL BODY	EZHIKKARA PANCHAYATH
LENGTH OF THODU	380m
WIDTH	VARING FROM 5m to 10m
AVERAGE DEPTH OF THODU	2M

The visual observations of Kuzhuveli thodu are explained below.

At Ch 0.00m
The thodu named as Kuzhuveli thodu starts near Ezhikkara Panchayat and flows in east – west direction. It joins Puthen thodu in Ezhikkara Panchayat and through Paravur puzha exits into Periyar. The thodu is wider and has sufficient carriage capacity. But many portions of the thodu are infested with water hyacinth due to lack of maintenance.

From Ch. 0m to Ch 380 m
Considerable silt is deposited in the thodu. Being silted up the capacity of the thodu reduced. The sides of the thodu protected

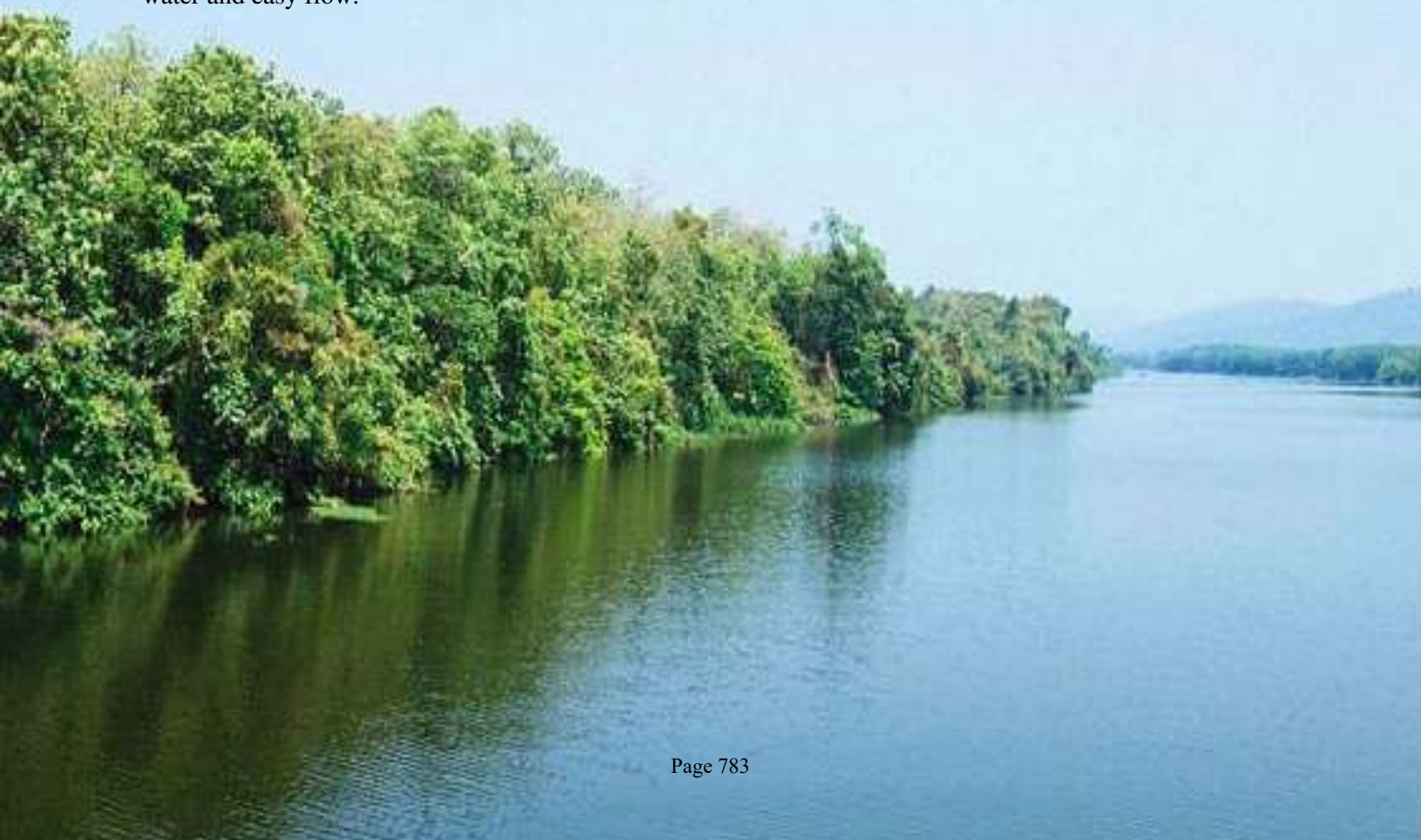
The following works to be carried out to clear the obstructions in the thodu and bring back the thodu to its original shape.

Removal of water hyacinth
Desilting and removal of debris

The photographs are shown below.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for removing hyacinth weeds, and desilting the thodu are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.



Sub Tributory of Paravur Puzha (Left Bank of Periyar)KAYIKKARA THODU

SALIENT FEATURES

LOCAL BODY	EZHIKKARA PANCHAYATH
LENGTH OF THODU	0.150 km
WIDTH	VARING FROM 2m,5m,6m
AVERAGE DEPTH OF THODU	1M

The visual observations of Kuzhuveli thodu are explained below.

At Ch 0.00m
The Tributary named as Kayikkarathodu starts near Ezhikkara Panchayath and flows in east -west direction It joins Puthenthodu at 4.00 km in Ezhikkara Panchayat and through Paravurpuzha exits into Periyar.

The Kayikkarathodu at this location is only 2m wide.The thodu is in a diminishing stage. The flow through the thodu is almost completely obstructed by vegetation and silt deposition. The carrying capacity of the thodu is also very less and during rainy season the adjacent areas will be at the risk of flooding.. Clearing of vegetation and desilting of thodu along its entire stretch is required.Desilting and boundary demarcation of thodu needs to be done at this location.

The sides of the thodupartially protected .The following works to be carried out to clear the obstructions in the Kayikkarathodu and bring back the thodu to its original shape.
Clearing light, thick and throny jungles on both the sides

OBSERVATIONS DURING SITE INSPECTION OF KAYIKKARA THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0 km (NearChira adjacent to Sacred Heart Church, VP Thuruth)

The Kayikkara thodu starts near Ezhikkara Panchayath and flows in east - west direction It joins Puthenthodu at 4.00 km in Ezhikkara Panchayat and through Paravurpuzha exits into Periyar.
The thodu flows towards west and has an average width of 6m.The thodu at the starting is with vegetation and silted. The thodu needs to be cleaned and desilted.

Chainage 0.100km (culvert across thodu near road)

There is a culvert at this location. Significant reduction in width of thodu is observed to the east side of this culvert. The water is clear. However, due to siltation the depth of thodu is very less. . Siltation has reduced the carrying capacity of the thodu. This will result in slow drainage of storm water during rainy season and may cause flooding in adjacent areas. waste deposition was observed at the starting portion ofthodu during site inspection.

Chainage 0.15 km (mouth of thodu at Puthenthodu)
The Kayikkarathodu discharges into Puthenthodu at . The water in the thodu is observed to be clear at this location.

CROSSINGS ACROSS KAYIKKARA THODU

There are 1 noof culvert across the thodu . They are listed below in the order from starting point of thodu .

Sl.no	Chainage	Name of bridge
1	100 m	Culvert

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing vegetation and desilting of Kayikkarathodu well need to be done
- Abrupt change in width of thodu is observed at the end portion . Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width.
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu. This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Sub Tributory of Paravur Puzha (Left Bank of Periyar) KONGINI THODU

SALIENT FEATURES

LOCAL BODY	EZHIKKARA PANCHAYATH
LENGTH OF THODU	0.940 km
WIDTH	VARING FROM 5M to 8m
AVERAGE DEPTH OF THODU	3M

The visual observations of Kongini thodu tributary are explained below.

At Ch 0.00m
The Tributary named as Kongini thodu starts from National waterway near Ezhikkara Panchayath and flows in east -west direction It joins Puthenthodu at 5.50 km in Ezhikkara Panchayat and through Paravur puzha exits into Periyar.

The sides of the thodu partially protected .The following works to be carried out to clear the obstructions in the Konginithodu and bring back the thodu to its original shape.

Clearing light, thick and throny jungles on both the sides

CROSSINGS ACROSS KONGINI THODU

CThere is 1 no of bridge across the thodu . They are listed below .

Sl.no	Chainage	Name of bridge
1	620 m	Culvert

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.

Sub Tributory of Paravur Puzha (Left Bank of Periyar) KUNDEKAVU THODU

Periyar – Paravurpuzha- Puthenthodu- Kannanchira thodu

SALIENT FEATURES

LOCAL BODY	EZHIKKARA PANCHAYATH
LENGTH OF THODU	0.480 km
WIDTH	VARING FROM 11 m
AVERAGE DEPTH OF THODU	3M

The visual observations of Kundekavu thodu tributary are explained below..

At Ch 0.00m
The Tributary named as Kundekavu thodu starts from Kannanchira near Ezhikkara Panchayath and flows in east -west direction It joins Puthenthodu at 3.40 km in Ezhikkara Panchayat and through Paravur puzha exits into Periyar.

The sides of the thodu partially protected .The following works to be carried out to clear the obstructions in the Kundekavu thodu and bring back the thodu to its original shape.

Clearing light, thick and throny jungles on both the sides

Sl.no	Chainage	Name of bridge
1	2.00 m	Kundekavu bridge

CROSSINGS ACROSS KUNDEKAVU THODU

There is 1 no of bridge across the thodu . They are listed below .

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

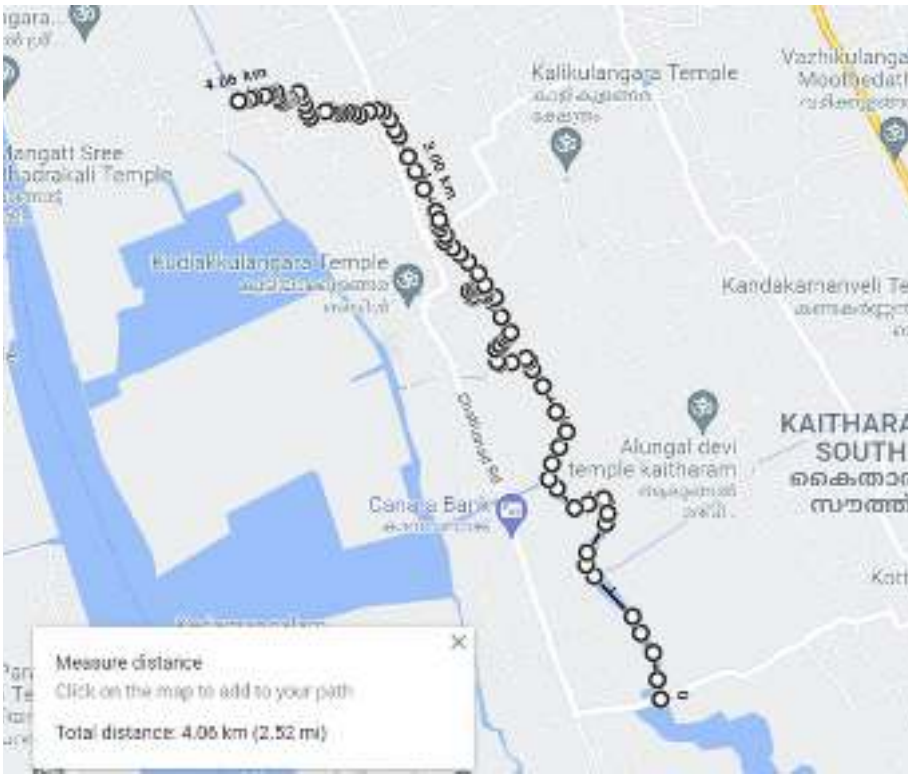
Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

Sub Tributary of Puthen thodu (Left Bank of Periyar) KANNANCHIRA THODU

Periyar – Paravurpuzha- Puthenthodu- Kannanchira thodu

Kannanchira thodu – Introduction

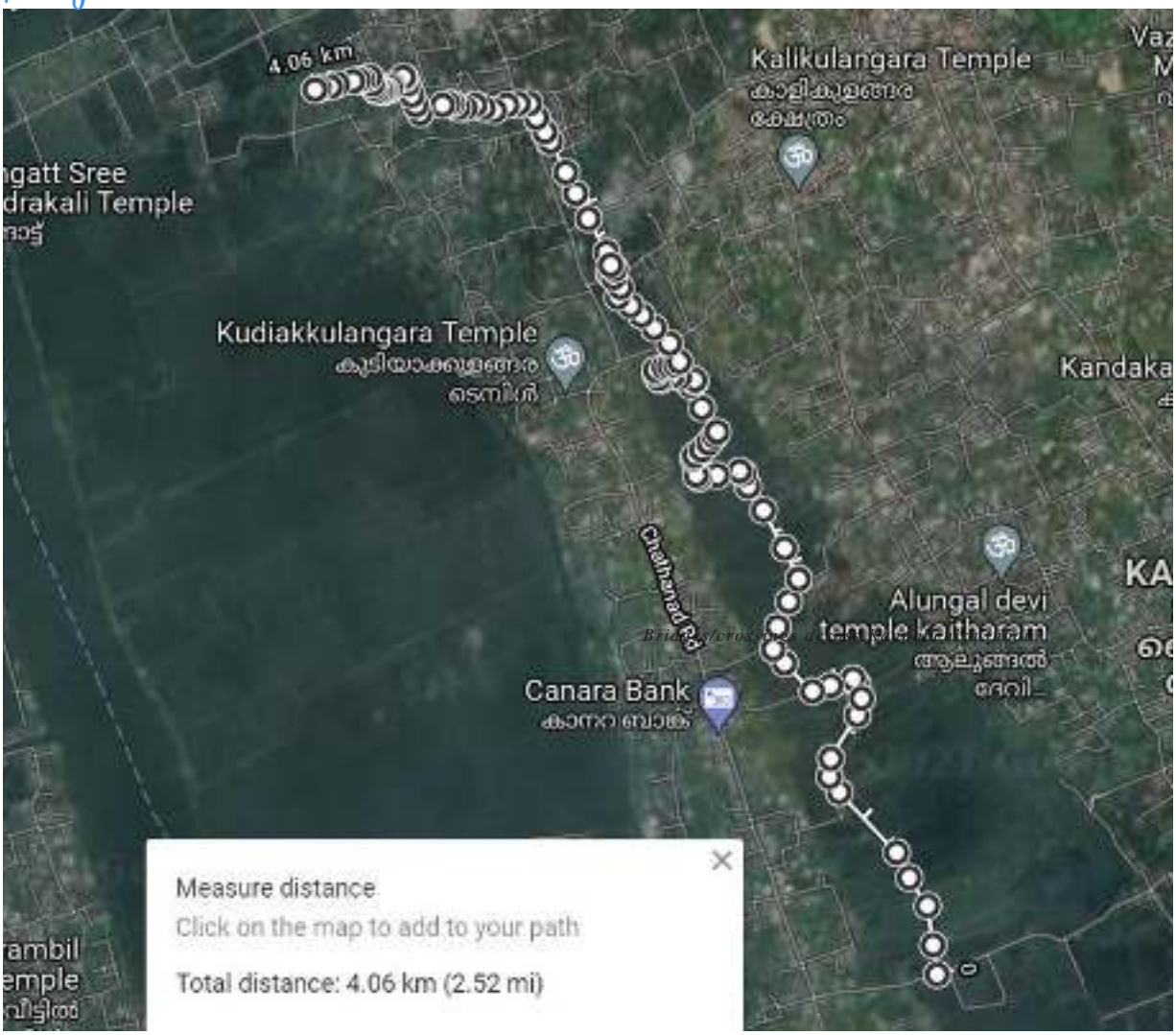
The Kannanchira thodu in Ezhikkara Panchayat is a subtributary of Puthen thodu emerging from Paravurpuzha, a tributary along left bank of Periyar. The Kannanchira thodu starts from Ezhikkara puzha and discharges into Puthenthodu at chainage 5.46 km of Puthen thodu. The Kannanchira thodu is approximately 4.06 km long. The width of the thodu varies from 5m to 40m at various locations along its stretch. The thodu facilitates to drain off storm water from Chathanad, Nanthiattukunnam areas of Ezhikkara Panchayat and South Kaitharam area of Kottuvally Panchayat and North Paravur Municipality.



GOOGLE MAP SHOWING KANNANCHIRA THODU IN EZHIKKARA, KOTTUVALLY PANCHAYATs AND PARAVUR MUNICIPALITY

SALIENT FEATURES

LOCAL BODY	EZHIKKARA, KOTTUVALLY PANCHAYATS, NORTH PARAVUR MUNICIPALITY
LENGTH OF THODU	4.06 km
AVERAGE WIDTH	20m
AVERAGE DEPTH OF THODU	1 M TO 2.2M



Sl.no	Chainage	Name of bridge/Crossing
1	0km	Ezhikkara bridge on Ezhikkara- Kaitharam bypass road
2	1.45km	Bridge near Nikathil Bhuvaneswari temple
3	2.5 km	culvert on Kudiakulangara Kalikkulangara link road
4	2.76km	culvert on byelane to Chathanad road
5	3.34km	Culvert on Chathanad road

Kannanchira thodu - Present status

The 4.06 km Kannanchira thodu starts from Ezhikkara puzha and discharges into Puthen thodu near Njaneswari Devi temple in North Paravur Municipality. The width of the thodu in the initial reach near Ezikkara puzha is about 40m. At ch 1.24 km, Kundekavu thodu joins to Kannachira thodu from the west. After about 1.6 km from the starting point, the width of the thodu is found to be decreasing towards the north direction. The thodu is fairly in good condition . No waste deposition observed along its stretch.

OBSERVATIONS DURING SITE INSPECTION OF KANNANCHIRA THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0km (Near Starting point of Kannanchira thodu from Ezhikkarapuzha)

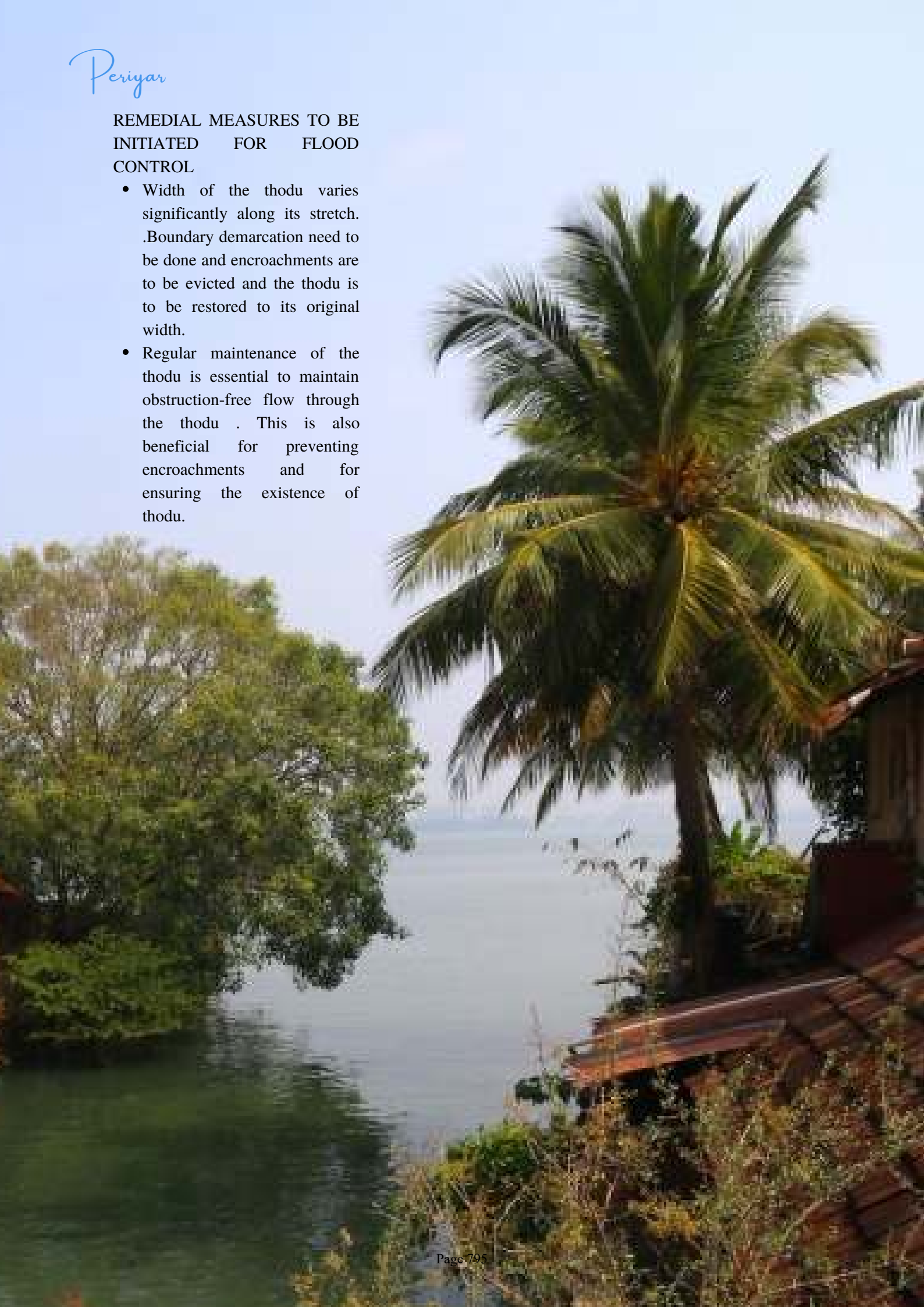
The Kannanchira thodu near its starting point from Ezhikkara puzha is about 40m m wide. No obstruction to flow or waste deposition is noticed in this area. The water is also clear at this location.

Chainage 1.24 km
Kundekavu thodu from Ezhikkara market area joins to Kannanchira thodu at this location. No obstruction to flow noticed at this junction.

Chainage 1.45 km(Near Nikathil Bhuvaneswari temple, Ezhikkara)
The thodu flows through padasekaram at this location. There is a small bridge across the thodu near Nikathil Bhuvaneswari temple in Ezhikkara . The width of the thodu at this location is approximately 18m. The thodu is clear of obstructions and is in fairly good condition.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Width of the thodu varies significantly along its stretch. .Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width.
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

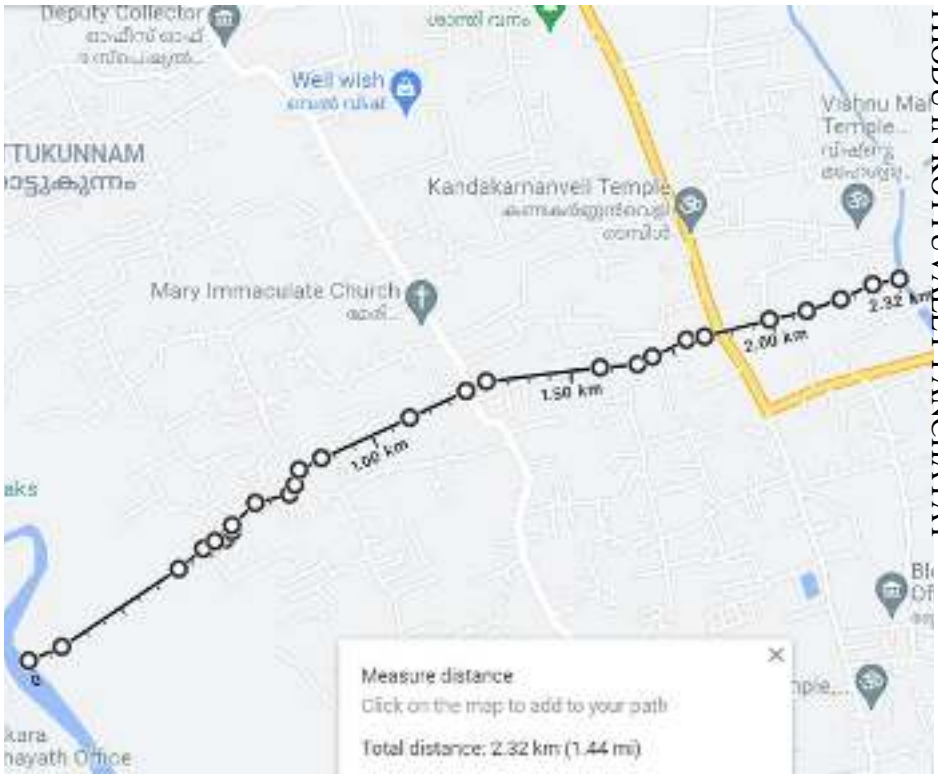


Sub Tributary of Pashni thodu :- KUNDEKAVU- CHERIYAPILLY THODU

Paravurpuzha- Pashni thodu- Kundekavu Cheriyapilly thodu

Kundekavu Cheriyapalli thodu – Introduction

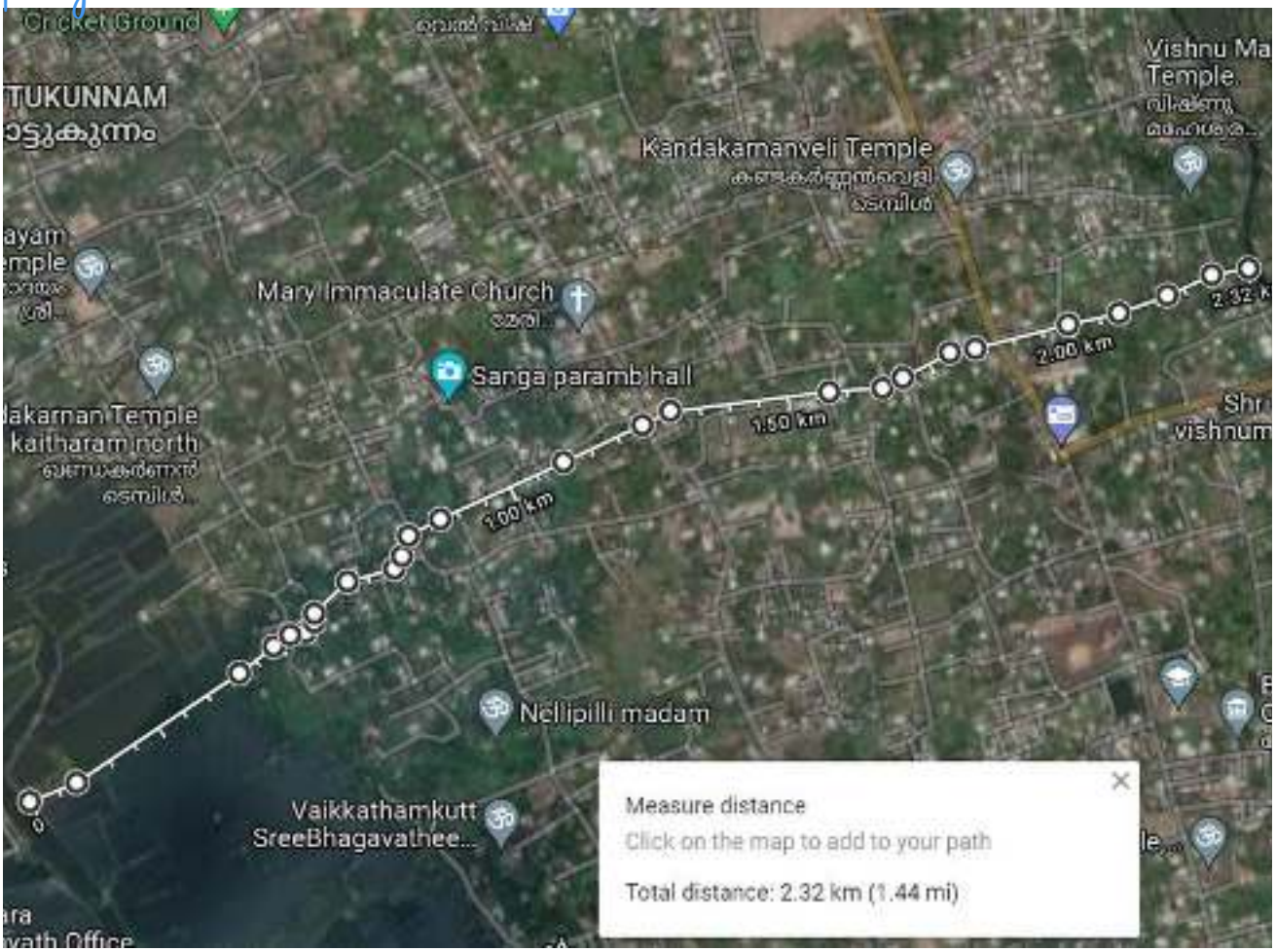
The Kundekavu-Cheriyapilly thodu in Kottuvally Panchayat connects Pashni thodu (a sub tributary of Paravurpuzha) and Kannanchira thodu in Ezhikkara Panchayat. The thodu is approximately 2.32 km long. The width of the thodu varies from 5m to 18m along various locations along its course. The thodu helps to drain off storm water from Kaitharam area in Kottuvally Panchayat and also facilitates agriculture. Vast cultivation fields are located on either sides of the thodu near its starting area near Kundekavu.



GOOGLE MAP SHOWING KUNDEKAVU CHERIYAPILLI THODU IN KOTTUVALLY PANCHAYAT

SALIENT FEATURES

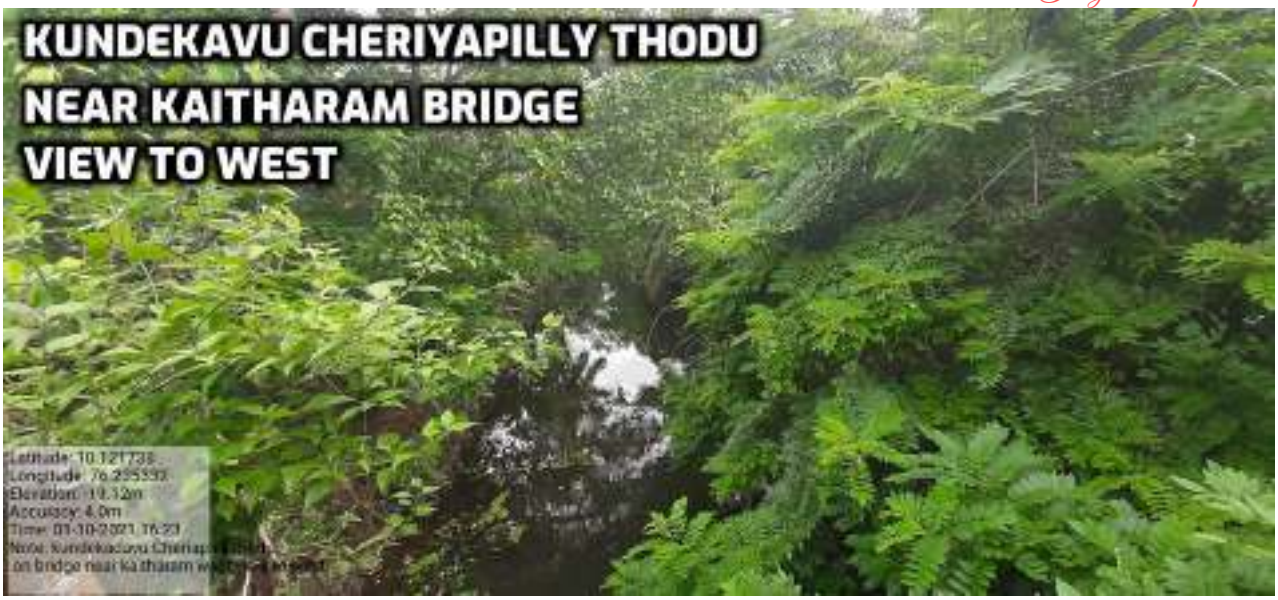
LOCAL BODY	KOTTUVALLY PANCHAYAT
LENGTH OF THODU	2.32 km
AVERAGE WIDTH	VARYING FROM 5M TO 18M
AVERAGE DEPTH OF THODU	0.5 M TO 1M



Kundekavu-Cheriyapilly thodu - Present status

The Kundekavu – Cheriyapilly thodu starts from Kannanchira thodu in Kundekavu area of Ezhikkara Panchayat and discharges into Pashni thodu at the north side of Cheriyapilly bridge in Kottuvally Panchayat. The thodu is approximately 2.32 km long and the course of the thodu is in east-west direction. The initial 600m portion of the thodu starting form Kannanchira thodu passes through fields. The subsequent reaches passes through residential area in Kottuvally Panchayat. Many stretches of the thodu are covered by thick vegetation obstructing flow through the thodu. There is also significant silt deposition in the thodu. At many stretches the thodu is observed to be stagnant. This will obstruct drainage of flood water during rainy season.

Sl.no	Chainage	Name of bridge/Crossing
1	0.82km	Culvert near Kaitharam West
2	1.26km	Culvert on Thonniyakavu thrikkapuram road
3	1.87km	Bridge on NH 66



OBSERVATIONS DURING SITE INSPECTION OF KUNDEKAVU-CHERIYAPILLY THODU

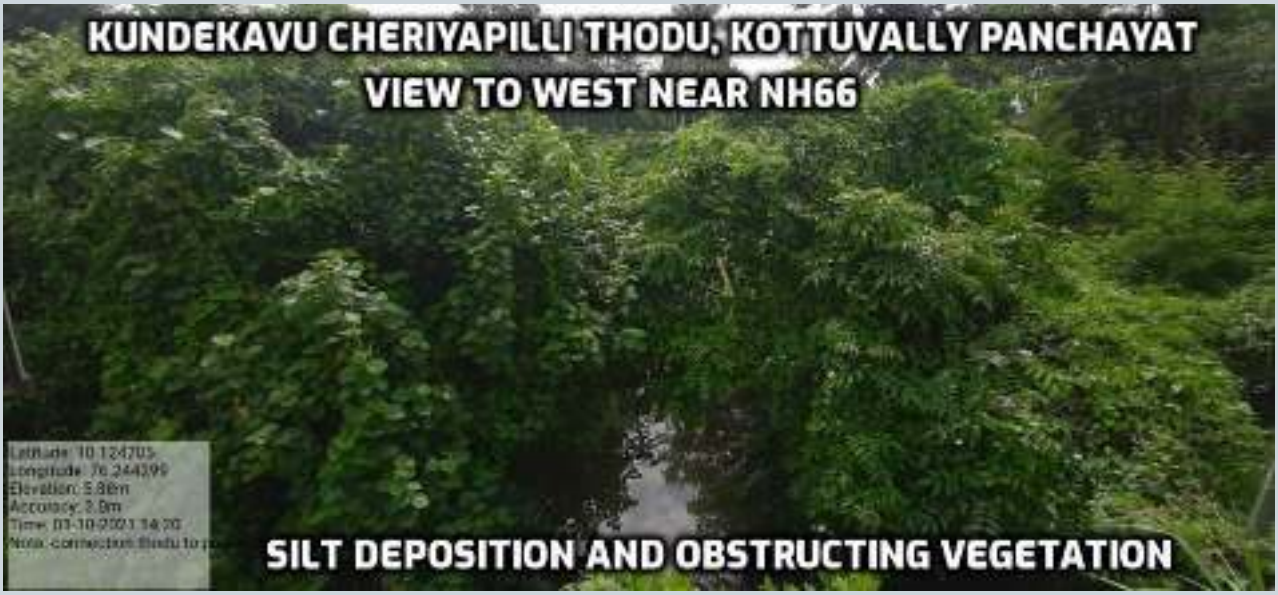
During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0.82 km (Near Kaitharam west)

The thodu is approximately 8m wide at this location. The thodu is obstructed by thick overgrown vegetation due to lack of maintenance. Due to heavy siltation, the carrying capacity of the thodu has reduced significantly. Clearing of vegetation and desilting of thodu is essential for restoring obstruction free flow in the thodu.

Chainage 1.26 km(Near Thonniyakavu road)

There is a new bridge across Kundekavu Cheriyapalli thodu at this location. The thodu is approximately 8m wide at this location. The thodu is observed to be stagnant. The sides of the thodu are protected . There is a temporary earthern bund formed on the east side of this bridge for the construction of bridge. Steps are being taken by Panchayat to clear off this obstruction. Obstructing overgrown vegetation are also observed on east side of this road . Clearing vegetation and silt removal is necessary for restoring flow in the thodu.



Chainage 1.87km (Near NH 66)
Due to lack of maintenance, the thodu is full of obstructing vegetation and silt deposition. Clearing of vegetation including trees inside thodu boundary and desilting is essential for restoring flow in the thodu.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing vegetation and desilting of thodu need to be done to restore flow in the thodu
- Due to lack of maintenance of thodu , encroachments are suspected at many parts of the thodu . Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Tributary of Periyar River:-
ALUNKALKADAVU THODU

PERIYAR RIVER / PARAVUR PUZHA /ALUNKAL KADAVU THODU

SALIENT FEATURES

LOCAL BODY	CHENDAMANGALAM PANCHAYAT
LENGTH OF THODU	2.17 km
AVERAGE WIDTH	VARYING FROM 4 TO 8M
AVERAGE DEPTH OF THODU	0.5M TO 1 M

Alunkalkadavuthodu– Introduction

The Alunkalkadavuthodu starts from Anchamparuthythodu near east side of Munduthuruthy bridgein Chendamangalam Panchayat and flows in north-south direction and discharges into Periyar. The thodu is approximately 2.17 km length and of average width 4m. The thodu facilitates to drain off storm water from the residential area in the Munduruthy, Arankkavu, Thekkumpuramkadavu and Alunkalkadavuareas toPeriyar.

Alunkalkadavuthodu - Present status

Along the full stretch of thodu , the thodu is heavily silted and obstructed by vegetation.The Starting portion of this thodu from Anchamparuthythodu near east side of Munduthuruthy bridge about 130m is in filled up condition. Due to this the outflow to Anchamparuthythodu is obstructed and hence the water is stagnant in the whole stretch of thodu. This will result in slow drainage of storm water during rainy season and may cause flooding in
adjacent areas.

Sl.no	Chainage	Name of bridge/Crossing
1	Ch 0.78 km	Mundathuruthyculvert
2	Ch1.12 km	Arankkavu culvert

OBSERVATIONS DURING SITE INSPECTION OF ALUNKAL KADAVU THODU

During site inspection of the thodu, the following observations were made at differentchainages of the thodu.

Chainage 0m (Start of Alunkalkadvuthodufrom Achamparuthythodu)

The Alunkalkadavuthodu starts from Anchamparuthythodu near east side of Munduthuruthy bridge in Chendamangalam Panchayat at GPS location 10.157010,76.247533.In this portion abut 130m length of thodu is filled up condition and flows towards north. Vegetation is observed near banks . The water in thodu appears clear at this location.

Chainage 0.13km (Neareast side of Munduthuruthy road)

This is the present starting portion of this thodu .Thick vegetation due to lack of maintenance is observed in this reach also. There is considerable silt deposition and hence the water carrying capacity of the thodu is relatively low.

Chainage 0.498km (Neareast side of Munduthuruthy culvert)

In this portion two link thodustrats towards south. The thodu is of average width 4m at this location. The reach of thodu is also affected by obstructing vegetation.

Chainage 0.780 km (NearMunduthuruthy culvert)
The thodu is of average width 4m near Raja mill road. The portion of thodu is observed to be stagnant in this stretch and divert its direction towards south . There is also heavy deposition of silt and overgrown vegetation which is to be cleared to restore flow in the thodu

Chainage 1.12km (Near Arankkavuculvrt)
The thodu flows further south and crosses Arankavu culvert near Muduthuruthy Anganavady in ChendamangalamPanchayat. Here also, the flow is obstructed by overgrown vegetation and silt deposition.

Chainage 1.79km (Near Thekkumpuramkadavu)
The flow in thodu near Vedimarakadavu roadis seen obstructed by thick vegetation in waterway. The thodu needs a complete rejuvenation and periodic maintenance to ensure flow through the thodu.Thethodu is of average width 5m at this location.

Chainage2.15 km (Near Anchamparuthythodu /end of Vedimarakadavuroad)

This portion is the nearmouth of Alunkalkadavuthoduat Ancamparuthythodu, is located to the east side of Vedimarakadvu road . Average width of thodu at this reach is observed to be 8m. The stretch of thodu near its mouth is also found to be obstructed by overgrown vegetation and silt deposition.

Chainage 2.17km (Exit at Anchamparuthypuzha)

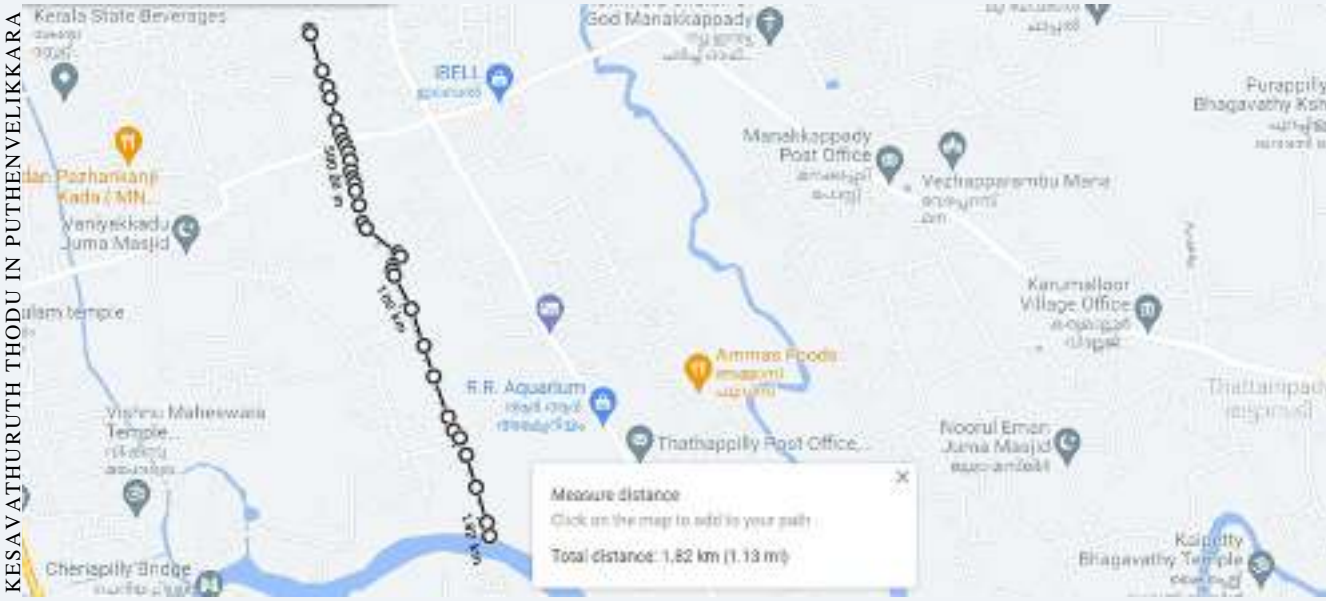
This portion is mouth of Alunkalkadavuthoduat Ancamparuthythodu, is located to the east side of Vedimarakadvu road . Average width of thodu at this reach is observed to be 8m. The stretch of thodu near its mouth is also found to be obstructed by overgrown vegetation and silt deposition.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing vegetation and desilting of Korakkarathodufor its entire length is to be done to restore flow in the thodu.
- Starting portion of thisthodu near east side of Munduthuruthy bridge in Chendamangalam Panchayatabout 130m length is filled up condition it needs to be opened up and the course of thodu to be restored.
- The heavily silted up and almost filled up portion of thodu to the south of Kottayil Kovilakam road near Mankuzhypadam needs to be opened up and the course of thodu to be restored.
- Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width along its full length.
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu. This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Tributary of Kaipettypuzha:- KESAVATHURUTH THODU

GOOGLE MAP SHOWING KESAVATHURUTH THODU IN PUTHENVELIKKARA



Kesavathuruth thodu – Introduction

The Kesavathuruth thodu in Kottuvally Panchayat starts from marshy fields to thenorth of Vazhikulangara Anachaal road and discharges into Kaippettypuzha. The course of the thodu is in north-south direction. The thodu is approximately 1.82 km long . The width of the thodu varies from 5m to 10m along various locations along its course. The thodu facilitates to drain off storm water from theMannam and Thathappilly areas.

SALIENT FEATURES

LOCAL BODY	KOTTUVALLY PANCHAYAT
LENGTH OF THODU	1.82 km
AVERAGE WIDTH	VARYING FROM 5M TO 10M
AVERAGE DEPTH OF THODU	0.5M TO 1.2M

Kesavathuruth thodu - Present status

The Kesavathuruthu- Kariyil thodu thodu starts from marshy field to the north side of Vazhikulangara-Anachal road in Kottuvally Panchayat and exits into Kaipettypuzha. The thodu is found to be silted and obstructed by overgrown vegetation including trees due to lack of maintenance. Siltation and overgrowth of vegetation inside thodu boundary has significantly reduced the carrying capacity of the thodu and in most reaches the thodu lacks flow. There is no side protection in most reaches of the thodu.

Bridges/crossings across Kesavathuruth thodu

Sl.no	Chainage	Name of bridge/Crossing
1	Ch 0.385 km	Bridge at Vazhikulangara- Anachal road
2	Ch 1.47 km	Kesavathuruth sluice bridge

OBSERVATIONS DURING SITE INSPECTION OF KESAVATHURUTH THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0.385 km (Near Vazhikulangara- Anachaal road). The Kesavathuruththodu at this location is about 8m wide. This portion comes under ward 4 and 5 of Kottuvally Panchayat. The thodu is observed to be infested with water weeds and obstructing vegetation.There is also considerable amount of silt deposition in the thodu. However no waste deposition is noticed in this reach and the water in the thodu is observed to be clear.

Chainage 1.47 km (Near Kesavathuruth sluice bridge)
There is a sluice-cum- bridge across the thodu at this location which comes under ward 8 in Kottuvally Panchayat. But presently the sluice is not functional. The thodu is approximately 10 m wide at this location. Due to lack of maintenance, the thodu is obstructed by water weeds, thick vegetation and silt deposition.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Clearing of obstructing vegetation and desilting of thodu need to be done to restore flow in the thodu

Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu. This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Sub Tributory of Paravur Puzha (Left Bank of Periyar) KACHERI THODU

PERIYAR RIVER / PARAVUR PUZHA / KACHERI THODU

SALIENT FEATURES

LOCAL BODY	Paravur Municiality
LENGTH OF THODU	208 m
AVERAGE WIDTH	from 7m to ,5.5m,
AVERAGE DEPTH OF THODU	1M TO 1.50M

The visual observations of Kacherithodu are explained below.
AT CH0.00 M
The thodu discharges at ch. 3.78 km of Paravur thodu in Paravur Municipality. The thodu is having an average width of 6m.The width of the thodu is reduced to 5.50m. This thodu has a depth of about 1.5m. The thodu has partialy silted. Vegetation are grown on the sides of the thodu. At Ch 0.00m the thodu is formed as a drain by connecting pipe.
From Ch. 0m to Ch. 208 m
Considerable silt is deposited in the thodu. Being silted up the capacity of the thodu reduced. The sides of the thodu protected The following works tobe carried out to clear the obstructions in the thodu and bring back the thodu to its original shape.

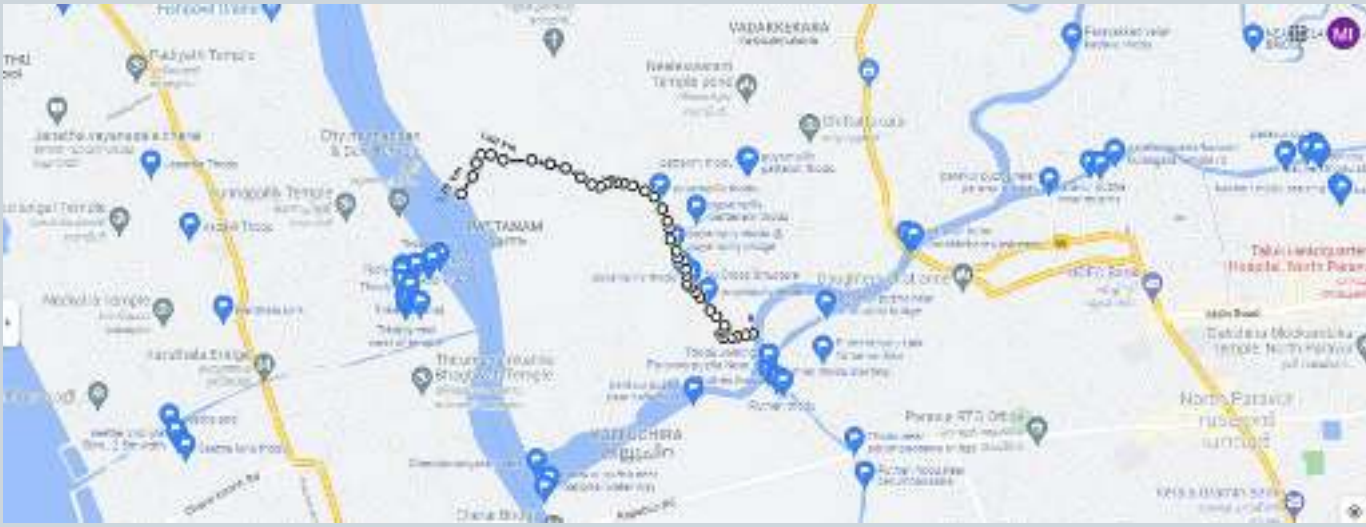
Clearing light, thick and throny jungles on both the sides
Desilting and removal of debris
Eviction of encroachments.

The photographs clearly shows the vegetation in the thodu

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing hyacinth weeds, removing thickly grown grass and desilting the thodu are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow. The thodu is stagnant in many reaches causing unhealthy situation .

Tributary of Periyar River (Left bank):- POOYAMPILLY,VADAKKEKARA



Pooyampillythodu– Introduction

The Pooyapillythodu starts from Paravurpuzha near south side of Pooyapilly bridge at the east side of Needoor colony road in VadakkekaraPanchayat and flows in east-west direction and discharges into National water way. The thodu is approximately 1.72km length and of average width 12m. The thodu facilitates to drain 1off storm water from the residential area in the Pattanam and Vadakkekaraareas toNational water way.

SALIENT FEATURES

LOCAL BODY	VADAKKEKARA PANCHAYAT
LENGTH OF THODU	1.72 km
AVERAGE WIDTH	VVARYING FROM 4 M TO25 M
AVERAGE DEPTH OF THODU	0.5M TO 1M

Pooyapillythodu - Present status

Along the full stretch of thodu, the thodu is heavily silted and obstructed by vegetation. Due to this the outflow to National water way is obstructed and hence the water is stagnant in the whole stretch of thodu. This will result in slow drainage of storm water during rainy season and may cause flooding in adjacent areas.

Sl.no	Chainage	Name of bridge/Crossing
1	Ch0.550km	Pooyampilly culvert

OBSERVATIONS DURING SITE INSPECTION OF POOYAPILLY THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu. Chainage 0m (Start of Pooyapillythodu from Paravurpuzha) The Pooyampillythodu starts from Paravurpuzhain Vadakkekara Panchayat at GPS location 10.147837,76.209271near the east side of Needoor colony road and flows towards west. Width of this portion is about 15m.Vegetation is observed near banks . The water in thodu appears clear at this location.

Chainage 0.292 km (Near Needoor colony road)

Thick vegetation due to lack of maintenance is observed in this reach also. There is considerable silt deposition and hence the water carrying capacity of the thodu is relatively low. The thodu is of average width 6m at this location

Chainage 0.386 km (Neareast side of Pooyappilly Gurumandhir, Chittatukara)

Along its course towards west, the thodu crosses Paliyamroad . The thodu is of average width 8m at this location. The reach of thodu to the east side of Pooyapilly Gurumandhir is also affected by obstructing vegetation.

Chainage 0.432 km (NearPooyappilly Gurumandhir, Chittatukara)

The thodu is of average width 8m near Raja mill road. The portion of thodu is observed to be stagnant in this stretch. There is also heavy deposition of silt and overgrown vegetation which is to be cleared to restore flow in the thodu

Chainage 0.550km (AtPooyappilly culvert, Chittatukara)

The thodu flows further west and crosses Needoor colony road in Chittattukara Panchayat.Here also, the flow is obstructed by overgrown vegetation and silt deposition.

Chainage0.603 km (Kaipram link thodu joining from east)
Kaipram link thodujoing to Pooyappillythoduin this change from east. Vegetation is observed near banks.The thodu needs a complete periodic maintenance to ensure flow through the thodu.Thethodu is of average width 13m at this location.

Chainage1.72 km (Exit at National Water Way)
The mouth of Pooyappillythodu at National water way is located to the west side of Vadakkekarapanchayath and north side of Pattanamarea .Average width of thodu at this reach is observed to be 20m. The stretch of thodu near its mouth is also found to be obstructed by overgrown vegetation and silt deposition.

POOYAPPILLY THODU- ACTION TO BE TAKEN
Clearing of obstructing vegetation and desilting of Pooyappillythodufor its entire length is to be done to restore flow in the thodu.
Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width along its full length.
Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu. This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Tributary of Periyar River (Left bank):- Kaipramthodu,VADAKKEKARA

SALIENT FEATURES

LOCAL BODY	CHITTATTUKARA PANCHAYAT
LENGTH OF THODU	0.450km
WIDTH	VARYING FROM 2M TO19M
AVERAGE DEPTH OF THODU	0.5M TO 1M

KaipramThodu– Introduction

TheKaipramthodu starts from Pattanamthodu near north side of Kalarikkal Temple Road at Vadakkekara Panchayat and flows in east-west direction and discharges into Puyampilly main thodu. The thodu is approximately 0.450km length and of average width 2.5m .The thodu facilitates to drain off storm water from the residential area in the Chittattukara and Pattanamareas to Periyar.

Kaipramthodu - Present status

Along the full stretch of thodu, the thodu is heavily silted and obstructed by vegetation. Intermediate portion of the thodu to the north of Kalarikkal Temple Road is in filled up condition. Due to this the outflow to Puyampilly main thodu is obstructed and hence the water is stagnant in the whole stretch of thodu. This will result in slow drainage of storm water during rainy season and may cause flooding in adjacent areas.

Sl.no	Chainage	Name of bridge/Crossing
1	Ch 0.005 km	Culvert across Kalarikkal Temple road

OBSERVATIONS DURING SITE INSPECTION OF KAIPRAM THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0m (Start of Kaipramthodu from Pattanamthodu)

The Kaipramthodustarts from PattanamthoduinVadakkekaraat GPS location 10.153585,76.209107near culvert crossand flows towards west. Vegetation is observed near banks. The water in thoduappears clear at this location.

Chainage 0.005 km (Near culvert across Kalarikkal temple road)
Thick vegetation due to lack of maintenance is observed in this reach also. There is considerable silt deposition and hence the water carrying capacity of the thodu is relatively low.

Chainage 0.34 km (NearPuyampilly main road)
The thodu is of average width 8m at this location. The reach of thodu to the east of Paliyam road is also affected by obstructing vegetation.

Chainage 0.347 km (Near Raja mill road, Chendamangalam)
The thodu is of average width 8 to 19 m nearmouth of Puyampilly main thodu. There isalso heavy deposition of silt and overgrown vegetation which is to be cleared to restore flow in the thodu

Chainage 0.450 km (Exit at Puyampilly main thodu)
The mouth of Kaipramthoduat Puyampilly main thodu is located to the north side of Puyampilly road. Average width of thodu at this reach is observed to be 19m. The stretch of thodu near its mouth is also found to be obstructed by overgrown vegetation and silt deposition.

KAIPRAM THODU- ACTION TO BE TAKEN
Clearing of obstructing vegetation and desilting of Kaipramthodufor its entire length is to be done to restore flow in the thodu.
Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width along its full length.
Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu. This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Sub Tributory of Paravur Puzha (Left Bank of Periyar) THACHAPILLY PUZHA

PERIYAR RIVER / PARAVUR PUZHA/ PARAYAKKAD VELANKADAVU THODU /THACHAPILLY PUZHA

SALIENT FEATURES

LOCAL BODY	CHENDAMANGALAM PANCHAYATH
LENGTH OF THODU	1.50 km
WIDTH	VARING FROM 15 M,12M,10M
AVERAGE DEPTH OF THODU	3M

The visual observations of ThachapillyPuzha are explained below.

At Ch 0.00m - The Tributary namedas ThachapillyPuzha discharges at 2.5 km of Parayakkad velankadavu thodu in ChendamangalamPanchayath and through Paravurpuzha exits into Periyar. The final portion of the thodu is wider and initial portionthe width of the thodu reduced.

Considerable silt is deposited in the thodu .The sides of the thodu partially protected .The following works to be carried out to clear the obstructions in the thachapillypuzha and bring back the thodu to its original shape.

- Clearing light, thick and throny jungles on both the sides
- Desilting and removal of debris

CROSSINGS ACROSS ThachaillyPuzha
There are 2nos of bridges across the thodu . They are listed below in the order from starting point of thodu

Sl.no	Chainage	Name of bridge
1	450m	Bridge
2	1.1 Km	Bridge near Parayakkad KAPPELA

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing hyacinth weeds, removing thickly grown grass and desilting the thodu are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.

Sub Tributory of Paravur Puzha (Left Bank of Periyar) PASHNI THODU

PERIYARRIVER / PARAVURPUZHA / PASHNI THODU

SALIENT FEATURES

LOCAL BODY	Paravur Municipality,
LENGTH OF THODU	3.85 km
WIDTH	VARING FROM 12m to 8m
AVERAGE DEPTH OF THODU	1M TO 5M

The visual observations of Pashni thodu are explained below.

At Ch 0.00m
The thodu starts from Kaipettypuzha near Kottuvally Panchayat and flows in north -south direction. It joins Paravurpuzha in Paravur Muncipality and through Paravurpuzha exits into Periyar. The Pashnithodu has a total length of 3.85km and has width varying from 12m to 8mThe thodu has completely silted.

From Ch.0m to Ch3.1 km
Considerable silt is deposited in the thodu . The sides of the thodupartially protected .The following works be carried out to clear the obstructions in the periyar to periyarthodu and bring back the thodu to its original shape.
Clearing light, thick and throny jungles on both the sides
Desilting and removal of debris
Eviction of encroachments.

From Ch.3.1KM to Ch. 3.85KM

It is seen that aquatic plants have been grown thickly and their roots firmly grown in to the bed. Due to this the water is stagnant in these reaches and this leads to breeding of mosquitoes etc. This also causes health hazards to the people residing along the sides of the thodu. Being silted up the capacity of the thodu reduced.

The following works tobe carried out to clear the obstructions in the thodu and bring back the thodu to its original shape.

- Clearing light, thick and throny jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments.

The photographs of thodu shown below:-

PASHNI THODU
VAZHIKULANGARA BRIDGE,KOTTUVALLY
VIEW TO NORTH
OBTRUCTED BY WATER WEEDS

PASHNI THODU
NEAR ANGANAWADI ROAD
WASTE DEPOSITION STAGNANT WATER

PASHNI THODU
NEAR PARAVOOR MUNICIPALITY
VIEW TO NORTH
STAGNANT WATER WASTE DEPOSITION

PASHNI THODU
NEAR ANGANAWADI ROAD
WIDTH OF THODU REDUCED FOR ROAD FORMATION
VIEW TO SOUTH
WASTE DEPOSITION STAGNANT WATER

PASHNI THODU
NEAR PERUVARAM BRIDGE
VIEW TO SOUTH
STAGNANT WATER WASTE DEPOSITION

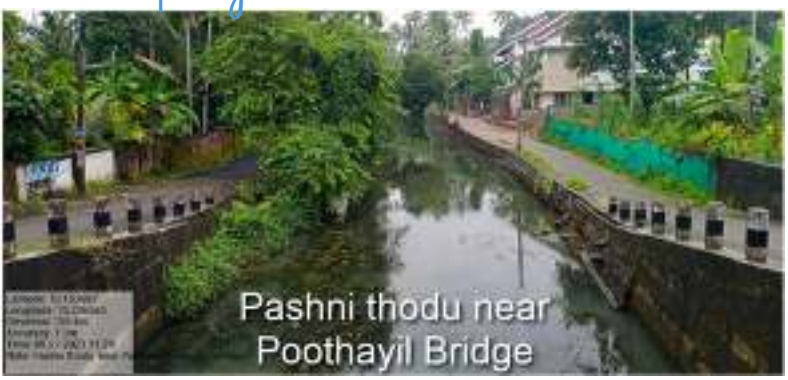
Pashni thodu

PASHNI THODU
NEAR ANGANAWADI ROAD
WIDTH OF THODU REDUCED FOR ROAD FORMATION
VIEW TO NORTH

Pashni thodu

PASHNI THODU
NEAR ANGANAWADI ROAD
WIDTH OF THODU REDUCED FOR ROAD FORMATION
VIEW TO SOUTH
WASTE DEPOSITION STAGNANT WATER

Pashni thodu



Sl.no	Chainage	Name of bridge
1	1.10km	Bridge at Vaniyamkadu
2	1.70km	Bridge at Vaniyamkadu
3	2.31km	Peruvaram Bridge
4	3.1km	Bridge at Pallithazham
5	3.25 km	Bridge near fire station road
6	3.59 km	Poothayil Bridge

This thodu is covered with water hyacinth and considerable silt is deposited in the thodu which obstructs the the flow of water. The sides of the thodu partially protected.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing hyacinth weeds, removing thickly grown grass and desilting the thodu are proposed to regain the capacityof the thodu for sufficient storage of water and easy flow. Thodu is stagnant in many reaches causing unhealthy situation.

Tributory of Periyar (Left Bank) KORAKKARA THODU

PERIYAR RIVER /KORAKKARA THODU

Introduction

The Korakkarathodu starts from Paliyamthodu near Mundathumal culvert at the north side of Vadakkumpuram road in Chendamangalam Panchayat and flows in east-west direction and discharges into Periyar. The thodu is approximately 2.15 km length and of average width 2.5m .The thodu facilitates to drain off storm water from the residential area in the Paliyam and Kottayil Kovilakam areas to Periyar.

SALIENT FEATURES

LOCAL BODY	CHENDAMANGALAM PANCHAYAT
LENGTH OF THODU	2.15 km
WIDTH	VARYING FROM 2M TO3M
AVERAGE DEPTH OF THODU	0.5M TO 1M

Korakkarathodu - Present status

Along the full stretch of thodu, the thodu is heavily silted and obstructed by vegetation. Intermediate portion of the thodu to the south of Kovilakam road near Mankuzhypadamis in filled up condition. Due to this the outflow to Periyar is obstructed and hence the water is stagnant in the whole stretch of thodu. This will result in slow drainage of storm water during rainy season and may cause flooding in adjacent areas.

Sl.no	Chainage	Name of bridge
1	Ch 0.01 km	Mundathummal culvert
2	Ch 0.25 km	Culvert across Kollamparambu-Panayathara road
3	Ch 0.42 km	Culvert across Paliyam road
4	Ch 0.795 km	Culvert across Raja mill road
5	Ch 1.15 km	Culvert across Ambedkar road
6	Ch 1.45km	Culvert across Perepadam road
7	Ch 1.8 km	Culvert near Mankuzhypadam
8	Ch 2.05km	Culvert across CHM K Kovilakam road

OBSERVATIONS DURING SITE INSPECTION OF KORAKKARA THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0m (Start of Korakkarathodu from Paliyamthodu)

The Korakkarathodu starts from Paliyamthoduin Chendamangalam Panchayat at GPS location 10.170601,76.230695 near Mundathumal culvert and flows towards east. Vegetation is observed near banks . The water in thoduappears clear at this location.

Chainage 0.25km (Near Kollamparambu Panayathara road)

Thick vegetation due to lack of maintenance is observed in this reach also. There is considerable silt deposition and hence the water carrying capacity of the thodu is relatively low.

Chainage 0.42 km (Near Paliyam road)

Along its course towards east, the thodu crosses Paliyamroad . The thodu is of average width 4m at this location. The reach of thodu to the east of Paliyam road is also affected by obstructing vegetation.

Chainage 0.795 km (Near Raja mill road, Chendamangalam)

The thodu is of average width 4m near Raja mill road. The portion of thodu is observed to be stagnant in this stretch. There isalso heavy deposition of silt and overgrown vegetation which is to be cleared to restore flow in the thodu

Chainage 1.15km (Near Ambedkar road, Chendamangalam)

The thodu flows further east and crosses Ambedkar road in Chendamangalam Panchayat.Here also, the flow is obstructed by overgrown vegetation and silt deposition.

Chainage 1.45 km(NearPerepadam road)

The flow in thodu near Perepadam road is seen obstructed by thick vegetation in waterway. The thodu needs a complete rejuvenation and periodic maintenance to ensure flow through the thodu.Thethodu is of average width 3m at this location.

Chainage 1.8 km (Near Mankuzhypadam)

The course of the Korakkarathodu is through Mankuzhypadam . But this reach is filled up due to deposition of silt over years . Hence the course of thodu through padam is not in a well defined condition.This filled up portion needs to be opened to restore flow through the thodu.

Chainage 2.05 km (Near CHM K Kovilakam road)

Beyond Mankuzhypadam the thodu flows in north direction and crosses CHM Kottayil Kovilakam road and exits to Periyar. The flow in this reach is also obstructed by overgrown vegetation and silt deposition.

Chainage 2.15km (Exit at Periyar)

The mouth of Korakkarathodu at Periyar is located to the north side of ChendamangalamKottayilKovilkam road. Average width of thodu at this reach is observed to be 3m. The stretch of thodu near its mouth is also found to be obstructed by overgrown vegetation and silt deposition.

KORAKKARA THODU- ACTION TO BE TAKEN

Clearing of obstructing vegetation and desilting of Korakkarathodufor its entire length is to be done to restore flow in the thodu.

The heavily silted up and almost filled up portion of thodu to the south of KottayilKovilakam road near Mankuzhypadam needs to be opened up and the course of thodu to be restored.

Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width along its full length.

Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu. This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Tributary of PeriyarRiver :- Paliyam Thodu

SALIENT FEATURES

LOCAL BODY	CHENDAMANGALAM GRAMAPANCHAYATH
LENGTH OF THODU	1.9 Km
WIDTH	VARING FROM 3M ,6M,5M, 4M
AVERAGE DEPTH OF THODU	1M TO1. 5M

The visual observations of paliyamthodu are explained below.

The tributary is named as Paliyamthodu . Itstarts from Thachapallipuzha and ends to Ch. 17.5 Km.near right bank ofPeriyar . Paliyamthodu is the thodu through that the goods were once transported and supplied to entire comer areas in Paravur. However the Navigation through the thodu ceased, it got filled with weeds.The plastics waste and waste from slaughterhouses in the nearby areas filled the waterbody and as a result, the water stagnated.1.2 km of the thodu is in Chendamangalam Panchayath.

The width of the thodu at the mouth isreduced and silt deposited and obstructs the flow of water. The canal is having an average width of 6 m.Thewidth of thethoduat the starting point is reduced to 3 m . This thodu has a depth of about 1.5m.Thethodu has Partially silted. Trees are grown on the sides of the thodu.

From Ch.0.0km to Ch. 1.9km

It is seen that the grass and aquatic plants have been grown thickly and their roots firmly grown in to the bed. Due to this the water is stagnant in these reaches and this leads to breeding of mosquitoes etc. This also causes health hazards to the people residing along the sides of the thodu.. Being silted up the capacity of the thodu reduced.

Considerable silt is deposited in the thodu.The sides of the thodupartially protected .The following works to be carried out to clear the obstructions in the Paliyamthodu and bring back the thodu to its original shape.

- Clearing light, thick and thorny jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments.

The photographs of the thodu are shown below :-

PALIYAM THODU NEAR LITTLE FLOWER CHAPEL
VADAKUMPURAM

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM
-VEGETATION

PALIYAM THODU NEAR LITTLE FLOWER CHAPEL
VADAKUMPURAM

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM
-THICK VEGETATION

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM
-THICK VEGETATION

PALIYAM THODU NEAR GOVT.SCHOOL,CHENDAMANGALAM
- THICK VEGETATION

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM

PALIYAM THODU NEAR GOVT.SCHOOL ,CHENDAMANGALAM
-THICK VEGETATION

PALIYAM THODU INTERMEDIATE ,CHENDAMANGALAM

CROSSINGS ACROSS PALIYAM THODU

There are 6 nos of bridges across the thodu . They are listed below in the order from starting point of thodu .

Sl no	Chainage	Name of bridge/Culvert
1	0.10km	Culvert at Chalipalam
2	0.20km	Culvert near Little Flower Chapel
3	0.90km	Culvert near Govt.School
4	0.95km	Culvert near Govt.School
5	1.40km	Culvert at Kovilakam Road.
6	1.75km	Culvert at Pazhampillythururh

CONCLUSION

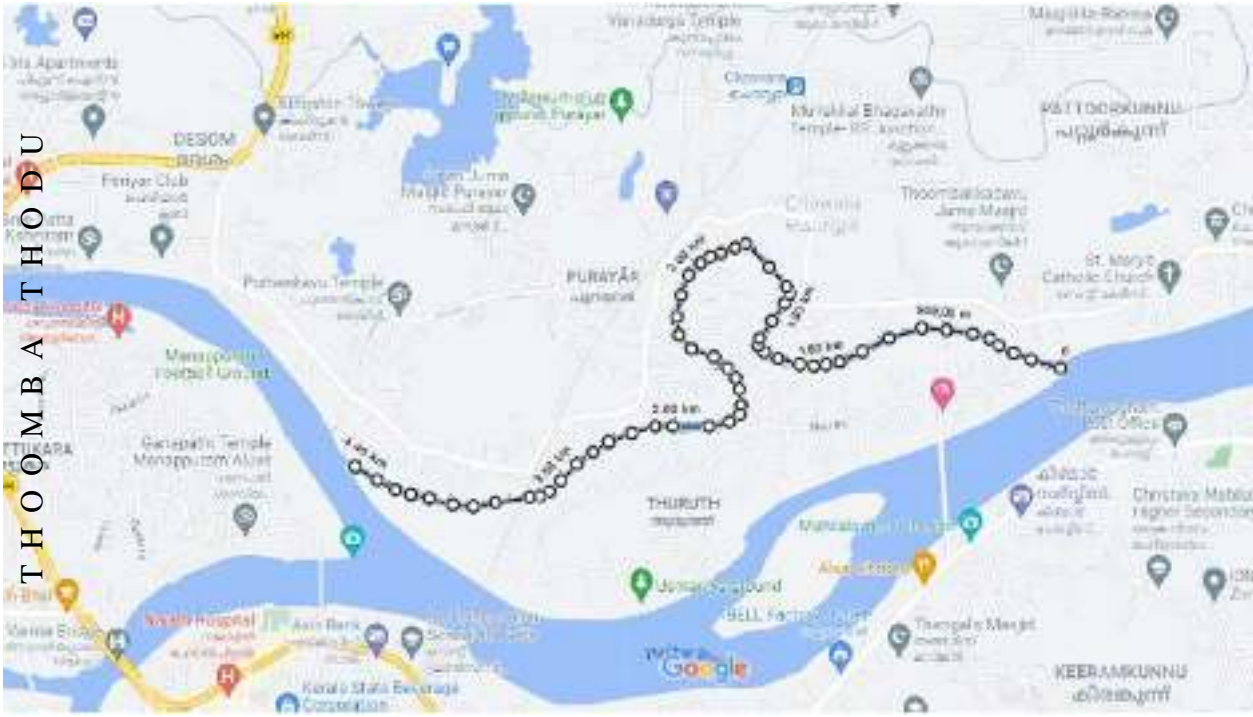
Provision for clearing jungle, removing hyacinth weeds, removing thickly grown grass and desilting the thodu are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow. The thodu is stagnant in many reaches causing unhealthy situation .

PERIYAR- ALUVA MANAPPURAM TO PUTHENVELIKKARA REACH

TRIBUTARIES ALONG RIGHT BANK

TRIBUTARY OF PERIYAR (RIGHT BANK) :- THOOMBA THODU

GOOGLE MAP OF THOOMBA THODU



INTRODUCTION:

The Thoomba thodu is a tributary of Periyar along its right bank which has both its starting and exit points at Periyar. The 4.4 km long thodu starts from Periyar at the north side of Mahilalayam – Thuruth bridge in Sreemoolanagaram Panchayat and exits to Periyar near Sastha temple in Aluva Municipality at chainage 0.42 km of Mangalappuzha branch of Periyar.

SALIENT FEATURES

LOCAL BODY	SREEMOOLANAGARAM PANCHAYATH & ALUVA MUNCIPALITY
LENGTH OF THODU	4.4 Km
WIDTH	VARING FROM 25M TO 70M
AVERAGE DEPTH OF THODU	2M TO 3M

BRIDGES/CROSSINGS ACROSS THOOMBA THODU

There are 4nos of bridges across the thodu. They are listed below in the order from starting point of thodu.

Sl no	Chainage	Name of bridge/Culvert
1	0.48 km	Chowara bridge
2	2.00 km	Footpath crossing
3	3.70 km	Thoombathodu bridge
4	3.80 km	Railway bridge

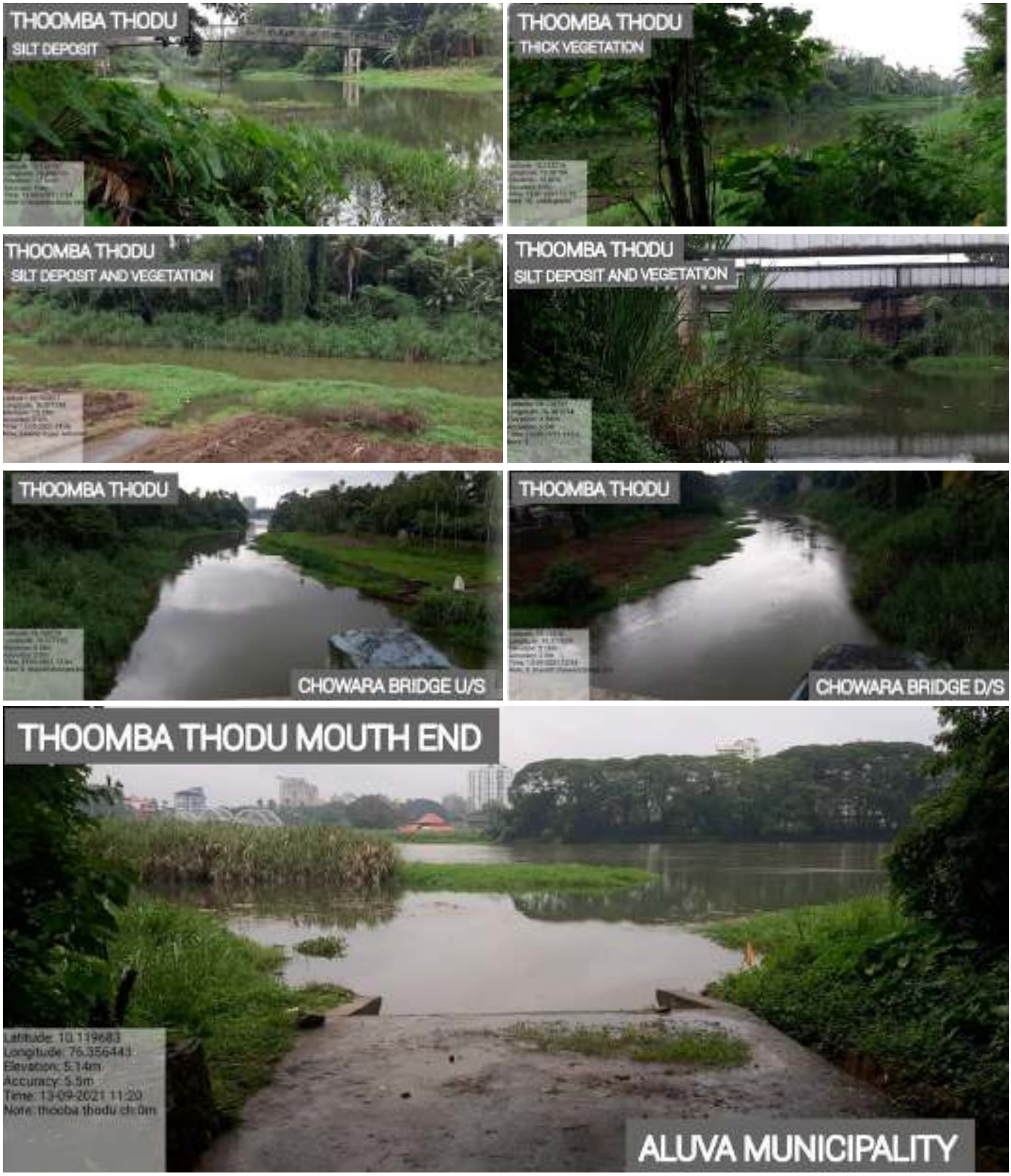
OBSERVATIONS DURING SITE INSPECTION OF THOOMBA THODU

The visual observations of Thoomba Thodu at various locations along its stretch are as detailed below.

At Ch 0.00m

The tributary named as Thoomba thodu starts from Periyar river near Sreemoolanagaram Panchayat and exits to Periyar near Sastha temple in Aluva Municipality at chainage 0.42 km of Mangalappuzha branch of Periyar. The thodu is having an average width of 45 m. But the width of the thodu at the starting point is reduced to 25 m.The thodu has completely silted. Trees are grown on the sides of the thodu. The mouth of the tributary is shown in fig.

view OF THOOMBA THODU



view OF THOOMBA THODU

From Ch.0. km to Ch. 4.4km

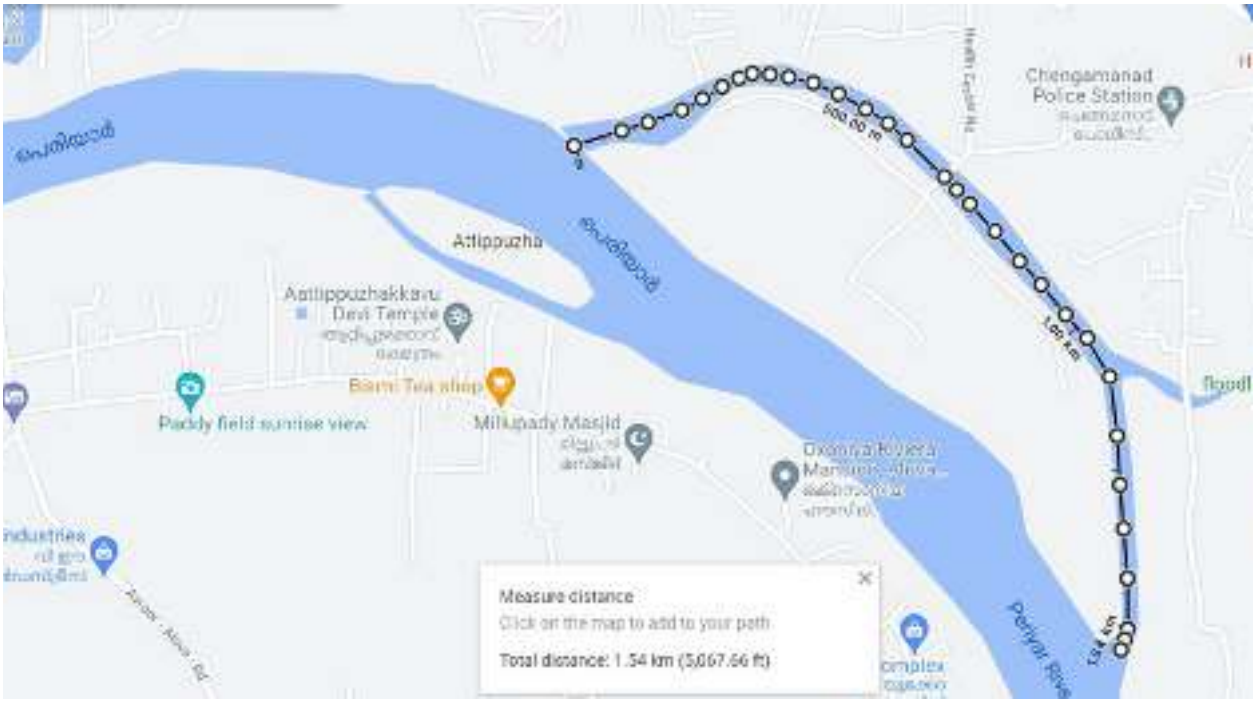
It is seen that the grass and aquatic plants have been grown thickly and their roots firmly grown in to the bed. Due to this the water is stagnant in thoomba thodu throughout the length. Considerable silt is deposited in the thodu .Silt deposit is comparatively higher under the thoomba thodu bridge and chowara bridge.The sides of the thodu are partially protected . The thodu is having an average width of 45 m. The thodu boundary is not visible in most of the locations. The demarcation of thodu boundary is needed to assess the actual width of thodu by comparing it with original land records.The photographs clearly shows the over growth vegetation in the thodu.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing jungle, removing water hyacinth weeds, grass and desilting the thodu are required to be done to regain the capacityof the thodu for sufficient storage of water and easy flow.
- Boundary demarcation to be done and boundaries of the river need to be clearly marked for eviction of encroachments and for preventing further encroachments.

TRIBUTARY OF PERIYAR RIVER (RIGHT BANK) :- KARINTHIRI AAR

GOOGLE MAP OF KARINTHIRI AAR



Introduction:

The Karinthiri Aar is a tributary of Periyar along the right bank of Periyar. It is located in Chengamanad Panchayat . This tributary is 1.54 km long and of average width 30m and has both its starting point and ending point on the right bank of Periyar.It starts from chainage 5.6 km along right bank of Mangalappuzha branch of Periyar and discharges into Periyar at chainage 4.35 km at right bank of Periyar itself.

SALIENT FEATURES

LOCAL BODY	CHENGAMANAD GRAMA PANCHAYATH
LENGTH OF THODU	1.54 Km
WIDTH	VARING FROM 25M TO 60M
AVERAGE DEPTH OF THODU	3M

Karinthiri aar- Present Status

Karinthiri Aar is a 1.54 km long tributary along the right bank of Periyar. The stream is heavily silted up and at many locations silt deposition is observed along the banks of Karinthiri Aar. On this silt deposition area, vegetation is seen overgrown , thus constricting the waterway width. Clearing of vegetation and desilting is necessary to ensure smooth flow through this stream.

Sl no	Chainage	Name of bridge/Culvert
1	0.68km	Kandanthuruth bridge

OBSERVATIONS DURING SITE VISIT OF KARINTHIRI AAR

The following points were observed at various locations along the course of Karinthiri Aar.

Chainage 0km (Near Kozhikka kadavu)

The Karinthiri Aar starts from Periyar near Kozhikka kadavu in Chengamanad Panchayat. There is considerable silt deposition at the mouth portion and along the banks of Karinthiri Aar at this location. Overgrown vegetation over this silt deposition is observed to obstruct free flow of water. Trees are also seen grown adjacent to this sit deposition. The sides are partially protected.

Chainage 0.23 km (At intermediate kadavu)

On both sides of the kadavu , silt deposition and obstructing vegetation is observed. This needs to be cleared

Chainage 0.38 km (Near Panchayat kadavu)

Chainage 0.68 km (near Kandanthuruth bridge)

The portion of Karinthiri Aar near Kandanthuruth bridge is observed to be heavily silted . Silt deposition observed along the banks for approx 10m width over which thick vegetation has flourished , thus obstructing the waterway. This needs to be cleared to restore flow in the stream. There is a pump house situated near the bridge utilising water from this stream for irrigation purpose.

Near Kandanthuruth bridge , plantain cultivation is observed in silt deposited areas along the east side bank. This area is presumably waterway and hence encroachment is suspected. Boundary needs to be demarcated and encroachment if any need to be evicted.

Chainage 1.09 km (Chengal thodu joins Karinthiri aar)

Chengal thodu joins Karinthiri aar from the north side at this location . The Chengal thodu is approximately 25m wide at this joining point. No visible obstruction to flow is noticed at this point.

No instances of waste dposition was observed along the full stretch of Karinthiri Aar. The major problems observed are siltation and presence of obstructing vegetation which is due to lack of regular maintenance.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Desilting and clearing of thickly grown vegetation and trees in the waterway is to be done for restoring flow in the water body.
- Boundary demarcation of the stream is to be done and encroachment if any to be evicted and the stream is to be restore to its oroginal width.
- Regular maintenance is essential for proper upkeep of the stream.

CHENGAL THODU (SUB TRIBUTARY OF KARINTHIRI AAR) (PERIYAR – KARINTHIRI AAR- CHENGAL THODU)

GOOGLE MAP OF CHENGAL THODU

INTRODUCTION:

The Chengal thodu is a sub tributary of Karinthiri Aar at right bank of Periyar in Chengamanad Panchayat. The thodu starts from a marshy field near SFS Airport Royale Apartment, Chengamanad and joins Karinthiri Aar at chainage 1.09 km of Karinthiri Aar. The Chengal thodu is approximately 4.25 km long and is of average width 10m .

SALIENT FEATURES

LOCAL BODY	CHENGAMANAD GRAMA PANCHAYATH
LENGTH OF THODU	4.25 Km
WIDTH	VARYING FROM 6M TO 15M
AVERAGE DEPTH OF THODU	1M TO 5M

The 4.25 km long Chengal thodu is observed to be heavily silted up along its full stretch . The silt deposition along the banks has constricted the width of the thodu and is causing obstruction to free flow . The thodu is observed to be stagnant at many intermediate reaches. At most reaches of thodu , there is no side protection. No waste deposition was observed along the stretch of the thodu.

BRIDGES/CROSSINGS ACROSS CHENGAL THODU

There are 2 nos of bridges across the thodu . They are listed below in the order from starting point of thodu .

Sl no	Chainage	Name of bridge
1	0.48 Km	Parambayam Bridge at National highway
2	4.1 Km	Thalakolli Bridge

OBSERVATIONS DURING SITE INSPECTION OF CHENGAL THODU

The points observed at various locations along the full strtech of Chengal thodu is as detailed in the photos below.

Chainage 0.46 km (Near Parambayam bridge)

The reach of Chengal thodu near Parambayam bridge is observed to be silted up . Due to silt deposition along banks, the width of waterway is reduced. Obstructing vegetation also observed to be flourishing over silt deposition area near banks .

Desilting and removal of obstructing vegetation is essential for restoring obstruction-free flow in the thodu.

Chainage 3.28 km(Near Puthenkadavu LIS)

There is a lift irrigation Scheme under Minor Irrigation at this location which is intended to utilise water from Chengal thodu for irrigating cultivation areas in Chengamanad Panchayat.

Chainage 3.65 km (Near Erayil Concrete bricks Shopping mall)

There is no visible obstruction to flow at this location and the water in the thodu appears clear in this stretch.

Chainage 3.75 km (Near Chengamanad Puthuvassery road)

Chainage 4.1 km (Near Thalakolli bridge)

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing thick obstructing vegetation on both sides of the thodu and desilting is essential for restoring flow in the thodu

- Boundary demarcation of the entire stretch of thodu is to be carried out for the purpose of evictinhg encroachment, if any, and for restoring the original width of the thodu

- Regular maintenance of the thodu is essential for maintaining the thodu in healthy condition

Puthenthodu
Periyar (Rightbank)-Karinthiri Aar-Chengal thodu- Puthen thodu

GOOGLE MAP OF PUTHEN THODU

BRIDGES/CROSSINGS ACROSS PUTHENTHODU

There are 2no of bridges across the thodu . They are listed below in the order from starting point of thodu .

Sl no	Chainage	Name of bridge
1	0.56 km	Bridge on Angamaly- Manjaly road
2	1.68 km	Panayakadavu bridge

OBSERVATIONS DURING SITE INSPECTION :

The following points are observed at various locations along the stretch of Puthen thodu.

At Ch 0.00m (Starting from marshy field, Chengamanad)

The Puthen thodu starts from a marshy field near C hengamanad Mahadevar temple and flows southwards to join Chengal thodu near Panayakadavu bridge. The thodu is heavily silted up at the starting reach . The stream is infested with weeds and vegetation and the water is not clear. The thodu is observed to be stagnant due to heavy siltation. The thodu is approximately 5m wide at this location.

Chainage 1.68 km (Near Panayakadavu bridge)

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- The entire length of thodu is to be desilted and obstructing vegetation in waterway to be cleared
- Boundary demarcation to be done for evicting possible encroachments and for restoring original width of the thodu
- Regular maintenance is essential for maintaining obstruction-free flow in the thodu.

Tributary of PeriyarRiver (Right bank):- CHERIYATHEKKANAM THODU

GOOGLE MAP OF CHERIYATHEKKANAM THODU

ntroduction:

The 1.05 km long Cheriyathekkanamthodu starts from ch . 20.62 km of Manjalythodu and discharges into Periyar at ch11.32 km along right bank of Mangalappuzha branch of Periyar. As the mouth of thodu is at the upstream side of Purappillykavu regulator, salt intrusion from Periyar to this thodu can be controlled.Thethodu is observed to be free of pollution. There is unobstructed flow of water through the thodu. The sides of the thodu are partially protected.

SALIENT FEATURES

LOCAL BODY - KUNNUKARA GRAMA PANCHAYATH
LENGTH - 1.05km
WIDTH -VARING FROM 15m to 40m
AVERAGE DEPTH OF WATER -1.2m TO 2.2m

Bridge / crossings across Cheriyathekkanamthodu

Sl No	Chainage	Name of bridge
1	Ch 0.7 km	Karakkathuruth bridge

OBSERVATIONS DURING SITE INSPECTION:

The following observations were made during at various locations along the course of thodu .

Chainage 0 km (Start of Cheriyathekkanamthodu)

The Cheriyathekkanamthodu starts from Manjalythodu at GPS location 10.153724, 76.280958 from the east side of Cheriyathekkanam bridge across Manjalythodu. The thodu is approximately 35m wide at the starting point. No obstruction to flow noticed and the water in thodu also appears clear.

Chainage 0.7 km (Near Karakkathuruth bridge)

At 700m downstream from start of Cheriyathekkanamthodu , Karakkathuruth bridge is located across the thodu.There is a small Kadavu near bridge. No obstruction to flow in thodu observed at this location.

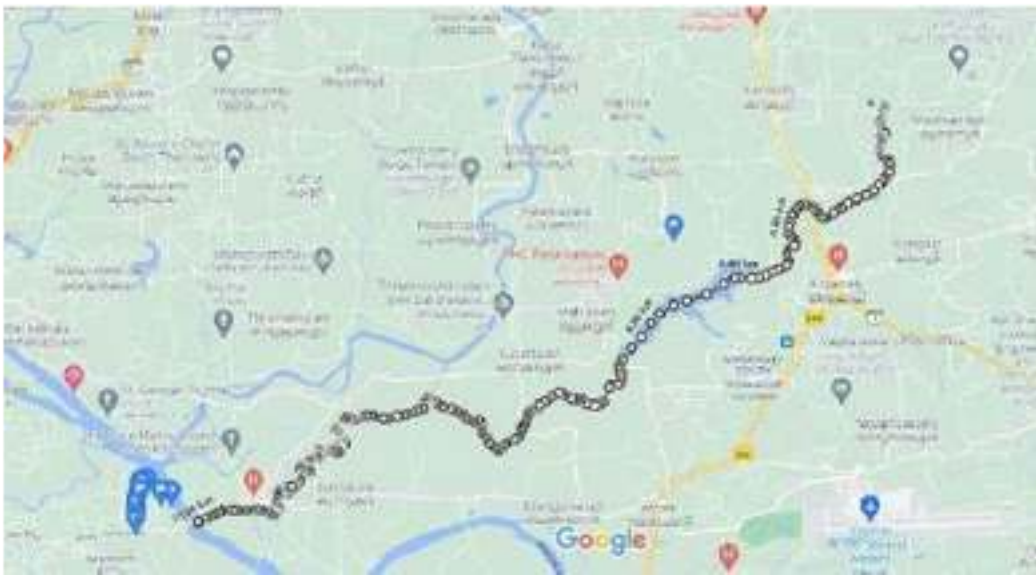
Chainage 1.05 km (Mouth of Cheriyathekkanamthodu)

The Cheriyathekkanamthodu discharges into Periyar at east side of Purappillykavu regulator bridge. The flow through the thodu is unobstructed.No waste deposition observed along the banks of the thodu . Salt water intrusion into Cheriyathekkanamthodu is kept under control by Purappillykavu regulator bridge.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

• Regular maintenance of the thodu is essential for preventing overgrowth of vegetation along its banks and also for ensuring unobstructed flow through the thodu

Tributary of Periyar River (Right bank):- MANJALY THODU



GOOGLE MAP SHOWING MANJALY THODU IN PUTHENVELIKKARA

Manjaly thodu – Introduction

Manjaly thodu starts from Mookkannoor near Angamaly and discharges into Periyar near Manjaly in Kunnukara Panchayat at ch 12.9 km of Mangalappuzha branch of Periyar. The length of Manjaly thodu from its starting point near Puthenpalam bridge on Mookkannoor- Ezhattumugham road to its mouth at Manjaly is approximately 21.6 km . In the past, Manjaly thodu was important inland waterway which connected Angamaly to the bustling trade town Paravur.The thodu facilitated transport of goods to and fro to Fort Kochi. The waterway helped to develop Angamaly as the ancient Muziris trade centre. The thodu was rich in fish resources also. Due to urbanisation along its banks and development of new roads, water transport lost its shine and since then, the thodu is in a neglected condition. Due to encroachment and silt deposition , the width of the thodu has reduced over years. The major sub streams of Manjaly thodu are Puthen thodu, Kanakka thodu and Cheriyathekkanam thodu.

SALIENT FEATURES OF MANJALY THODU

LENGTH : 21.6 km
WIDTH : Average width 15m
AVERAGE DEPTH OF WATER : 0.7m to 1.5m
LOCAL BODY CONCERNED :Kunnukara, Nedumbassery, Parakkadavu,Mookkannoor Panchayats, Angamali Municipality

The 21.6 km long Manjaly thodu has lost its past significance as an inland waterway. Due to lack of maintenance, the thodu is found to be heavily silted along its reach. Siltation has reduced the carrying capacity of the thodu to a great extent. The banks of the thodu are observed to be eroded and are almost at mean water level .This will result in flooding in adjacent areas even during moderate rains. There are reportedly vast encroachments along its banks. This precious water body needs a complete rejuvenation by means of desilting, clearing vegetation obstructions and by providing bank protection.

Sl no	Chainage	Name of bridge/crossing
1	0 km	Puthenpalam bridge on Karukutty- Mookkannoor road
2	1.63km	Bharaniparambu bridge on Mookkannoor- Ezhattumugham road
3	3.48 km	Kothakulangara bridge
4	4.16km	Angamaly walkway bridge
5	4.96 km	Bridge on Angadikadavu road
6	5.42 km	Manjali railway bridge
7	8.9 km	Madhurapuram bridge on Athani Mekkad Elavoor road
8	9.63 km	Alunkakadavu bridge
9	12.06 km	Chundanthuruth bridge on Aluva- Mala road
10	15.12 km	Oozhamkadavu bridge
11	19.7km	Bridge on Angamaly- Manjaly road
12	19.78km	Chalakka Korenkadavu Bridge on Athani-Paravoor road near Ryan School
13	20.72km	Cheriyathekkanam bridge

Sub tributaries of Manjaly thodu

The starting chainage 0km of Manjaly thodu is taken at Puthenpalam bridge on Karukutty-Mookkannoor road in Mookkannoor Panchayat and the end chainage 21.6km near its mouth at Periyar in Kunnukara Panchayat The major sub tributaries of Manjaly thodu viz Puthen thodu, Kanakka thodu and Cheriyathekkanam thodu discharges into Manjaly thodu at chainages 14.56km, 18.06 km and 20.62 km of Manjaly thodu respectively.

OBSERVATIONS DURING SITE INSPECTION OF MANJALY THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0 km (Puthenpalam bridge, Mookkannoor)
The Manjaly thodu starts from Thonnamakkam thodu near Puthenpalam bridge in Mookkannoor Panchayat and flows towards south . The thodu is approximately 6m wide at this location. The water in the thodu is observed to be clear . The thodu passes amidst fields at this location. No obstruction to flow observed at this location.

Chainage 1.63 km (Bharaniparambu bridge on Mookkannoor- Ezhattumugham road)

This portion of Manjaly thodu is located in Mookkannoor Panchayat. Due to heavy siltation, the depth of the thodu is very less. The water is observed to be clear . There is also a lift irrigation scheme adjacent to this location utilising water from Manjaly thodu.

Chainage 3.48 km (Kothakulangara bridge)

Silt deposition and obstructing vegetation observed in Manjaly thodu at Kothakulangara bridge portion. The condition of thodu at the time of site visit is as detailed in pictures below.

Chainage 4.16 km (Angamaly walkway bridge)

The reach of Manjaly thodu at this location is fully infested with overgrown vegetation and silt deposition, thus constricting the waterway width. Due to this, the carrying capacity of thodu is very less. Desilting and removal of vegetation is essential to restore waterway to its full capacity and to ensure unobstructed flow at this location.

Chainage 4.96 km (Near Angadikadavu road)
Near Angadikadavu bridge in Angamaly across Manjaly thodu, intense infestion of weeds and vegetation is observed in waterway. The thodu is of average 35 m width at this location. However due to heavy siltation, water carrying capacity is less.

Chainage 5.42 km (Manjali railway bridge, Angamali)
Rail line crosses Manjaly thodu at North Champannoor area in Angamaly. At the location of rail bridge, the Manjaly thodu is approximately 60m wide. The waterway is seen obstructed by water weeds and vegetation. The bank height is also observed to be low at this location.

Chainage 8.9km (Madhurapuram bridge on Athani Mekkad Elavoor road)

The portion of Manjaly thodu towards the south side of this bridge for a length of approx 3km ie upto Chundamthuruth bridge at ch 12.06 km is the worst affected by infestation of water weeds, vegetation and silt deposition.

Chainage 9.63km (near Alunkakadavu bridge, Nedumbassery)

At Alunkakadavu bridge portion also, the reach of Manajalipuzha is fully obstructed by vegetation and silt deposition. The adjacent areas of the thodu are low lying area and the bank height is very low. Hence it is difficult to identify the course of the thodu from the adjacent low lying fields. Due to siltation , the water carrying capacity of the thodu is very less

Chainage 12.06km (Chundamthuruth bridge on Aluva- Mala road)

At this location, the Manjaly thodu forms the border between Parakadavu and Nedumbassery Panchayats. As the bank height is low, the course of the thodu is seen merged with the adjacent low lying areas. Overgrown vegetation , water weeds and siltation also observed blocking the flow at this location.

Chainage 15.12km (Near Oozhamkadavu bridge, Kunnukara) This location comes under ward 2 of Kunnukara Panchayat. The thodu is approximately 20m wide at this location. Due to low bank height, the thodu is seen merged with nearby low lying fields. Water weed infestation, overgrown vegetation and silt deposition obstructing flow observed at this location.

Chainage 17.515 km(Near Kalathikadavu,Kunnukara)

The Kalathikadavu portion of Manjaly thodu is located in ward 15 of Kunnukara Panchayat. The thodu is of average width 14m at this location. The bank height is observed to be very low which makes the adjacent areas prone to flooding in rainy season. The side protection near kadavu is also observed to be damaged. The reach of thodu is seen heavily silted up.

Chainage 18.28 km (Near Manayipalli kadavu, Kunnukara)

The Manjali thodu is approximately 18m wide at this location. It is located in ward 10 of Kunnukara Panchayat.The sides of the thodu are not protected. The banks are seen at par with water level. There are fields on either side of the thodu. Due to lack of maintenance , there is considerable silt deposition and water hyacinth at this location . The adjacent areas of the thodu were severely affected during 2018 floods. The thodu needs to be desilted and bank height to be raised to mitigate the effects of flooding in adjacent areas.

Chainage 18.555km (Intermediate location in Kunnukara)

At this location, the Manjaly thodu passes near agricultural fields in Kunnukara Panchyat. The thodu is approximately 15m wide at this location . The water in thodu at this location is observed to be clear. No waste deposition or pollution observed in this stretch.

Chaiange 19.7 km (Bridge on Angamali- Manjaly road)

Beneath the bridge at this location , there are remnants of bund constructed across Manjaly thodu. The flow through the thodu is seen obstructed at this location. Only the water above the bund level is seen overflowing . To ensure free flow through the thodu and to prevent flooding at upstream side , this obstructing bund and posts in waterway need to be cleared.

Chainage 19.78km (Near Chalakka Korenkadavu bridge, Kunnukara)

Manjaly thodu is approximately 20m wide at this location. There is no visible pollution and water in the thodu is clear at this location. Thick vegetation on banks slanting towards waterway and partially obstructing the flow in thodu is observed to the south side of this bridge. To the south side of Chalakka Korenkadavu bridge, a link thodu joins Manjaly thodu from east side near Ryan School, Kunnukara. The link thodu is approx 1.5 km long and average 3m wide starts from padasekharam and discharges into Manjaly thodu at south side of Ryan School, Kunnukara.

Chainage 20.72km (Near Cheriyathekkanam bridge)

There is a sluice -cum bridge across Manjali thodu at this location. The sluice is intended to prevent salt water intrusion from Periyar into Manjali thodu. But the sluice is age old and is not functional presently. This sluice needs to be reconstructed or a new sluice may be constructed at a suitable location near to the exit of Manjaly thodu at Periyar. Water hyacinth and obstructing vegetation to water flow also observed at this location.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing vegetation and desilting of thodu to be done for the full length of Manjaly thodu
- At most locations the banks of the thodu are seen eroded and bank height is observed to be very less and is almost at par with water level in the thodu. This increases chances of flooding in adjacent areas. The thodu is to be desilted and earthen bunds of sufficient height to be formed on either banks of the thodu using the excavated spoil which maybe further kept intact by fixing coir geotextiles.
- The non functional Cheriyathekkanam sluice-cum-bridge at ch 20.72km of Manjaly thodu is to be reconstructed.
- Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width.
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Sub Tributary of Manjaly thodu (Rightbank) :- PUTHEN THODU

GOOGLE MAP SHOWING PUTHENTHODU IN KUNNUKARA

Puthenthodu - Present status

Puthenthodu – Introduction

The Puthenthodu in Kunnukara Panchayat connects Chalakudy river and Manjaly thodu (a tributary of Periyar) . The thodu is approximately 0.785 km long . The width of the thodu varies from 8m to 15m along various locations along its course. The thodu facilitates to drain off storm water from theAyroor area in Kunnukara Panchayat.

SALIENT FEATURES OF PUTHENTHODU

LENGTH : 0.785 km
WIDTH : VARYING FROM 8M TO 15M
AVERAGE DEPTH OF WATER : 0.5 M TO 1M
LOCAL BODY CONCERNED : KUNNUKARA PANCHAYAT

The Puthenthodu in Kunnukara Panchayat connects Chalakudy river and Manjaly thodu . The thodu is found to be heavily silted and obstructed by overgrown vegetation

due to lack of maintenance. Siltation , water weeds and overgrowth of vegetation inside thodu boundary has obstructed smooth flow in the thodu. There is no side protection in most reaches of the thodu . The thodu is completely blocked at an intermediate location due to sliding of sides. Hence the flow is completely obstructed and the thodu is stagnant on either sides of this obstructing portion.Presence of overgrown vegetation is observed in full reach of the thodu .

Bridges/crossings across Puthenthodu

Sl no	Chainage	Name of bridge/crossing
1	Ch 0.22km	Bridge on Aluva- Mala road

OBSERVATIONS DURING SITE INSPECTION OF PUTHENTHODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0km (Near Starting point of Puthenthodu)

The Puthenthodu starts from Chalakudy river near Veliyathuparamban road in Ayroor area in Kunnukara Panchayat. The thodu is approximately 8m wide at its starting point . The flow through the thodu is obstructed by vegetation and silt deposition. Clearing of vegetation and desilting of thodu along its entire stretch is required for restoring flow in the thodu.

Chainage 0.22 km (near Bridge on Aluva- Mala road)

At the location of Ayroor bridge, the thodu is approximately 10m wide. Thick and overgrown vegetation observed to be causing hndrance to flow. Regular clearing is essential for the proper upkeep of the thodu.

Chainage 0.42 km(obstruction to flow near Chettapadam road)

The bank height of the thodu is high approx 6m at this location. The width of the thodu at this location is approximately 15m. Side of the thodu has eroded and split apart as a large block and has fallen into the middle of the waterway causing complete blockage. Presently, vegetation is seen grown all over the blockage portion . This blockage needs to be removed and flow is to be restored in the thodu.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing vegetation and desilting of thodu need to be done to restore flow in the thodu
- The eroded portion of the bank which has slided into the waterway at ch 0.42 km needs to be completely removed so as to restore flow in the thodu.
- Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Sub Tributary of Manjaly thodu (Rightbank) :- KANNAKKA THODU

GOOGLE MAP SHOWING KANNAKKA THODU IN KUNNUKARA

Kannakka thodu –Introduction

The Kannakka thodu in Kunnukara Panchayat connects Chettikad thodu (a tributary of Chalakudy river) and Manjaly thodu (a tributary of Periyar) . The thodu is approximately 1.4 km long . The width of the thodu varies from 3m to 15m along various locations along its course. The thodu facilitates to drain off storm water from the Chalakka area in Kunnukara Panchayat.

SALIENT FEATURES OF KANNAKKA THODU

LENGTH : 1.4 km
WIDTH : VARYING FROM 3M TO 18M
AVERAGE DEPTH OF WATER : 0.5 M TO 1M
LOCAL BODY CONCERNED :KUNNUKARA PANCHAYAT

Kannakka thodu - Present status

The Kannakka thodu in Kunnukara Panchayat starts from ch 1.47 km of Chettikad thodu and joins Manjaly thodu at its chainage 18.06 km . The thodu is found to be heavily silted and obstructed by overgrown vegetation due to lack of maintenance. Siltation , water weeds and overgrowth of vegetation inside thodu boundary has significantly reduced the carrying capacity of the thodu. This will obstruct drainage of flood water during rainy season and may

cause flooding in adjacent areas. There is no side protection in most reaches of the thodu . The thodu is stagnant in most reaches due to siltation and due to the presence of overgrown vegetation.

Bridges/crossings across Kannakka thodu

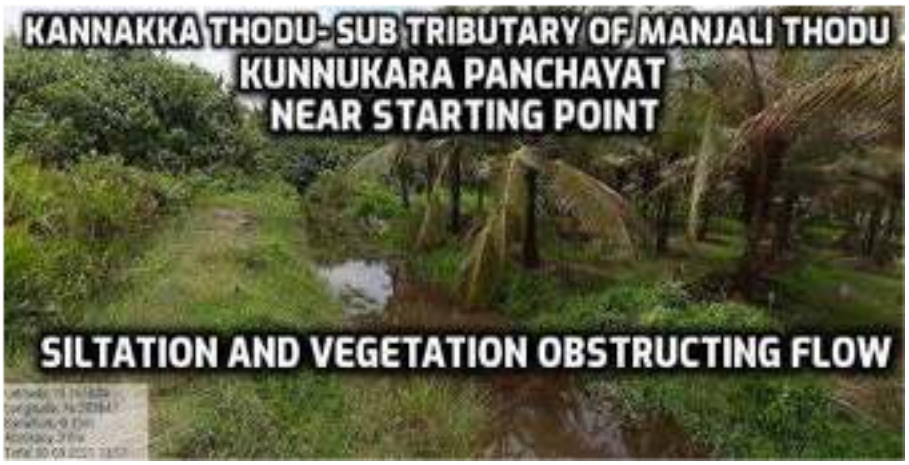
Sl no	Chainage	Name of bridge/crossing
1	Ch 0.7km	Culvert on byelane to Chalakka Kuthiathode road
2	Ch 1 km	Bridge on Chalakka Kuthiathode road

OBSERVATIONS DURING SITE INSPECTION OF KANNAKKA THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0.060 km (Near Starting point of Kannaka thodu)

The Kannakka thodu near its starting point from Chettikad thodu is only3m wide. The flow through the thodu is obstructed by vegetation and silt deposition. The carrying capacity of the thodu is also very less and during rainy season the adjacent areas are at the risk of flooding. The thodu is in a diminishing stage. Clearing of vegetation and desilting of thodu along its entire stretch is required for restoring flow in the thodu.



Chainage 1.00 km(Near Chalakka Kuthiathode road)

The course of the thodu is through marshy fields in Kunnukara . At ch 1km , the thodu crosses Chalakka Kuthiathode road. The width of the thodu at this location is approximately 18m. The thodu is completely obstructed by water weeds and vegetation at this location. Due to lack of maintenance, there is considerable silt deposition in the thodu. Beyond this point, the thodu further flows southwards and joins Manjaly thodu.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing water weeds, vegetation and desilting of thodu for its full stretch need to be done to restore flow in the thodu.
- Due to lack of maintenance of thodu , encroachments are suspected at many parts of the thodu . Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Sub Tributary of Periyar(Right bank) :- Chalakudy river

CHALAKUDY RIVER – Introduction

Chalakkudy River is the fifth longest river in Kerala. The Chalakkudi River is formed by the confluence of five streams, Parambikulam, Kuriarkutty, Sholayar, Karappara and Anakkayam, all of them originating in the Anamalai Hills of the Western Ghats . After the confluence of these tributaries, the main river flows west across forested hills and agricultural valleys and wetlands joined by various tributaries and numerous rivulets en route such as Anakkayam thodu, Charpa thodu, Kannankuzhi thodu, Kappa thodu, Parayan thodu, Alamattom thodu etc. The river flows through forested tracts upto Athirappilly waterfalls from where it enters the midlands and plains, taking a tortuous course to join the right arm of Periyar river at Elanthikkara and and finally Joins Kodungallur Backwaters before it drains into the Arabian Sea .
The Chalakudy river flows through Palakkad,Thrissur and Ernakulam districts of Kerala. The total drainage area of the river is 1704 km2. out of this 1404 km2 lies in Kerala and the rest 300 km2 in Tamil Nadu. The famous waterfalls, Athirappilly Falls and Vazhachal Falls, are situated on this river. The hydro electric projects on Chalakkudy River are Sholayar Hydro Electric Project and Peringalkuttu Hydro Electric Project. For irrigation purposes Thumboormoozhy weir is constructed across this river. Chalakudy River Diversion Scheme (CRDS) is a major irrigation project intended for irrigation of cultivable land in the Ernakulam and Thrissur districts. Numerous drinking water schemes and lift irrigation schemes are also dependent on the river .

SALIENT FEATURES OF CHALAKUDY RIVER

LENGTH : 145.5 km
WIDTH : VARYING FROM 15M TO 45M
AVERAGE DEPTH OF WATER : 1.2 M TO 2.5M
LOCAL BODY NEAR CHALAKUDY RIVER- PERIYAR CONFLUENCE POINT : PUTHENVELIKKARA, KUNNUKARA PANCHAYATS

OBSERVATIONS DURING SITE INSPECTION OF CHALAKUDY RIVER NEAR ITS MOUTH AT PERIYAR

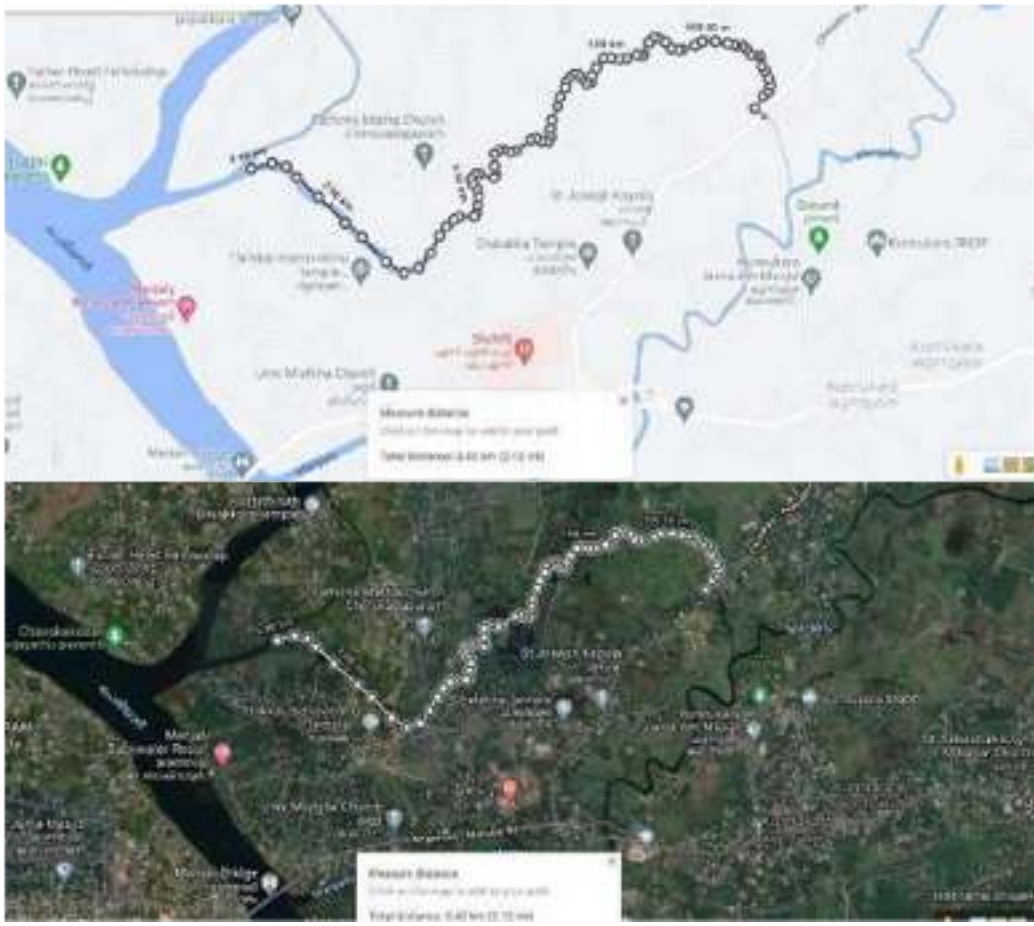
The Chalakudy river joins Periyar at chainage 14.3 km of Mangalappuzha branch of Periyar along right bank of Periyar near Puthenvelikara. The Chalakudy river is approximately 100m wide at its mouth at Periyar . No visible obstruction to flow was noticed in Chalakudy river in this area during site inspection.The Puthenvelikkara and Kunnukara Panchayats located in the immediate vicinity of the confluence point of Chalakudy river and Periyar river are under the threat of flooding in heavy rainfall periods.

NOTE:

Study on Chalakudy river. and its sub streams are being carried out separately. Hence during site inspection, the areas adjacent to the confluence point of Chalakudy river with Mangalappuzha branch of Periyar near Puthenvelikkara were only explored.

Sub Tributary of Chalakudy river (Right bank) :- CHETTIKAD THODU

GOOGLE MAP SHOWING CHETTIKAD THODU IN KUNNUKARA



SATELLITE VIEW CHETTIKAD THODU IN KUNNUKARA

Chettikad thodu – Introduction

The Chettikad thodu in Kunnukara Panchayat starts from Kannakka thodu near north-west side of Chalakka- Kuthiathode road and joins to a link of Chalakudy river near Kozhithuruth . The thodu is approximately 3.4 km long . The width of the thodu varies from 8m to 40m along various locations along its course. The thodu facilitates to drain off storm water from the Chalakka and Cherukadappuram areas in Kunnukara Panchayat.

SALIENT FEATURES OF CHETTIKAD THODU

LENGTH : 3.4 km
WIDTH : VARYING FROM 10M TO 40M
AVERAGE DEPTH OF WATER : 0.8 M TO 2M
LOCAL BODY CONCERNED :KUNNUKARA PANCHAYAT

Chettikad thodu - Present status

The 3.4 km long Chettikad thodu in Kunnukara Panchayat starts from ch 0.97 km of Kannakka thodu at north west side of Chalakka Kuthiathode road bridge and joins Chalakudy river near Kozhithuruth . The initial reach of the thodu found to be passing through marshy fields is heavily silted and obstructed by overgrown vegetation due to lack of maintenance. Siltation , water weeds and overgrowth of vegetation inside thodu boundary has significantly reduced the carrying capacity of the thodu in the initial reaches . But towards its exit to a link of Chalakudy river, the thodu is observed to be wider . The water in the thodu is also clear . No pollution or waste deposition was observed along the reach of the thodu. Cultivation of plantain , vegetables etc were observed along the banks of the thodu.

Bridges/crossings across Chettikad thodu

Sl no	Chainage	Name of bridge/crossing
1	Ch 2.34 km	Cherukadapuram Bridge

OBSERVATIONS DURING SITE INSPECTION OF CHETTIKAD THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0.0km (Starting point near west side of Chalakka – Kuthiathode road)

The Chettikad thodu starts from Kannakka thodu at north west side of bridge on Chalakka Kuthiathode road . The thodu is of average width 10m at the starting point. The flow through the thodu is obstructed by water hyacinth, vegetation and silt deposition. Regular maintenance and clearing of water hyacinth is required to maintain flow in the thodu.

Chainage 2.34 km (near Cherukadappuram bridge)

There is a sluice-cum-bridge at this location. This sluice is intended to prevent salt water intrusion from Periyar into the cultivation fields in Kunnukara. On either side of the bridge, thick vegeation is seen inside the waterway of thodu causing hindrance to flow

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

- Clearing of obstructing vegetation and desilting of thodu need to be done to restore flow in the initial reach of thodu for a length of 2.5km
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Tributary of PeriyarRiver :- Pandipadam Thodu

GOOGLE MAP SHOWING PANDIPADAM THODU IN PUTHENVELIKKARA

Pandipadam thodu– Introduction

The Pandipadam thodu in Puthenvelikkara Panchayat starts from Thanthonnichira and discharges into Periyar near ch. 15.15 km of Mangalappuzha branch of Periyar at its right bank. The thodu is approximately 1.3 km long . The width of the thodu varies from 2m to 6m along various locations along its course. The thodu facilitates to irrigate agricultural fields in Pandipadam area of Puthenvelikkara Panchayat.

SALIENT FEATURES

LOCAL BODY	PUTHENVELIKKARAPANCHAYAT
LENGTH OF THODU	1.30 km
WIDTH	VARYINGFROM 2M TO6M
AVERAGE DEPTH OF THODU	0.8 M TO 1.2M

Present status

Major portion of Pandipadam thodu is found to pass through agricultural fields. The thodu is found to be in silted condition due to lack of maintenance. Siltation has significantly reduced the carrying capacity of the thodu. This will obstruct drainage of flood water during rainy season and may cause flooding in adjacent areas. There is no side protection in most reaches of the thodu and the existing side protection is found to be damaged. No sort of pollution or waste deposition was observed along the stretch of thodu during site inspection.But the thodu is stagnant in most reaches due to siltation and due to the presence of overgrown vegetation.

Bridges/crossings across Pandipadam thodu

Sl no	Chainage	Name of bridge/crossing
1	Ch 0 km	Culvert near Thanthonnichira
2	0.38 km	Culvert on padasekharam road
3	0.705 km	Culvert on Pandipadam- Choukakadavu road
4	1.14 km	Culvert on byelane of Choukakadavu road

OBSERVATIONS DURING SITE INSPECTION OF PANDIPADAM THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0 km (Thanthonnichira, Puthenvelikkara)

The Pandipadam thodu starts from Thanthonnichira in Puthenvelikkara Panchayat. The Thanthonnichira is approximately 1 hectare in area and is located near Choukakadavu road in Puthenvelikkara. The Pandipadam thodu starts from the north-west corner of Thanthonnichira and flows towards west and then turns south.

Periyar

The starting portion of Pandipadam thodu is observed to be infested with water weeds and vegetation. Heavy silt deposition is also observed in this reach . Hence the water at this location is stagnant. Clearing of water weeds and vegetation and desilting is required to be done to ensure free flow of water .

Chainage 0.705 km (Near Pandipadam – Choukakadavu road)

At this location, the thodu passes through Pandipadam agricultural fields. The width of the thodu varies from 2m to 4m . The thodu is observed to be silted and of low carrying capacity. Temporary provision of earthern bund for preventing salt water intrusion into agricultural fields was observed near the culvert across thodu on Pandipadam- Choukakadavu road.

Chainage 1.14km (Near Culvert on byelane of Choukakadavu road)

The Pandipadam thodu discharges into Periyar at the south side of this location. The reach of thodu at this location is also silted and has poor carrying capacity. Thick vegetation obstructing flow is also observed in this stretch.

A sub thodu of approx. length 600m coming from Choukakadavu area joins Pandipadam thodu at this location. The sub thodu is also heavily silted and obstructing vegetation is also observed in this thodu .

PANDIPADAM THODU- ACTION TO BE TAKEN

• Clearing of water weeds, vegetation and desilting of thodu need to be done on a regular basis to maintain obstruction free flow through the thodu
• The Thanthonnichira at the starting point of the thodu also requires cleaning and desilting.

Tributary of Periyar River (Right bank) :- Kuttikattupallam Thodu

GOOGLE MAP SHOWING KUTTIKATTUPALLAM THODU IN PUTHENVELIKKARA

SALIENT FEATURES

LOCAL BODY	PUTHENVELIKKARAPANCHAYAT
LENGTH OF THODU	0.22 km
WIDTH	VARYINGFROM 1.5M TO 3M
AVERAGE DEPTH OF THODU	0.15M TO 0.5M

Kuttikattupallam thodu – Introduction

The Kuttikattupallam thodu in Puthenvelikkara Panchayat starts from the premises of Kadavil temple at east side of Station Kadavu Malavana road and discharges into Periyar near ch. 15.38 km of Mangalappuzha branch of Periyar at its right bank. It is located in ward 11 of Puthenvelikkara Panchayat. The thodu is approximately 0.22 km long . The width of the thodu varies from 1.5m to 3m along various locations along its course. The thodu facilitates to drain off storm water from the residential area on the north side of Station Kadavu – Malavana road .

Kuttikattupallam thodu - Present status

The Kuttikkattupallam thodu starts from near the premises of Kadavil temple in Puthenvelikkara Panchayat and flows southwards and crosses the Station Kadavu-Malavana road and discharges into Periyar.The width of the thodu at many locations along its course is found to be very less. The thodu is found to be heavily silted and obstructed by overgrown vegetation due to lack of maintenance. Siltation and overgrowth of vegetation inside thodu boundary has significantly reduced the carrying capacity of the thodu. This will obstruct drainage of flood water during rainy season and may cause flooding in adjacent areas. There is no side protection in most reaches of the thodu.No sort of pollution or waste deposition was observed along the stretch of thodu during site inspection.But the thodu is stagnant in most reaches due to siltation and due to the presence of overgrown vegetation. The thodu is found to be in a diminishing stage. Regular maintenance and rejuvenation of the thodu is essential for its survival.

Bridges/crossings across Kuttikattupallam thodu

Sl no	Chainage	Name of bridge/crossing
1	Ch 0.16 km	Culvert across Station Kadavu- Malavana road

OBSERVATIONS DURING SITE INSPECTION OF KUTTIKATTUPALLAM THODU

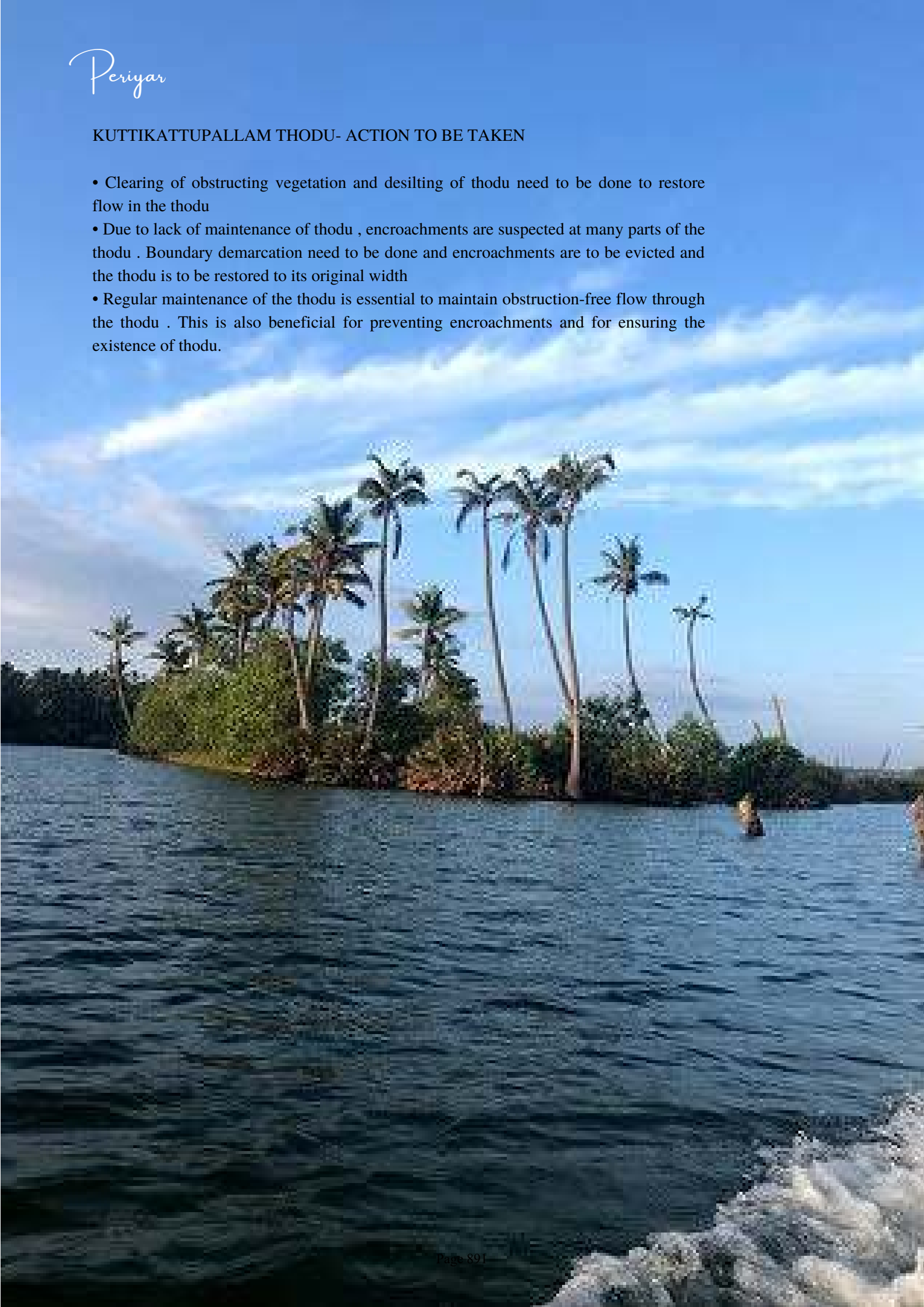
During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0.16 km (Near Station Kadavu- Malavana road)

The Kuttikattupallam thodu at this location is only 2m wide. The flow through the thodu is almost completely obstructed by vegetation and silt deposition. The carrying capacity of the thodu is also very less and during rainy season the adjacent areas will be at the risk of flooding. The thodu is in a diminishing stage. Clearing of vegetation and desilting of thodu along its entire stretch is required for restoring flow in the thodu.

KUTTIKATTUPALLAM THODU- ACTION TO BE TAKEN

• Clearing of obstructing vegetation and desilting of thodu need to be done to restore flow in the thodu
• Due to lack of maintenance of thodu , encroachments are suspected at many parts of the thodu . Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width
• Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.



Tributary of Periyar River (Right bank) :- Payikattupallam Thodu

GOOGLE MAP SHOWING PAYIKATTUPALLAM THODU IN PUTHENVELIKKARA

Payikattupallam thodu – Introduction

The Payikattupallam thodu in Puthenvelikkara Panchayat starts from Thondal thoduand discharges into Periyar near ch. 15.71 km of Mangalappuzha branch of Periyar at its right bank. It is locally known as Vaidyasalapallam thodu . It is located in ward 11 of Puthenvelikkara Panchayat. The thodu is approximately 0.45 km long . The width of the thodu varies from 1.5m to 3m along various locations along its course. The thodu facilitates to drain off storm water from the residential area on the north side of Station Kadavu – Malavana road .

SALIENT FEATURES

LOCAL BODY	PUTHENVELIKKARA PANCHAYAT
LENGTH OF THODU	0.45 km
WIDTH	VARYINGFROM 1.5M TO 3M
AVERAGE DEPTH OF THODU	0.15M TO 0.5M

Payikattupallam thodu - Present status

The Payikkattupallam thodu / Vaidyasalapallam thodu starts from Thondal thodu at approximately 240m south side of Thondal bridge.The width of the thodu at the starting reach and many locations along its course southwards upto Periyar is found to be very less. Encroachment will have to be verified by carrying out boundary demarcation. The thodu is found to be in silted and obstructed by overgrown vegetation including trees due to lack of maintenance. Siltation and overgrowth of vegetation inside thodu boundary has significantly reduced the carrying capacity of the thodu. This will obstruct drainage of flood water during rainy season and may cause flooding in adjacent areas. There is no side protection in most reaches of the thodu.No sort of pollution or waste deposition was observed along the stretch of thodu during site inspection.But the thodu is stagnant in most reaches due to siltation and due to the presence of overgrown vegetation. The thodu is found to be in a diminishing stage. Regular maintenance and rejuvenation of the thodu is essential for its survival.

Bridges/crossings across Payikattupallam thodu

Sl no	Chainage	Name of bridge/crossing
1	Ch 0.39 km	Culvert across Station Kadavu- Malavana road

OBSERVATIONS DURING SITE INSPECTION OF PAYIKATTUPALLAM THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0.35 km (East side of Station Kadavu- Malavana road)

The Payikattupallam thodu at this location is only 2m wide. The thodu is observed to be full of vegetation including small trees. The flow through the thodu is almost completely obstructed by vegetation and silt deposition. The carrying capacity of the thodu is also very less and during rainy season the adjacent areas will be at the risk of flooding. The thodu is in a diminishing stage. Rejuvenation of the thodu is essential.

Chainage 0.39 km (Near Station Kadavu- Malavana road)

At this location , the thodu crosses the Station kadavu- Malavana road through a culvert. Due to lack of maintenance the entire reach of thodu is obstructed by vegetation and silt deposition. As a result, carrying capacity of the thodu is very less and water depth is observed to be very less, approx 15cm.

PAYIKATTUPALLAM THODU- ACTION TO BE TAKEN

• Clearing of obstructing vegetation and desilting of thodu need to be done to restore flow in the thodu

• Due to lack of maintenance of thodu , encroachments are suspected at many parts of the thodu . Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width

• Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Tributary of Periyar River (Rightbank) :- THONDALTHODU (PUTHENVELIKKARA)

GOOGLE MAP SHOWING THONDAL THODU IN PUTHENVELIKKARA PANCHAYAT

Thondal thodu – Introduction

The Thondal thodu in Puthenvelikkara Panchayat is approximately 3.95 km long and is of average width 7m . The thodu starts near Keezhurpadam in ward 6 of Puthenvelikkara Panchayat and discharges into Periyar at its right bank to the south side of Station Kadavu bridge near ch 17.2 km of Mangalappuzha branch of Periyar. The Thondal thodu serves as an important drainage in Puthenvelikkara Panchayat.It helps to drain off storm water from Elenthikkara area to Periyar. The thodu also caters to irrigate vast agricultural fields in Puthenvelikkara Panchayat especially Thazhanchirapadam. There are two sluices constructed across the thodu for preventing salt water intrusion from Periyar to agricultural fields in Elenthikkara area in Puthenvelikkara Panchayat.

SALIENT FEATURES OF THONDAL THODU

LENGTH : 3.95 km
WIDTH : VARYING FROM 5M TO 12M
AVERAGE DEPTH OF WATER :1M TO 2M
LOCAL BODY CONCERNED :PUTHENVELIKKARA PANCHAYAT

Thondal thodu - Present status

The Thondal thodu is comparatively a pollution-free thodu. The thodu is rather clean and no major pollution/waste deposition was observed along its stretch. However, many reaches are in silted up condition and requires desilting to ensure free flow of water.The width of the thodu is found to vary significantly at many locations along its course. Hence encroachment is suspected at many locations.

BRIDGES/CROSSINGS ACROSS THONDAL THODU

Sl no	Chainage	Name of bridge/crossing
1	0.195 km	Culvert on byelane of Thirutha road
2	0.535 km	Culvert on Elanthikkara road
3	0.810 km	Byelane to Elanthikkara road
4	1.00 km	Crossing over thodu
5	1.22 km	Culvert on byelane of Elanthikkara road
6	1.83 km	Sluice near Thazhanchira padam
7	1.84 km	Culvert on Thazhanchira padam road
8	2.84 km	Crossing over thodu
9	2.89 km	Culvert on byelane
10	3.07 Km	Thondal bridge
11	3.34 km	Culvert
12	3.64 km	Slab crossing
13	3.72 km	Sluice across thodu
14	3.87 km	Culvert on Station Kadavu- Malavana road

OBSERVATIONS DURING SITE INSPECTION :

During site inspection of the thodu, the following observations were made at different chainages of Thondal thodu.

At Ch 0.00m (Near Keezhurpadam, Puthenvelikkara Panchayat)

The Thondal thodu starts from Keezhurpadam area in Puthenvelikkara Panchayat. The starting point GPS location is 10.185672, 76.272843. It flows towards west and crosses Elenthikkara road and turns southwards. It flows amidst vast agricultural fields towards Thazhanchirapadam.

Chainage 1.80 km (Near Thazhanchirapadam , Puthenvelikkara)

Approximately 2 km stretch of Thondal thodu passes through the Thazhanchirapadam agricultural fields in Puthenvelikkara. The thodu plays an important role in irrigating these fields. The water in this area is observed to be clear. The reach of thodu through the padasekharam is protected on both sides by rubble masonry.

There is a provision of sluice near Thazhanchirapadam for regulating water in the padasekhram and for preventing salt water intrusion from Periyar end. At the eastern side of sluice, the thodu takes a turn. Due to this, considerable quantity of silt is seen deposited near the sluice. Desilting of this reach is essential to restore flow in thodu.

Chainage 2.84km (Near crossing over thodu)

At this intermediate crossing location also, the water in the thodu is observed to be clear . Plantain Cultivation being done on bank of thodu near this location. The sides of the thodu are also protected.

On western side , thick vegetation is observed along the banks of thodu. Although there is no pollution, thodu is observed to be silted up and carrying capacity is less. Hence desilting and removal of vegetation is to be done in this reach to enhance the carrying capacity of the thodu.

Chainage 3.07 km Thondal Bridge

The Thondal bridge is situated on Kanakkankadavu-Puthenvelikkara road across Thondal thodu. The thodu is heavily silted at this location. Vegetation and small trees are also seen inside the boundary of thodu thus causing obstruction to flow. The reach of thodu to the south side of Thondal bridge is heavily silted and in almost stagnant condition.

Chainage 3.64 km

Chainage 3.72 km (Near Kurunnilakkal temple road)

There is a sluice across Thondal thodu near Kurunnilakkal temple road for preventing salt water intrusion to agricultural fields from Periyar. But the ventway of the sluice is constricted and causing obstruction to free flow of water through the thodu. This sluice is to be reconstructed with sufficient ventway.

Chainage 3.87 km (Near Station Kadavu – Malavana road)

The Thondal thodu crosses Station Kadavu-Malavana road at chainage 3.87 km . The water in the thodu at this location is clear. The thodu joins Periyar at 60m south side of Station Kadavu bridge at right bank of Periyar.

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

• Desilting along the full length of the thodu is essential to enhance the water carrying capacity of the thodu
• Unscientific obstructing constructions across the thodu viz. sluice near Kurunnilkkal temple road needs to be reconstructed without obstructing the waterway
• Periodic maintenance of the thodu to be done to keep the thodu in a healthy condition
• Boundary demarcation to be done and encroachments if any are to be evicted and the original width of thodu to be restored along its full reach

Tributary of PeriyarRiver:- VP THURUTHTHODU,PUTHENVELIKKARA

GOOGLE MAP SHOWING VP THURUTH THODU IN PUTHENVELIKKARA

VP Thuruth thodu – Introduction

The VP Thuruth thodu (Valiya Pazhampilly Thuruth thodu) in Puthenvelikkara Panchayat starts from the Chira near Sacred Heart Church in Valiya Pazhampilly thuruthand flows to north discharging into Periyar near ch. 18.25 km of Mangalappuzha branch of Periyar . The thodu is located in ward 11 of Puthenvelikkara Panchayat. The thodu is approximately 0.22 km long and of average width 6m. The thodu facilitates to drain off storm water from the residential area in the Valiya Pazhampilly Thuruth to Periyar. The thodu also caters agriculture along its banks.

SALIENT FEATURES OF VP THURUTH THODU

LENGTH : 0.22 km
WIDTH : VARYING FROM 2.5M TO 7M
AVERAGE DEPTH OF WATER :0.5M TO 1.3M
LOCAL BODY CONCERNED :PUTHENVELIKKARA PANCHAYAT

VP Thuruth thodu - Present status

The VP Thuruth thodu starts from Chira near Sacred Heart Churchin Valiya Pazhampilly Thuruth in Puthenvelikkara Panchayat and flows north and discharges into Periyar. The thodu is found to be heavily silted along its reach. Siltation has reduced the carrying capacity of the thodu. This will result in slow drainage of storm water during rainy season and may cause flooding in adjacent areas. No sort of pollution or waste deposition was observed along the stretch of thodu during site inspection.The water in the thodu was observed to be clear. Cultivation of vegetables as well as nutmeg was observed along the banks of thodu.

Bridges/crossings across VP Thuruth thodu

Sl no	Chainage	Name of bridge/crossing
1	Ch 0.095 km	Culvert across thodu

OBSERVATIONS DURING SITE INSPECTION OF VP THURUTH THODU

During site inspection of the thodu, the following observations were made at different chainages of the thodu.

Chainage 0 km (Near Chira adjacent to Sacred Heart Church, VP Thuruth)

The VP Thuruth thodu starts from the north west corner of Chira near Sacred Heart Church in Valiya Pazhampilly Thuruth. The thodu flows towards north and has an average width of 6m. The Chira is infested with vegetation and water weeds. The Chira needs to be cleaned and desilted.

Chainage 0.125 km (culvert near earthern road)

The VP Thuruththodu at this location is only 2m wide. The flow through the thodu is almost completely obstructed by vegetation and silt deposition. The carrying capacity of the thodu is also very less and during rainy season the adjacent areas will be at the risk of flooding. The thodu is in a diminishing stage. Clearing of vegetation and desilting of thodu along its entire stretch is required

Chainage 0.095km (culvert across thodu near earthern road)

There is an intermediate culvert at this location. Significant reduction in width of thodu is observed to the north side of this culvert. The water is clear. However, due to siltation the depth of thodu is very less. Desilting and boundary demarcation of thodu needs to be done at this location.

Chainage 0.22 km (mouth of thodu at Periyar)

The VP Thuruth thodu discharges into Periyar at the northern side of Valiya Pazhampilly Thuruth. The water in the thodu is observed to be clear at this location.

VP THURUTH THODU- ACTION TO BE TAKEN

- Clearing of obstructing vegetation and desilting of VP Thuruth thodu as well as Chira near Sacred heart Church need to be done
- Abrupt change in width of thodu is observed at the intermediate culvert portion . Boundary demarcation need to be done and encroachments are to be evicted and the thodu is to be restored to its original width.
- Regular maintenance of the thodu is essential to maintain obstruction-free flow through the thodu . This is also beneficial for preventing encroachments and for ensuring the existence of thodu.

Periyar River (From Ch.17.500km to 27.470km – Station Kadavu Bridge to Munambam Azhimugham) – Present Study History

The aim of the study is to understand the features of banks along Periyar Main River Course and the present status of river. The tail end of Periyar River is being dealt in this report. The study starts from Ch.17.500km and ends in 27.470km. The Periyar River is bifurcating into two near Manappuram at Aluva and flows in Northern and Western directions. The Northern Branch towards Mangalappuzha is passing through this reach. The Chainage at Manappuram Junction of Periyar River is taken as 0km. From Ch.0km the river is flowing through Aluva Municipality, Nedumbassery GP, Chengamanad GP, Alangad GP, Karumalloor GP and Kunnukara GP before entering Puthenvelikkara GP. The Periyar River is flowing vigorously in Puthenvelikkara GP, Chendamangalam GP and North Paravur Municipality. The Chalakkudy River joins with Periyar River D/S of Manjaly Bridge on RHS in Puthenvelikkara GP. The Chalakkudy River is merging with Periyar River on upstream right hand side (U/S RHS) of Station Kadavu Bridge in Puthenvelikkara GP. This reach is most **Critical** due to the confluence of Chalakkudy River and thereby discharging its catchment area collection into Periyar River. The undercurrents are very severe in this reach and width & depth of flow of water is very high when comparing with other reaches.

The Periyar River passing through Kunnukara GP is crossing Manjaly Bridge on N Paravur – Nedumbassery SH near Manjaly. Thereafter the River is running in bends and straights and passes mainly through N Paravur Municipality, Chittattukara GP, Chendamangalam GP and Vadakkekkara GP before entering Azhimugham near Munambam in Pallippuram GP. Due to the peculiar nature of flow, a number of Thuruthus (Islands) were formed on both banks of River. **The Cochin State Manual (1911) written by C. Achyuta Menon, while referring to islands in then Kanayannur-Cochin Taluk, states, "Most of the islands in the backwaters were formed by the deposit of alluvium brought down by the rivers during the monsoons. They are generally low and swampy, and favour the luxuriant growth of coconut palms."** These islands are named according to size, name of the person who formed and flowing direction of river. The names of some Thuruths are Valiya Pazhampilly Thuruthu (VP Thuruthu), Cheriya Pazhampilly Thuruthu (CP Thuruthu), Thekke Thuruthu, Valiya Pallam Thuruthu, Cheriya Pallam Thuruthu, Madaplathuruthu, Thelathuruthu, Puliamthuruthu and Valiya Panikkan Thuruthu. The Karas along the banks of the River are known by the directions and banks. They are known as Vadakkekkara and Chittattukara.

Manjaly Bridge D/S

In this reach Periyar River is bifurcating at a distance of about 400m D/S of Manjaly Bridge and an Island named Valiya Pazhampilly Thuruthu is formed in between Periyar River. Chalakkudy River is meeting Periyar River on right hand side and the bridge across RHS is known as Station Kadavu Bridge. The bridge across LHS is known as Valiya Pazhampilly Thuruthu Bridge. The floodwaters that led to the creation of the island brought with it plantain crops and, even before human habitation, the piece of land had an abundance of bananas growing on its shores. The presence of bananas (‗pazham' in Malayalam) was what gave the island its name, he believes. There are other accounts that the fertile soil on the island made the cultivation of several crops possible, among which plantains were the most important. The large banana grew so popular that the island itself was named after it. There are two islands lying close to each other — the bigger (valiya) one, over time, became Valiya Pazhampilly Thuruth and the smaller, Cheriya Pazhampilly Thuruth. Surrounded by the Periyar, Valiya Pazhampilly Thuruth, which boasts a long and rich history, got the name owing to its abundance of bananas. Believed to have been formed in floods centuries ago, the island, inhabited by around 250 families, also happened to be one of the worst hit in the August 2018 deluge. Surrounded by the Periyar and with the Chalakudy River flowing along its boundary, the 2-km-long Valiya Pazhampilly was prone to flooding during the monsoon before the major dams came up.

Another aspect of island life that changed over the years, but for the better, is the mode of commute. Earlier, Valiya Pazhampilly could be accessed only by boats and ferries. The Karippayikadavu Bridge that came up in 2006 and the Station Kadavu Bridge that came up in June 2018 gave the islanders an easier connects to Ernakulam and nearby Thrissur district.

Valiya Pazhampilly Thuruthu

Cheriya Pazhampilly Thuruthu

On the other hand the LHS of the River is passing through Valiya & Cheriya Pazhampilly Thuruthu and Chendamangalam GP. The Periyar is running vigorously D/S of both Pazhampilly Thuruthu bridges and passes in between various islands before final discharge atAzhimugham near Munambam.

The bridges also improved tourism potential, with a couple of resorts making their way here. The island‗s proximity to Chendamangalam and the launch of the Muziris Heritage Project further upped the tourism quotient. There remains on Valiya Pazhampilly vestiges of its tryst with royalty. The island was the property of the Chendamangalam- headquartered Paliyath Achans, hereditary prime ministers to the erstwhile Cochin Maharaja for about 150 years. The first residents were believed to be brought to the island

by the rulers as caretakers of their vast agricultural properties and to rear cattle. A portion of the island was, however, part of the Travancore (or Thiruvithamkoor) Kingdom. One of the many stones that marked the boundary between the two erstwhile kingdoms, with the inscriptions ‗ko‘ and ‗thi‘ in Malayalam (ko‘ for Cochin and ‗thi‘ for Thiruvithamkoor)can be seen near the Station Kadavu bridge.

Landmarks: The „ko-thi" stones on Valiya Pazhampilly Thuruth used to mark the boundary between the erstwhile Cochin and Travancore kingdoms.

There is a rock like formation on RHS of Periyar River in between Station Kadavu and
Manjaly Bridge. Nearby is a rock that locals refer to as ‗Kappithanpara‘. Word on the island goes that Kappithan Panikkar, an envoy of erstwhile King Sakthan Thampuran, was murdered at the spot by members of the Paliyam family who found him a great nuisance. Over the passing of time, the lore of Kappithan grew in legendary proportions, and today, he is worshipped by some as the protector of the island and a lamp lit at a small temple onthe rock every day.

Periyar Study Report

The aim of the study is to understand the features of banks along Periyar Main River Course and the present status of river. The tail end of Periyar River is being dealt in this report. The study starts from Ch.17.500km and ends in 27.470km. This reach is very critical according to the flood point of view as Chalakkudy River is merging with Periyar River near Ch.17.200km of Periyar River. The uncontrolled release of water to Chalakkudy River from the Dams of Chalakkudy Basin worsened the situation during 2018 flood. As a result all low lying Thuruths were submerged resulting in heavy loss to public and private properties. The visual observations of Periyar River from Puthenvelikkara Station Kadavu Bridge to Munambam are explained below. This reach is passing through Ernakulam and Thrissur Districts. Thus the Periyar River starting from mountainous Idukki District flows through the centre of Ernakulam and Thrissur Coastal Districts before its finaldischarge into Arabian Sea along the border of above two Districts. The River Periyar is the ―Lifeline‖ of these 3 Central Districts in Kerala. The immediate and necessary actions to be taken up for the River Rejuvenation are also explained in concluding report.

TRIBUTARY OF PERIYAR(LEFT BANK)

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY–

Tributoryof BhavanaAnganavadithodu in Edavanakkad Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1 m

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and

deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

Culvert-1no.

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.086543,76.202953

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY)

TRIBUTARY - Ola Thodu in Edavanakkad Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be

restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500m

WIDTH – 4 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

Culvert-1 No.

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.086253,76.202212

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPEEN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF -Thodu near ILLATHUAPDI ROAD in Edavanakkad Grama Panchayath

The thodu has an average width of 4 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be

restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –800 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – EdavanakkadGrama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.094629,76.208855

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF -Thodu nearTzunami flat in Edavanakkad Grama Panchayat

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –150m

WIDTH – 2.5 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath

Latitude: 10.091201
Longitude: 76.203898
Elevation: 4.92m
Accuracy: 4.6m

Latitude: 10.091207
Longitude: 76.203909
Elevation: 4.92m
Accuracy: 4.6m

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.091123,76.203914

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF -VachakkalThodu in Edavanakkad Panchayath

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –300 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this

thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

Culvert-1 no.

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.092635,76.202831

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF –Chathangad link thodu in Edavanakkad Grama Panchayath (ward 1)

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –250 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath (ward 1)

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.15349,76.186908

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPEEN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY TRIBUTARY OF -PAZHANGAD South HSSthodu in EDAVANAKKAD Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –300 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.089581,76.202552

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF) -Colony koottinkalAdapputhodu in Pallippuram Grama Panchayath (Ward 6)

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be

restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Grama Panchayath (ward 6)

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

Culvert-1no.

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.086844,76.211528

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF -Aniyil Temple Thodu in Edavanakkad Panchayath (Ward 7)

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –250m
WIDTH – 3 m Average
AVERAGE DEPTH OF WATER –1
LOCAL BODY CONCERNED – EdavanakkadPanchayath (Ward 7)

Latitude: 10.080171
Longitude: 76.215172
Elevation: 1.96m
Accuracy: 9.0m

Latitude: 10.079724
Longitude: 76.213291
Elevation: 6.96m
Accuracy: 11.0m

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

Culvert-1 no.

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.079759, 76.213202

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF - thodu near Igbal road in EdavanakkadPanchayath(ward 8)

Latitude: 10.077491
Longitude: 76.205284
Elevation: 6.96m
Accuracy: 3.2m

Latitude: 10.077611
Longitude: 76.205362
Elevation: 2.96m
Accuracy: 4.0m

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –600m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Panchayath (Ward 8)

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.076815,76.207171

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF -Jaya thodu in EdavanakkadGrama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Edavanakkad Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this

thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.101326,76.20012

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF –West colony thodu in Edavanakkad Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500 m

WIDTH – 3.00 m Average

AVERAGE DEPTH OF WATER –

LOCAL BODY CONCERNED – EdavanakkadPanchayath

Latitude: 10.093827
Longitude: 76.202992
Elevation: 99.82m
Accuracy: 2.2m

Latitude: 10.096676
Longitude: 76.201665
Elevation: 6.91m
Accuracy: 3.0m

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.09454,76.202731

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPIN CONSTITUENCY-TRIBUTARY OF VEERANPUZHA(NATIONAL WATER WAY

TRIBUTARY OF -Kambithazhamthodu in Edavanakkad Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1M

LOCAL BODY CONCERNED – Edavanakkad Panchayath

Latitude: 10.096915
Longitude: 76.21345
Elevation: 97.12m
Accuracy: 2.3m

Latitude: 10.101015
Longitude: 76.20729
Elevation: 98.2m
Accuracy: 1.4m

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

BRIDGES / CROSSINGS ACROSS THODU

Slab culvert-2 nos

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.104044,76.207834

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length

3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

REPORT

Tributary of VeeranPuzha:-CHANTHANGAD THODU

SALIENT FEATURES

LOCAL BODY – KUZHUPILLY PANCHAYATH

LENGTH - 2.75Km

WIDTH VARING FROM 10m .15m,20m

AVERAGE DEPTH OF WATER - 3M

The visual observations of Chathangad thodu are explained below.

At Ch 0.00m

The tributary named as Chathangadthodu starts from kettu near beach and ends at KollamKodungalloorNational water way .The Chathangadthodu is having an average width of 15 m.This thodu has a depth of about 3m.

At Ch.0.0m to 2.75 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the Chathangadthodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides

- Desilting and removal of debris
- Eviction of encroachments

The photographs of the Chathangad THODU shown below:-

REPORT

Tributary of VeeranPuzha:-ANIYAL THODU

SALIENT FEATURES

LOCAL BODY –EDAVANAKKAD PANCHAYATH

LENGTH - 3.10Km

WIDTH VARING FROM 8 m to 20m

AVERAGE DEPTH OF WATER 3M

The visual observations of Aniyal thodu are explained below.

At Ch 0.00m

The tributary named asAniyal thodu starts fromTributory of Banergithodu and ends at KollamKodungalloorNational water way .Width of starting point has 10m and theAniyal thodu is having an average width of 12 m.Thisthodu has a depth of about 3m.

At Ch.0.0m to 3.10km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the Aniyal thodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

The photographs of the Aniyal THODU shown below:-

CROSSINGS ACROSS Aniyilthodu

There are 2nos of bridges across the thodu . They are listed below in the order from starting point of Veenanpuzha.

Sl.no	Chainage	Name of crossing
1.	1600m	bridge
2	2400m	bridge

<u>REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL</u>

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.

REPORT

Tributary of Veeran Puzha: BUNDAR CANAL

SALIENT FEATURES

LOCAL BODY –ELAMKUNNAUZHA & NJARACKAL PANCHAYATH

LENGTH - 4 Km

WIDTH VARING FROM 10m to 12m

AVERAGE DEPTH OF WATER 3M

The visual observations of Bundar canal are explained below.
GPS coordinates- 10.00174,76.239568

At Ch 0.00m

The tributary named as Bundar canal starts from kettu near Njarackal Malsya fed and ends in Kollam Kodungalloor National water way near Valappu. Width of starting point has 10m and the Bundar canal is having an average width of 12m. This thodu has a depth of about 3m.

At Ch.0.0m to 4 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

The photographs of the bundar canal are as follows :-

Latitude: 10.029789
Longitude: 76.21871
Elevation: 3.1m
Accuracy: 4.0m

Latitude: 10.024189
Longitude: 76.221235
Elevation: 5.12m
Accuracy: 3.0m

TRIBUTARY OF VEERAN PUZHA – COMANYEEDIKA thodu in Elamkunnapuzha Grama Panchayath

The thodu has an average width of 3m. Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH – 1Km

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.5 m

LOCAL BODY CONCERNED – Elamkunnapuzha Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.00174,76.239568

The photographs of the thodu are as follows :-

Latitude: 10.001127
Longitude: 76.235129
Elevation: 13.19m
Accuracy: 14.0m

Latitude: 10.000937
Longitude: 76.235121
Elevation: 10.19m
Accuracy: 3.0m

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Fish farm Bandhar canal link Thodu in Elamkunnapuzha Grama Panchayath

The thodu has an average width of 4 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –2m

LOCAL BODY CONCERNED –Elamkunnapuzha Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

The photographs of the thodu are as follows :-

Latitude: 10.020195
Longitude: 76.214628
Elevation: 100.62m
Accuracy: 3.0m

Latitude: 10.02271
Longitude: 76.220713
Elevation: 96.42m
Accuracy: 1.9m

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA –Elamkunnapuzha canal link Thodu in Elamkunnauzha Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –380m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –2m

LOCAL BODY CONCERNED – Elamkunnapuzha Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.02959, 76.218478

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA –Mookanchira thodu in Elamkunnapuzha Grama Panchayat

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –420m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Elamkunnapuzha Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from floor

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.01561 ,76.22307

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA –PALLI Thodu in Elamkunnauzha grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Elamkunnauzha Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.166018,76.177539

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow

2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA –Anjattuthodu in Elamkunnapuzha Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Elamkunnapuzha Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.023116, 76.233249

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

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REPORT

Tributary of VeeranPuzha:-Ramavarma canal

SALIENT FEATURES

LOCAL BODY – PANCHAYATH

LENGTH - 2.1 KM

WIDTH VARING FROM 12m to 14 m

AVERAGE DEPTH OF WATER 3M

The visual observations of Ramavarma canal are explained below.

At Ch 0.00m

The tributary named as Ramavarma canal starts from kettu and ending in Kollam Kodungalloor National water way near Manilly boat jetty . Width of starting point has 15m and the Ramavarma canal is having an average width of 12 m.Thisthodu has a depth of about 3m.

At Ch.0.0m to 2.10 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the Ramavarma canal and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting andremoval of debris
- Eviction of encroachments

The photographs of the Ramavarma canal are shown below:-

CROSSINGS ACROSS Ramavarma canal

There are 2nos of bridges across the thodu . They are listed below in the order from starting point of Veenanpuzha.

Sl.no	Chainage	Name of crossing
1.	275 m	bridge
2.	1 km	bridge at Pallippuram road

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

REPORT

Tributary of VeeranPuzha:- VEMBLAI CANAL

SALIENT FEATURES

LOCAL BODY –KUZHUPILLY PANCHAYATH

LENGTH - 1.50 Km

WIDTH VARING FROM 10m to 12 m

AVERAGE DEPTH OF WATER 3 M

The visual observations of Vemblaicanal are explained below.

At Ch 0.00m

The tributary named as Vemblaicanal starts from Paruthithodu and ends to Kollam Kodungalloor National water way . Width of starting point has 10m and the Vemblaicanal is having an average width of 12 m.Thisthodu has a depth of about 3m.

At Ch.0.0m to 1.50 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the thodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Removal of debris
- Eviction of encroachments

The photographs of the VemblaiCanal shown below:-

CROSSINGS ACROSS Vemblaicanal

There are 2nos of bridges across the thodu . They are listed below in the order from starting point of Veenanpuzha.

Sl.no	Chainage	Name of crossing
1.	300 m	bridge
2.	1000 m	bridge

<u>REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL</u>

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.

REPORT
Tributary of VeeranPuzha:- KUZHUPILLY T**HODU**

SALIENT FEATURES

LOCAL BODY – KUZHUILLY PANCHAYATH

LENGTH - 2.10 Km

WIDTH VARING FROM 15 m to 20m

AVERAGE DEPTH OF WATER 2 M

The visual observations of Kuzhupilly thodu are explained below.

At Ch 0.00m

The tributary named as Kuzhupilly thodu starts from Kannupillakettu and ends in Kollam Kodungalloor National water way . Width of starting point has 10m and the Kuzhupilly thodu is having an average width of 12 m.This thodu has a depth of about 2m.

At Ch.0.0m to 2.10 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the Kuzhupillythodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

The photographs of the KUZHUILLY THODU shown below:-

CROSSINGS ACROSS **KUZHUILLY THODU**

There are 1 no of bridges across the thodu . They are listed below in the order from starting point of Veeranpuzha.

Sl.no	Chainage	Name of crossing
1.	**1100M**	**bridge At** Pallippuram road
2.	**1700 m**	**Culvert**

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

Nalukandomthodu in Kuzhipilly Grama Panchayath

The thodu has an average width of 4.00m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –270 m

WIDTH – 4.00 m Average

AVERAGE DEPTH OF WATER –1 m.

LOCAL BODY CONCERNED – KUZHUPPILLY PANCHAYATH (Ward 5)

GPS coordinates- 10.112535,76.19851.

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

Vemplayi thodu in Kuzhipilly Grama Panchayath (Ward 2)

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –640 m

WIDTH – 3.50 m Average

AVERAGE DEPTH OF WATER –

LOCAL BODY CONCERNED – KUZHUPPILLY PANCHAYTATH (Ward 2)

GPS coordinates- 10.123563,76.195722

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

Latitude: 10.122483
Longitude: 76.196357
Elevation: 81.13m
Accuracy: 2.1m

Latitude: 10.123532
Longitude: 76.195728
Elevation: 96.73m
Accuracy: 1.4m

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

Paruthythodu in Kuzhipilly Grama Panchayath (Ward 11)

The thodu has an average width of 4m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 4 m Average

AVERAGE DEPTH OF WATER –2 m

LOCAL BODY CONCERNED – KUZHUPPILLY PANCHAYTATH (Ward 11)

GPS coordinates- 10.113728,76.195597.

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

Nadathodu in Kuzhuilly Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –600 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – KUZHUPPILLY PANCHAYTATH

GPS coordinates- 10.125916,76.205274

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length

Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

REPORT

Tributary of VeeranPuzha:-NJARAKKAL THODU

SALIENT FEATURES

LOCAL BODY – NJARACKAL PANCHAYATH

LENGTH - 1.45Km

WIDTH VARING FROM 10m to 12m

AVERAGE DEPTH OF WATER 3M

The visual observations of Njarackalthodu are explained below.

At Ch 0.00m

The tributary named asNjarackalthodu starts from Banerji thodu and ends at NedungadPuzha.Width of starting point has 10m and the Veeranpuzha is having an average width of 12m.Thisthodu has a depth of about 3m.

At Ch.0.0m to 1.45 km

The sides of the thodu arepartially protected .The following works to be carried out to clear the obstructions in the Njarackalthodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

The photographs of the Njarackal THODU shown below:-

CROSSINGS ACROSS Njarackalthodu

There are 2nos of bridges across the thodu . They are listed below in the order from starting point of Njarackalthodu.

Sl.no	Chainage	Name of crossing
1.	**650 m**	**bridge**
2.	**950 m**	**bridge at alliuram road**

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

REPORT

Tributary of VeeranPuzha:-APPangad THODU

SALIENT FEATURES

LOCAL BODY –NjarackalPANCHAYATH

LENGTH - 2 Km

WIDTH VARING FROM15 m to 20m

AVERAGE DEPTH OF WATER 3M

The visual observations of APPANGADthodu are explained below.

At Ch 0.00m

The tributary named asAppangadthodu starts from bunder canal and ends to Kollam KodungalloorNational water way near Thattankeri Ln.Width of starting point has 13m and the Appangadthodu is having an average width of 12 m.Thisthodu has a depth of about 3m.

At Ch.0.0m to2km

The sides of the thodu arepartially protected .The following works to be carried out to clear the

obstructions in the Appangadthodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

The photographs of the Appangad **THODU shown below:-**

CROSSINGS ACROSS Appangadthodu

There are 2nos of bridges across the thodu . They are listed below in the order from starting point of Veenanpuzha.

Sl.no	Chainage	Name of crossing
1.	500m	East Appangad bridge
2.	1000m	bridge at pallippuram road
3.	1500m	bridge at Elenjikkal Ln

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for removing hyacinth weeds, and desilting the thodu are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow.

TRIBUTARY OF VEERAN PUZHA - - Thodu near Pozhiyil road in Njarakkal Panchayath

Thodu near Pozhiyil road in Njarakkal Panchayath

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –300 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.2m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.033817, 76.210352

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - Puthuval thodu near 4 cent colony in Njarakkal Panchayath

Puthuval thodu near 4 cent colony in Njarakkal Panchayath

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3m Average

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this

thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.040078, 76.214731

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - Canal thodu in Njarakkal Grama Panchayath

Canal thodu in Njarakkal Grama Panchayath

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500m

WIDTH – 3.50 m Average

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.047075, 76.205946

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - Aruvelithodu in Njarakkal Panchayath

Aruvelithodu in Njarakkal Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500 m

WIDTH – 1.50 m Average

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.036702, 76.229427

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -Kurathiyattuthodu in ward 8 of Njarakkal Grama Panchayath

Kurathiyattuthodu in ward 8 of Njarakkal Grama Panchayath

The thodu has an average width of 3m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3.00 m Average

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.045941, 76.230539

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA – Mampallithodu in Njarakkal Grama Panchayath

-Mampallithodu in Njarakkal Panchayath

The thodu has an average width of 3.00 m .Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –100 m

WIDTH – 3.00 m

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.051005 , 76.222217

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -OliparambilThodu in Njarakkal Panchayath ward

OliparambilThodu in Njarakkal Panchayath ward

The thodu has an average width of 3.0m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –150 m

WIDTH – 3.00 m

AVERAGE DEPTH OF WATER –

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.050444, 76.221752

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -Thodu near Vallakkadavu bhagam in Njarakkal Panchayath

Thodu near Vallakkadavubhagam in Njarakkal Panchayath

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –430 m

WIDTH –average 3.50 m

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.048488, 76.224251

existence of thodu

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ofthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the

TRIBUTARY OF VEERAN PUZHA -Kallumadamthodu in Njarakkal Grama Panchayath

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –300 m

WIDTH –average 3.50 m

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.045545 , 76.225027

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - thodu near Francis Road in Njarakkal Panchayath

Thodu near Francis Road in Njarakkal Panchayath

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –250 m

WIDTH – 3.50 m

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.042502, 76.22751

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -Thodu near Priyadarsini Road in Njarakkal Grama Panchayath

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH –average 3.50 m

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.045544, 76.225164

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -Puthuval Panchayath Thodu in Njarakkal Panchayath ward

Puthuval Panchayath Thodu in Njarakkal Panchayath ward

The thodu has an average width of 3.50m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH –average 3.50 m

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.030667, 76.21667

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -Thodu near KottarathilSreedharan Road in Njarakkal Panchayath ward

Thodu near KottarathilSreedharan Road in Njarakkal Panchayath ward

The thodu has an average width of 3.20m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –400 m

WIDTH –average 3.20 m

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.038783, 76.215328

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA -Bundar Canal Kaivazhi Thodu in Njarakkal Panchayath Ward

The thodu has an average width of 3.00m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –250 m

WIDTH –average 3.00m

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates - 10.04228, 76.219193

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERANPUZHA -CheriyaputhanThodu in Njarakkal Panchayath

CheriyaputhanThodu in Njarakkal Panchayath

The thodu has an average width of 3.00m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –300m

WIDTH –average 3.00m

AVERAGE DEPTH OF WATER –1.2m

LOCAL BODY CONCERNED – Njarakkal Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates 10.043904, 76.210671

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting ogthodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

VYPPIN CONSTITUENCY-TRIBUTARY OF VEERAN PUZHA

:- VASTHERI THODU

SALIENT FEATURES

LOCAL BODY – PALLIPPURAM PANCHAYATH

LENGTH - 1.70 Km

WIDTH VARING FROM 10m to 16 m

AVERAGE DEPTH OF WATER 2 M

The visual observations of Vastheri thodu are explained below.

At Ch 0.00m

The tributary named as Vastheri thodu starts near kettu and ends in Kollam Kodungalloor National water way near Korassery temple . Width of starting point has 16m and the Veeran puzha is having an average width of 12 m.This thodu has a depth of about 3m.

At Ch.0.0m to 1.70 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the Karuthala thodu and bring back the thodu to its original shape.

1. Clearing light jungles on both the sides
2. Desilting and removal of debris
3. Eviction of encroachments

The photographs of the VASTHERI THODU shown below:-

CROSSINGS ACROSS Vastheri thodu

There are 2 nos of bridges across the thodu . They are listed below in the order from starting point of Veenan puzha.

Sl.no	Chainage	Name of crossing
1.	230 m	bridge at Komaranthi road
2.	820 m	bridge at Pallippuram road

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

Tributary of Veeran Puzha:- KARUTHALA THODU

SALIENT FEATURES

LOCAL BODY – PALLIPPURAM PANCHAYATH

LENGTH - 1.75 Km

WIDTH VARING FROM 10m to 12 m

AVERAGE DEPTH OF WATER 3M

The visual observations of Karuthala thodu are explained below.

At Ch 0.00m

The tributary named as Karuthala thodu starts from kettu and ending in Kollam Kodungalloor National water way near Thrikkadakkailli temle . Width of starting point has 10m and the Veeran puzha is having an average width of 12 m.This thodu has a depth of about 3m.

At Ch.0.0m to 1.75 km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in the Karuthala thodu and bring back the thodu to its original shape.

1. Clearing light jungles on both the sides
2. Desilting and removal of debris
3. Eviction of encroachments

The photographs of the KARUTHALA THODU shown below:-

CROSSINGS ACROSS Karuthala thodu

There are 2 nos of bridges across the thodu . They are listed below in the order from starting point of Veenan puzha.

Sl.no	Chainage	Name of crossing
1.	**380 m**	**bridge**
2.	**890 m**	**karuthala bridge**

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

Tributary of Veeran Puzha:- CONVENT THODU

SALIENT FEATURES

LOCAL BODY – PALLIPPURAM PANCHAYATH

LENGTH - 1.20 Km

WIDTH VARING FROM 12m to 14 m

AVERAGE DEPTH OF WATER 3M

The visual observations of Convent thodu are explained below.

At Ch 0.00m

The tributary named as Convent thodu starts near kettu and ends to Kollam Kodungalloor National water way near Kovillakathum kadavu . Width of starting point has 10m and the Convent Thodu is having an average width of 12 m. This thodu has a depth of about 3m.

At Ch.0.0m to 1.20 km

The sides of the thodu are partially protected .The following works are to be carried out to clear the obstructions in the Convent thodu and bring back the thodu to its original shape.

1. Clearing light jungles on both the sides
2. Desilting and removal of debris
3. Eviction of encroachments

The photographs of the CONVENT THODU shown below:-

CROSSINGS ACROSS Convent thodu

There are 2 nos of bridges across the thodu . They are listed below in the order from starting point of Veenan puzha.

Sl.no	Chainage	Name of crossing
1.	35 m	bridge
2.	375 m	bridge at kadathu road

REMEDIAL MEASURES TO BE INITIATED FOR FLOOD CONTROL

Provision for clearing jungle, removing thickly grown grass are proposed to regain the capacity of the thodu for sufficient storage of water and easy flow

TRIBUTARY OF VEERAN PUZHA –

TL Antony Thodu in Pallippuram Grama Panchayath

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Pallippuram Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.16578, 76.183118

GPS coordinates- 10.165703, 76.183143

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - Thrikkadakkailly Thodu in Pallippuram Grama Panchayath

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –400 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER – 1m

LOCAL BODY CONCERNED – Pallippuram Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.14033 76.196537

GPS coordinates- 10.148577, 76.196345

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA – Chankaradithara Thodu in Pallippuram Grama Panchayat

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –270 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Pallippuram Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates-

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - Seethilane thodu in Pallippuram Grama Panchayath)

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1m

LOCAL BODY CONCERNED – Pallippuram Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.14325, 76.188288

GPS coordinates- 10.143162, 76.18826

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow

2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length

3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA - Link thodu between Karuthala and convent thodu in Pallippuram Grama Panchayath

The thodu has an average width of 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –2 Km

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER – 1M

LOCAL BODY CONCERNED – Pallippuram Grama Panchayath

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.143861, 76.184368

GPS coordinates- 10.144232, 76.186018

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

TRIBUTARY OF VEERAN PUZHA - Punna Thodu in Pallippuram Grama Panchayath

The thodu has an average width of 4 m. Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –252 m

WIDTH – 4 m Average

AVERAGE DEPTH OF WATER –

LOCAL BODY CONCERNED – Pallippuram Grama Panchayath (Ward 22)

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

OBSERVATIONS DURING SITE VISIT

GPS coordinates- 10.16562, 76.180056

GPS coordinates- 10.165688, 76.180209

ACTIONS TO BE TAKEN

4. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow

5. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length

   Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu

REPORT

Tributary of Veeran Puzha:-IYYATHU THODU

SALIENT FEATURES

LOCAL BODY – NAYARAMBALAM PANCHAYATH

LENGTH - 2.18Km

WIDTH VARING FROM 6m, 8M ,9M to 12m

AVERAGE DEPTH OF WATER 2.5M

The visual observations of IYYATHU thodu are explained below.

At Ch 0.00m

The tributary named as Iyyathuthodu starts from Banerji thodu and ends to Nedungaduuzha and flows in north -south direction It joins Veeranpuzha.Width of starting point has 10m and the Iyyathu thodu is having an average width of 12m.This thodu has a depth of about 2.5m.

At Ch.0.0m to 2.18km

The sides of the thodu are partially protected .The following works to be carried out to clear the obstructions in theIyyathuthodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

MAMPILLY
ICE FACTORY

REPORT

Tributary of VeeranPuzha:-PUNCHAYIL THODU

SALIENT FEATURES

LOCAL BODY NAYARAMBALAM PANCHAYATH

LENGTH - 2Km

WIDTH VARING FROM8m to 12m

AVERAGE DEPTH OF WATER 3M

The visual observations of punchayilthodu are explained below.

At Ch 0.00m

The tributary named aspunchayilthodu starts from TRIBUTORY OF BANERJI THODU and ends at Kollam KodungalloorNational water way .Width of starting point has 10m and the Veeranpuzha is having an average width of 12m.Thisthodu has a depth of about 3m.

At Ch.0.0m to 2 km

The sides of the thodu arepartially protected .The following works to be carried out to clear the obstructions in the punchayilthodu and bring back the thodu to its original shape.

- Clearing light jungles on both the sides
- Desilting and removal of debris
- Eviction of encroachments

The photographs of thePUNCHAYIL THODU shown below:-

TRIBUTARY OF VEERAN PUZHA - Valiya Banerjee Link thodu in Nayarambalam Panchayath,

The thodu has an average width of 5-15 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH – 800 m

WIDTH – 4 m Average

AVERAGE DEPTH OF WATER – 2m

LOCAL BODY CONCERNED – Nayarambalam Grama Panchayath

GPS coordinates- 10.058342,76.202516

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Cheriya Banerjee thodu in Elamkunnapuzha Grama Panchayath

Cheriya Banerjee thodu in Ward No.12 of Nayarambalam Panchayath

The thodu has an average width of 3.5-4.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –1400km

WIDTH – 3.5 -4.0 m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED – Nayarambalam Grama Panchayath

GPS coordinates- 10.064297,76.199642

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Priyadarsini Anganwadi thodu in Ward No.12 of Nayarambalam Panchayath

Priyadarsini Anganwadi thodu in Ward No.12 of Nayarambalam Panchayath

The thodu has an average width of 5.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –100 m

WIDTH – 3.0 m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED – Nayarambalam Grama Panchayath

GPS coordinates- 10.057653,76.202224

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Panakkal thodu in Nayarambalam Panchayath

Panakkal thodu in Nayarambalam Panchayath.

The thodu has an average width of 4.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –100 m

WIDTH – 3.0 m Average

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED – Nayarambalam Grama Panchayath

GPS coordinates-

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Tributary of Banerjee thodu in Nayarambalam Panchayath

Tributary of Banerjee thodu in Nayarambalam Panchayath

The thodu has an average width of 5.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500 m

WIDTH – 4.0 m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED – Nayarambalam Grama Panchayath

GPS coordinates-

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Vadayil South Thodu thodu in Nayarambalam Panchayath

Vadayil South Thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 3.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH – 3.0 m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.062942 , 76.216759

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Nambrattithara thodu in Nayarambalam Panchayath

Nambrattithara thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 1.5-3.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –430 m

WIDTH – 1.5-3.0 m Average

AVERAGE DEPTH OF WATER –

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.063774, 76.220318

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Vattathara Koottathara thodu in Nayarambalam Panchayath

Vattathara Koottathara thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 3.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH –3.0 m Average

AVERAGE DEPTH OF WATER –1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.065001 ,76.219038

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Lakshamveedu Colony thodu in Nayarambalam Panchayath.

Lakshamveedu Colony Thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 3.0-3.5 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH –3.0 m-3.50m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates -

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Nedungadupuzha link thodu in Nayarambalam Panchayath

Nedungadupuzha link thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 3.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –100 m

WIDTH –3.0m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.070837 , 76.217979

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA –Thodu near Padinjare beach road in Nayarambalam Panchayath

Thodu near Padinjare beach road in Nayarambalam Panchayath

The thodu has an average width of 3.0 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH –3.0m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.058307, 76.201088

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Panchayath Thodu in Nayarambalam Panchayath

Panchayath Thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 2.50-3.00 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –400 m

WIDTH –3.00m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.071108 , 76.206095

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Ammangattu Thodu in Nayarambalam Panchayath

Ammangattu Thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 3.0m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200 m

WIDTH –3.0m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.060912, 76.219357

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow

2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Punchayil west Thodu in Nayarambalam Panchayth

Punchayil west thodu in Nayarambalam Grama Panchayath

The thodu has an average width of 5.50 -6.50 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging

problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –250 m

WIDTH –3m Average

AVERAGE DEPTH OF WATER – 1.5m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.069411, 76.216765

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting og thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Thodu near Edayathu Temple road in Nayarambalam Panchayth

Thodu near Edayathu Temple road in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH – 200 m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.-0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.058238, 76.202289

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through thethodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Mangalathu thodu near Veliyathparambu beach road in Nayarambalam Panchayth

Mangalathu thodu near Veliyathparambu beach road in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.-0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.055888, 76.203138

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Thodu near Veliyathparambu beach road in Nayarambalam Panchayth

Thodu near Veliyathparambu beach road in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.058307, 76.201088

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow

2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Kochambalm East thodu in Nayarambalam Panchayth

Kochambalm East thodu in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.06683, 76.213836

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Pallath thodu in Nayarambalam Panchayth

Pallath thodu in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –300m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.071107, 76.216198

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Vadayil south thodu in Nayarambalam Panchayth

Vadayil south thodu in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.062942, 76.216759

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Kommankattil thodu in Nayarambalam Panchayth

Kommankattil thodu in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –500m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.058748, 76.219553

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Peruva thodu in Nayarambalam Panchayth

Peruva thodu in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –1200m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.062123, 76.227586

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

TRIBUTARY OF VEERAN PUZHA – Ambalathodu in Nayarambalam Panchayth

Ambala thodu in Nayarambalam Panchayth

The thodu has an average width 3 m.Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood

SALIENT FEATURES

LENGTH –1000m

WIDTH – 3 m Average

AVERAGE DEPTH OF WATER –1.0m

LOCAL BODY CONCERNED - Nayarambalam Grama Panchayath

GPS coordinates- 10.071481, 76.207699

PRESENT STATUS

Due to deposits, the depth of flow is less and water is stagnant in some reaches of the thodu causing unhealthy situation in the premises. Water logging problem also persists in adjacent areas of this thodu. In this estimate it is proposed to remove the deposited silt /debris/vegetation. By removal of the deposited silt and debris, the normal flow of the thodu could be restored. By cleaning and deepening of the thodu, free flow of can be ensured preventing water logging and protecting the nearby residents from flood.

ACTIONS TO BE TAKEN

1. Clearing of obstructing vegetation and desilting of thodu for its entire length is to be done to restore the flow
2. Boundary demarcation need to be done and encroachments to be evicted and the thodu is to be restored to its original width along its full length
3. Regular maintenance of thodu is essential to maintain obstruction free flow through the thodu.This is also beneficial for preventing encroachment and for ensuring the existence of thodu.

Ernakulam District Map

Thrissur District Map

The salient features and longitudinal characteristics of study reach are represented in Table 1 and Fig.1. The main feature of this reach is the Survival of 3 Inhabited Islands in Main River Course which was formed years back by the deposition of Alluvial Soil. The islands are also formed in between the Main River and Tributaries due to the deposition of alluvial soil

1	Local Body	LHS - Chendamangalam GP, Vadakkekkara GP, Pallippuram GP RHS – Puthenvelikkara GP, Kodungalloor Municipality, Eriyad GP
2	Length	9970m (9.97km)
3	Width (Varying)	250m, 125m, 340m, 450m, 550m, 305m, 465m, 635m, 165m
4	Average Depth of Water	6m, 5m
5	Water Spread Area	9.97km x 0.39km = 3.90sq.km
6	Islands in Main River	Valiya Pazhampilly Thuruthu (0.16sq.km), Valiya Panikkan Thuruthu (0.40sq.km), Sathar Island (0.69sq.km)

Table 1 - Salient Features

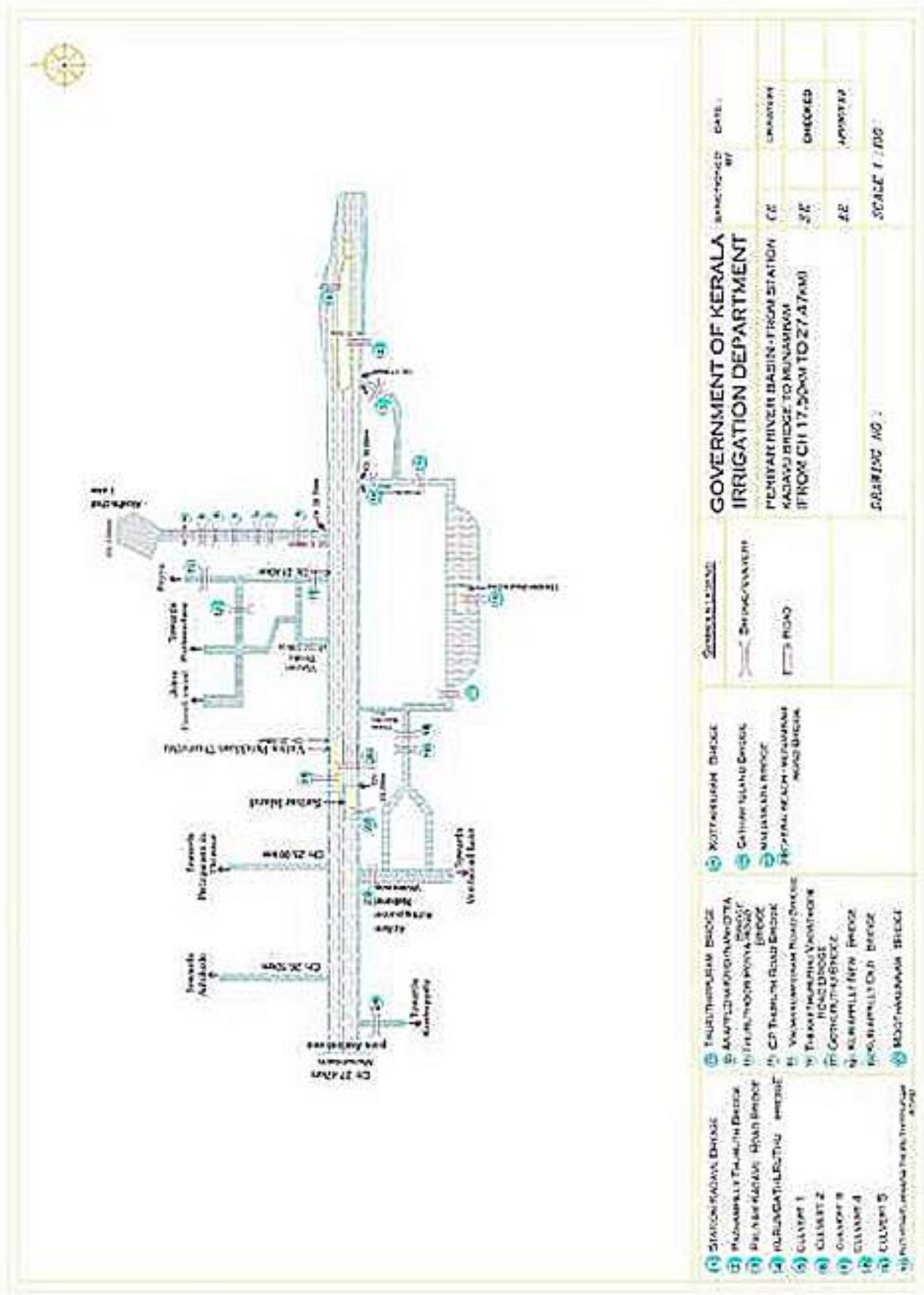


Fig.2 - Schematic Diagram

The Schematic Diagram of study reach is shown in Fig.2. The length of Tributaries and Off take Chainages from Main River along with location of Boat Jetties are shown below in Table 2 and Table 3 respectively.

Sl. No.	Tributary	Length (km)	Off-take Chainage (km)	Remarks
1	LHS1	1.100	17.900	CP Thuruth (Paliyam) Branch
2	LHS2	4.960	19.000	Thekkethuruth Branch
3	LHS3	2.030	23.300	Sathar Island Branch
4	LHS4	25.400	25.670	National Waterway Junction
5	LHS5	15.500	26.670	Inlet / Outlet of Lakes in Vypin Island
6	RHS1	3.100	20.700	Kurumbathuruthu - Akathuchal Branch
7	RHS2	3.000	21.400	Thuruthipuram Branch
8	RHS3	0.785	22.200	Vijayan Thodu Branch
9	RHS4	1.700	22.300	Valiya Panikkan Thuruth Branch
10	RHS5	1.100	25.000	Azhikode Canal Branch
11	RHS6	0.854	26.500	Azhikode Puthenpalli Beach Road Branch

Table 2 - Tributaries of Periyar River

Sl. No.	Name of Boat Jetty	Latitude	Longitude	Remarks
1	Vadakkumpuram Ferry (Gothuruthu - Kurumbathuruthu)	10.1839021	76.224709	Left
2	Gothuruthu – Thuruthippuram Ferry	10.19077	76.217607	Left
3	Kurumbathuruthu West Boat Jetty	10.192856	76.220551	Right
4	Chathedom – Gothuruthu Ferry	10.193499	76.220795	Right
4	Moothakunnam Old Boat Jetty	10.192655	76.202648	Left

Table 3 - Boat Jetties on Banks of Periyar River

Periyar River At. Ch.17.500km and upto Confluence Point The Periyar River is running parallel in this reach upto the Confluence Point. The Thuruthu in between the River is known as Valiya Pazhampilly Thuruthu. There are two bridges across Periyar River to connect Pazhampilly Thuruthu to main land. The bridge on RHS is known as Station Kadavu Bridge and on LHS is known as Karippayikadavu Bridge. The white shaded sketch of Valiya Pazhampilly Thuruthu and Bridges with upstream and downstream views are shown in Fig.3.

Fig.3

Latitude: 30.173001
Longitude: 76.243045
Elevation: 33.35m
Accuracy: 4.6m
Time: 09/18/2021 12:01
Near: Station Kadow, Bridge 4

Station Kadavu Bridge on RHS of Periyar

Station Kadavu Bridge on RHS of Periyar

Station Kadavu Bridge U/S

Station Kadavu Bridge D/S

Fig.3

Karippayikadavu Bridge on LHS of Periyar

Karippayikadavu Bridge on LHS of Periyar

Karippayikadavu Bridge U/S

Karippayikadavu Bridge D/S

Fig.3

The distance of RHS from Station Kadavu Bridge to Confluence Point is 1200m and width of 250m. The longitudinal distance from Karippayikadavu Bridge to Confluence Point is 920m with an average width of 125m. This reach passes through Chendamangalam GP on LHS and Puthenvelikkara GP on RHS. There are no major obstructions to the flow of river like accumulation of water weeds and solid wastes in this reach. There are some vegetation growths on the banks of the river which obstruct the normal flow of water in river near banks. The branches of some trees are grown into the boundary of the river and cause obstruction to distant vision for people travelling in country boats. Due to the vegetation growth the water weeds may accumulate near the banks and cause delta formation along the sides of river. The water is almost clear with no visible pollutants. The River on LHS branches into a Tributary named Cheriya Pazhampilly (CP) Thuruthu (Paliyam) River (LHS1) before reaching confluence point. The depth of water in this reach is 5m-6m and silt deposited is about 0.8m. The Google Map showing width of River at both bridges location, vegetation growth along the banks of river and offtake of Tributary (Cheriya Pazhampilly Thuruthu (Paliyam) River) on LHS at Ch.17.90km of Periyar is shown in Fig.4.

Station Kadavu Bridge Location Karrippayikadavu Bridge Location

Fig.4 - Width of River at Ch.17.500km

Vegetation Growth on Banks of River

Mouth of Tributary on LHS – LHS1 (Paliyam River)

Fig.4

The sides of the river are partially protected with Laterite, DR Masonry, RR Masonry and
locally available materials. A series of Muttus can be seen projecting into the river to reduce the intensity of flood water affecting banks. The Muttus are constructed with rubble or laterite and are projecting into the river for at least 2m from River banks. They are of trapezoidal in shape with semicircle front face. This sort of protection of River banks may be conceived by locals from ancestors or by past experience. These are seen to be protecting banks locally during medium flood. But they do not serve the purpose during severe flood. On the other hand they may cause delta formation in their premises and reduce flow of water. A detailed study is needed to provide further Muttus along the banks of Periyar River.

There are some blocks of Fishing Nests and Chinese Fishing Nets installed on both banks of river. They do not obstruct the normal flow of water. It will affect the flow of flood water during monsoon and may cause to develop Water Head on upstream reaches. Being a Critical reach there should not be any fish catching arrangements installed in River upto Confluence Point to avoid severe damages during flood. If necessary i t should be ensured that the fishing nests are to be kept near banks to avoid settlement of particles slowly thus paving the way for the formation of deltas. These are represented in Fig.5.

River Bank Protection – RR Masonry&Muttu Projection

River Bank Protection – Laterite Masonry

River Bank Protection – DR Masonry

River Bank Protection – Damaged Muttu

Fig.5

Chinese Fishing Net on River Bank

Fishing Nest on River Bank

The following activities have to be carried out to make room for river in this reach,

• Clearing light, thick and thorny jungle including vegetation growths on LHS and RHS of River
• Pruning branches of trees grown into the River
• Removal of vertical posts in River, Relocation of Fishing Nests, Chinese Fishing Nets and Local Fish catching arrangements to the Banks of River
• De-silting and removal of debris from River bed as well as Banks
• Regular Maintenance & Upkeep of River and Banks is necessary as this reach is Critical
• General consensus should be made with Revenue, Fisheries, Local Self Government and Irrigation Department to install Fishing Nests, Chinese Fishing Nets and Local Fish Catching arrangements
• Formation of Flood Banks with the excavated Silt from River
• River Banks should have at least 3m water depth to accommodate flood water
• Survey of River to evict any types of encroachments

Periyar River From Confluence Point to Moothakunnam Bridge

The reach is having a length of 3900m and varying width as shown in various Google Map which is represented in Fig.5. The Periyar River after traversing a distance of about 2km as LHS and RHS on D/S of Manjaly Bridge is getting merged (Fig.6) at this point. From the Map it is clear that the the River is acquiring maximum width in this reach and branches into different directions on both sides. The Main River is getting divided in this reach and Tributaries run in zig-zag directions paving the way for the formation of various islands. These islands are thickly populated and a major concern during flood times.

Longitudinal Profile (Length-3900m)

Periyar River Confluence D/S Puthenvelikkara Station Kadavu Bridge

Width @ Confluence Point – 340m

Width D/S Confluence Point – 450m

Width of River at Bifurcation – 550m

Width @ Bridge Across River - 305m

Fig.6

The Tributaries LHS2, RHS1, RHS2, RHS3 and RHS4 offtakes in this reach. The branch RHS2 extends upto the middle of Thrissur District. The salient feature of this reach is the offtake and discharge of LHS2 into the Main River Periyar after traversing a distance of about 5km. The offtaking points of the Tributaries of Periyar River are represented in Fig.6.

LHS2 (Thekkethuruthu River) Mouth

LHS2 (Thekkethuruthu River) End

RHS1 (Kurumbathuruth-Akathuchal) Mouth

RHS2 (Thuruthippuram River) Mouth

Fig.6

The Tributary RHS3 orginates in this reach and meets the Sub Tributary of RHS2 after traversing a distance of about 800m in Northern direction. Another salient feature of this reach is the bifurcation of River towards North forming an Island called Valiya Panikkan Thuruthu in between the River Course. This Tributary joins Main River after traversing distance of 2km from offtake point. The average width of the Tributary RHS4 is about 180m. The entry and exit mouths are having sufficient width and depth. Similar to all other reaches, this stretch is also having Chinese Fishing Net, Vertical Posts and Fishing Nests in River Course. Valiya Panikkan Thuruthu is having an area of 0.40sq.km and comes under Kodungalloor Municipality. Kottappuram Bridge on NH66 connects VP Thuruthu with main land.

There are some Resorts, Religious Institutions, Settled people and some Commercial / Shop Establihsments in the Island. The Island connectivity roads are bordering the River which may be formed by filling River Banks. This has to be ascertained with original land records. The waste water from the premises of household and commercial establishments are finding its way into the River by means of pipes / channels. It pollutes the River marginally and has to be taken care off by Government Agencies. The installation of Sewage Treatment Plant in VP Thuruthu by the respective Local Self Government Institution is the solution to the River pollution. The different views of VP Thuruthu Island are shown in Fig.7.

RHS4 (Valiya Panikkan ThuruthuRiver) U/S

RHS4 (Valiya Panikkan ThuruthuRiver) D/S

Fig.7

The River is passing through Chendamangalam GP, Vadakkekkara GP on LHS and Kodungalloor Municipality on RHS. The reach is having sufficient width and depth for the free flow of water. There are no obstructions to the flow of water like water weeds and accumulation of solid wastes. The National Highway 66 (NH66) crosses Periyar River at Moothakkunnam and Kottappuram and the bridges are known by the above names. The Periyar River is getting bifurcated into two on RHS on upstream side of Moothakunnam Bridge. The cross drainage work across RHS4 is known as Kottappuram Bridge. The Northern end of Moothakunnam Bridge lands at Valiya Panikkan Thuruthu and Kottappuram Bridge connects VP Thuruthu and Kodungalloor main land. Valiya Panikkan Thuruthu is an island formed by meandering of river on RHS. The bridges are similar in nature and are having sufficient vertical and horizontal clearance for free water flow even during flood season. The bridges are shown in Fig.8.

The banks of river have to be surveyed and full width of river should be maintained throughout the entire length to avoid any type of encroachment of river in future course. The sides of the channel are partially protected with rubble, laterite and locally available materials. The photographs as in Fig.6 clearly show the obstructions to the natural as well as flood flow of water. The Chinese fishing nets and Blocks of Fishing Nests on U/S and D/S of bridge obstruct the flow of water marginally. The vertical posts installed by local fishermen for local fishing activities also obstruct the flow of water.

Moothakunnam Bridge U/S

Moothakunnam Bridge D/S

Kottappuram Bridge

Kottappuram Bridge

Fig.8

Vertical Posts – River Obstruction

Chinese Fishing Nets – River Obstruction

Fishing Nests - River Obstruction

Chinese Fishing Net - River Obstruction

Chinese Fishing Net - River Obstruction

Chinese Fishing Net / Vertical Posts - RiverObstruction

Fig.8

Chinese Fishing Net / Fishing Nests - River Obstruction

Abandoned Vertical Posts - River Obstruction

Chinese Fishing Net / Fishing Nests - River Obstruction

Abandoned Vertical Posts - River Obstruction

The following activities have to be carried out to make room for river in this reach,

- Clearing light, thick and thorny jungle including vegetation growths on LHS and RHS of River
- Pruning branches of trees grown into the River
- Relocation of Fishing Nests, Chinese Fishing Nets and Local Fish catching arrangements to the Banks of River
- Removal of vertical posts in River
- De-silting and removal of debris from River bed as well as Banks
- Regular Maintenance & Upkeep of River and Banks is necessary as this reach is Critical
- General consensus should be made with Revenue, Fisheries, Local Self Government and Irrigation Department to install Fishing Nests, Chinese Fishing Nets and Local Fish Catching arrangements
- Formation of Flood Banks with the excavated Silt from River
- River Banks should have at least 3m water depth to accommodate flood water
- Survey of River to evict any types of encroachments

- Periyar River From Moothakunnam Bridge to Munambam Azhimugham
- The reach is having a length of 4860m and varying width as shown in various Google Map which is represented in Fig.9. The Main Course of the River is on RHS which is having an average width of about 450m. The salient feature of this reach is the Left Bifurcation of the River at a distance of 700m from Moothakunnam Bridge on downstream side. Due to the bifurcation a Thuruthu named Sathar Island is formed which is the Northern boundary of Ernakulam District. This reach can be divided into two;
-
- 1. Main River Course – Situated on D/S of Moothakunnam Bridge and RHS of Sathar Island
- 2. Sathar Island River Course – Situated on LHS of Sathar Island The salient features of both reaches are described below.

Longitudinal Profile (Length – 4860m)

Width of River at Munambam Azhimugham - 165m

Width of River after Bifurcation @ VP Thuruthu - 450m

Maximum Width of River - 630m

Fig.9

Sathar Island – Bird"s Eye view

Periyar Main River Course (D/S of Moothakunnam Bridge and RHS of Sathar Island)

The River stretch is passing through Vadakkekkara GP on LHS, Kodungalloor Municipality and Eriyad GP on RHS before its final discharge into Azhimugham at Munambam situated in Pallippuram GP. At azhimugham Pallippuram GP in Ernakulam District is situated on LHS and Eriyad GP in Thrissur District is situated on RHS of Periyar River. The Periyar River is divided into two on downstream side of Moothakunnam Bridge. There is a private inhabited Thuruthu named Sathar Island situated in the middle of the river D/S of Moothakunnam Bridge. The RHS views of Sathar Island are shown in Fig.10.

There are minimum visible encroachments on the banks of river and has to be verified after river survey. The banks of river have to be surveyed and full width of river should be maintained throughout the entire length to avoid any type of encroachment of river in future course. The sides of the channel are partially protected with rubble, laterite and locally available materials. There are no obstructions to the flow of water like water weeds and accumulation of solid wastes. The different views of the River on around Sathar Island including Munambam Azhimugham are shown in Fig.10.

Sathar Island – Eastern End

Periyar – RHS of Sathar Island

Fig.10

Periyar – RHS of Sathar Island

Sathar Island – DR Side Wall

Vertical Posts – River Obstruction

Eriyad GP - RHS

Fig.10

Munambam Azhimugham

The RHS of the River is a part of Thrissur District. Kodungallor Municipality and Eriyad GP lies along the banks of Periyar River. It is stretching upto Azheekkode in Eriyad GP which is the Right Hand Side of Munambam Azhimugham. The depth of water is about 6m and silt deposit is about 0.8m. The photographs clearly show minor obstructions to the natural as well as flood flow of water. The Chinese fishing nets and Blocks of Fishing Nests on River Course obstruct the flow of water marginally. The vertical posts installed by local fishermen for local fishing activities also obstruct the flow of water.

Periyar - Sathar Island River Course (LHS3) – LHS of Sathar Island

The Tributary LHS3 originates in this reach as Left Bifurcation to the Main River. Sathar Island is situated in between LHS Tributary and Main Periyar River Course. Sathar Island is situated in Ernakulam District and a part of Vadakkekkara GP. The connectivity to the main land is through a bridge named Sathar Bridge across Periyar River on LHS. The bridge connects Sathar Island and Kottuvallikkad in Vadakkekkara GP which is having sufficient vertical and horizontal clearance for the maximum flow of water through the Tributary. The longitudinal profile having a length of 2030m and average width of 90m is shown in Fig.11.

Fig.11

The photographs as in Fig.11 clearly show minor and major obstructions to the natural as well as flood flow of water. The Chinese fishing nets and Blocks of Fishing Nests in Sathar Island River Course obstruct the flow of water marginally. The vertical posts installed by local fishermen for local fishing activities also obstruct the flow of water. Munambam Harbor is situated on Western end of Sathar Island. A lot of fishing boats are anchored along LHS of the River. Vertical Posts are installed in River to tie boats to the shore. These vertical posts are obstruction during flood times. There are susceptible encroachments on LHS of Sathar Island River Course. From the Google Map it is clear that the width of River Course is varying drastically from 60m to 150m then to 90m and 50m. So there are possible encroachments on LHS of Tributary. The sudden climate change now-a-days cause heavy downpour causing flash flood on the banks of river. If it happens, there will be severe damage to the public and private properties. The above obstructions prevent Govt, Departments to take immediate steps during any emergency. In order to avoid flash flooding the way of river should be very clear without any obstructions.

There are widespread visible encroachments on the banks of river and has to be evicted immediately after river survey.The sides of the channelare partially protectedwith rubble, laterite and locally availablematerials. The differentviews (LHS & RHS) of Sathar Islandare shown in Fig.11 and Fig.12.

There exists a Muttu called Sarvan Muttu on LHS of Sathar Island. This Muttu is situated on Eastern end of Sathar Island. The person named Sarvan contributed a lot for the betterment of the society and the people living in nearby area. It is said that his family had contributed a lot for the fishermen and their community. To commemorate his good doings, the projection to the River is known as Sarvan Muttu. It prevents erosion of river banks on southern side and act as barrier. The Sarvan Muttu is formed by continuous River Activity in the recent past. A delta is formed by the River Activity on LHS of Sathar Island River Tributary. The delta is recently protected by the person/firm who owns the land. It seems to be an encroachment and result in flooding on the upstream reaches of Periyar River. This happened during 2018 flood and damaged upstream reaches of Periyar extensively. A detailed River Survey has to be done in this reach to assess the extent of land presently available for the River flow and the status of encroachments.

Sarvan Muttu and Fishing Nests – Entry Mouth of LHS3

Sarvan Muttu – River Obstruction

Coconut Posts – River Obstruction

Chinese Fishing Net – River Obstruction

Vertical Posts / Fishing Nests – River Obstruction

Sathar Island Bridge

Anchored Fishing Boats on LHS of Tributary

Anchored Fishing Boats on LHS of Tributary

Vertical Posts as Boat Anchors – River Obstruction

LHS and RHS of Sathar Island River Tributary

Sathar Island River Tributary – Western End

Munambam Azhimugham – Distant View

The Left Hand Side of the Tributary is extensively encroached and there is presence of medium pollution in the tributary by means of waste water discharges from Fishing Boats, Residential houses and Commercial Establishments. It pollutes River course marginally and prevention measures have to be taken up to reduce waste water discharge to River. The encroachments on LHS of the Tributary are visible from the photographs given in Fig.12.

The following activities have to be carried out to make room for river in this reach,

The width at the entry mouth of Sathar Island Tributary is about 1/3rd of of the width of River Tributary due to delta formation. This is evident from the Google Map as in Fig.10. This delta prevented flood discharge into the sea during 2018 flood. This mouth has to be widened to the maximum available width of River. As the impact on human livelihood during 2018 flood was more due to this delta, additional land acquisition can also be considered in the same location to develop mouth of the Tributary.

• Clearing light, thick and thorny jungle including vegetation growths on LHS and RHS of River

• Pruning branches of trees grown into the River
• Dredging of Sarvan Muttu
• Regularisation of Fishing Boat Anchors
• Relocation of Fishing Nests, Chinese Fishing Nets and Local Fish catching arrangements to the Banks of River
• Removal of Vertical Posts in River
• De-silting and removal of debris from River bed as well as Banks
• Regular Maintenance & Upkeep of River and Banks is necessary as this reach is Critical
• General consensus should be made with Revenue, Fisheries, Local Self Government and Irrigation Department to install Fishing Nests, Chinese Fishing Nets and Local Fish Catching arrangements
• Formation of Flood Banks with the excavated Silt from River
• River Banks should have at least 3m water depth to accommodate flood water
• Survey of River to evict any types of encroachments

Proforma

The visual observations of Periyar River is summarised in the following Seven Proforma. They are attached in the following pages in order. (Table 4 to Table 14)

1. Silt Deposit Locations
2. Waste Deposit Locations
3. List of Structures across River
4. List of Structures to be demolished / re-constructed
5. Pumping Stations in River - Nil
6. Forest Lands on Banks of River – Nil
7. River Bank Features

LOCATION OF SILT DEPOSIT / DELTA IN VARIOUS REACHES

Sl.No	Name of River	Name of Local body	Name of Location/ Local name of Loaction	Latitude	Longitude	Average Width of River/Thodu (m)	Chainage		Approx Depth of Siltation (m)	Approx Quantity (m3)	Composition of soil in %			Remarks
							From (km)	To (km)			Sand	Silt	Clay	
1	Periyar	Puthenvelikkara GP, Chendamangalam GP, Vadakkekkara GP, Periyar Pallippuram GP to Kodungalloor Municipality, Eriyard GP	Periyar Main River stretch	10.178552 to 10.177008	76.243235 to 76.162964	450	17.500	27.470	0.80	3500000	20	20	60	Silt deposit found for entire stretch

Table 4

LOCATION OF SILT DEPOSIT / DELTA IN VARIOUS REACHES

Sl. No.	Name of Tributary	Name of Local Body	Name of Location/ Local Name of Location	Latitude	Longitude	Average Width of River/Thodu (m)	Chainage		Approx Depth of Siltation (m)	Approx Quantity (m^3)	Composition of soil in %			Remarks
							From (km)	To (km)			Sand	Silt	Clay	
1	Cheriya Pazhampilly Thuruthu Tributary	Chendamangalam GP	Paliyam	10.177769 to 10.181449	76.236351 to 76.227211	40	0	1.100	0.80	35200	20	20	60	Silt deposit found for entire stretch
2	Thekkethuruthu Tribnutary	Chendamangalam GP Vadakkekkara GP	Gothuruthu	10.183702 to 10.193041	76.228036 to 76.204926	40	0	4.960	0.80	158720	20	20	60	Silt deposit found for entire stretch
3	Chettikkadu Sub Tributary	Vadakkekkara GP	Malyankara	10.187379 to 10.172082	76.203682 to 76.182107	40	0	3.310	0.80	105920	15	10	75	Silt deposit found for entire stretch
4	Kurumbathuruthu - Akathuchal Tributary	Puthenvelikkara GP Chendamangalam GP	Kurumbathuruthu	10.199629 to 10.193616	76.228628 to 76.220656	65	0	3.100	1.00	201500	15	10	75	Silt deposit found for entire stretch
5	Thuruthippuram Tributary	Kodungallor Municipality Puthenvelikkara GP	Malyankara	10.193117 to 10.204103	76.215621 to 76.230510	310	0	3.000	0.80	744000	20	20	60	Silt deposit found for entire stretch

Sl. No.	Name of Tributary	Name of Local Body	Name of Location/ Local Name of Location	Latitude	Longitude	Average Width of River/Thodu (m)	Chainage		Approx Depth of Siltation (m)	Approx Quantity (m^3)	Composition of soil in %			Remarks
							From (km)	To (km)			Sand	Silt	Clay	
6	Vijayan Thodu Tributary	Kodungallor Municipality	Malyankara	10.197584 to 10.201174	76.206483 to 76.211517	21	0	0.800	0.80	13440	20	20	60	Silt deposit found for entire stretch
6	Elichira Sub Tributary	Puthenvelikkara GP Poyya GP	Puthenvelikkara-Mala Road	10.203993 to 10.205187	76.231848 to 76.245609	50	0	2.200	0.60	66000	20	20	60	Silt deposit found for entire stretch
	Karooppadanna Sub Tributary	Kodungallor Municipality Vellangalloor GP	Pulloott	10.203993 to 10.205188	76.231848 to 76.245610	250	0	7.500	0.60	1125000	20	20	60	Silt deposit found for entire stretch
8	Thachappilly Sub Tributary	Kodungallor Municipality Vellangalloor GP	Thachappilly	10.203993 to 10.205189	76.231848 to 76.245611	60	0	3.350	0.60	120600	20	20	60	Silt deposit found for entire stretch
9	Neythikkudy Sub Tributary	Kodungallor Municipality Mala GP	Neythikkudy	10.203993 to 10.205190	76.231848 to 76.245612	45	0	6.000	0.60	162000	20	20	60	Silt deposit found for entire stretch

Table 5

LOCATION OF WASTE DISPOSAL IN VARIOUS REACHES												
Sl. No.	**Name of River**	**Name of Local body**	**Ward No**	**Name of location/ local name of loaction**	**Chainage**	**Latitude**	**Longitude**	**Type of waste**		**Nature of waste**		**Remarks**
								Industrial	**Domestic**	**Solid**	**Liquid**	
1	Periyar	Puthenvelikkara GP Chendamangalam GP Vadakkekkara GP	All	Thekkethuruth River Tail End (LHS1 / LHS2)	22.500km	10.19303	76.201104	Yes	Yes		Yes	Tributary of Periyar and Sub Tributary of Thekkethuruthu River is polluted with Domestic and Peeling Shed discharge. The polluted water is ultimately reaching Periyar Main River
2	Periyar	Chendamangalam GP Puthenvelikkara GP	2, 3, 5, 7	Kurumbathuruthu-Akathuchal Tail End (RHS1)	20.700km	10.193616	76.220656	Yes	Yes		Yes	Tributary of Periyar is polluted with Domestic and Peeling Shed discharge. The polluted water is ultimately reaching Periyar Main River

Sl. No.	Name of River	Name of Local body	Ward No	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Industrial	Domestic	Solid	Liquid	
3	Periyar	Puthenvelikkara GP Kodungalloor Municipality	All	Thuruthippuram Tail End (RHS2)	21.400km	10.193616	76.220656	Yes	Yes		Yes	Tributary of Periyar is polluted with Domestic and Peeling Shed discharge from Sub Tributaries also. The polluted water is ultimately reaching Periyar Main River
4	Periyar	Kodungalloor Municipality	All	Vijayan Thodu Tail End (RHS3)	22.200km	10.197584	76.206483	Yes	Yes		Yes	Tributary of Periyar is polluted with Domestic and commercial waste discharge from nearby institutions The polluted water is ultimately reaching Periyar Main River
5	Periyar	Vadakkekkara GP Kodungalloor Municipality Eriyad GP	All	Sathar Island LHS / RHS	23.200km	10.18501	76.182514	Yes	Yes		Yes	Domestic discharge from LHS and RHS of Sathar Island Tributary. Waste deposit from anchored Fishing Boats

Table 6

LOCATION OF WASTE DISPOSAL IN VARIOUS REACHES

Sl.No	Name of Tributary	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
1	Cheriya Pazhampilly Thuruthu Tributary	2,3,6,7	All Wards	Paliyam	Entire Stretch	10.177769 to 10.181449	76.236351 to 76.227211	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
2	Thekkethuruthu Tribnutary	Chendamangalam GP	All Wards	Gothuruthu	Entire Stretch	10.183702 to 10.193041	76.228036 to 76.204926	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
3	Chettikkadu Sub Tributary	Vadakkekkara GP	7,9,11	Malyankara	Entire Stretch	10.187379 to 10.172082	76.203682 to 76.182107	Yes	Yes	Yes	Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
4	Kurumbathuruthu - Akathuchal Tributary	Puthenvelikkara GP Chendamangalam GP	2, 4, 5, 7	Kurumbathuruthu	Entire Stretch	10.199629 to 10.193616	76.228628 to 76.220656	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
5	Thuruthippuram Tributary	Kodungallor Municipality Puthenvelikkara GP	All Wards	Malyankara	Entire Stretch	10.193117 to 10.204103	76.215621 to 76.230510	Yes	Yes	Yes	Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
6	Vijayan Thodu Tributary	Kodungallor Municipality	3	Malyankara	Entire Stretch	10.197584 to 10.201174	76.206483 to 76.211517	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
6	Elichira Sub Tributary	Puthenvelikkara GP Poyya GP	3,6,7,9	Puthenvelikkara-Mala Road	Entire Stretch	10.203993 to 10.205187	76.231848 to 76.245609	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
7	Karooppadanna Sub Tributary	Kodungallor Municipality Vellangalloor GP	All Wards	Pulloott	Entire Stretch	10.203993 to 10.205188	76.231848 to 76.245610	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
8	Thachappilly Sub Tributary	Kodungallor Municipality Vellangalloor GP	2,5,8	Thachappilly	Entire Stretch	10.203993 to 10.205189	76.231848 to 76.245611	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
9	Neythikkudy Sub Tributary	Kodungallor Municipality Mala GP	3,4,6,9	Neythikkudy	Entire Stretch	10.203993 to 10.205190	76.231848 to 76.245612	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries

Table 7

LOCATION OF STRUTURES AND BRIDGES TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl. No.	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of struture**	**Whether Demolished & reconstruction needed**	**Demolisio n only**	**Remarks**
1	Periyar	Vadakkekkara GP	Moothakunnam Bridge	22.715km	10.194690	76.201205	Road Bridge	No	No	
2		Kodungallor Municipality	Kottapuram Bridge	22.95km	10.199232	76.200644	Road Bridge	No	No	
3		Vadakkekkara GP	Sathar Island Bridge	23.3km	10.185733	76.187891	Road Bridge	No	No	

Table 8

LOCATION OF BRIDGES AND STRUTURES IN VARIOUS REACHES										
Sl no	**Name of Tributary**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge/other struture**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Kurumbathuruthu bridge	0.546km	10.191779	76.224887	Road bridge	No	No	
2	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.394km	10.187721	76.231140	Culvert	No	No	Rehabilitation required
3	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.400km	10.187777	76.231189	Culvert	No	No	Rehabilitation required
4	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.500km	10.188301	76.231804	Culvert	Yes	No	Re-construction required
5	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.580km	10.188772	76.232429	Culvert	Yes	No	Re-construction required
6	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.700km	10.189543	76.232998	Culvert	Yes	No	Re-construction required
7	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara Thuruthipuram Road	1.850km	10.191061	76.233271	Filled Road	Yes	No	No culvert provided
8	LHS 1 - Paliyam	Chendamangalam GP	Paliyam boat jetty bridge	0.265km	10.177610	76.233254	Road bridge	Yes	No	Re-construction required
9	LHS 2-Thekkethuruth distributary	Chendamangalam GP	CP thuruth road bridge	0.095km	10.182398	76.227472	Road bridge	Yes	No	Re-construction required
10	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Vadakkumpuram-Gothuruth bridge	0.315km	10.181203	76.226187	Road bridge	No	No	
11	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Thekkethuruth vadathodu road bridge	1.706km	10.188301	76.231804	Road bridge	Yes	No	Re-construction required
12	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Gothuruth bridge	2.667km	10.184171	76.206196	Road bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of Bridge/other struture	Whether Demolished & reconstruction needed	Demolision only	Remarks
13	LHS 2-ST 1-Thekkethuruth Chettikkad subtributary	Vadakkekkara GP	Kuriyappilly old bridge	0.108km	10.187577	76.202481	Road bridge	Yes	No	Re-construction required
14	LHS 2-ST 1-Thekkethuruth Chettikkad subtributary	Vadakkekkara GP	Kuriyappilly new bridge	0.150km	10.187476	76.202058	Road bridge	No	No	
15	RHS 2-Thuruthipuram tributary	Kodungalloor Municipality	Thuruthipuram bridge	0.370km	10.199092	76.213699	Road bridge	No	No	
16	Elichira Sub Tributary	Puthenvelikkara GP	Thuruthoor-Poyya Bridge	0.800km	10.20184	76.2348951	Road bridge	No	No	
17	Elichira Sub Tributary	Puthenvelikkara GP	Elichira Sluice	2.20km	10.205266	76.245616	Road bridge	Yes	No	Re-construction required
18	Karoopadanna Sub Tributary	Kodungalloor Municipality	Mala-Krishnankotta Bridge	0.70km	10.210420	76.216966	Road bridge	Yes	No	
19	Karoopadanna Sub Tributary	Kodungalloor Municipality	Pulloott Bridge	3.00km	10.227284	76.208027	Road bridge	Yes	No	
20	Thachappilly Sub Tributary	Puthenvelikkara GP	Elichira Sluice	3.35km	10.238178	76.227402	Road bridge	Yes	No	
21	Neythikkudy Sub Tributary	Puthenvelikkara GP	Elichira Sluice	6.00km	10.242386	76.241934	Road bridge	Yes	No	

Table 9

LOCATION OF BRIDGE TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl. No.	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Periyar							No Bridges / Structure to be re-constructed / demolished in Main Stretch		

Table 10

LOCATION OF BRIDGES AND STRUTURES TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl no	**Name of Tributary**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge/other struture**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Kurumbathuruthu bridge	0.546km	10.191779	76.224887	Road bridge	No	No	
2	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.394km	10.187721	76.231140	Culvert	No	No	Rehabilitation required
3	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.400km	10.187777	76.231189	Culvert	No	No	Rehabilitation required
4	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.500km	10.188301	76.231804	Culvert	Yes	No	Re-construction required
5	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.580km	10.188772	76.232429	Culvert	Yes	No	Re-construction required
6	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.700km	10.189543	76.232998	Culvert	Yes	No	Re-construction required
7	RHS 1- Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara Thuruthipuram Road	1.850km	10.191061	76.233271	Filled Road	Yes	No	No culvert provided
8	LHS 1 - Paliyam	Chendamangalam GP	Paliyam boat jetty bridge	0.265km	10.177610	76.233254	Road bridge	Yes	No	Re-construction required
9	LHS 2-Thekkethuruth distributary	Chendamangalam GP	CP thuruth road bridge	0.095km	10.182398	76.227472	Road bridge	Yes	No	Re-construction required
10	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Vadakkumpuram-Gothuruth bridge	0.315km	10.181203	76.226187	Road bridge	No	No	
11	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Thekkethuruth vadathodu road bridge	1.706km	10.188301	76.231804	Road bridge	Yes	No	Re-construction required
12	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Gothuruth bridge	2.667km	10.184171	76.206196	Road bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of Bridge/other struture	Whether Demolished & reconstruction needed	Demolision only	Remarks
13	LHS 2-ST 1-Thekkethuruth Chettikkad subtributary	Vadakkekkara GP	Kuriyappilly old bridge	0.108km	10.187577	76.202481	Road bridge	Yes	No	Re-construction required
14	LHS 2-ST 1-Thekkethuruth Chettikkad subtributary	Vadakkekkara GP	Kuriyappilly new bridge	0.150km	10.187476	76.202058	Road bridge	No	No	
15	RHS 2-Thuruthipuram tributary	Kodungalloor Municipality	Thuruthipuram bridge	0.370km	10.199092	76.213699	Road bridge	No	No	
16	Elichira Sub Tributary	Puthenvelikkara GP	Thuruthoor-Poyya Bridge	0.800km	10.20184	76.2348951	Road bridge	No	No	
17	Elichira Sub Tributary	Puthenvelikkara GP	Elichira Sluice	2.20km	10.205266	76.245616	Road bridge	Yes	No	Re-construction required
18	Karoopadanna Sub Tributary	Kodungalloor Municipality	Mala-Krishnankotta Bridge	0.70km	10.210420	76.216966	Road bridge	Yes	No	
19	Karoopadanna Sub Tributary	Kodungalloor Municipality	Pulloott Bridge	3.00km	10.227284	76.208027	Road bridge	Yes	No	
20	Thachappilly Sub Tributary	Puthenvelikkara GP	Elichira Sluice	3.35km	10.238178	76.227402	Road bridge	Yes	No	
21	Neythikkudy Sub Tributary	Puthenvelikkara GP	Elichira Sluice	6.00km	10.242386	76.241934	Road bridge	Yes	No	

Table 11

DETAILS OF WATER PUMPING STATIONS IN VARIOUS REACHES

Sl. No.	Name of River	Name of Local body	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Left Bank / Right Bank	Approx. Qty of water taken per year	Agency	Remarks
1	Periyar and Tributaries						No Pumping Stations on Both Banks of Main River and Tributaries			

Table 12

FOREST DETAILS ON THE MAIN RIVER BANK

Sl.No.	Name of River	Chainage		Latitude	Longitude	Left Bank / Right Bank	Remarks
		From	To				
1	Periyar and Tributaries					No Forest Area on Both Banks of Main River and Tributaries	

Table 13

PERIYAR RIVER

River/Tributary/Sub-tributary :	Periyar River
Name of River/Tributary/Sub-tributary :	Main River
Name of officer :	Yasdodadevi N

Sl. No.	Chainage	Location Name	Lattitude	Longitude	Approx Width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
															Structure				Sedimentation			Waste Deposit			
							Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	0.546km	Station Kadavu Bridge D/S	10.178834	76.243480	250m	Clay & Sand	Partially	Private	Clay & Sand	1.2m	1.2m	Clay & Sand	Private	Partially	No Obstruction on D/S	River having sufficient width and depth for free flow of normal flood water	No	No	0.8m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	Present on both banks
2	1.394km	Karippayikadavu Bridge D/S	10.17557	76.238450	125m	Clay & Sand	Partially	Private	Clay & Sand	1.2m	1.2m	Clay & Sand	Private	Partially	No Obstruction on D/S	River having sufficient width and depth for free flow of normal flood water	No	No	0.8m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	Present on both banks
3	1.400km	Confluence Point D/S to Moothakunnam Bridge	10.182691	76.233314	340m	Clay & Sand	Partially	Govt. & Private	Clay & Sand	1.2m	1.2m	Clay & Sand	Govt. & Private	Partially	No Obstruction on D/S	River having sufficient width and depth for free flow of normal flood water	No	No	0.8m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks
4	1.500km	Moothakunnam Bridge & D/S	10.19367	76.20123	320m	Clay & Sand	Partially	Govt. & Private	Clay & Sand	1m	1m	Clay & Sand	Govt. & Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal flood water	No	No	0.8m	Clay & Sand	60% Clay 20% Silt 20% Sand	Nil	NA	NA	Present on both banks
5	1.580km	Kottappuram Bridge & D/S	10.199	76.20064	205m	Clay & Sand	Partially	Govt. & Private	Clay & Sand	1m	1m	Clay & Sand	Govt. & Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal flood water	No	No	0.8m	Clay & Sand	60% Clay 20% Silt 20% Sand	Nil	NA	NA	Present on both banks
6	1.700km	Sathar Island Bridge & D/S	10.18562	76.18792	92m	Clay & Sand	Partially	Govt. & Private	Clay & Sand	0.8m	0.8m	Clay & Sand	Govt. & Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal flood water	No	No	0.8m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks
7	1.850km	Munambam Azhimugham	10.17662	76.16277	165m	Clay & Sand	Partially	Govt. & Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Govt. & Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal flood water	No	No	0.6m	Clay	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks

Table 14

Conclusion

The activities that has to be carried out for River Rejuvenation can be classified into two namely;

- Short Term Measures (Once / Twice in a Year)
- Long Term. Measures (As per Long Term Plan)

They are summarised as shown in Table 15. The remarks in the column show the periodicity of each activity. The Short Term Routine Activities can be carried out by respective Government Departments in consultation with concerned Local Self Government Institutions. The Short Term Measures can be implemented through MGNREGS by local bodies. The Long Term Activities can be done by Irrigation / PWD / Revenue / Fisheries Departments or any other Department as decided by the Government. The Short Term Measures are of repetitive in nature and Long Term Measures are of maintenance in nature.

Sl. No.	Activity	Description of Work	Remarks
1	**Short Term Measures**	Clearing Vegetation Growths	Routine Activity for Smooth River Flow
2		Pruning Branches of Trees	Routine Activity for Smooth River Flow
3		Cutting Trees	Routine Activity for Smooth River Flow
4		Clearing Water Weeds, Floating Objects and Other Materials	Routine Activity for Smooth River Flow
5		De-Siltation and Deepening of River Banks	Routine Activity for Smooth River Flow
6		Removal of Vertical Posts for Fishing	Routine Activity for Smooth River Flow
7		Removal of Low Lying Cables / Electric Lines across River	Routine Activity for Smooth River Flow
8		Removal and Separation of Degradable and Non Bio-Degradable Deposits from River	Routine Activity for Smooth River Flow

Table 15

Sl. No.	Activity	Description of Work	Remarks
1	Long Term Measures	De-Siltation / Delta Removal and Deepening of River	Smooth River Flow and Flood Prevention
2		Survey of River	Smooth River Flow and Flood Prevention
3		Eviction of Encroachments	Smooth River Flow and Flood Prevention
4		Re-location of Chinese Fishing Nets	Smooth River Flow and Flood Prevention
5		Re-location of Fishing Nests	Smooth River Flow and Flood Prevention
6		Re-construction / Rehabilitation of Cross Drainage Works	Smooth River Flow and Flood Prevention
7		Installation of Sewage Treatment Plants at Regular Intervals (Primary and Secondary)	Smooth River Flow and Flood Prevention
8		Formation of Flood Banks with Removed Silt	Smooth River Flow and Flood Prevention
9		Planting Grass, Rapid Growing Bamboos / Trees on Banks of River	Smooth River Flow and Flood Prevention
10		River Banks Protection with Environment Friendly Materials like Coir, Geotextiles etc.	Smooth River Flow and Flood Prevention
11		River Banks Protection with Rubble, Laterite, Concrete, Sheet Pile etc.	Smooth River Flow and Flood Prevention
12		Creation of Buffer Zone on Banks of River	Smooth River Flow and Flood Prevention

Table 15

The activities like de-siltation, clearing light, thick & thorny jungle grown into the river, removal of all types of debris and removalof all obstructions in river also have to be executed to clear waterway to the maximum possible extent. The de-siltation and jungleclearance have to be done in consultation with the respective Local Bodies. The de-siltation

and removal of all types of jungle should be done periodically. The removed silt can be used to replenish River Banks by forming Embankments on both sides. In this reach Flood Banks are necessary due to the formation of different Islands (Thuruthus) in River Course. The Flood Banks should be formed around all Islands and River Banks. It prevents flooding the adjacent places around Main River. Moreover the River Banks should have at least 3m depth of water to maintain sufficient flow during all seasons.

All types of waste disposal into the river have to be regulated in coordination with the respective local bodies. The installation of Sewage Treatment Plants at regular intervals on the banks can be considered as preventive measure to prevent pollution of river. Thus it can be ensured that only treated water flows into the river making pollution to minimum extent. The treatment of effluents can be done in two stages; Primary and Secondary. It has to be decided after a detailed study in consultation with Local Self Government Institutions. The demarcation of river boundary with original land records is also required to bring back River to its original shape. There should be a vivid law and order to install Chinese Fishing nets, Fishing Nests, VerticalPosts and Electricwires in the Periyar Main River as they are obstructing the flow of water during flood times. This has to be done in consultation with Irrigation, Fisheries, Revenue, KSEB Departments and stakeholders. Above all there should be regular public awareness campaign by Local Self Government Institutions not to pollute River, Tributaries and ultimately any type of Water Bodies for the wellbeing of next generation. The law enforcing agencies like Police and Vigilance Department can also play a vital role in implementing Water Conservation Act published by Kerala Government. The offenders may be given warning for the first time and the repetition of the activity may be charged under Water Conservation Act by imposing heavyfine / imprisonment or both.

The Local Self Government Institutions and Government Departments can play a vital role for the Room for River Activity initiated by Government. The Acquisition of Land or Freezing all types of Construction / Man-made Activities on both Banks of River can be considered by Government. The concept of Building Line as mentioned in Kerala BuildingRules (KBR) is also applicable to River Banks and should be implemented without any delay. The boundary of Minimum Land Acquisition / Freezing Zone should be 3m and Maximum be 5m from existing River Bank. The extent of acquisition may be decided by Public Hearing in co-ordination with Elected Representatives at all level. The acquired land acts as Buffer Zone to prevent flooding of Islands in River and Banks of River. The rapid growing Grass, Bamboos / Ramachamor any other fast growingtrees may be planted in Buffer Zones and

they will protect the River Banks from erosion. The medicinal plants like Ramacham, Amla, Neem and Arya Vepu can be planted along the banks of River. Their roots absorb pollutants from water and thus the extent of pollution in River can be minimised. The majority of River Bank protection may be done with environment friendly materials. The conventional protection measures like Rubble, Laterite and Concrete Walls may also be adopted at suitable locations

By doing all the above activities in coordination with all Government Departments and participation from Public the concept of “Room for River” can be easily achieved.

PERIYAR RIVER BASIN – From Ch. 17.500km to 26.970km

L1. Paliyam (Cheriya Pazhampilly (CP) Thuruthu) Tributory (PRB LHS1)

Salient Features

1	Local Body	Chendamangalam GP (Ward No. 2, 4, 5, 7)
2	Length	1100m (1.10km)
3	Width (Varying)	30m, 33m, 35m, 45m
4	Average Depth of Water	5m, 4m
5	Water Spread Area	1.10km x 0.040km = 0.044sq.km
Table 1		

The visual observations of Periyar River Tributary are explained below. The immediate and necessary actions to be taken up are also explained in concluding report.

The Schematic Diagram of the Tributary in Main River Stretch is shown as shaded in Fig.1. The off take point of the Tributary from the Main River is taken as Ch.0m for convenience and better understanding

Schematic Diagram of Tributary in Main River

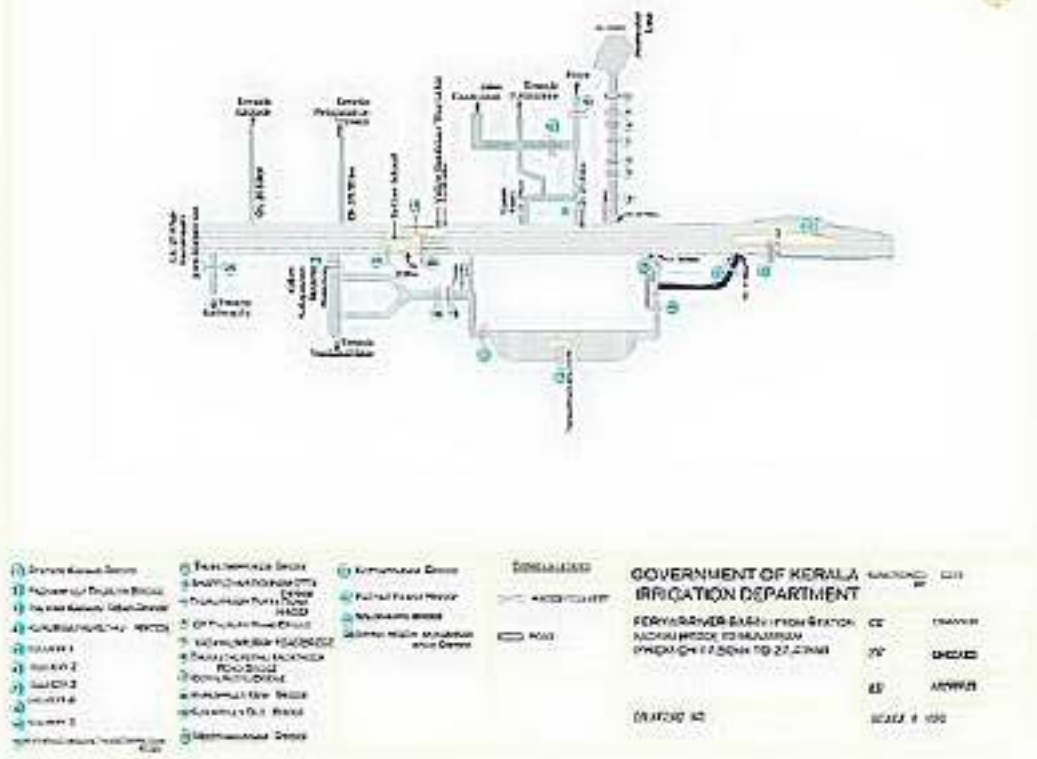


Fig.1

The original path of the Tributary (Blue Hatch) is represented in Fig.2.

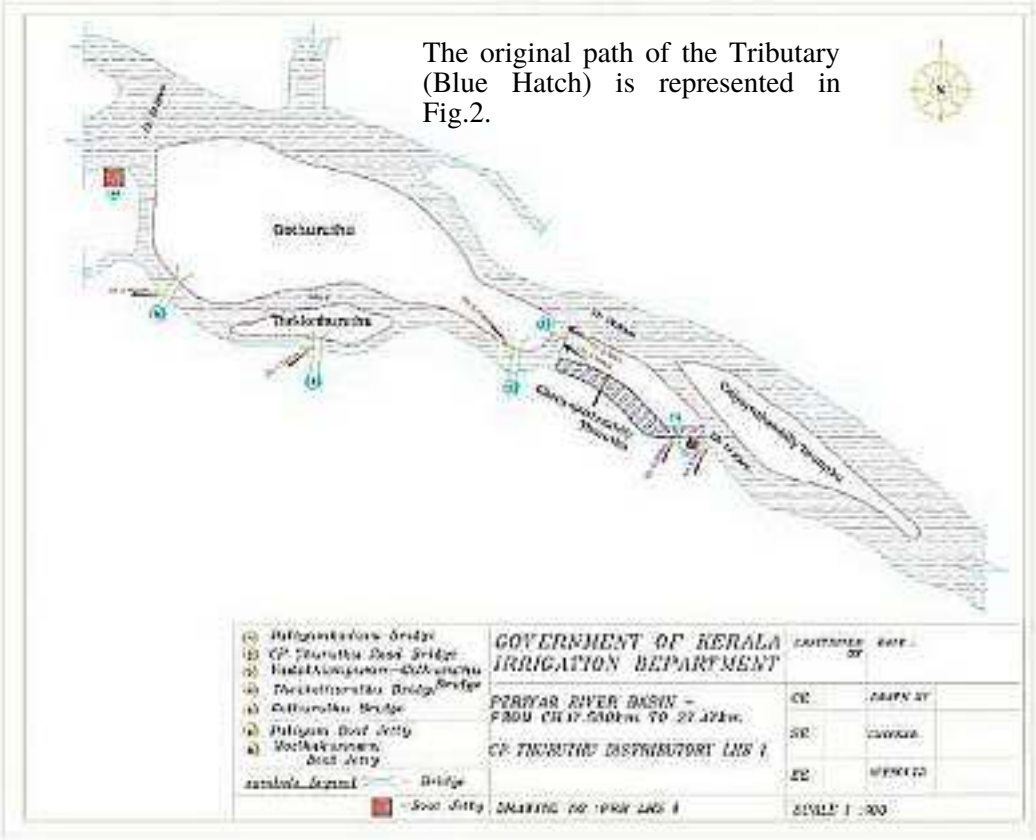


Fig.2

The Critical Activity of the Tributary is shown in Fig.3

Fig.3

Fig.4

L1.1 At Ch.0/000m

The Tributary named Cheriya Pazhampilly Thuruthu (Paliyam) starts near Ch. 17.400km downstream of Karippayikadavu Bridge on Left Bank of Periyar River. Cheriya Pazhampilly Thuruthu is surrounded by Periyar and Paliyam Tributary on North and South side. It is situated in Chendamangalam GP. There are about 80 families residing in CP Thuruth. The salient features of the Tributary are shown in Table 1. The mouth of the Tributary is shown in Fig.4.

The mouth is having sufficient width and depth for the free flow of water. The width of mouth is about 25m and depth of water is about 5m and there are minor obstructions to the flow of water like water weeds and accumulation of solid wastes. The formation of a small delta on LHS of the tributary is observed which may be formed due to meandering of river. The formation of delta on LHS of the Tributary results in accumulation of floating wastes on mouth of River. It has to be removed for making Room for River. It is also seen that thick vegetation on both sides of mouth prevents free flow of water during flood times. The activities that has to be carried out to clear waterway is given at the end of the report.

L1.2 From Ch.0m to 1100m

The Starting Chainage of the Tributary is taken as Off take Point from Periyar River and the Ending Chainage is the Junction point with Thekkethuruthu Tributary. The reach can be divided into two namely;

1.From Paliyam River Mouth to Paliyam Kadavu Bridge

The U/S side of Paliyam Kadavu Bridge is having an average width of 25m and a water depth of 5m. Paliyam Boat Jetty is situated on LHS near Bridge. The Boat Jetty is constructed as a part of Muziris Heritage Project. The Piers and Slab of the Bridge are damaged and may fall atany time which will obstruct the flow of water and may cause casualty to the public and their properties. If Paliyam Bridge falls, the connectivity of CP Thuruthu with main land will be cut and it will cause hardship to the people living in that area.

The upstream views of bridge are shown in Fig.5. The photographs clearlyshow the damagedPiers of the Bridge, the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on U/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel. The depth of water is about 5m and silt deposit is about 0.8m. There are some visible encroachments and waste disposal from some of the establishments / houses situated on the banks of river. It is seen that some drain pipes are leading from nearby houses to the river course. The sides of the channelare partially protected with rubble, lateriteand locally available materials.

The following works have to be carried out to make Room for River to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Removal of delta on mouth of Tributary
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river and removal of vertical posts
- De-silting, removal of debris, water weeds and waste water outlets
- Re-Construction of Paliyam Bridge as single span
- Survey of river and eviction of encroachments

Paliyam Kadavu Bridge U/S

Paliyam Kadavu Bridge – Needs Re-construction

Paliyam Kadavu Boat Jetty

Paliyam Kadavu Bridge – Side View

Fig.5

2. Paliyam Kadavu Bridge to Thekkethuruthu River Junction.

The D/S side of the river is having an average width of 35m with a water depth of 5m. The branches of trees grown into the river obstruct the free flow of water and have to be trimmed as early as possible. The downstream views of bridge are shown in Fig.6. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on D/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel. The vertical posts installed by local fishermen for fishing activities also obstruct the free flow of water. There are some visible encroachments and waste disposal from some of the establishments / houses situated on the banks of river. It is seen that some drain pipes are leading from nearby houses to the river course. The sides of the channel are partially protected with rubble, laterite and locally available materials. This Tributary meets Thekkethuruthu River which is the second Tributary of Periyar on LHS of the reach. Thereafter the Tributary flows as one channel before discharging its storage into Periyar River itself.

Paliyam Kadavu Bridge D/S – River Obstruction

Paliyam Kadavu Bridge D/S – Thick Vegetation

Paliyam Kadavu Bridge D/S – Thick Vegetation on Banks

Paliyam Kadavu Bridge D/S - Thick Vegetation

Paliyam Kadavu Bridge D/S – Fish Nest – River Obstruction

CP Thuruthu – Thekkethuruthu River Junction

Fig.6

The following works have to be carried out to make Room for River to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Removal of delta on junction of Tributary
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river and removal of vertical posts
- De-silting, removal of debris, water weeds and waste water outlets
- Re-Construction of Paliyam Bridge as Single Span
- Survey of river and eviction of encroachments

L1.3 Proforma

The visual observations of Periyar River is summarised in the following Seven Proforma. They are attached in the following pages in order. (Table 2 to Table 8)

1. Silt Deposit Locations
2. Waste Deposit Locations
3. List of Structures across River
4. List of Structures to be demolished / re-constructed
5. Pumping Stations in River - Nil
6. Forest Lands on Banks of River – Nil
7. River Bank Features

LOCATION OF SILT DEPOSIT / DELTA IN VARIOUS REACHES														
Sl. No.	Name of Tributary	Name of Local Body	Name of Location/ Local Name of Location	Latitude	Longitude	Average Width of River/Thodu (m)	Chainage		Approx Depth of Siltation (m)	Approx Quantity (m^3)	Composition of soil in %			Remarks
							From (km)	To (km)			Sand	Silt	Clay	
1	Cheriya Pazhampilly Thuruthu (Paliyam)	Chendamangalam GP	Paliyam	10.177769 to 10.181449	76.236351 to 76.227211	40	0	1.100	0.80	35200	20	20	60	Silt deposit found for entire stretch

Table 2

LOCATION OF WASTE DISPOSAL IN VARIOUS REACHES												
Sl. No	Name of Tributary	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
1	Cheriya Pazhampilly Thuruthu (Paliyam)	Chendamanagalam GP	2, 4, 5. 7	Paliyam	Entire Stretch	10.177769 to 10.181449	76.236351 to 76.227211	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributary

Table 3

LOCATION OF BRIDGES AND STRUTURES TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl. No.	**Name of Tributary**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge/other struture**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Cheriya Pazhampilly Thuruthu (Paliyam)	Chendamangalam GP	Paliyam Boat Jetty Bridge	0.265km	10.177610	76.233254	Road bridge	Yes	No	Re-construction required

Table 4

LOCATION OF BRIDGE TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl. No.	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Cheriya Pazhampilly Thuruthu (Paliyam)	Chendamangalam GP	Paliyam Boat Jetty Bridge	0.265km	10.177610	76.233254	Road Bridge	Yes	No	Re-construction required

Table 5

DETAILS OF WATER PUMPING STATIONS IN VARIOUS REACHES

Sl. No.	Name of River	Name of Local body	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Left Bank / Right Bank	Approx. Qty of water taken per year	Agency	Remarks
1	Cheriya Pazhampilly Thuruthu (Paliyam)						No Pumping Stations on Both Banks of Tributary			

Table 6

FOREST DETAILS ON THE MAIN RIVER BANK

Sl.No.	Name of River	Chainage		Latitude	Longitude	Left Bank / Right Bank	Remarks
		From	To				
1	Cheriya Pazhampilly Thuruthu (Paliyam)					No Forest Area on Both Banks of Tributary	

Table 7

PERIYAR RIVER

River/Tributary/Sub-tributary :	Periyar River
Name of River/Tributary/Sub-tributary :	Cheriya Pazhampilly Thuruthu (Paliyam) Tributary
Name of officer :	Yasdodadevi N

Sl. No.	Chainage	Location Name	Lattitude	Longitude	Approx Width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
															Structure				Sedimentation			Waste Deposit			
							Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	0	Entry Mouth of Paliyam Tributary to Paliyam Bridge	10.177769	76.236351	35m	Clay & Sand	Partially	Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Private	Partially	No Obstruction on D/S	Tributary mouth having sufficient width and depth for free flow of normal and flood water	No	No	0.8m	Clay & Sand	60% Clay, 20% Silt 20% Sand	L/B & R/B	Liquid	Slightly	Present on both banks
2	0.265km	Paliyam Kadavu Bridge	10.177795	76.232227	45m	Clay & Sand	Partially	Govt.	Clay & Sand	0.6m	0.6m	Clay & Sand	Govt.	Partially	Bridge Obstruction	Piers of Bridge obstructs normal flow of water. Bridge damaged. Re-construction required	Yes	Yes	0.8m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	Re-Construction required
3	1.100km	Paliyam Bridge to Tail End of Paliyam-Thekkethuruthu River Junction	10.182691	76.233314	45m	Clay & Sand	Partially	Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Private	Partially	No Obstruction on D/S	River having sufficient width and depth for free flow of normal and flood water	No	No	0.8m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks

Table 8

L1.4 Conclusion

The activities on priority basis that have to be carried out for Tributary Rejuvenation can be classified into two namely;

- Short Term Measures(Once / Twice in a Year)
- Long Term. Measures(As per Long Term Plan)

They are summarised as shown in Table 9. The remarksin the column show the periodicity of each activity.The Short Term Routine Activities can be carriedout by respective Government Departments in consultation with concerned Local Self Government Institutions. The Short Term Measures can be implemented through MGNREGS by local bodies. The Long Term Activities can be done by Irrigation / PWD / Revenue / FisheriesDepartments or any other Department as decided by the Government. The Short Term Measures are of repetitive in nature and Long Term Measures are of maintenance in nature.

Sl. No.	Activity	Description of Work	Remarks
1	Short Term Measures	Clearing Vegetation Growths	Routine Activity for Smooth River Flow
2		Pruning Branches of Trees	Routine Activity for Smooth River Flow
3		Cutting Trees	Routine Activity for Smooth River Flow
4		Clearing Water Weeds, Floating Objects and Other Materials	Routine Activity for Smooth River Flow
5		De-Siltation and Deepening of River Banks	Routine Activity for Smooth River Flow
6		Removal of Vertical Posts for Fishing	Routine Activity for Smooth River Flow
7		Removal of Low Lying Cables / Electric Lines across River	Routine Activity for Smooth River Flow
8		Removal and Separation of Degradable and Non Bio-Degradable Deposits from River	Routine Activity for Smooth River Flow

Table 9

Sl. No.	Activity	Description of Work	Remarks
1		Re-construction of Paliyam Kadavu Bridge	Smooth River Flow and Flood Prevention
2	Long Term Measures	De-Siltation / Delta Removal and Deepening of River	Smooth River Flow and Flood Prevention
3		Survey of River	Smooth River Flow and Flood Prevention
4		Eviction of Encroachments	Smooth River Flow and Flood Prevention
5		Re-location of Chinese Fishing Nets	Smooth River Flow and Flood Prevention
6		Re-location of Fishing Nests	Smooth River Flow and Flood Prevention
7		Installation of Sewage Treatment Plants at Regular Intervals (Primary and Secondary)	Smooth River Flow and Flood Prevention
8		Formation of Flood Banks with Removed Silt	Smooth River Flow and Flood Prevention
9		Planting Grass, Rapid Growing Bamboos / Trees on Banks of River	Smooth River Flow and Flood Prevention
10		River Banks Protection with Environment Friendly Materials like Coir, Geotextiles etc.	Smooth River Flow and Flood Prevention
11		River Banks Protection with Rubble, Laterite, Concrete, Sheet Pile etc.	Smooth River Flow and Flood Prevention
12		Creation of Buffer Zone on Banks of River	Smooth River Flow and Flood Prevention

Table 9

The Re-construction of Paliyam Kadavu Bridge is necessary in this reach to avoid any untoward incidents during flood. The existing Bridge has to be demolished and a new Bridge to be constructed without any intermediate supports in River. The activities like de-siltation, clearing light, thick & thorny jungle grown

into the river, removal of all types of debris and removal of all obstructions in river also have to be executedto clear waterway to the maximum possibleextent. The de-siltation and jungle clearancehave to be done in consultation with the respective Local Bodies. The de-siltation and removal of all types of jungle should be done periodically. The removed silt can be used to replenish River Banks by forming Embankments on both sides. In this reach Flood Banks are necessary due to the formation of different Islands (Thuruthus) in River Course. The Flood Banks should be formed around all Islands and River Banks. It prevents flooding the adjacent places around Main River. Moreover the River Banks should have at least 3m depth of water to maintain sufficient flow during all seasons.

All types of waste disposal into the river have to be regulated in coordination with the respective local bodies. The installation of Sewage Treatment Plants at regular intervals on the banks can be considered as preventive measure to prevent pollution of river. Thus it can be ensured that only treated water flows into the river making pollution to minimum extent. The treatment of effluents can be done in two stages; Primary and Secondary. It has to be decided after a detailed study in consultation with Local Self Government Institutions. The demarcation of river boundary with original land records is also required to bring back River to its original shape. There should be a vivid law and order to install Chinese Fishing nets, Fishing Nests, VerticalPosts and Electricwires in the Periyar Main River as they are obstructing the flow of water during flood times. This has to be done in consultation with Irrigation, Fisheries, Revenue, KSEB Departments and stakeholders. Above all there should be regular public awareness campaign by Local Self Government Institutions not to pollute River, Tributaries and ultimately any type of Water Bodies for the wellbeing of next generation. The law enforcing agencies like Police and Vigilance Department can also play a vital role in implementing Water Conservation Act published by Kerala Government. The offenders may be given warning for the first time and the repetition of the activity may be charged under Water Conservation Act by imposing heavyfine / imprisonment or both.

The Local Self Government Institutions and Government Departments can play a vital role for the Room for River Activity initiated by Government. The Acquisition of Land or Freezing all types of Construction / Man-made Activities on both Banks of River can be considered by Government. The concept of Building Line as mentioned in Kerala BuildingRules (KBR) is also applicable to River Banks and should be implemented without any delay. The boundaryof Minimum Land Acquisition / Freezing Zone should be 3m and Maximum be 5m from existing River Bank. The extent of acquisition may be decided by Public Hearing in co-ordination with Elected Representatives at all level. The acquired land acts as Buffer Zone to prevent flooding of Islands in River and Banks of River. The rapid growing Grass, Bamboos / Ramacham or any other fast growing trees may be planted in Buffer Zones and they will protect the River Banks from erosion. The medicinal plants like Ramacham, Amla, Neem and Arya Vepu can be planted along the banks of River. Their roots absorb pollutants from water and thus the extent of pollution in River can be minimised. The majority of River Bank protection may be done with environment friendlymaterials. The conventional protection measures like Rubble, Laterite and Concrete Walls may also be adopted at suitable locations

By doing all the above activities in coordination with all Government Departments and participation from Public the concept of “Room for River” can be easily achieved.

PERIYAR RIVER BASIN – From Ch. 17.500km to 26.970km

L2. Thekke Thuruthu Tributory (PRB LHS2)

Salient Features

1	Local Body	Chendamangalam GP, Vadakkekkara GP
2	Length	(320m+900m+1200m+1160m+280m+1100m) 4960m (4.96km)
3	Width (Varying)	30m, 28m, 35m, 45m, 55m, 60m
4	Average Depth of Water	6m, 5m, 4m
5	Water Spread Area	4.96km x 0.045km = 0.223sq.km
Table 1		

Periyar

The visual observations of Periyar River Tributary are explained below. The immediate and necessary actions to be taken up are also explained in concluding report.

The Schematic Diagram of the Tributary in Main River Stretch is shown as shaded in Fig.1 and Salient Features in Table 1. The off take point of the Tributary from the Main River is taken as Ch.0m for convenience and better understanding.

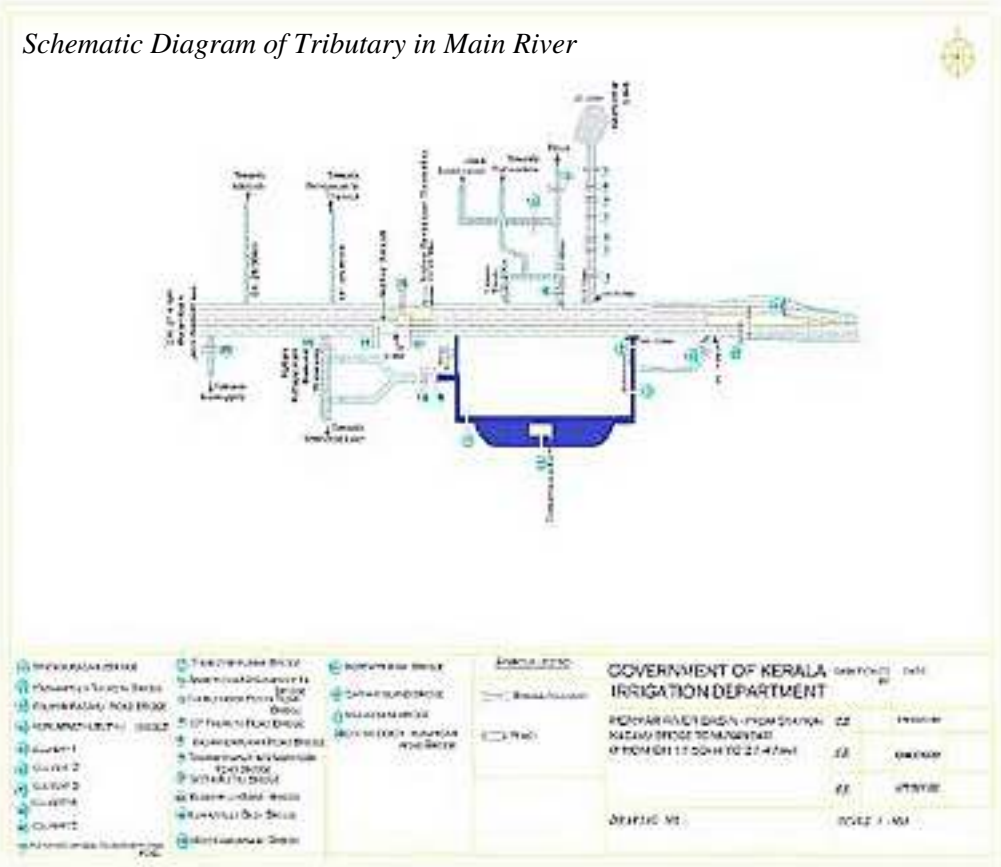
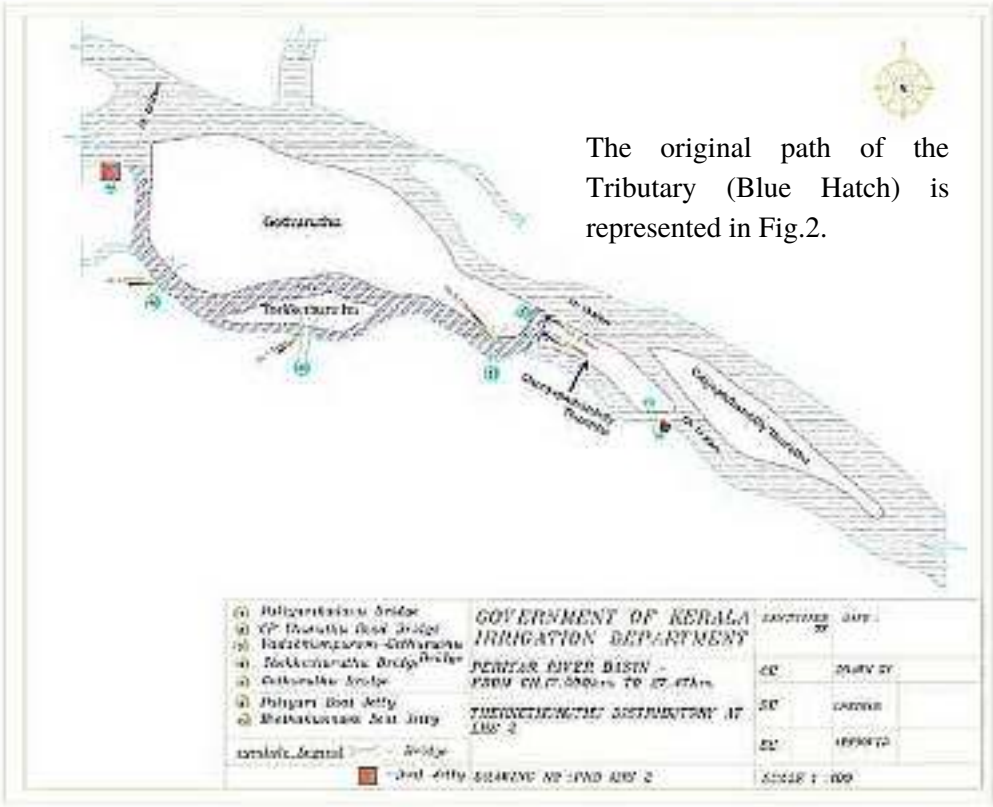


Fig.1



The original path of the Tributary (Blue Hatch) is represented in Fig.2.

Fig.2

Re-Construction of CP Thuruthu Bridge – Piers Damaged

Fig.3

Re-Construction of Thekkethuruthu-Vadathodu Bridge – Insufficient Vent Way

Thekke Thuruthu Tributary Mouth

L2.1 At Ch.0/000m

The Tributary named Thekke Thuruth starts near Ch. 18.500km downstream Pazhampilly Thuruthu Bridge on Left Bank of Periyar River. The place named Gothuruthu is surrounded by Periyar and Thekkethuruthu Tributary on North and South side. It is situated in Chendamangalam GP. There are about 250 families residing in Gothuruth. The mouth of the Tributary is shown in Fig.4.

The mouth is having sufficient width and depth for the free flow of water. The width of mouth is about 30m and depth of water is about 5m and there are no obstructions to the flow of water like water weeds and accumulation of solid wastes. The formation of a small delta on LHS of the tributary is observed which may be formed due to meandering of river.

L2.2 From Ch.0m to 320m (River Mouth to Vadakkumpuram – Gothuruthu Bridge)

1. From Thekke Thuruthu Mouth to CP Thuruthu Bridge and CP Thuruthu River Junction

The U/S side of CP Thuruthu Bridge is having an average width of 15m and a water depth of 5m. The piers and slab of bridge are damaged and may fall at any time which will obstruct the flow of water and may cause casualty to the public and their properties. The upstream and downstream views of bridge are shown in Fig.5. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on U/S and D/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel. The depth of water is about 5m and silt deposit is about 0.8m. There are no visible encroachments except at bridge approach and waste disposal from any of the establishments / houses situated on the banks of river. The Southern approach of CP Thuruthu Bridge is seen to have made by filling river on RHS. The flow of water is a little bit obstructed in this reach due to formation of approach road. As the piers of the bridge are damaged, Re-construction is necessary preferably as a single span. The sides of the channel are partially protected with rubble, laterite and locally available materials.

2. CP Thuruthu - Thekke Thuruthu River Junction upto Vadakkumpuram-Gothuruthu Bridge

The D/S side of the river is having an average width of 35m with a water depth of 5m. The branches of trees grown into the river obstruct the free flow of water and have to be trimmed as early as possible. There are no visible encroachments and waste disposal from any of the establishments / houses situated on the banks of river. It is seen that some drain pipes are leading from nearby houses to the river course. The sides of the channel are partially protected with rubble, laterite and locally available materials. A leading channel is meeting on the U/S LHS of Vadakkumpuram-Gothuruthu Bridge which is having sufficient width and depth for incoming water flow. The details are represented in Fig.5.

The following works have to be carried out to make Room for River to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river
- De-silting, removal of debris and water weeds
- Re-Construction of CP Thuruthu Bridge as single span
- Re-alignment of approach of CP Thuruthu Bridge
- Survey of river and eviction of encroachments

Thekke Thuruthu Mouth

Thekke Thuruthu Mouth D/S

CP Thuruthu Bridge U/S

CP Thuruthu Bridge – Needs Re-construction

CP Thuruthu Bridge Approach - Obstruction

CP Thuruthu Bridge D/S

CP Thuruthu – Thekkethuruthu River Junction

CP Thuruthu – Thekkethuruthu River Junction

Thekke Thuruthu River – Fishing Nest Obstruction

Vadakkumpuram-Gothuruthu Bridge-U/S Obstruction

Fig.5

Vadakkumpuram-Gothuruthu Bridge-D/S Nest Obstruction

Thekke Thuruthu River – Incoming LHS Channel

Fig.5

L2.3 From Ch.320m to 1220m (Vadakkumpuram–Gothuruthu Bridge to Bifurcation)

The D/S side of Vadakkumpuram - Gothuruthu Bridge is having an average width of 40m and a water depth of 5m. The downstream views of bridge are shown in Fig.6. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on D/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel. The depth of water is about 5m and silt deposit is about 0.8m. There are some visible encroachments and waste disposal from some of the establishments / houses situated on the banks of river. It is seen that some drain pipes are leading from nearby houses to the river course. The sides of the channel are partially protected with rubble, laterite and locally available materials. The fishing nests and posts are even situated in Bifurcation point which obstructs normal flow of water and ultimately destroy river by means of delta formation.

Vadakkumpuram-Gothuruthu Bridge- D/S LHS Minor Obstruction

Thekke Thuruthu River – Fishing Nest Obstruction

Fig.6

Thekke Thuruthu River – Fishing Nest Obstruction

Thekke Thuruthu River – Fishing Nest Obstruction

Thekke Thuruthu River – Obstruction in Bifurcation

Thekke Thuruthu River – LHS Bifurcation Point Obstruction

Fig.6

The following works have to be carried out to clear off obstructions in river and to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river and removal of vertical posts
- De-silting, removal of debris, water weeds and waste water outlets
- Survey of river and eviction of encroachments

L2.4 From Ch.1220m to 2420m – Left Bifurcation (Length – 1200m)

The D/S side of Left Bifurcation is having an average width of 23m and a water depth of 5m. The formation of a small delta is observed on RHS of Left Bifurcation. The downstream views of Left Bifurcation are shown in Fig.7. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on D/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel. The vertical posts installed by local fishermen for fishing activities also obstruct the free flow of water. The depth of water is about 5m and silt deposit is about 0.8m. Thekke Thuruthu – Vadathodu Bridge is crossing near Ch.600m of Thekke Thuruthu Left River. The vent way of the bridge is very much reduced and is having only 1/4th of the width of river. The bridge has to be re- constructed to the full width of river and should be constructed as single span. The approach of the bridge is made by filling river on both sides of bridge. It has to be dismantled and a new bridge has to be constructed in the location immediately. A foot bridge is also situated in this location which is of no use and should be dismantled after the construction of new bridge. There are some visible encroachments and waste disposal from some of the establishments / houses situated on the banks of river. It is seen that some drain pipes are leading from nearby houses to the river course. The sides of the channel are partially protected with rubble, laterite and locally available materials. The fishing nests are even situated in Bifurcation point which obstructs normal & flood flow of water and ultimately destroy river by means of delta formation.

Thekke Thuruthu Left Bifurcation D/S – Vegetation Growths

Thekke Thuruthu Left Bifurcation D/S – Thick Vegetation

Thekke Thuruthu–Vadathodu Bridge - Obstruction

Thekke Thuruthu Left River- Vegetation Obstruction

Thekke Thuruthu Left River- Vegetation Obstruction

Thekke Thuruthu Left River- Existing Protection

Thekke Thuruthu Left River- Obstruction

Thekke Thuruthu River - Left & Right Bifurcation Junction

Fig.7

The following works have to be carried out to make Room for River to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river and removal of vertical posts
- De-silting, removal of debris, water weeds and waste water outlets
- Re-Construction of Thekke Thuruthu - Vadathodu Bridge as single span
- Survey of river and eviction of encroachments

L2.5 From Ch.1220m to 2660m – Right Bifurcation (Length -1160m) and Upto Gothuruthu Link Bridge (Length – 280m)

The D/S side of Right Bifurcation / Upto Link Bridge is having an average width of 30m/55m and a water depth of 5m. The downstream views of Right Bifurcation are shown in Fig.8. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on D/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel. The depth of water is about 5m and silt deposit is about 0.8m. There are no visible encroachments and waste disposal from any of the establishments / houses situated on the banks of river. The sides of the channel are partially protected with rubble, laterite and locally available materials.

Thekke Thuruthu Right River- Vegetation Obstruction

Thekke Thuruthu Right River- Fishing Nest Obstruction

Thekke Thuruthu Right River- Fishing Nest Obstruction

Thekke Thuruthu Right River- Fishing Nest Obstruction

Fig.8

Thekke Thuruthu Right Bifurcation D/S

Thekke Thuruthu Right River-Nest Obstruction

Thekke Thuruthu River - Left & Right Bifurcation Junction

Gothuruthu Link Bridge – U/S

Gothuruthu Link Bridge

The fishing nests and vertical posts for local fishing are even situated in Bifurcation point which obstructs normal & flood flow of water and ultimately destroy river by means of delta formation. There are no visible obstructions from Bifurcation Junction to U/S of Gothuruthu Link Bridge. The waterway is almost clear and there are no obstructions to the flow of water.

The following works have to be carried out to make Room for River to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river and removal of vertical posts
- De-silting, removal of debris, water weeds and waste water outlets
- Survey of river and eviction of encroachments

L2.6 From Ch.3860m to 4960m – Gothuruthu Link Bridge to Tail End (Length – 1100m)

The D/S side of Gothuruthu Link Bridge (Av.Width - 60m) and Tail End Mouth (Av.Width - 120m) is having a water depth of 6m. The downstream views of Link Bridge upto tail end of Thekke Thuruthu River are shown in Fig.9. The photographs clearly show the growth of vegetation and trees which obstructs the natural flow of water. The Chinese fishing nets and Blocks of Fishing Nests on U/S and D/S of bridge also obstruct the flow of water to a great extent. Some of the above structures are situated in the middle of the channel.

Thekke Thuruthu River - LHS Sub Tributary

Thekke Thuruthu River Before Tail End

Thekke Thuruthu River - Tail End Mouth

Thekke Thuruthu River - Tail End Mouth

Fig.9

Gothuruthu Link Bridge – D/S

Thekke Thuruthu River Tail End

Periyar - Thekke Thuruthu River Junction

Fig.9

The depth of water is about 6m and silt deposit is about 0.8m. There are no visible encroachments and waste disposal from any of the establishments / houses situated on the banks of river. It is seen that some drain pipes are leading from nearby houses to the river course. The sides of the channel are partially protected with rubble, laterite and locally available materials. There are no visible obstructions from Gothuruthu Link Bridge to Tail end of Thekkethuruthu River. Gothuruthu Muziris Boat Jetty is situated on RHS of this tributary near tail end. The waterway is almost clear and there are no obstructions to the flow of water. The Sub Tributary of Thekkeruthu River on LHS is off taking near Ch.4330m which is passing through Vavakkaad, Kottuvallikkadu, Kunjithai and ultimately meets Kayal near Malyankara Bridge.
The following works have to be carried out to make clear way for water to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river and removal of vertical posts
- De-silting, removal of debris, water weeds and waste water outlets
- Survey of river and eviction of encroachments

L2.7 Proforma

The visual observations of Periyar River is summarised in the following Seven Proforma. They are attached in the following pages in order. (Table 2 to Table 8)

1. Silt Deposit Locations
2. Waste Deposit Locations
3. List of Structures across River
4. List of Structures to be demolished / re-constructed
5. Pumping Stations in River - Nil
6. Forest Lands on Banks of River – Nil
7. River Bank Features

LOCATION OF SILT DEPOSIT / DELTA IN VARIOUS REACHES

Sl. No.	Name of Tributary	Name of Local Body	Name of Location/ Local Name of Location	Latitude	Longitude	Average Width of River/Thodu (m)	Chainage		Approx Depth of Siltation (m)	Approx Quantity (m^3)	Composition of soil in %			Remarks
							From (km)	To (km)			Sand	Silt	Clay	
1	Thekkethuruthu Tribnutary	Chendamangalam GP Vadakkekkara GP	Gothuruthu	10.183702 to 10.193041	76.228036 to 76.204926	45	0	4.960	0.60	133920	20	20	60	Silt deposit found for entire stretch

Table 2

LOCATION OF WASTE DISPOSAL IN VARIOUS REACHES

Sl. No	Name of Tributary	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Industrial	Domestic	Solid	Liquid	
1	Thekkethuruthu Tribnutary	Chendamangalam GP and Vadakkekkara GP	1, 2, 4, 5, 14, 16, 17, 18 and 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	Gothuruthu / Moothakunnam	Entire Stretch	10.183702 to 10.193041	76.228036 to 76.204926	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries

Table 3

LOCATION OF BRIDGES AND STRUTURES IN VARIOUS REACHES										
Sl. No.	**Name of Tributary**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge/other struture**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	LHS 2-Thekkethuruth Tributary	Chendamangalam GP	CP Thuruth Road Bridge	0.095km	10.182398	76.227472	Road bridge	Yes	No	Re-construction required
2	LHS 2-Thekkethuruth Tributary	Chendamangalam GP	Vadakkumpuram-Gothuruth Bridge	0.315km	10.181203	76.226187	Road bridge	No	No	
3	LHS 2-Thekkethuruth Tributary	Chendamangalam GP	Thekkethuruth-Vadathodu Road Bridge	1.706km	10.188301	76.231804	Road bridge	Yes	No	Re-construction required
4	LHS 2-Thekkethuruth Tributary	Chendamangalam GP	Gothuruth Bridge	2.667km	10.184171	76.206196	Road bridge	No	No	

Table 4

LOCATION OF BRIDGE TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl. No.	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	LHS 2-Thekkethuruth Tributary	Chendamangalam GP	CP Thuruth Road Bridge	0.095km	10.182398	76.227472	Road bridge	Yes	No	Re-construction required
2	LHS 2-Thekkethuruth Tributary	Chendamangalam GP	Thekkethuruth-Vadathodu Road Bridge	1.706km	10.188301	76.231804	Road bridge	Yes	No	Re-construction required

Table 5

DETAILS OF WATER PUMPING STATIONS IN VARIOUS REACHES										
Sl. No.	**Name of River**	**Name of Local body**	**Name of location/ local name of loaction**	**Chainage**	**Latitude**	**Longitude**	**Left Bank / Right Bank**	**Approx. Qty of water taken per year**	**Agency**	**Remarks**
1	Thekke Thuruthu Tributary						No Pumping Stations on Both Banks of Tributary			

Table 6

FOREST DETAILS ON THE MAIN RIVER BANK							
Sl.No.	**Name of River**	**Chainage**		**Latitude**	**Longitude**	**Left Bank / Right Bank**	**Remarks**
		From	**To**				
1	Thekke Thuruthu Tributary					No Forest Area on Both Banks of Tributary	

Table 7

PERIYAR RIVER

River/Tributary/Sub-tributary : Periyar River

Name of River/Tributary/Sub-tributary : Thekke Thuruthu Tributary

Name of officer : Yasdodadevi N

Sl. No.	Chainage	Location Name	Lattitude	Longitude	Approx Width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
															Structure				Sedimentation			Waste Deposit			
							Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	0	Entry Mouth of Thekke Thuruthu Tributary to CP Thuruthu Bridge	10.183226	76.227693	35m	Clay & Sand	Partially	Private	Clay & Sand	0.4m	0.4m	Clay & Sand	Private	Partially	No Obstruction	Tributary mouth having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay, 20% Silt 20% Sand	L/B & R/B	Liquid	Slightly	Present on both banks
2	0.100km	CP Thuruthu Bridge	10.182360	76.227415	40m	Clay & Sand	Partially	Govt.	Clay & Sand	0.6m	0.6m	Clay & Sand	Govt.	Partially	Bridge Obstruction	Piers of Bridge obstructs normal flow of water. Bridge damaged. Re-construction required	Yes	Yes	0.6m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	Re-Construction required
3	1.100km	CP Thuruthu Bridge to Tail End of Paliyam River Junction	10.181419	76.227015	45m	Clay & Sand	Partially	Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks
4	0.300km	Vadakkumpuram Gothuruthu Bridge	10.180914	76.226172	60m	Clay & Sand	Partially	Govt.	Clay & Sand	0.6m	0.6m	Clay & Sand	Govt.	Partially	No Obstruction	Tributary mouth having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	
5	1.25km	Bifurcation Point	10.183748	76.218823	65m	Clay & Sand	Partially	Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks

Sl. No.	Chainage	Location Name	Lattitude	Longitude	Approx Width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
															Structure				Sedimentation			Waste Deposit			
							Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
6	1.72km	Thekkethuruthu-Vadathodu Road Bridge	10.182479	76.214980	5m	Clay & Sand	Partially	Govt.	Clay & Sand	0.6m	0.6m	Clay & Sand	Govt.	Partially	Bridge Obstruction	Ventway of Bridge obstructs normal flow of water. Re-construction required	Yes	Yes	0.6m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	Re-Construction required
7	2.50km	Bifurcation Junction	10.183612	76.208418	65m	Clay & Sand	Partially	Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks
8	2.80km	Gothuruthu Link Road Bridge	10.184056	76.206055	60m	Clay & Sand	Partially	Govt.	Clay & Sand	0.6m	0.6m	Clay & Sand	Govt.	Partially	No Obstruction	River having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay, 20% Silt 20% Sand	Nil	NA	NA	
9	4.50km	Chettikkadu Sub Tributary Junction	10.187389	76.203454	65m	Clay & Sand	Partially	Private	Clay & Sand	0.6m	0.6m	Clay & Sand	Private	Partially	No Obstruction	River having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks
10	4.96km	Tail End - Exit Mouth to Periyar	10.192712	76.203748	145m	Clay & Sand	Partially	Private & Govt.	Clay & Sand	0.6m	0.6m	Clay & Sand	Private & Govt.	Partially	No Obstruction	River having sufficient width and depth for free flow of normal and flood water	No	No	0.6m	Clay & Sand	60% Clay 20% Silt 20% Sand	RB & LB	Liquid	Marginally	Present on both banks

Table 8

L2.8 Conclusion

The activities on priority basis that have to be carried out for Tributary Rejuvenation can be classified into two namely;

- Short Term Measures(Once / Twice in a Year)
- Long Term. Measures(As per Long Term Plan)

They are summarised as shown in Table 9. The remarksin the column show the periodicity of each activity.The Short Term Routine Activities can be carriedout by respective Government Departments in consultation with concerned Local Self Government Institutions. The Short Term Measures can be implemented through MGNREGS by local bodies. The Long Term Activities can be done by Irrigation / PWD / Revenue / FisheriesDepartments or any other Department as decided by the Government. The Short Term Measures are of repetitive in nature and Long Term Measures are of maintenance in nature.

Sl. No.	Activity	Description of Work	Remarks
1	Short Term Measures	Clearing Vegetation Growths	Routine Activity for Smooth River Flow
2		Pruning Branches of Trees	Routine Activity for Smooth River Flow
3		Cutting Trees	Routine Activity for Smooth River Flow
4		Clearing Water Weeds, Floating Objects and Other Materials	Routine Activity for Smooth River Flow
5		De-Siltation and Deepening of River Banks	Routine Activity for Smooth River Flow
6		Removal of Vertical Posts for Fishing	Routine Activity for Smooth River Flow
7		Removal of Low Lying Cables / Electric Lines across River	Routine Activity for Smooth River Flow
8		Removal and Separation of Degradable and Non Bio-Degradable Deposits from River	Routine Activity for Smooth River Flow

Table 9

Sl. No.	Activity	Description of Work	Remarks
1		Re-construction of CP Thuruthu Bridge and Thekke Thuruthu-Vadathodu Bridge	Smooth River Flow and Flood Prevention
2	Long Term Measures	De-Siltation / DeltaRemoval and Deepening of River	Smooth River Flow and Flood Prevention
3		Survey of River	Smooth River Flow and Flood Prevention
4		Eviction of Encroachments	Smooth River Flow and Flood Prevention
5		Re-location of Chinese Fishing Nets	Smooth River Flow and Flood Prevention
6		Re-location of Fishing Nests	Smooth River Flow and Flood Prevention
7		Installation of Sewage Treatment Plants at Regular Intervals (Primary and Secondary)	Smooth River Flow and Flood Prevention
8		Formation of Flood Banks with Removed Silt	Smooth River Flow and Flood Prevention
9		Planting Grass, Rapid Growing Bamboos / Trees on Banks of River	Smooth River Flow and Flood Prevention
10		River Banks Protection with Environment Friendly Materials like Coir, Geotextiles etc.	Smooth River Flow and Flood Prevention
11		River Banks Protection with Rubble, Laterite, Concrete, SheetPile etc.	Smooth River Flow and Flood Prevention
12		Creation of Buffer Zone on Banks of River	Smooth River Flow and Flood Prevention

Table 9

The Re-construction of CP Thuruthu Bridge and Thekke Thuruthu – Vadathodu Bridge is necessary in this reach to avoid any untoward incidents during flood. The existing bridge has to be demolished and a new bridge has to be constructed without any intermediate supports in river for CP Thuruthu Bridge.

The span of Thekke Thuruthu – Vadathodu Bridge also has to be increased by providing necessary vertical clearance. The activities like de-siltation, clearing light, thick & thorny jungle grown into the river, removal of all types of debris and removal of all obstructions in river also have to be executed to clear waterway to the maximum possible extent. The de-siltation and jungle clearance have to be done in consultation with the respective Local Bodies. The de-siltation and removal of all types of jungle should be done periodically. The removed silt can be used to replenish River Banks by forming Embankments on both sides. In this reach Flood Banks are necessary due to the formation of different Islands (Thuruthus) in River Course. The Flood Banks should be formed around all Islands and River Banks. It prevents flooding the adjacent places around Main River. Moreover the River Banks should have at least 3m depth of water to maintain sufficient flow during all seasons.

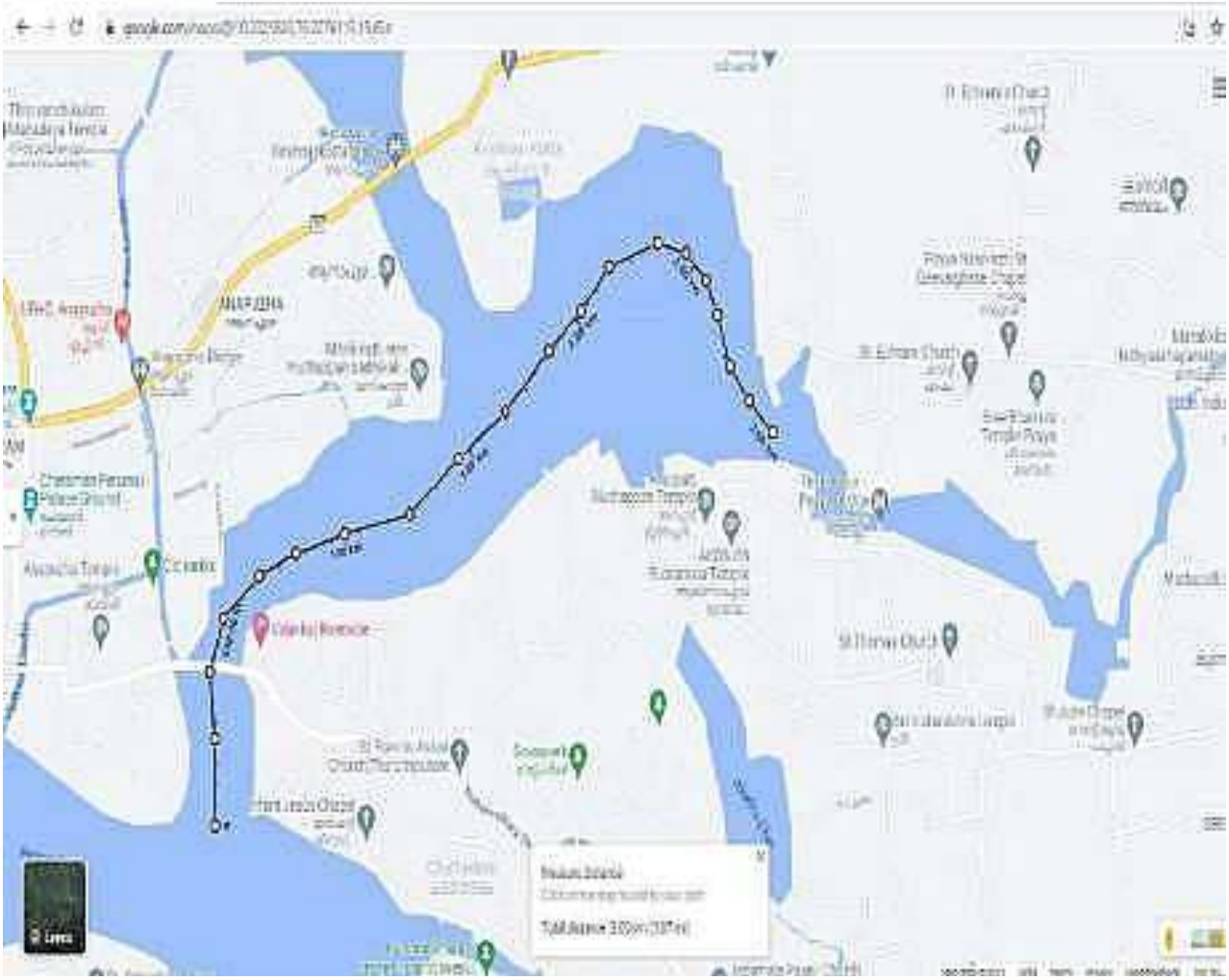
All types of waste disposal into the river have to be regulated in coordination with the respective local bodies. The installation of Sewage Treatment Plants at regular intervals on the banks can be considered as preventive measure to prevent pollution of river. Thus it can be ensured that only treated water flows into the river making pollution to minimum extent. The treatment of effluents can be done in two stages; Primary and Secondary. It has to be decided after a detailed study in consultation with Local Self Government Institutions. The demarcation of river boundary with original land records is also required to bring back River to its original shape. There should be a vivid law and order to install Chinese Fishing nets, Fishing Nests, Vertical Posts and Electric wires in the Periyar Main River as they are obstructing the flow of water during flood times. This has to be done in consultation with Irrigation, Fisheries, Revenue, KSEB Departments and stakeholders. Above all there should be regular public awareness campaign by Local Self Government Institutions not to pollute River, Tributaries and ultimately any type of Water Bodies for the wellbeing of next generation. The law enforcing agencies like Police and Vigilance Department can also play a vital role in implementing Water Conservation Act published by Kerala Government. The offenders may be given warning for the first time and the repetition of the activity may be charged under Water Conservation Act by imposing heavy fine / imprisonment or both.

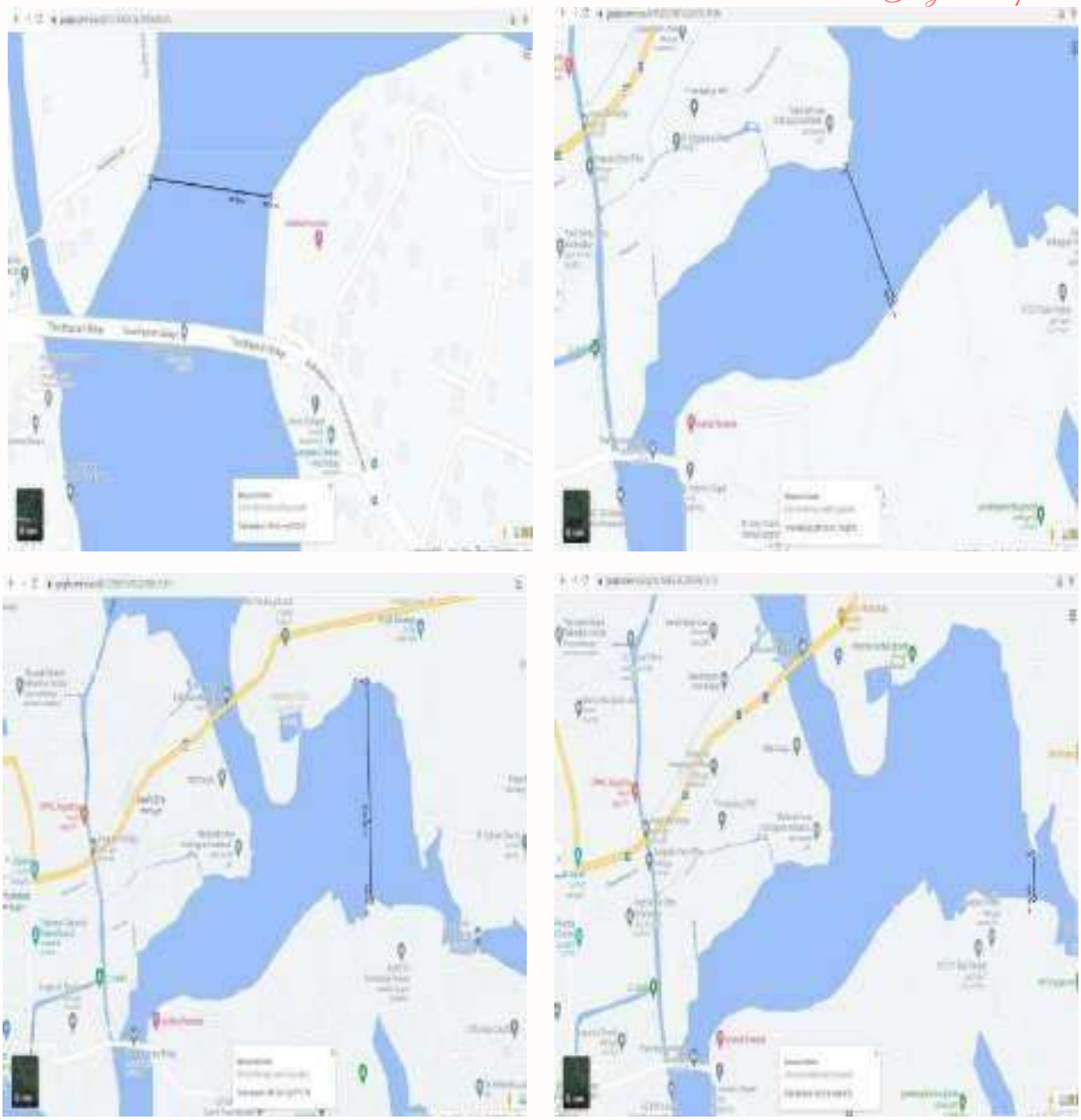
The Local Self Government Institutions and Government Departments can play a vital role for the Room for River Activity initiated by Government. The Acquisition of Land or Freezing all types of Construction / Man-made Activities on both Banks of River can be considered by Government. The concept of Building Line as mentioned in Kerala Building

Rules (KBR) is also applicable to River Banks and should be implemented without any delay. The boundary of Minimum Land Acquisition / Freezing Zone should be 3m and Maximum be 5m from existing River Bank. The extent of acquisition may be decided by Public Hearing in co-ordination with Elected Representatives at all level. The acquired land acts as Buffer Zone to prevent flooding of Islands in River and Banks of River. The rapid growing Grass, Bamboos / Ramacham or any other fast growing trees may be planted in Buffer Zones and they will protect the River Banks from erosion. The medicinal plants like Ramacham, Amla, Neem and Arya Vepu can be planted along the banks of River. Their roots absorb pollutants from water and thus the extent of pollution in River can be minimised. The majority of River Bank protection may be done with environment friendly materials. The conventional protection measures like Rubble, Laterite and Concrete Walls may also be adopted at suitable locations
By doing all the above activities in coordination with all Government Departments and participation from Public the concept of “Room for River” can be easily achieved.

PERIYAR RIVER BASIN – From Ch. 17.500km to 27.470km

R2. Thuruthippuram Tributory (PRB RHS2)





Salient Features

1	Local Body	Kodungalloor Municipality, Puthenvelikkara GP
2	Length	3000m (3km)
3	Width (Varying)	270m, 205m, 140m, 335m, 780m, 130m
4	Average Depth of Water	6m, 5m
5	Water Spread Area	3km x 0.31km = 0.91sq.km

Table 1

The visual observations of Periyar River Tributary named Thuruthippuram River are explained below. The immediate and necessary actions to be taken up are also explained in concluding report.

The Schematic Diagram of the Tributary in Main River Stretch is shown as shaded in Fig.1 and the salient features are expressed in Table 1. The off take point of the Tributary from the Main River is taken as Ch.0m for convenience and better understanding.

Schematic Diagram of Tributary in Main River

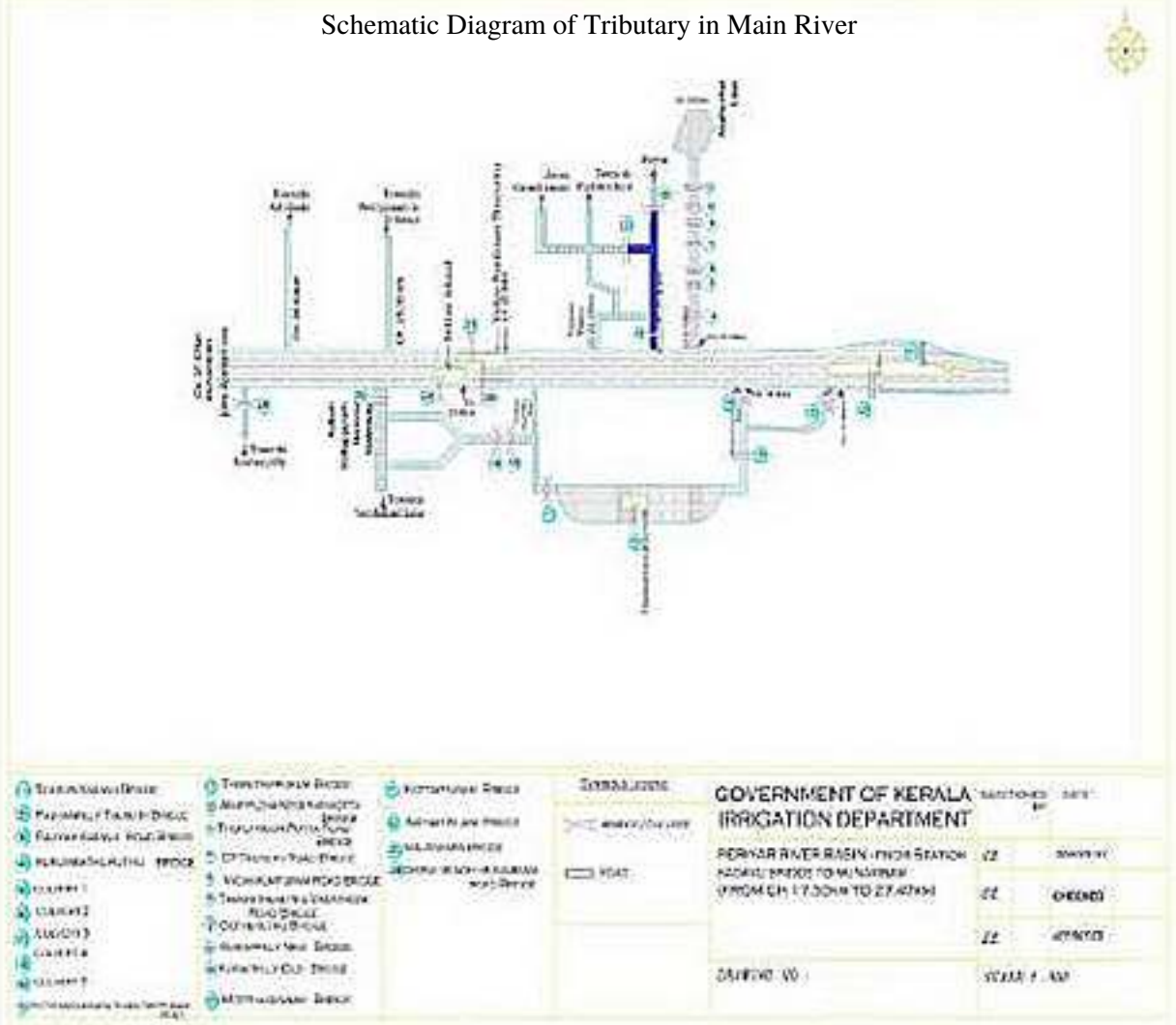


Fig.1

The Critical Activities of the Tributary is shown in Fig.2

Typical Chinese Fishing Nest – River Obstruction

Series of Chinese Fishing Nests – River Obstruction

Vertical Posts for Local Fishing – River Obstruction

Thuruthippuram Bridge U/S - River Mouth Obstruction – Vertical Posts and Chinese Fishing Nets

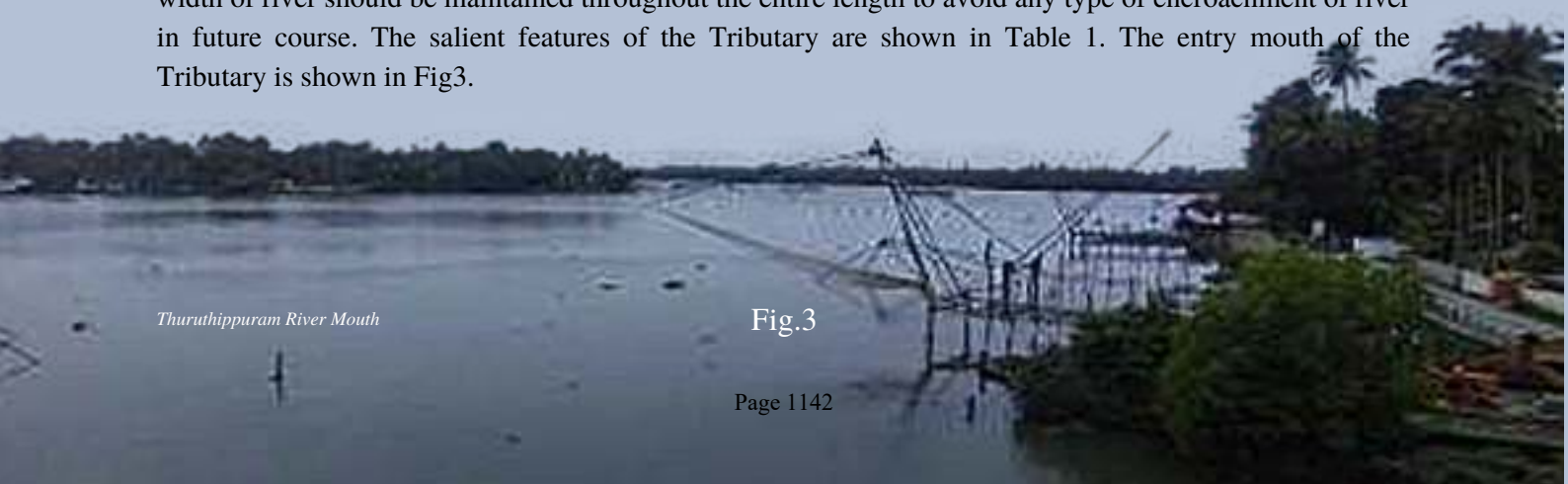
Thuruthippuram Bridge D/S - River Obstruction – Vertical Postsand Chinese Fishing Nets

Fig.2

R2.1 At Ch.0/000m

The Periyar River is deviating near Ch. 21.40km on RHS towards Thrissur District. The Tributary named Thuruthippuram is having sufficient width and depth for discharge of normal as well as flood water. The Tributary borders Puthenvelikkaera GP on right side and Kodungalloor Municipality on left side. The Muziris Fort and Tail End of Kollam- Kottappuram National Water Way (Kottappuram Boat Jetty) is situated on LHS of the Tributary.

The mouth is having sufficient width and depth for the free flow of water. The width of mouth is about 270m and depth of water is about 5m and there are no obstructions to the flow of water like water weeds and accumulation of solid wastes. There are a lot of Chinese Fishing nets in the middle of river. They obstruct the flow of water to a great extent in this reach. The vertical posts installed in river for local fishing activities are the obstruction to the flow of water. The banks of river have to be surveyed and full width of river should be maintained throughout the entire length to avoid any type of encroachment of river in future course. The salient features of the Tributary are shown in Table 1. The entry mouth of the Tributary is shown in Fig3.



Thuruthippuram River Mouth

Fig.3

R2.2 From Ch.0m to 3000m (River Mouth to Tail End)

The Periyar River Tributary crosses Thuruthippuram Bridge which connects Ernakulam and Thrissur Districts on North-East direction. The D/S of Thuruthippuram Bridge leads to a lake like formation and branches in different directions except South. The catchment area is so vast that it can accommodate huge quantity of water. The catchment area of the Tributary is about 1 sq.km. The upstream & downstream views of bridge and D/S reaches are shown in Fig.4.

The photographs clearly show the obstructions to the natural as well as flood flow of water. The Chinese fishing nets and Blocks of Fishing Nests on U/S and D/S of bridge obstruct the flow of water marginally. Some of the above structures are situated in the middle of the channel. Most of the Chinese Fishing Nets are situated in the middle of the river. The Chinese Fishing nets are installed in 2 to 3 rows in river. It obstructs natural flow of water through the river to a great extent. The insulated/un insulated electric wires are running criss cross and it is very difficult for a small boat to cross the river without any hindrance. The waterway is not clear in this reach and boats have to travel in zigzag direction to cover the entire reach. It is very difficult and danger to travel through the Tributary at night time. The vertical posts installed by local fishermen for local fishing activities also obstruct the flow of water. The sudden climate change now-a-days cause heavy downpour causing flash flood on the banks of river. If it happens, there will be severe damage to the public and private properties. The above obstructions prevent Govt, Departments to take immediate steps during any emergency. In order to avoid flash flooding the way of river should be very clear without any obstructions. Kottappuram-Muziris Boat Jetty is situated on LHS of the Tributary. The enroute views of Thuruthippuram River are also shown in Fig.5.

Chinese Fishing Net – River Obstruction

Chinese Fishing Net Vertical Posts –River Obstruction

Chinese Fishing Net – River Obstruction

Series of Chinese Fishing Net –River Obstruction

Chinese Fishing Net Vertical Posts –River Obstruction

Kottappuram Muziris Boat Jetty

Rows of Chinese Fishing Nets –River Obstruction

Vertical Posts for Local Fishing –River Obstruction

Rows of Chinese Fishing Nets –River Obstruction

Thuruthippuram Bridge

Thuruthippuram Bridge D/S

Thuruthippuram BridgeD/S

Thuruthippuram Bridge D/S - Chinese Fishing Net – River Obstruction

Chinese Fishing Net – River Obstruction

Fig.4

Thuruthippuram Bridge

The Chinese Fishing nets and Blocks of Fishing Nests are situated closer and will result in settlement of particles in River bed. It will destroy River in future by means of Delta formation. The depth of water is about 5m and silt deposit is about 0.8m. There is a private Island named Chekuthanthuruthu situated in the middle of the lake like formation near the tail end of the Tributary. It seems to be an unauthorized occupation by an individual / firm and has to be verified with original land records available with Revenue Department. There are minimum visible encroachments on the banks of river and has to be evicted immediately after river survey. The sides of the channel are partially protected with rubble, laterite and locally available materials. The different views of Thuruthippuram River including tail end are represented in Fig.5.

Fishing Nests – River Obstruction

Private Island in River – Unauthorised Occupation

Chinese Fishing Net – River Obstruction

Private Island in River – Unauthorised Occupation

River Obstruction

Chinese Fishing Net – River Obstruction

River Tail End

River Tail End

Fig.5

The Thuruthippuram Tributary is a little bit damaged due to unscientific installation of fish catching facilities in the centre / sides of river. The water in this reach is almost clear by visual examination with minimum presence of pollutants from nearby houses / establishments. There is sufficient tidal effect in the Tributary and natural flushing of water is occurring in river regularly.

The Thuruthippuram River is split up into 4 branches namely; Karuppadanna Branch, Elichira Branch, Puthenchira Branch and Naithikkudi Branch. Thus Periyar River extends from Ernakulam District to Thrissur District and covers more tha 50% of the area of Thrissur District.

The following works have to be carried out to make Room for River to avoid any flooding in future.

- Clearing light, thick and thorny jungle on both sides
- Trimming branches of trees
- Relocating Chinese Fishing nets from the centre of channel to sides
- Relocation of Fishing Nests to the sides of river
- Removal of Vertical Posts installed in river for local fishing activities
- Removal of Electric wires across river
- De-silting, removal of debris, water weeds and waste water outlets
- Survey of River & an Island in Tributary and eviction of encroachments

R2.3 Proforma

The visual observations of Periyar River is summarised in the following Seven Proforma. They are attached in the following pages in order. (Table 2 to Table 8)

1. Silt Deposit Locations
2. Waste Deposit Locations
3. List of Structures across River
4. List of Structures to be demolished / re-constructed
5. Pumping Stations in River - Nil
6. Forest Lands on Banks of River – Nil
7. River Bank Features

LOCATION OF SILT DEPOSIT / DELTA IN VARIOUS REACHES

Sl. No.	Name of Tributary	Name of Local Body	Name of Location/ Local Name of Location	Latitude	Longitude	Average Width of River/Thodu (m)	Chainage		Approx Depth of Siltation (m)	Approx Quantity (m^3)	Composition of soil in %			Remarks
							From (km)	To (km)			Sand	Silt	Clay	
1	Thuruthippuram Tributary	Puthenvelikkara GP Kodungalloor Municipality	Thuruthippuram	10.195609 to 10.204105	76.213409 to 76.231790	310	0	3.000	0.80	744000	15	10	75	Silt deposit found for entire stretch

Table 2

LOCATION OF WASTE DISPOSAL IN VARIOUS REACHES

Sl. No	Name of Tributary	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Industrial	Domestic	Solid	Liquid	
1	Thuruthippuram Tributary	Puthenvelikkara GP & Kodungalloor Municipality	15, 16, 17 & 19, 20, 21, 22, 23, 24, 25	Thuruthippuram	Entire Stretch	10.195609 to 10.204105	76.213409 to 76.231790	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries

Table 3

LOCATION OF BRIDGES AND STRUTURES IN VARIOUS REACHES										
Sl. No.	**Name of Tributary**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge/other struture**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Thuruthippuram Tributary	Puthenvelikkara GP / Kodungalloor Municipality	Thuruthipuram Bridge	0.380km	10.199277	76.213512	Road Bridge	No	No	

Table 4

LOCATION OF BRIDGE TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
Sl. No.	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of Bridge**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Thuruthippuram Tributary	Puthenvelikkara GP / Kodungalloor Municipality	Thuruthipuram Bridge	0.380km	10.199277	76.213512	Road Bridge	No	No	No Obstruction to flow

Table 5

DETAILS OF WATER PUMPING STATIONS IN VARIOUS REACHES

Sl. No.	Name of River	Name of Local body	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Left Bank / Right Bank	Approx. Qty of water taken per year	Agency	Remarks
1	Thuruthippuram Tributary						No Pumping Stations on Both Banks of Tributary			

Table 6

FOREST DETAILS ON THE MAIN RIVER BANK

Sl.No.	Name of River	Chainage		Latitude	Longitude	Left Bank / Right Bank	Remarks
		From	To				
1	Thuruthippuram Tributary					No Forest Area on Both Banks of Tributary	

Table 7

PERIYAR RIVER / THURUTHIPPURAM TRIBUTARY

River/Tributary/Sub-tributary :	Periyar River
Name of River/Tributary/Sub-tributary :	Thuruthippuram Tributary - PRB RHS2
Name of officer :	Yasdodadevi N

Sl. No.	Chainage	Location Name	Lattitude	Longitude	Approx Width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
															Structure				Sedimentation			Waste Deposit			
							Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	0 to 0.380km	Thuruthippuram Bridge U/S	10.195609	76.213409	270m	Clay	Partially	Govt.	Clay	80cm	80cm	Clay	Govt.	Partially	Low height embankment on banks	Partially Protected Banks	No	No	0.8m	Clay	80% Clay, 20% Sand	L/B & R/B	Liquid	Slightly	Thick vegetation on banks
2	0.380km	Thuruthippuram Bridge	10.199277	76.213512	245m	Clay	Partially	Govt.	Clay	80cm	80cm	Clay	Govt.	Partially	Bridge	Bridge having Sufficient Vertical and Horizontal Clearance	No	No	0.8m	Clay	80% Clay, 20% Sand	L/B & R/B	Liquid	Slightly	
3	0.380km to 3.00km	Thuruthippuram Bridge D/S	10.204105	76.23179	450m	Clay	Partially	Govt.	Clay	80cm	80cm	Clay	Private	Partially	Low height embankment on banks	Partially Protected Banks	No	No	0.8m	Clay	80% Clay, 20% Sand	L/B & R/B	Liquid	Slightly	Thick vegetation on banks

Table 8

R2.4 Conclusion

The activities on priority basis that have to be carried out for Tributary Rejuvenation can be classified into two namely;

·Short Term Measures(Once / Twice in a Year)
·Long Term. Measures(As per Long Term Plan)

They are summarised as shown in Table 9. The remarksin the column show the periodicity of each activity.The Short Term Routine Activities can be carriedout by respective Government Departments in consultation with concerned Local Self Government Institutions. The Short Term Measures can be implemented through MGNREGS by local bodies. The Long Term Activities can be done by Irrigation / PWD / Revenue / FisheriesDepartments or any other Department as decided by the Government. The Short Term Measures are of repetitive in nature and Long Term Measures are of maintenance in nature.

Sl. No.	Activity	Description of Work	Remarks
1	Short Term Measures	Clearing Vegetation Growths	Routine Activity for Smooth River Flow
2		Pruning Branches of Trees	Routine Activity for Smooth River Flow
3		Cutting Trees	Routine Activity for Smooth River Flow
4		Clearing Water Weeds, Floating Objects and Other Materials	Routine Activity for Smooth River Flow
5		De-Siltation and Deepening of River Banks	Routine Activity for Smooth River Flow
6		Removal of Vertical Posts for Fishing	Routine Activity for Smooth River Flow
7		Removal of Low Lying Cables / Electric Lines across River	Routine Activity for Smooth River Flow
8		Removal and Separation of Degradable and Non Bio-Degradable Deposits from River	Routine Activity for Smooth River Flow

Table 9

Sl. No.	Activity	Description of Work	Remarks
1		De-Siltation / DeltaRemoval and Deepening of River	Smooth River Flow and Flood Prevention
2	Long Term Measures	Survey of River	Smooth River Flow and Flood Prevention
3		Eviction of Encroachments	Smooth River Flow and Flood Prevention
4		Re-location of Chinese Fishing Nets	Smooth River Flow and Flood Prevention
5		Re-location of FishingNests	Smooth River Flow and Flood Prevention
6		Installation of Sewage Treatment Plants at Regular Intervals (Primary and Secondary)	Smooth River Flow and Flood Prevention
7		Formation of flood banks with Removed Silt	Smooth River Flow and Flood Prevention
8		Planting Grass, Rapid Growing Bamboos / Trees on Banks of River	Smooth River Flow and Flood Prevention
9		River Banks Protection with Environment FriendlyMaterials like Coir, Geotextiles etc.	Smooth River Flow and Flood Prevention
10		River Banks Protection with Rubble, Laterite, Concrete, SheetPile etc.	Smooth River Flow and Flood Prevention
11		Creation of Buffer Zone on Banks of River	Smooth River Flow and Flood Prevention

Table 9

The canal boundary is not visible in most of the locations. The demarcation of Tributary boundary is needed to assess the actual width of canal by comparing it with original land records. The Re-alignment of Chinese Fishing Nets and Fishing Nests are necessary in this reach to have free flow of water through the river during flood.

The existing installed arrangements for fishing obstruct the flow of water in broad spectrum. The unauthorized ownership of an island in the Tributary has to be verified with the original land records available with Revenue Department. The activities like de-siltation, clearing light, thick & thorny jungle grown into the river, removal of all types of debris and removal of all obstructions in river also have to be executed to clear waterway to the maximum possible extent. The de-siltation and jungle clearance have to be done in consultation with the respective Local Bodies. The de-siltation and removal of all types of jungle should be done periodically. The removed silt can be used to replenish River Banks by forming Embankments on both sides. In this reach Flood Banks are necessary due to the formation of different Islands (Thuruthus) in River Course. The Flood Banks should be formed around all Islands and River Banks. It prevents flooding the adjacent places around Main River. Moreover the River Banks should have at least 3m depth of water to maintain sufficient flow during all seasons.

All types of waste disposal into the river have to be regulated in coordination with the respective local bodies. The installation of Sewage Treatment Plants at regular intervals on the banks can be considered as preventive measure to prevent pollution of river. Thus it can be ensured that only treated water flows into the river making pollution to minimum extent. The treatment of effluents can be done in two stages; Primary and Secondary. It has to be decided after a detailed study in consultation with Local Self Government Institutions. The demarcation of river boundary with original land records is also required to bring back River to its original shape. There should be a vivid law and order to install Chinese Fishing nets, Fishing Nests, Vertical Posts and Electric wires in the Periyar Main River as they are obstructing the flow of water during flood times. This has to be done in consultation with Irrigation, Fisheries, Revenue, KSEB Departments and stakeholders. Above all there should be regular public awareness campaign by Local Self Government Institutions not to pollute River, Tributaries and ultimately any type of Water Bodies for the wellbeing of next generation. The law enforcing agencies like Police and Vigilance Department can also play a vital role in implementing Water Conservation Act published by Kerala Government. The offenders may be given warning for the first time and the repetition of the activity may be charged under Water Conservation Act by imposing heavy fine / imprisonment or both.

The Local Self Government Institutions and Government Departments can play a vital role for the Room for River Activity initiated by Government. The Acquisition of Land or Freezing all types of Construction / Man-made Activities on both Banks of River can be considered by Government. The concept of Building Line as mentioned in Kerala Building Rules (KBR) is also applicable to River Banks and should be implemented without any delay.

The boundary of Minimum Land Acquisition / Freezing Zone should be 3m and Maximum be 5m from existing River Bank. The extent of acquisition may be decided by Public Hearing in co-ordination with Elected Representatives at all level. The acquired land acts as Buffer Zone to prevent flooding of Islands in River and Banks of River. The rapid growing Grass, Bamboos / Ramacham or any other fast growing trees may be planted in Buffer Zones and they will protect the River Banks from erosion. The medicinal plants like Ramacham, Amla, Neem and Arya Vepu can be planted along the banks of River. Their roots absorb pollutants from water and thus the extent of pollution in River can be minimised. The majority of River Bank protection may be done with environment friendly materials. The conventional protection measures like Rubble, Laterite and Concrete Walls may also be adopted at suitable locations. By doing all the above activities in coordination with all Government Departments and participation from Public the concept of "Room for River" can be easily achieved.

Flood affecting areas in Periyar River

During the recent north east monsoon season, highest volume of water was discharged fromMullaperiyar dam on 06/12/21 at 8.30pmin an unscientific and inhuman manner. On 06/12/21 due to heavy inflow, spillway discharge was increased to 7105.59 cusecs at 7.45 pm from 3967 cusecs and then to 10130 cusecs at 8.15 pm and then to 12654 cusecs at 8.30pm without giving sufficient time for evacuation. This sudden and large rate of spillway discharge affected badlythe inhabitants in the downstream side. The water level in the river crossed the danger level by 0.19m and reached 795.39m (Danger level 795.20m). Low lying areas atVallakadaavuChappath, Karuppupalam, Kadassikadattoram, Manjumalaattoram, Vikas Nagar,Nallathampi colony, Keerikkara, Ayyappancovilattoram, Mlamalaattoram, and Chandravanamattoram are inundated. On the same day 71 families were shifted to safer zonesfrom the flooded areas.

In 2018, maximum discharge was 26835 cusescs. At that time about 743 families were affected in Peerumedu taluk.

So about 743 families have to bepermanently shifted to safer places in order to keep the maximum safe discharge through the river @ 25000 cusecs.

REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km

Flood affecting areas in tributaries of Periyar River

1. ChottuparaThodu 300m From Confluence to 2.15Km

Chottuparathodu is flowing parallel to NH 183(Kottayam – Kumily road) in this stretch in VandiperiyarPanchayath. During rainy season the thodu overflows and submerge the National Highway, badly affecting the traffic. This happens in each and every year.This road is the main access to the famous tourist destination Thekkady from Southern districts of Kerala. The width and depth of the thodu is to be increased and low laying bridges and culverts across the thoduare to be demolished and reconstructed for the smooth flow of flood water.

2. Muthirapuzha River

The flood history of Muthirapuzha sub basin clearly shows that the region Munnar is a high flood zone area. The wider extent of free catchment with high intense rain fall is the major reason for high magnitude run off in the river Muthirapuzha. The floods in 2018 and 2019 affected Munnar region . The main reason for the flooding is the reduction in carrying capacity of river due to siltation, illegal constructions due to rapid urbanization, lack of sufficient storage structures etc.

Usually thefollowing laying areas are submerged during flooding

1. Periavaria at Munnar udumalpetta road
2. Munnar town ship
3. DTPC centre portion ,Munnar
4. Kunchithanni
5. Ellakkal
6. Panniyarkkutty Confluence

Munnar town and panniyarkutty are worstly affected areas during flood.

Table showing the details of flood affecting area I Periyar River.

Name of river	Name of area	Chainage From	Lat/Longe	Left bank/Right bank	Name of local body	Major issues
Periyar	Chappath	69.980km	9.551446N 77.092234E	Right bank – ward 9 Left bank – ward 11,13	Vandiperiyar GP	Water entered houses
	Karuppupalam	71.83km	9.562861 77.09421	Right bank – ward 9 Left bank – ward 13	Vandiperiyar GP	Water entered houses
	Kadassikadavu	72.62km	9.333734 77.51966	Right bank – ward 9 Left bank – ward 13	Vandiperiyar GP	Water entered houses
	Manjumala	74.05km	9.56708 77.08577	Right bank – ward 9 Left bank – ward 16	Vandiperiyar GP	Water entered houses
	Vikas Nagar	75.3 Km to 76.0 Km	9.575338, 77.087971	Right Bank	Vandiperiyar GP	Water entered houses
	Opposite Ayyappa temple	76.3 Km	9.582595, 77.087242 9.609920,	Right Bank	Vandiperiyar GP	Water entered houses
	Moonkalar riverside	79.7 Km	77.081931 9.609190,	Right Bank	Vandiperiyar GP	Water entered houses
	Chandravanam riverside	80.2 Km	77.077832	Left Bank and Right bank	Vandiperiyar GP	Water entered houses

REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km

No flood prone areas detected in Reach II

REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km

The flood prone areas along the banks of river Periyar in the reach from Bhothathankettu Barrage to Kalady Bridge are the following.

1. Malayattoor-NeeleeswaramPanchayath, Chainage from 194.06 km to 206.61km (right bank)
2. KaladyPanchayath, Chainage from 206.61km to 209.55 km(right bank)
3. PindimanaPanchayath, Chainage from 179.62 km to 182.87 km(left bank)
4. Vengoor westPanchayath, Chainage from 182.87 km to 194.06 km(left bank)
5. KoovappadyPanchayath, Chainage from 194.06 km to 206.61km (left bank)
6. OkkalPanchayath, Chainage from 206.61 km to 209.55 km(left bank)

The flood prone areas along the banks of tributaries of Periyar in the reach from Bhothathankettu Barrage to Kalady Bridge are the following.

1. PalluppettaThodu, Malayattoor-NeeleeswaramPanchayath, Chainage from 1.78 km to 3.835 km(right and left bank)
2. MukkadaiThodu, ManjapraPanchayath, Chainage from 9.814 km to 11.164 km(right and left bank)
3. MukkadaiThodu, KaladyPanchayath, Chainage from 11.164 km to 15.108 km(right and left bank)
4. 2nd order KrariyeliThodu, Vengoor westPanchayath, Chainage from 3.096 km to 7.290km(right and left bank)
5. ThottuvaThodu, KoovappadyPanchayath, Chainage from 4.180 km to 7.775 km (right and left bank)

REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km

Left Bank.

1. Periyar - Okkal Thuruth – Ch.212.96 – Length -1.91 Km.
Location – Okkal Thuruth
Name of Local body – Okkal Panchayath.
2. Periyar - Mudikkal – Ch.217.35 – Length -100 m.
Location – End of Vallam Thodu- near Sunset point
Name of Local body – Vazhakulam.
3. Periyar - Kunnuvazhy – Ch.220.83 – Length -100 m.
Location – Near Kunnuvazhy Kadavu
Name of Local body – Vazhakulam.
4. Periyar - Marampilly – Ch.221.25 – Length -100 m.
Location – Near KWA pump house
Name of Local body – Keezhmadu.
5. Periyar - Thottumugham – Ch.227.35 – Length -100 m.
Location – Near Thottumugham bridge
Name of Local body – Keezhmadu.

Right Bank

1. Periyar - Aluva Manapuram – Ch.229.25km– Length -100 m.

Location – Aluva Shivarathrimanapuram.

Name of Local body – Aluva Muncipality

2. Chengal Thodu– Ch .211.55km of Periyar – Length -1.5km

Location – Near Vattatara

Name of Local body – Kanjoor panchayath.

REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA

The flood prone areas along the banks of river Periyar in the reach of Periyar from AluvaMarthandavarmabridge to Varappuzha bridge are the following

1. Uliyannoor , Ward9 , KadungalloorPanchayathchainage 1.83Km (left bank) Nearest Land mark –Near chandrika water plant
2. Kadungalloor , Ward 19, KadungalloorPanchayathchainage2.41Km (right bank) Nearest Land mark – Navodaya FC home ground
3. Kadungalloor , Ward 15 , KadungalloorPanchayathchainage3.31Km (right bank) Nearest Land mark – Onjithodu starting point
4. Uliyannoor , Ward 15 , KadungalloorPanchayathchainage3.57Km (right bank) Nearest Land mark – Kayantikkara
5. Eloor , Ward 13 , Eloor Municipalitychainage4.39Km (left bank) Nearest Land mark – Edamula
6. Eloor , Ward 10 , EloorMunicipalitychainage 7.74Km (left bank) Nearest Land mark- pathalam bund
7. Eloor , Ward 6 , EloorMunicipalitychainage11.29Km (right bank) Nearest Land mark- Muttinakam
8. Eloor , Ward 2 , EloorMunicipalitychainage11.54Km (right bank) Nearest Land mark-Eloor north chirayamkadavu
9. Varappuzha , ward 5 ,VarappuzhaPanchayathchainage14.36Km (right bank) Nearest Land mark- Mannamthuruth
10. Alangad, ward 13,Alangadpanchayath, chainage 12.1 KM (Right bank of Varattar) Nearest land mark- Methanam
11. Kadungallur , chainage - 0.756 km in kadugallur Panchayath ward 7,8,9,13 (Right bank)
12. Downstream of Manjummel RCB, chainage – 10.00 km for a length of 2km, left Kalamassery Mncipality Block no.5 and right bank in Eloor Muncipality.
13. Eloor, in Eloor Muncipality chainage – 15.41 km ward 2,3,6,9,10,12,20,23,26,31(Right bank)

REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH

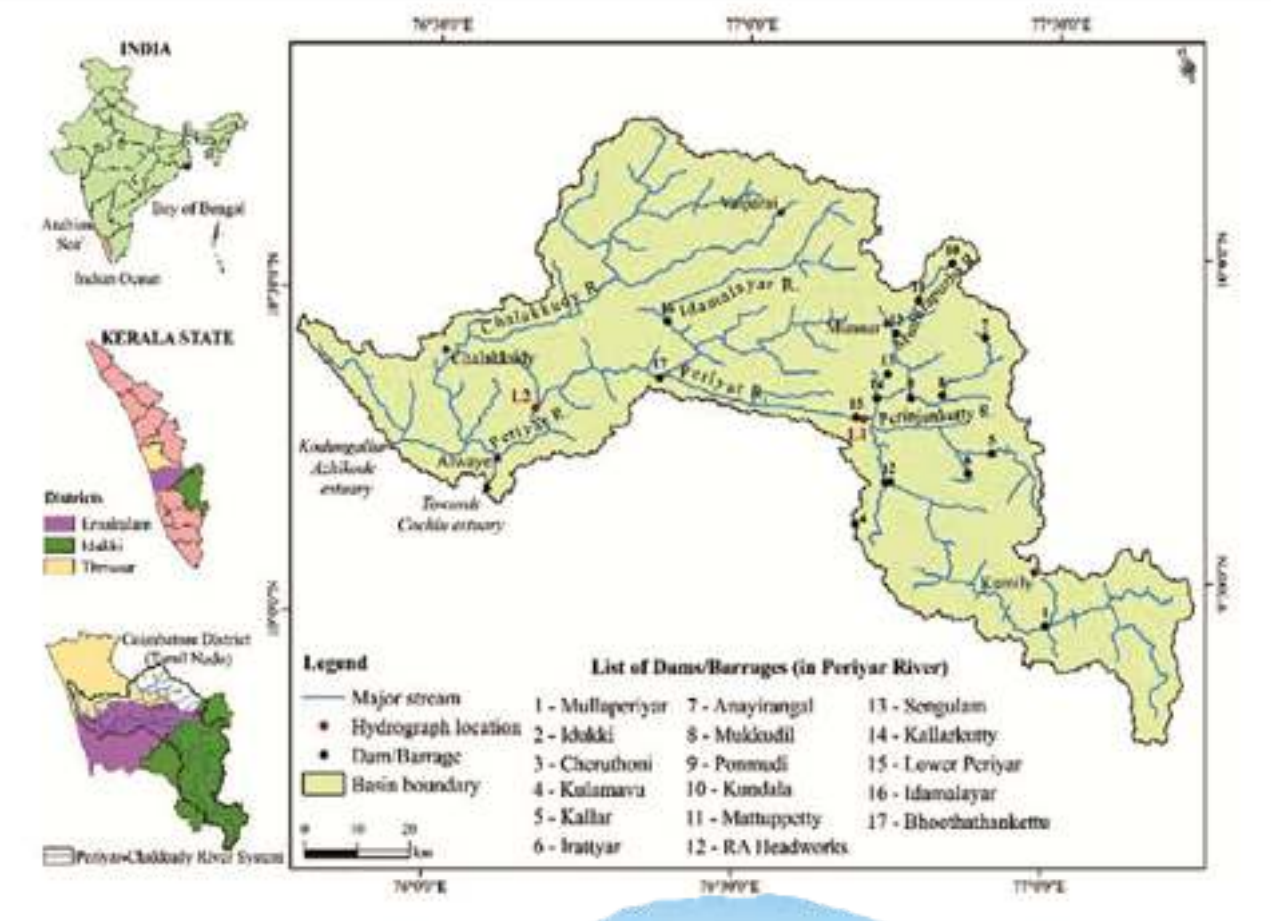
The flood prone areas along the banks of river Periyar in the reach of Periyar from AluvaManappuram to Munambam are the following.

1. Ammalathupallam, Ward 12, Kunnukara Panchayat Chainage - 11.2 km (right bank), Nearest Landmark- east side of Purappillykavu regulator bridge)
2. Kozhithuruth (Ward 8, Puthenvelikara Panchayat Chainage – 14.3 km (Right bank)- Nearest Landmark:- Near confluence point of Chalakudypuzha with Periyar)
3. ValiyaPazhampillythuruth (Ward 11, Puthenvelikkara Panchayat and ward 7, Chendamangalam Panchayat, Chainage – 18 km Nearest Landmark:- Sacred Heart church)
4. Thuruthipuram- Vellottupuram, Thenapuram area (Ward 15,16,17 , Puthenvelikkara Panchayat , Chainage – 20.5 km(right bank) Nearest Landmark :- St Francis Assissi church , Thuruthipuram)
5. Gothuruth , (Ward 2, Chendamangalam Panchayat Chainage – 21.5 km (left bank) Nearest Landmark- St Sebastian Chapel)

Periyar

DETAILS OF DAMS IN PERIYAR RIVER BASIN
(MI SUBDIVISION MOOLAMATTOM)
PERIYAR RIVER

Periyar is the longest river and the river with the largest discharge potential in the Indian state of Kerala. It is one of the few perennial rivers in the region and provides drinking water for several major towns. The Periyar is of utmost significance to the economy of Kerala. It generates a significant proportion of Kerala's electrical power via the Idukki Dam and flows along a region of industrial and commercial activities. The source of the Periyar lies high in the Western Ghats. It is variously claimed to be located in Pathanamthitta district of Kerala and in the neighbouring state of Tamil Nadu. The source of the river lies in the remote forests of the Periyar Tiger Reserve. Various sources indicate the origin of the river to be ChokkampattiMala ,a peak on the southern boundary of the Periyar Tiger Reserve.



The Periyar basin spreads over an area of 5,398 square kilometres (2,084 sq mi), most of it in central Kerala. It lies between latitudes 9°15’30"N and 10°21’00"N and longitudes 76°08’38"E and 77°24’32"E. The river drains parts of Idukki, Ernakulam and Thrissur districts in Kerala. . Most of the streams flow in deep gorges with steep valleys along the highlands of the basin. Coming out of the hills, the Periyar flows west and its basin occupies the northern part of Ernakulam district, covering the region from Neriamangalam through Aluva to Varapuzha and Munambam. The average drainage density of the basin is 2.46 km/ km2 with a total number of first order streams of 15,773. The total stream length inclusive of all orders in the basin is 13,291 kilometres. The river originates from the high hills of the Western Ghats and the influence of tectonism can be evidenced from the stream pattern and presence of structural valleys.

In its early course, the river flows in a narrow north sloping valley starting from the Chokkampatti hills and extending north about 25 kilometres, with a number of sharp lateral ridges running down to it from east and west. Its major tributaries are Muthirapuzha River,Mullayar River, Cheruthoni River, Perinjankutti River, Edamala River. Minor tributaries are Muthayar, Perunthuraiar, Chinnar, Cheruthony, Kattappanayar.

Basic Facts about Periyar

Length– 244 km.

Origin– Sivagiri Hills, Sundaramala(Tamil Nadu).

Mouth– Kodungallur lake, Arabian Sea.

The first tributary that joins Periyar– Mullayar.

The largest hydroelectricity project– Idukki Hydro Project.

The Idukki dam is located where the Periyar meets with – Cheruthoni river.

Famous places on the banks of river Periyar –Aluva,AluvaAdwaithashram, Kaladi, Malayattoor, Thekkady, &Neriyamangalam.

Periyar National Park &Thekkady Wildlife Sanctuary (PeriyarElephant& Tiger Reserve).

Major Floods occurred on river Periyar

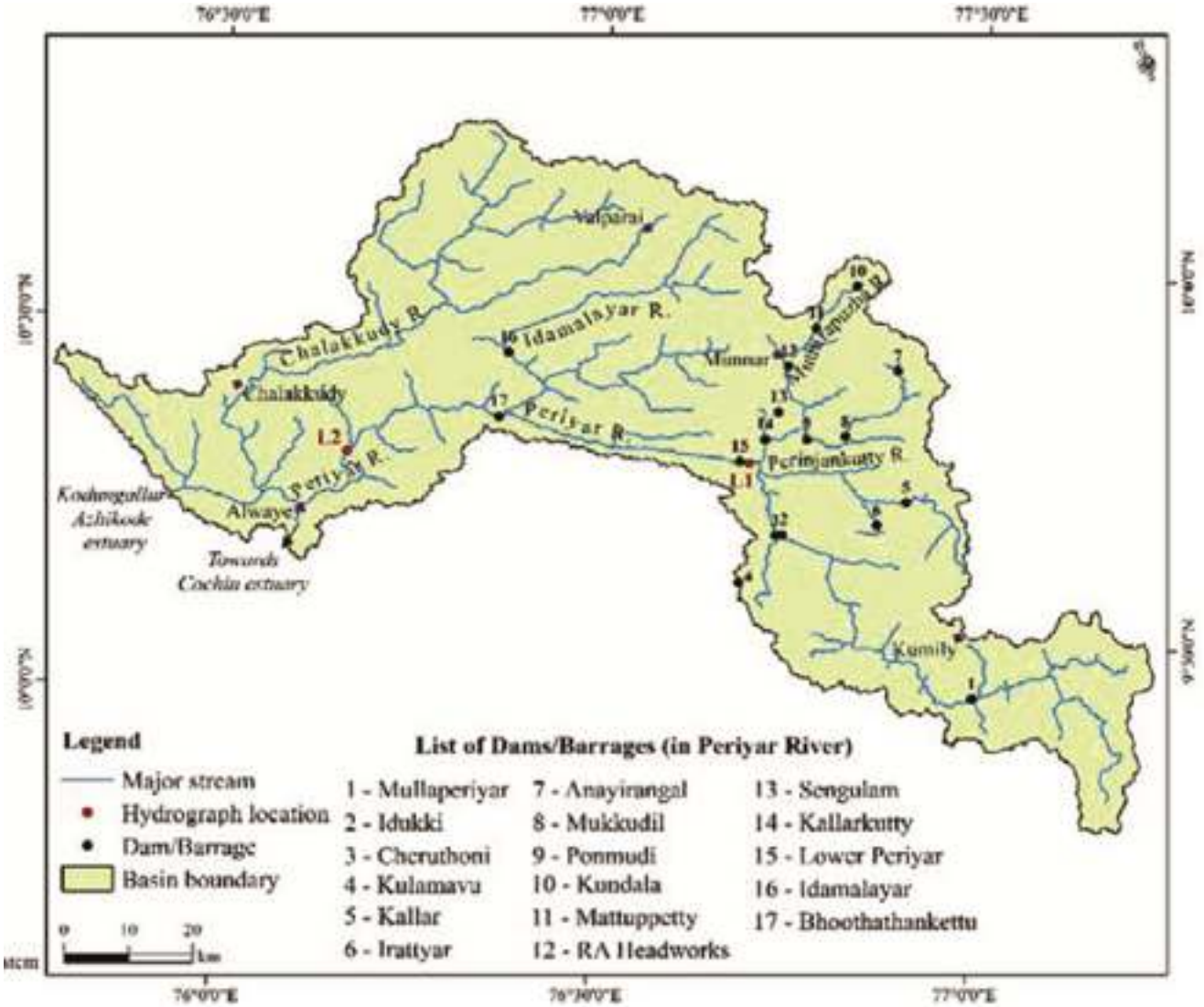
The Great flood of July 1924(flood of 99).

Floods of August 2018.

Periyar

Dams on Periyar

1. MullaPeriyar
2. Idukki
3. BhuthathanKettu
4. MattupettyMunnar
5. Cheruthoni
6. Kulamavu
7. Irattayar
8. Edamalayar
9. Anayirangal
10. Ponmudi
11. Lower Periyar



Major Tributaries of Periyar

1. Muthirappuzha	7. Muthayar
2. Edamalayar	8. Perunthuraiar
3. Mullayar	9. Chinnar
4. Perunthurayar	10. Cheruthony
5. Kattappanayar	11. Kattappanayar
6. Cheruthoniyar	12. Thottiyar

1) MULLA PERIYAR DAM

The Mullaperiyar Dam is the first Surkhi concrete dam in a "V" -shaped gorge in the Western Ghats on the west flowing Periyar River. The Mullaperiyar Dam is having a height of 47.24 m (155 ft) above the river bed level of 0 (zero) ft and a length of 366 m (1200 ft). The total width at top including the original parapet was 3.66 m (12 ft). The front and rear faces of the dam are built with uncoursed rubble masonry in lime surkhi combination mortar of proportion 2.l:3. The proportion of lime surkhi mortar is two parts of lime, one part of surkhi and three parts of sand. The hearting, which accounts for more than 60% of the volume of dam is constructed of lime surkhi concrete with 3.125 parts of stone and 1 part of mortar. Later on, during the 1980s, a concrete backing of 10 m width was attached to the old dam on the downstream face as a measure to strengthen the old structure. The total width at the top after the strengthening has been increased to 6.4 m (21 ft). Thus, it is a composite heterogeneous structure comprising of rubble masonry on the upstream, lime surkhi concrete hearting (which accounts for more than 60% of the volume of the dam), again rubble masonry on the downstream, an ungrouted open joint and a 10 m concrete backing.

The Periyar River is a perennial river which rises from the Sivagiri group of hills in Kerala State and flows through this State and joins the Arabian Sea. Out of its total catchment of 5398 sq. km, 114 sq. km is located in Tamil Nadu far down the river from the Mullaperiyar Dam site and 5284 sq. km lies in Kerala. The maximum height of the Main dam is 53.64 m (176 ft). On both sides of the main valley, there are small saddles and the one on the left side was blocked by a Baby Dam of the same type with 73.15 m (240 ft) length and 16.15 m (53 ft) height which is connected to the high ground by means of an Earthen Dam. The saddle on the right flank is utilized as an escape channel and now serves as a spillway with 13 nos. control gates. The crest level of spillway is 867041 m. Later on, 3 more spillway vents were added with control gate each vent is of size 12.16 m x 4.88 m (40 ft x 16 ft).

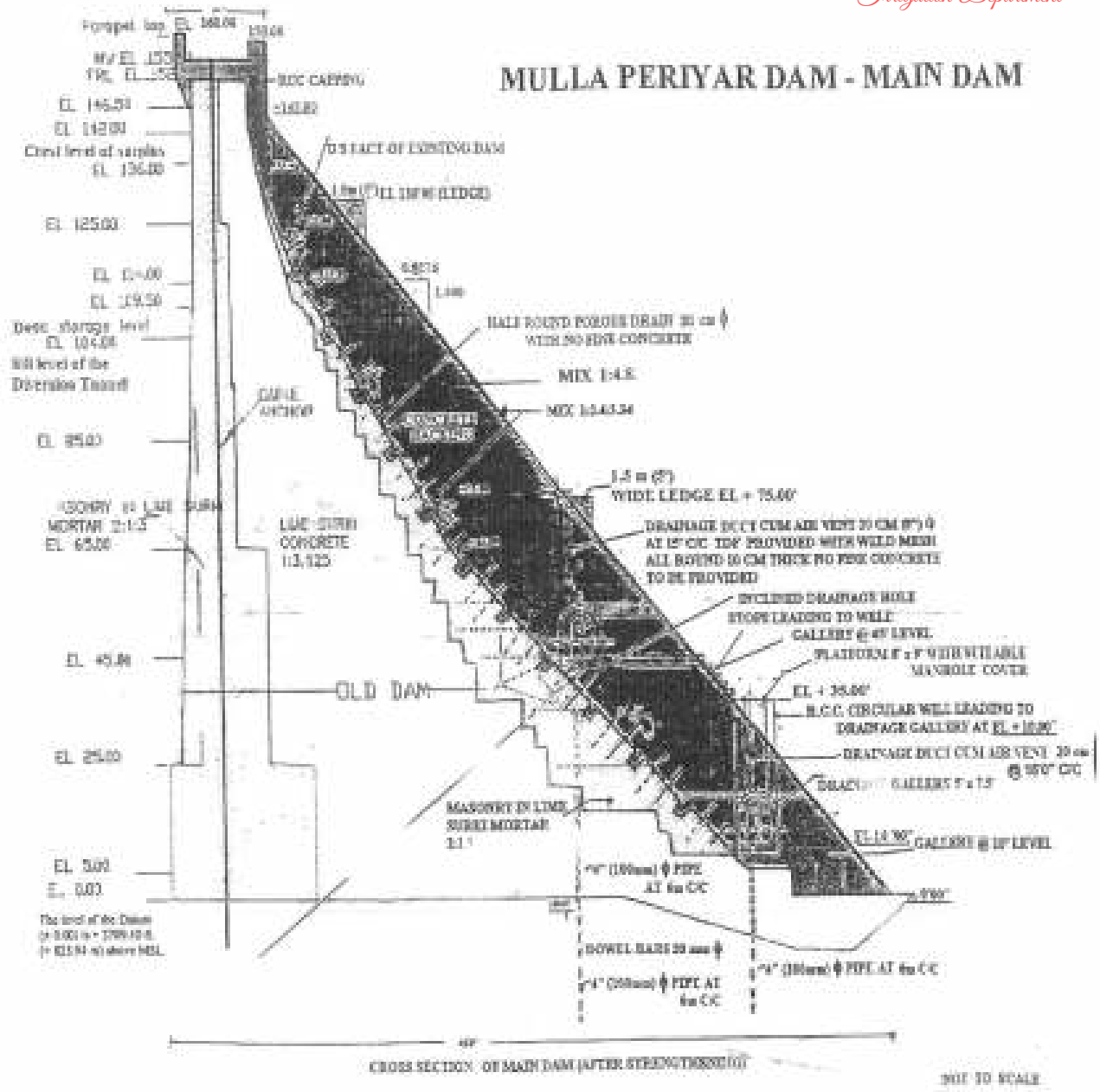
There is an extremely huge quantity of Dead Storage provided merely to raise the remainder water to the level at which it can be passed through the tunnel into the Eastern side of the river watershed. The level of the sluice through which the water drawn by the Tamil Nadu is 15.75 m (48 ft) below the crest of the Dam which leaves a Dead Storage water depth of 41.01 m (125 ft) when full, the lake holds 553 MCM (15.661 TMC) of water out of which 324 MCM (9.176 TMC) is utilizable as it lies above the level of the sluice.

The rainfall occurs in 4 out of 5 days during June to November when the rain is practically continuous. Sudden floods from 283.17 to 3398 cumecs (or 10000 to 120000 cusecs) are constantly experienced during most of the year. Sometimes, 76.2 mm (3 inches) of rain is recorded in a period of 4 hours resulting in heavy floods. The project sanctioned in 1884 and started in 1887 was completed by 1895.

SALIENT FEATURES OF MULLAPERIYAR DAM

Latitude:	: 9°31'30" N
Longitude:	: 77°8' 45" E
Catchment area:	: 624 sq. Km
Full Reservoir level:	: 46.33 m (152 ft)
Maximum Water level:	: 47.24 m (155 ft)
Gross Capacity of Reservoir:	: 443.23 MCM (15.662 TMC)
Gross storage at 104 ft:	: 144.19 MCM (5.092 TMC)
Gross. storage at136 ft:	: 317.43 MCM (11.210TMC)
Gross storage at 155 ft:	: 470.54 MCM (16.617 TMC)
Probable Maximum Flood:	: 8676 cumecs (306399 cusecs)
Recorded Maximum Flood:	: 8453 cumecs (298519 cusecs)

Length:	: 366 m (1200 ft)
Top of dam including parapet:	: 48.16 m (158 ft)
Height of dam from deepest foundation:	: 53.64 m (176 ft)
Top width of dam with parapet:	: 6.4 m (21 ft)
Downstream slope:	: 0.9276 to 1.0
Upstream Slope:	: 1 to 20



IDUKKI HYDROELECTRIC PROJECT

The Idukki Hydroelectric Project is the biggest hydrolectric Project in Kerala (India). It comprises of three dams at Idukki, Cheruthony and Kulamavu and related systems. The power house at Moolamattom is the longest underground power station in India and the pressure shaft is the largest in the country. The Idukki dam is one of the highest dams in the world and the first arch dam in India. Cheruthony is the largest and highest gravity dam in Kerala.

2) IDUKKI DAM

The Idukki Dam is a double curvature Arch dam constructed across the Periyar River in a narrow gorge between two granite hills locally known as Kuravan and Kurathi in Mariyapuram village in Idukki District in Kerala, India. At 168.91 metres (554.2 ft), it is one of the highest arch dams in Asia. It is constructed and owned by the Kerala State Electricity Board. It supports a 780 MW hydroelectric power station in Moolamattom, which started generating power on 4 October 1975. The dam type is a concrete, double curvature parabolic, thin arc dam. The Indo-Canadian project was inaugurated by the Prime Minister Indira Gandhi on February 17, 1976. This dam was constructed along with two other dams at Cheruthoni and Kulamavu. Together, the three dams and Two saddle dams, Kulamavu Saddle Dam (Near Junction) and Kulamavu Saddle Dam (Right Bank) have created an artificial lake that is 60 km2 (23 sq mi) in area. The stored water is used to produce electricity at the Moolamattom Power house, which is located inside nearby rocky caves. The dam is commissioned in 1975.

Power Generation In Idukki Dam

The Project harnesses a major portion of the power potential of Periyar, the largest river in Kerala, by the creation of a reservoir of 2,000 M.cum (2 Billion Tonnes) capacity, diversion of waters thus impounded through a water conductor system consisting of a power tunnel and two underground pressure shafts to an underground power house situated in Moolamattom. The installed capacity of the Power House is 780 MW consisting of 6 Units of Pelton-type turbines with a power generation capacity of 130 MW each. The regulated waters of Periyar falls through a drop of about 669.2 m (2,196 ft) while generating power in the underground power house. The generated power is given to two sub stations. One double circuit line to Kalamassery; one single circuit line to Tamil Nadu; One single circuit line to Pallom, 3 feeder bays for future.

FEATURES

Idukki Dam is 168.91 m (554.2 ft) tall, constructed between the two mountains - Kuravanmala (839 m (2,753 ft)) and Kuravathimala (925 m (3,035 ft)). Length of the dam on its top is 365.85 m (1,200.3 ft). It has a width of 7.62 m (25.0 ft) in the top and 19.81 m (65.0 ft) in the bottom. About 464,000 m3 (16,400,000 cu ft) of concrete was used in the construction of the dam. This project is situated in Idukki District and its underground power house is located at Moolamattom which is about 43 km (27 mi) from the dam. One thing to be noted is, Idukki Arch dam doesn't have any shutters to be opened so it has to rely on the Cheruthoni dam to maintain the reservoir water level.

Salient features of Idukki dam:

Village	: Idukki
Type	: Concrete arch(double curvature thin)
Latitude	: 90 50’ 30’’ N
Longitude	: 760 58’ 40’’ E
FRL	: 732.62 m
MWL	: 734.3 m
Catchment area	: 649.3 km2
Storage capacity	: 1998.57 Mm3
Live storage	: 1459 Mm3
Spillway details	: no spillway
Spillway type	: Chute type
Installed capacity of the project	: 780 MW

Salient features of Cheruthoni dam:

Village	: Idukki
Type	: Concrete gravity
Latitude	: 9050’ 45’’ N
Longitude	: 760 58’ 03’’ E
FRL	: 732.62 m
MWL	: 734.3 m
Catchment area	: 649.3 km2
Storage capacity	: 1998.57 Mm3
Live storage	: 1459 Mm3
Spillway details	: 7 Nos (5 radial floodgates and 2 Vertical flood gates)
Spillway type	:Chute type
Installed capacity of the project	: 780 MW

Ogee Spillway in Cheruthoni Dam

3) CHERUTHONY DAM

Cheruthoni dam located in Idukki district (Vazhathope Panchayath) is constructed as a part of Idukki Hydroelectric project along with Idukki dam and Kulamavu dam. Cheruthoni dam is a concrete gravity dam having a length of 650.9 m and a height of 138 m. Cheruthoni dam is located 1 km west of Idukki dam and is commissioned in the year 1976. The spillway of Idukki reservoir is in Cheruthoni dam.

The dam is under the ownership of KSEB. Also this dam is the highest and largest gravity dam in Kerala. Construction of Idukki, Cheruthoni and Kulamavu dams created an artificial lake of 60 km2 and water stored is used for power generation at Moolamattom power house.

Thrice in total, the floodgates of Cheruthoni had to be opened; twice during the northeast monsoon (October to December) of 1981 and 1992 and once during the 2018 Kerala floods. The first time was in 1981 (when the shutters were repeatedly opened and shut between 29 October and 13 November) and the second time was in 1992 (when they were kept open for 12 days from 12 to 23 October) and recently during the great flood of 2018 from 9 August 2018 to 7 September 2018, all 5 shutters were opened while all 14 districts of kerala were put under Red Alert with heavy disaster creating destruction all over kerala.

On the first 2 occasions, the water level in the dam touched the brim only when the storage built up during the southwest monsoon (June to September) was augmented by the inflow received immediately afterwards following heavy downpour early in the northeast monsoon.[5] On 9 August 2018, after a gap of 26 years, owing to continuous downpour of the southwest monsoon, the floodgates of dam in Idukki was opened. This was the first instance of water being released from the dam during the southwest monsoon season and also the first time in history when all 5 shutters of the dam were opened since it was commissioned in 1976.

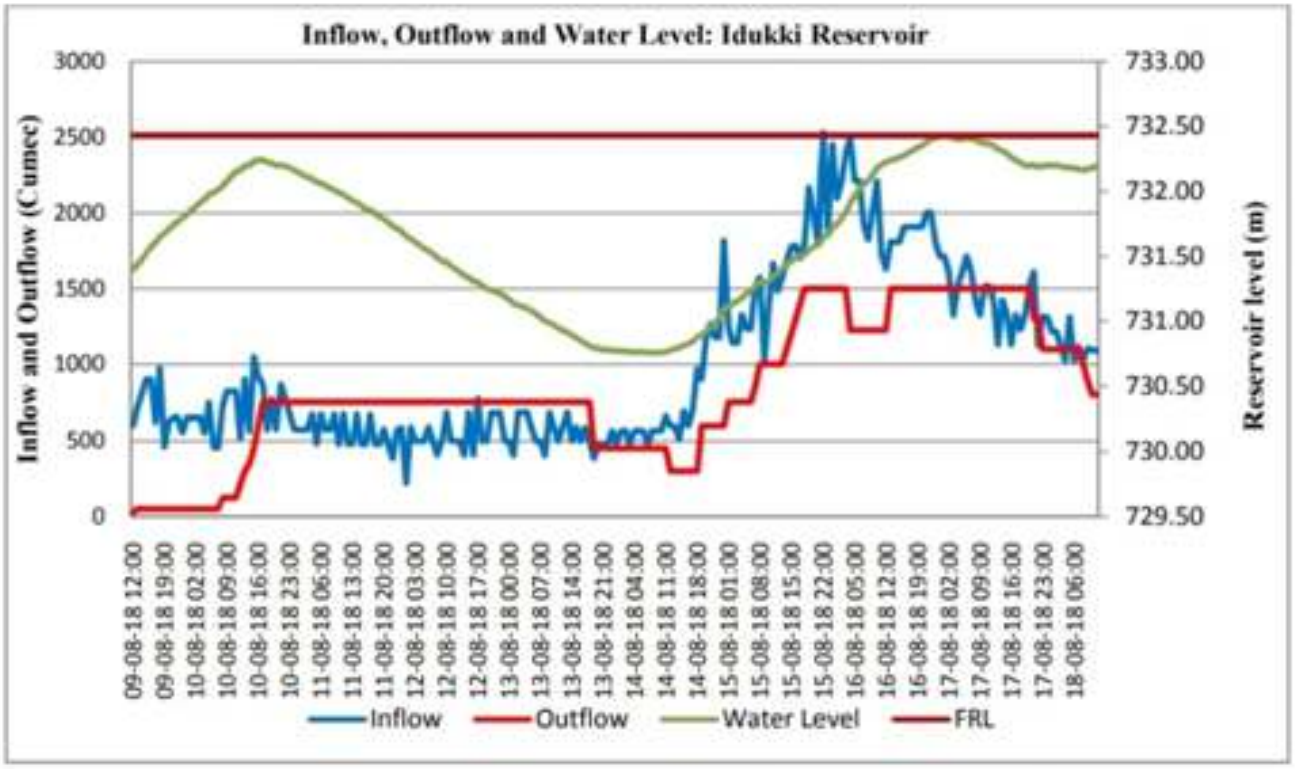


Fig.4: Inflow, outflow and water level at Idukki reservoir

On 10 August 2018, all five radial floodgates of the dam were raised for the first time in history with the water level in the dam exceeding the 2400 ft mark. The water level kept rising in Asia's biggest arch dam even after opening the first sluice gate which lead to the opening of all five gates within a matter of 26 hours. The spill gates sent down 750 cumecs (7.5 lakh litres per second) of water downstream, along with the heavy downpours resulting in widespread flooding along the state's longest river. On 15 August 2018 the gates were raised further owing to continuous downpour and release of water from Mullaperiyar Dam sending 1000 cumecs of water downstream.

4) KULAMAVU DAM

Kulamavu dam is located on Kilivillithodu tributary of Periyar in Arakkulam village of Idukki district. The dam is a gravity/masonry dam built as a part of Idukki Hydroelectric power project along with Idukki and Cheruthoni dam. The dam constructed to prevent water escape through a rivulet called Kilivally and is situated on the Thodupuzha-Puliyanmala state highway (SH-33) , about 23 km from Idukki dam and 22 km from Cheruthoni dam. The top portion of this dam is in concrete and the bottom is masonry. The dam was commissioned in the year 1976 and is under the ownership of KSEB. The dam is having a length of 385 m and height of 100 m. No spillway is associated with Kulamavu dam.

The dam is situated on the Thodupuzha - Puliyanmala state highway (SH-33), about 23 km (14 mi) from Idukki arch dam, 22 km (14 mi) from Cheruthoni dam and 38 km (24 mi) from Thodupuzha. The dam was completed in the year 1977 and is operated and maintained by Kerala State Electricity Board.

The dams of Idukki, Cheruthoni and Kulamavu extend to an area of 33 km². The construction of these three dams formed a 60 km² artificial lake. The water stored in it is used for the production of electricity at the power house in Moolamattom. Taluks through which release floware Thodupuzha, Udupanchola, Devikulam, Kothamangalam, Muvattupuzha, Kunnathunadu, Aluva, Kodungalloor and Paravur

Salient features of Kulamavu dam:

Village	: Arakkulam
Type	: concrete and masonry
Latitude	: 90 10’ 03’’ N
Longitude	: 760 53’ 08’’ E
FRL	: 732.62 m
MWL	: 734.3 m
Catchment area	: 38 km2
Storage capacity	: 1998.57 Mm3
Live storage	: 1459 Mm3
Spillway	: no spillway
Installed capacity of the project	: 780 MW

5) KALLAR DAM

Kallar dam is a diversion dam (latitude: 90 49’ 30’’ and longitude: 770 09’ 23’’) located in Nedumkandam panchayth of Idukki district. It is built as a part of Idukki Hydroelectric Power project across Perinjamkuttyar routing through Erattayar reservoir. The weir was commissioned in 1991.

The concrete diversion weir is having a length of 58 m with a height of 12.2 m. The water will be diverted to Erattayar reservoir during monsoon through a tunnel. Taluks through which the releases flow are Thodupuzha, Udumbanchola, Devikulam.Kothamangalam, Muvattupuzha, Kunnathunadu, Aluva, Kodungallor and Paravur.

- Latitude : 9^0 49′ 30 ” N
- Longitude: 77^0 09′ 20” E
- Panchayath : Nedumkandam
- Village : Kalkoonthal
- District : Idukki
- River Basin : Periyar
- River : Perinjamkutty (Tributary of Periyar)
- Release from Dam to river : Periyar
- Type of Dam : Concrete- Gravity
- Classification : LH (Low height)
- Maximum Water Level (MWL) : 824.48 meters
- Full Reservoir Level (FRL) : 824.48 meters
- Storage at FRL : 0.793 Mm3
- Height from deepest foundation : 12.19 m
- Length : 57.91 m
- Spillway : Ogee type – 4 Nos. Radial gates, each of size 7.62 x 6.10 m

6) ERATTAYAR DAM

The Erattayar dam (latitude: 9^0 48′ 35 ” N and longitude: 77^0 06′ 20” E) is constructed across Perinjamkutty to divert part of water to Idukki reservoir through a diversion tunnel called Anchuruli tunnel. The dam was commissioned in 1991 and is having a length of 146.3 m and height of 19.81 m and is a part of Idukki Hydroelectric power project. The concrete gravity dam is located in Erattayar village (Erattayar Panchayath) is a medium height dam.

FRL	: 754.38 m
MWL	: 754.38 m
Spillway crest level	: 818.40 m
Storage capacity	: 5.352 Mm3
Catchment area	: 68.8 sq.km
Live storage	: 5.086 Mm3
Spillway details	: Ogee type – 2 Nos. Radial gates, each of size 7.62 x 6.10 m
Installed capacity of the project	: 780 MW

7. Kundala dam

Kundala Dam is constructed in the upstream reaches of Mudirappuzha sub basin,downstream of the confluence of Chittuvarai, Ellappatti and Chunduvarai streams, in Periyar Basin in Idukki District, Kerala State. The upstream most dam in Mudirappuzha sub basin is Kundala. It is a masonry dam, constructed during 1947. The location of dam is 770 11' 55" E/100 08' 37" N. Maduppetty is the immediate downstream dam in the same stream.

The Gross Storage of Kundala Dam is 7.78 Mm3 and live storage 7.65 Mm3. FRL of the reservoir is 1758.69 m and the MWL is 1759.30 m. Top level of dam is 1759.92 m. There are five vertical gates (falling type), each of size 5.18 m x 2.74 m. Crest level of spillway is 1756.86 m. One lower level outlet of 1.8 m dia. is also provided in the dam. Spillway capacity is 184 m3/s. the reservoir will be at FRL near the end of monsoon season. The water stored in the reservoir is released to Maduppetty Reservoir, located about 4 km downstream, through the river course generally from April to May. The reservoir will be empty by the end of May.

Reservoir Operation – Kundala Dam

The Gross Storage of Kundala Dam is 7.78 Mm3 and live storage 7.65 Mm3. FRL of the reservoir is 1758.69 m and the MWL is 1759.30 m. Top level of dam is 1759.92 m. There are five vertical gates (falling type), each of size 5.18 m x 2.74 m. Crest level of spillway is 1756.86 m. One lower level outlet of 1.8 m dia. is also provided in the dam. Spillway capacity is 184 m3/s. the reservoir will be at FRL near the end of monsoon season. The water stored in the reservoir is released to Maduppetty Reservoir, located about 4 km downstream, through the river course generally from April to May. The reservoir will be empty by the end of May.

Dam Name : KUNDALA DAM
Name of River : Kundala river (Tributary of Muthirappuzha)
Dam location : Idukki District.
Lat/Long : 770 11' 55" E/100 08' 37" N
Seismic Zone : Zone III
Year of Starting Dam Construction : 1941
Year of first Impoundment : 1947
Year of commissioning of Dam : 1947
Name of Immediate Upstream Dam : Nil
Name of Immediate Downstream Dam : Maduppetty
Main Dam
Type : Masonry Gravity
Length : 259 m
Maximum Height : 26.2 m
Top Width : 3.05 m
Top of Dam : 1759.92 m
Drainage area : 36.43 km2
Spillway
Crest level : 1756.86 m
No of gate : 5
Size : 5.18 m X 2.74 m
Lower Level outlet : 1 No 1.8 m dia. at 1735.84 m
Reservoir
Full Reservoir Level : 1758.69 m
Live Storage : 7.65 Mm3
Gross storage : 7.78 Mm3
Reservoir Spread Area at FRL : 0.65 Km2

8.Maduppetty Dam

Maduppetty dam is constructed about 10 km downstream of Kundala Dam. It is a concrete gravity dam. This reservoir stores the water from the catchment downstream of Kundaladam. It also routes the releases from Kundala dam to R A Head works from where it is diverted to Pallivasal Power Station. This dam was constructed in 1956 and is intended to store water for power generation.

The Gross Storage of Maduppetty Dam is 55.23 Mm3 and live storage 54.77 Mm3. FRL &MWL of the reservoir is 1599.59 m. Top level of dam is 1600.20 m. There are three nos. Of radial gates each of size 6.70 m x 4.95 m. Crest level of spillway is 1594.71 m. One lower level outlet of 1.2 m dia. is also provided at elevation 1565.15 m Spillway capacity is 453 m3/s. The water stored in the reservoir is released through a Dam Toe Power Station, which in turn used for generating power from Pallivasal Hydro Electricity Project.

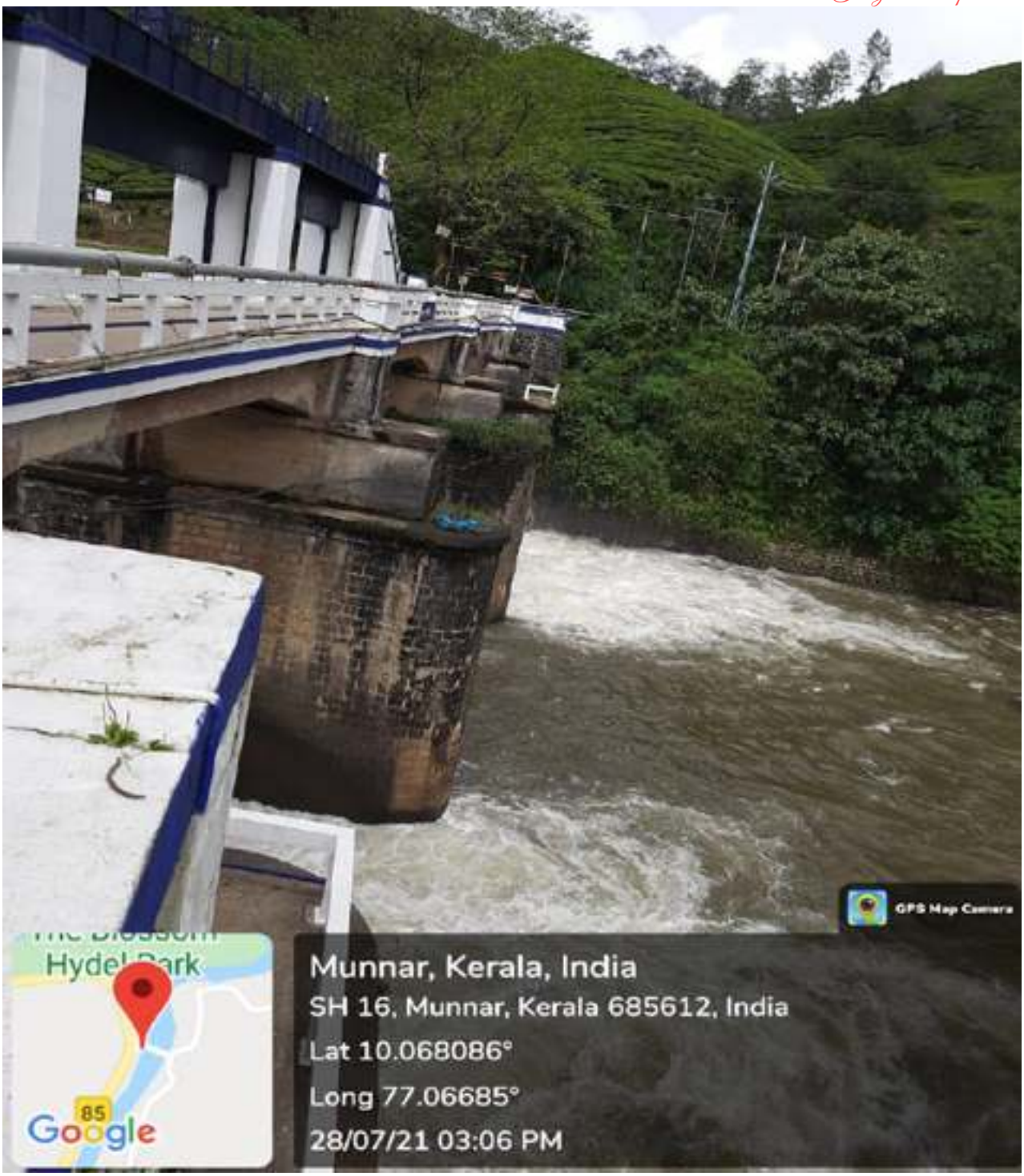
Reservoir Operation – Maduppetty Dam

The Gross Storage of Maduppetty Dam is 55.23 Mm3 and live storage 54.77 Mm3. FRL & MWL of the reservoir is 1599.59 m. Top level of dam is 1600.20 m. There are three nos. of radial gates each of size 6.70 m x 4.95 m. Crest level of spillway is 1594.71 m. One lower level outlet of 1.2 m dia. is also provided at elevation 1565.15 m Spillway capacity is 453 m3/s. The water stored in the reservoir is released through a Dam Toe Power Station, which in turn used for generating power from Pallivasal Hydro Electricity Project.

SALIENT FEATURES

Dam Name : MADUPPETTY DAM
Name of River : Kundala river (Muthirapuzha river)
Dam location : Idukki District.
Lat/Long : 770 07’ 26” E/100 06’ 23” N.
Seismic Zone : Zone III
Year of first Impoundment : 1956
Year of commissioning of Dam : 1956
Name of Immediate Upstream Dam : Kundala
Name of Immediate Downstream Dam : R A Head Works
Main Dam
Type : Concrete Gravity
Length : 237.70 m
Maximum Height : 46.33 m
Top Width : 6.1 m
Top of Dam : 1600.20 m
Drainage area : 57.106 km2
Spill Way
Crest level : 1594.71 m
No of gate : 3
Size : 6.70 X 4.95 m
Lower level outlet : 1.2 m dia. at 1565.15 m

Reservoir
Full Reservoir Level : 1599.59 m
Live Storage : 55.23 Mm3
Gross storage : 54.77 Mm3
Reservoir Spread Area at FRL : 3.24 Km2



8. R A Head Works

This is a barrage like structure with gate arrangements which diverts water to the tunnel of Pallivasal Hydro Electric Project. The water is impounded by gates. The sill level of the gate is almost at the bed level of the stream. Release from Maduppetty reservoir as well as inflow from own catchment reaches R A Head Works. This structure is constructed during 1944. The pondage of the diversion structure is 0.22 Mm3. The Full Reservoir Level is 1450.92 m. The crest level of gate is 1445.00 m. There are three vertical lift gates for this barrage each of size 11.6 m X 6.7 m. The rate of diversion to the power station is about 8 m3/s.

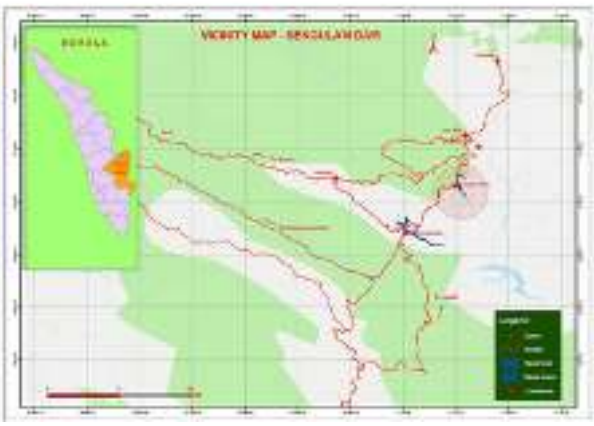
Reservoir Operation - R A Head Works

The pondage of the diversion structure is 0.22 Mm3. The Full Reservoir Level is 1450.92 m. The crest level of gate is 1445.00 m. There are three vertical lift gates for this barrage each of size 11.6 m X 6.7 m. The rate of diversion to the power station is about 8 m3/s.

Dam Name : R A Head Works
Name of River : Muthirappuzha
Dam location : Idukki District.
Lat/Long : 100 04' 05" N & 770 04'01" E
Seismic Zone : Zone III
Year of first Impoundment : 1944
Year of commissioning of Dam : 1944
Name of Immediate Upstream Dam : Maduppetty
Name of Immediate Downstream Dam : Kallarkutty
Main Dam
Type : Barrage (gated structure)
Length : 3 Vents 11.6 X 6.7 m
Maximum Height : 0.30 m (height of sill)
Drainage area : 238.256 km2
Spillway
Crest level : 1445.00 m
No of gate : 3
Size : 11.60 X 6.70 m
Reservoir
Full Reservoir Level : 1450.92 m
Gross storage : 0.22 Mm3
Reservoir Spread Area at FRL : 0.01 Km2

9. SENGULAM DAM

Sengulam reservoir is created as part Sengulam Hydro Electric Project (48 MW) by constructing a dam across Sengulam stream. Latitude and Longitude of Sengulam dam is 10° 0'39.14"N and 77°1'57.45"E respectively. The project was commissioned during 1955. The storage capacity of the reservoir is 0.71 Mm3. Water from the reservoir is diverted to the power station located at Sengulam, through tunnel/penstock system. Maximum rate of diversion is 16.9 m3/sec.



The catchment area of Sengulam dam is 5.18 km2. The inflow to the catchment is contributed partly from own catchment and partly from the water pumped from the tail pool of upstream Pallivasal Hydro Electric Project.

Reservoir Operations

During monsoon, Sengulam reservoir receives inflow from own catchment as well as the regulated discharge from pumping tail water of upstream project. During non-monsoon period the source of inflow is only the regulated discharge from upstream Pallivasal Project which is merely routed through the Sengulam reservoir. Sengulam reservoir rarely spills. The inflow plus pumped water is effectively utilized in Sengulam Power Plant without much spill. Hence the downstream reaches of the dam are encroached to a large extent. The stream bed and banks are used for cultivation etc. Downstream dam is Kallarkutty. The operation of Sengulam reservoir does not have significant impact on downstream reservoir. FRL of the reservoir is 847.65m and dam top level is 850.10m. the spill way is ungated with 3 vents of size 4.88mx1.83m.

Blue Alert will be declared when there is a;

• Forecast of heavy rain by IMD;

• High intensity rainfall (greater than 115.6 mm) in the catchment area of reservoir Orange Alert will be declared when there is a;

• Water level crosses FRL;

• Spillway discharge 0-30 m3/s.

Red Alert will be declared when there is a;

• Water level crosses FRL of dam;

• Spillway discharge greater than 30 m3/s.

Dam Name : SENGULAM DAM
Name of River : Sengulam
Dam location : Sengulam
Lat/Long : 10° 0'39.14"N and 77°1'57.45"E
Seismic Zone : Zone III
Year of Starting Dam Construction :
Year of first Impoundment : 1955
Year of commissioning of Dam : 1955
Name of Immediate Upstream Dam : Pallivasal
Name of Immediate Downstream Dam : Kallarkutty
Emergency Planning Manager : Thomas Alexander
Phone Number : 9446008421

Main Dam
Type : Masonry
Length : 143.26 m
Maximum Height : 19.5 m
Top Width : 4.88 m
Top of Dam : 850.10 m
Drainage area : 5.18 km2
Spillway
Ungated with 3 vents -4.88mx1.83m.
Lower Level Outlet : 1 No. 0.60m dia.
Reservoir
Full Reservoir Level : 847.65 m
Gross storage : 0.71 Mm3
Reservoir Spread Area at FRL : 0.29 Km2

11 .IDAMALAYAR

Idamalayar dam is constructed as part of Idamalayar Hydro Electric Project (75 MW). The dam is constructed across Idamalayar River, a tributary of Periyar. It is a concrete gravity dam. The tail water of the project is used for drinking purpose, irrigation and for salinity control. The construction activities of the project were started during 1976 and the project completed in 1987. The project is located in Ernakulam District. Geographical coordinates of Dam location are Lat : 100 13’ 18” N & Long: 760 42’ 23” E.

Rule levels of the reservoir is shown below;

Fig Rule Curve

Water stored in the reservoir is diverted to Power Station through tunnel/Penstock system. The spill water flows to Idamalayar river. Tail water from power plant flows to Idamalayar river. The project lay out is shown in the figure below;

Idamalayar Dam

Idamalayar is a concrete gravity dam. The length of dam is 373m & height from above bed level is 91 m. The dam is constructed with 22 blocks

5.2 Reservoir Operations

The Full Reservoir Level (FRL) of the reservoir 169 m. Spillway crest level is 161 m. Four numbers of spillway gates of size 11.5m X 9.7 m are there. Two numbers of lower level outlets of size 1.5 m is provided at 103.5 m. The storage is 1089 Mm3. Maximum generation from the project take place during monsoon. The reservoir rarely spills during monsoon.

Rule levels of the reservoir is shown below.

Blue Alert will be declared when there is a;

- Forecast of heavy rain by IMD
- Water level in the reservoir crosses 0.6 m below the rule level
- High intensity rainfall (greater than 115.6 mm) in the catchment area of reservoir
- Need to open gates in an emergency.

Orange Alert will be declared when there is a;

- Water level in the reservoir crosses the rule level
- Controlled Release through Spillway (0- 300 m3/s).

Red Alert will be declared when there is a;

- Water level in the reservoir crosses the rule level
- Large Controlled Release through Spillway (greater than 300 m3/s).

Dam Name : IDAMALAYAR DAM
Name of River : Idamalayar
Dam location : Idamalayar
Lat/Long : 100 13’ 18” N & 760 42’ 23” E.
Seismic Zone : Zone III
Year of Starting Dam Construction :
Year of first Impoundment : 1987
Year of commissioning of Dam :
Name of Immediate Upstream Dam : Nil
Name of Immediate Downstream Dam : Periyar Barrage at Bhoothathankettu.
Emergency Planning Manager : Biju P N
Phone Number : 9446008425
Type of dam : Concrete
Length : 373 m
Maximum Height : 91 m
Top Width : 8.5m
Top of Dam : 172 m
Drainage area : 481 km2

Spillway
Crest Level : 161 m
No of gates : 4
Size : 11.5m X 9.7m
Lower Level Outlet
Nos. : 2
Size : 1.5 m
Elevation : 103.5 m
Reservoir
Full Reservoir Level : 169 m
Gross storage : 1089 Mm3
Reservoir Spread Area at FRL : 28.3 Km2

12 ANAYIRANKAL DAM

Anayirankal Dam is constructed as part of Panniyar Hydro Electric Project. It is an Earth &Rockfill Dam with masonry spillway structure. The dam is located in Idukki district. Anayirankal is an augmentation reservoir and is located in the upstream of Ponmudi reservoir from which water is drawn to Panniyar Power Station. The water stored in Anayirankal reservoir is released to downstream river through lower level sluice which flows down to Ponmudi reservoir. The dam is located at geographic coordinates 77 12' 26" E/10 00' 35" N. The dam was commissioned during 1965.

Name of River :Anayirankal
Dam location : Idukki District.
Lat/Long : 77 12' 26" E/10 00' 35" N
Seismic Zone : Zone III
Year of Starting Dam Construction :
Year of first Impoundment : 1965
Year of commissioning of Dam : 1965
Name of Immediate Upstream Dam : Nil
Name of Immediate Downstream Dam :Ponmudi

Main Dam

Type : Earth &Rockfill with Masonry spillway
Length : 326.00 m
Maximum Height : 34.13 m
Top Width : 6.1 m
Top of Dam : 1212.51 m
Drainage area 0: 64.92 km2

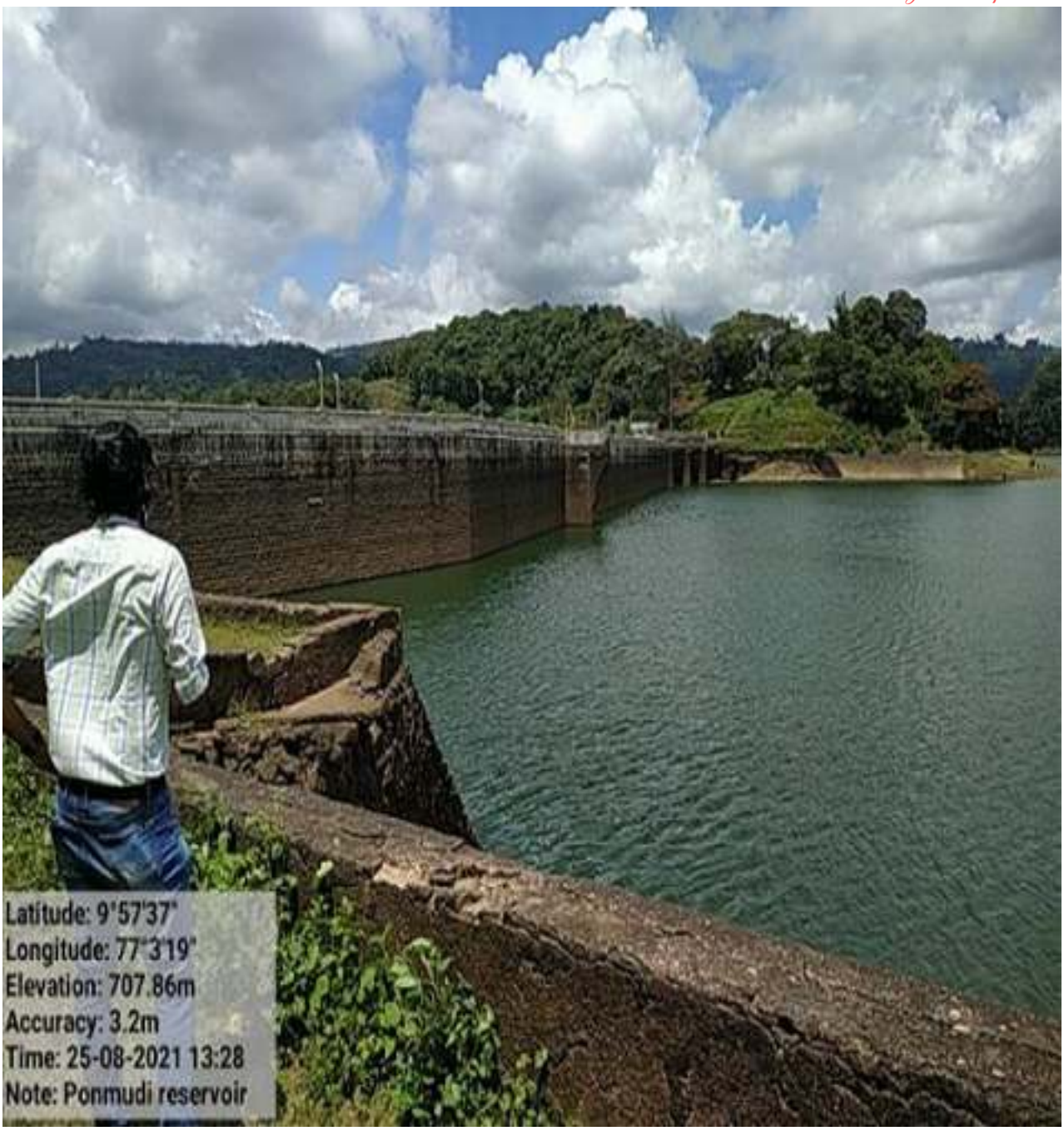
Spillway

The Spillway is ungated having a crest length of 28.05 m and the crest level is 1207.02 m.

Reservoir

Full Reservoir Level : 1207.02 m
Live Storage : 49.83 Mm3
Gross storage : 50.68 Mm3
Reservoir Spread Area at FRL : 4.85 Km2

PANNIYAR



13 PONMUDI DAM

Ponmudi Dam is constructed as part of Panniyar Hydro Electric Project. The dam is in Idukki district. It is a masonry dam constructed across Panniyar River. Ponmudi dam is located in the downstream of Anayirankal dam. Ponmudi reservoir store water from its own catchment as well as route the releases from Anayirankal dam to generating power from Panniyar Power Station. The dam is located at geographic coordinates 770 03' 24" E/90 57' 37" N. The dam was commissioned during 1963.

Reservoir Operations

The Gross Storage of Ponmudi Dam is 51.54 Mm3 and live storage 47.40 Mm3. FRL of the reservoir is 707.75 m and the MWL is 708.66 m. Top level of dam is 709.57 m. There are three radial gates, each of size 10.97 m x 6.40 m. Crest level of spillway is 701.35 m. Spillway capacity is 1359 m3/s. One lower level outlet is provided in the dam at 662.33 level. The upstream reservoir is Anayirankal& downstream reservoir is Kallarkutty. The water stored in the Ponmudi reservoir is used for power generation from Panniyar Power Station. The tail water is released to the Kallarkutty reservoir.

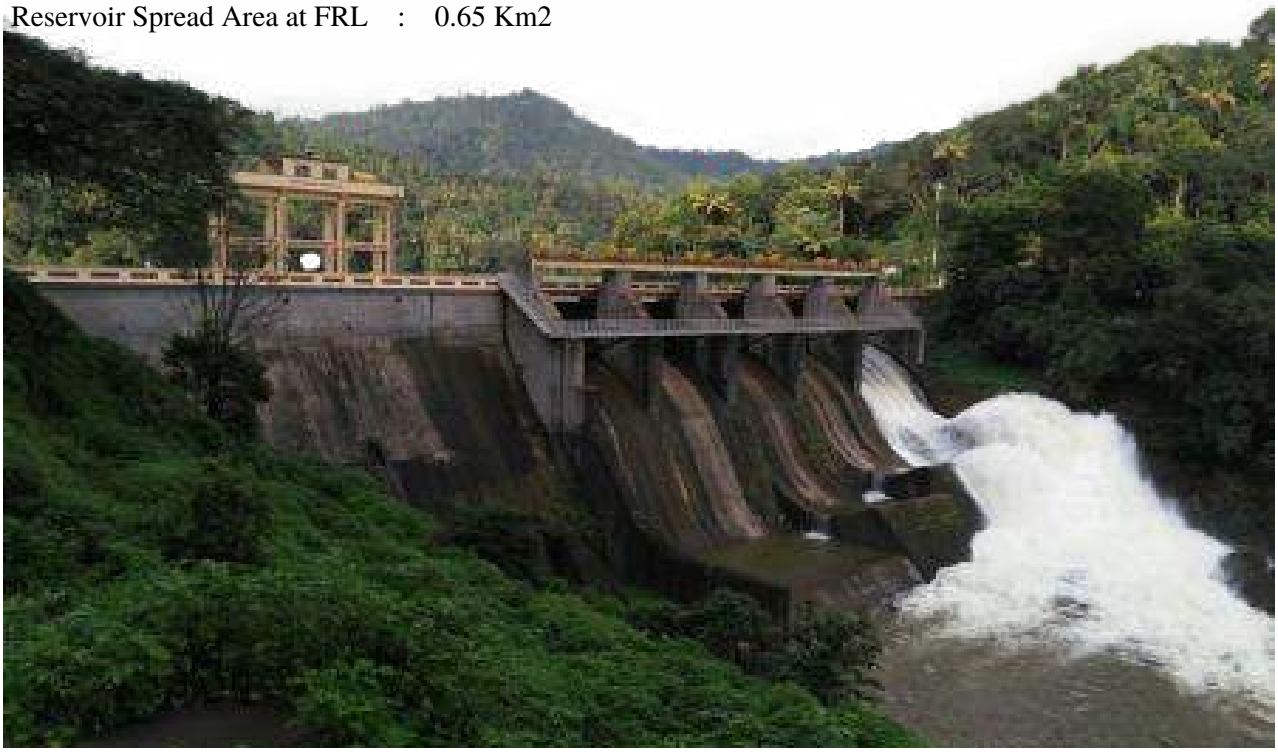
Periyar

Name of River :Panniyar
Dam location : Idukki District.
Lat/Long : 770 03’ 24” E/90 57’ 37” N
Seismic Zone : Zone III
Year of Starting Dam Construction :
Year of first Impoundment : 1963
Year of commissioning of Dam : 1963
Name of Immediate Upstream Dam : Nil
Name of Immediate Downstream Dam :Kallarkutty
Emergency Planning Manager : Thomas Alexander
Phone Number : 9446008421
Main Dam
Type : Masonry Gravity
Length : 288.80 m
Maximum Height : 57.6m
Top Width : 6 m
Top of Dam : 709.57 m
Drainage area : 221.75 km2
Spillway
Crest level : 701.35 m
No of gate : 3
Size : 10.97 X 6.40 m
Lower Level Outlet : 1 No, 1.8 m dia.
Elevation : 662.33 m
Reservoir
Full Reservoir Level : 707.75 m
Live Storage : 51.54 Mm3
Gross storage : 47.4 Mm3
Reservoir Spread Area at FRL : 2.78 Km

14 KALLARKUTTY DAM

Kallarkutty Dam is constructed as part of Neriyamangalam Hydro Electric Project. The dam is in Idukki district. It is a masonry dam constructed across Mudirappuzha River. Kallarkutty dam is located in the downstream of Ponmudi dam. Kallarkutty reservoir stores water from its own catchment as well as routed spills from Ponmudi&Maduppetty dams and tail race releases from Panniyar/Pallivasal/Sengulam Power Stations. The dam is located at geographic coordinates 90 58' 48" N /770 00' 05" E. The dam was commissioned during 1961.

Name : KALLARKUTTYDAM
Name of River : Mudirapuzha
Location : Idukki District.
Lat/Long : 9 58' 48" N /77 00' 05" E
Seismic Zone : Zone III
Year of Starting Dam Construction : Year of first Impoundment : 1961
Year of commissioning of Dam : 1961
Name of Immediate Upstream Dam : Nil
Name of Immediate Downstream Dam :Pambla
Main Dam Type : Masonry Gravity
Length : 182.88 m
Maximum Height : 45m Top
Width : 6.1 m
Top of Dam : 457.80 m
Drainage area : 730.38 km2
Spillway Crest level : 450.20 m
No of gates : 5 Size : 10.97 X 6.40 m
Lower Level Sluice Number : 1 No. Size : 2.44 m x 5.18 m
Sill level : 429.77 m
Reservoir Full Reservoir Level : 456.60 m
Live Storage : 6.43 Mm3
Gross storage : 6.80 Mm3
Reservoir Spread Area at FRL : 0.65 Km2



15 LOWER PERIYAR DAM

Lower Periyar Dam is constructed as part of Lower PeriyarHydro Electric Project (180 MW). The dam is in Idukki district. It is aconcretedam constructed across Periyar River. Lower Periyar dam is located in the downstream of Kallarkutty and Idukki dams. Lower Periyar dam reservoir stores water from its own catchment as well as routedspills from Kallarkutty&Idukki dams and tail race releases fromNeriyamangalam Power Station. The downstream reservoir is Bhoothathankettu. The dam is located at geographic coordinates 90 57’ 44” N /760 57’ 25” E. The dam was commissionedduring 1997.

Name of River : PERIYAR
Dam location : Idukki District.
Lat/Long : 90 57’ 44” N /760 57’ 25”
ESeismic Zone : Zone III
Year of Starting Dam Construction : 1993
Year of first Impoundment : 1997
Year of commissioning of Dam : 1997
Name of Immediate Upstream Dam : Kallarkutty
Name of Immediate Downstream Dam :Pambla

Main Dam
Type : Concrete Gravity
Length : 284 m
Maximum Height : 32.3m
Top Width : 7 m
Top of Dam : 257.00 m
Drainage area : 584 km2

Spillway
Crest level : 237.74 m
No of gate : 5
Size : 10.97 X 6.40 m

Reservoir
Full Reservoir Level : 253.00 m
MWL : 256.00 M
Live Storage : 4.50 Mm3
Gross storage : 5.35 Mm3
Reservoir Spread Area at FRL : 0.45 Km2

16 BHOOTHATHAN KETTU BARRAGE

The main sources of water which are stored at PVIP Barrage, Bhoothathankettu are from various hydroelectric projects situated along the Periyar river, independent catchment area that is lying lower areas of these hydroelectric projects and Idamalayar hydroelectric projects. These stored water is diverting through left side canal for the purpose of irrigating 32800 hectares of agricultural land in Ernakulam district. The agricultural land situated in various taluks i.e. Kothamangalam, Muvattupuzha, Kunnathunadu, Aluva, Paravoor and Kanayannoor is benefitting from this project.

1. The total length of PVIP Barrage across the Periyar river: 210.92 Metre
2. Main canal (Left side) : 8.00 Km
3. Low-level canal : 20.80 Km
4. High-level canal : 24.00 Km
5. Distributaries and Branch canals : 685.00 Km

Commissioning of this project

The construction of this project started in 1956 and partially commissioned in 1967. In 1976 – 77, this project was able to irrigate 18880 hectares of agricultural land. In 1977, necessary steps were being taken for construction of HLC & distributaries and thus increased the capacity to irrigate 32800 hectares of agricultural land.

Other Benefits --- After completing of this project, in addition to irrigate 32800 hectares of agricultural land, this project is used for distributing pure water for the purpose of drinking and industrial uses in great Cochin, to control high tide in Periyar and Lift irrigation schemes. Moreover, the water required for FACT is distributing through the canal of this project.

components of this project are:

1. Barrage

The length of the barrage constructed across the Periyar is 210.92 Metre. There are 15 nos. of shutters at this Barrage. The Maximum Floor Level of this Barrage is 34.95 Metre.

2. Main Canal

The water diverted from the barrage are distributing to the agricultural land through main canal which is 8 km long. The major portion of this canal is made with earth. Concrete lining was provided partially and in some areas there is no concrete lining because of this breaches occurred and water entering to the adjacent places at the time of distribution. Kothamangalam branch canal and Injakandam MD canal is originatingfrom this Main canal. The Main canal is ending at Muthamkuzhi and then divides into two canals i.e. Low level canal and High level canal. Low level canal is the important canal in this system and it is the oldest canal which was being constructed at the beginning of this project. The major portion of this canal is made with earth and it's earthern canal. The distribution of water to the branch canals i.e. Kottappadi, Kodanad East, Kodanad West, Perumbavoor, Vattakkattupadi, Rayamangalam, Madathipadi, Aluva, Paravur, Idappalli, Kizhakkambalam, Punnayam, Kuzhoor, which starts from this canal are depends upon the intensity of flow of water in this LLC. The water distribution to the tail end areas i.e. Paravoor and Idappalli is not possible due to various reasons such as lack of concrete lining in the canal, damages at sides of canal caused loss of it's natural shape, wear and tear due to continuous use and old age.

High-level canal is another important canal of this project and it is 24 km long. In this canal, the concrete lining had been provided during the initial stage, however, at present these concrete linings are damaged in most of the areas.

Mulavoor branch canal, Panel branch canal, Cheruvattoor MD, Paipra MD, Valakam branch canal, Mazhuvannoor branch canal, Kizhakkambalam branch canal, Kolencheri branch canal, Karukappilly MD, Kanjiramattorm MD, Thiruvankulam MD, Edakkattuvayal MD are within the limit of HLC.

17. KUTHUMKAL DAM (Private)

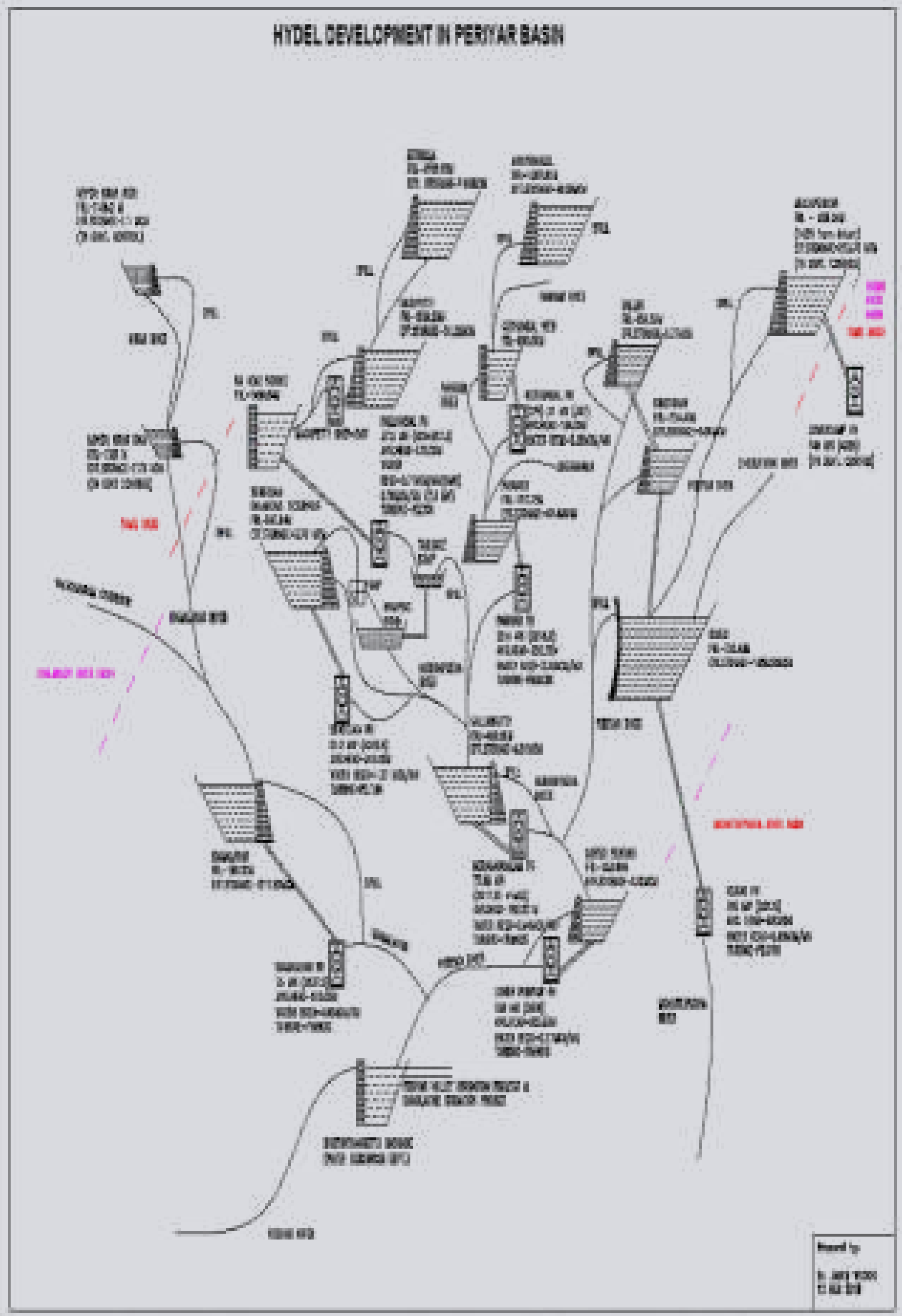
The dam is located in Panniyar River at chainage 24/300 in RajakkaduPanchayath. This dam is situated in Senapathi – Rajakkadu road. The dam was constructed in 2000 as a part of a hydroelectric project. The location of the dam is Latitude 9o56'19"N, Longitude 77o6'21"E. The type of soil at this location is rock. The ownership of land of dam is Private. Kuthunkalhydro electric powerhouse uses this water for power production. It is locsted 2km upstream of Kuthunkal water fall.

18 Iruttukanam small hydel power project check dam

This check dam is across Ambazhachal river in the downstream of Ambazhachal bridge. In this location river have a width of about 20m. Left bank of the river is protected and right bank is not protected. This check dam is located at 10°00'53.9"North and 77°00'45.9"East.

Hydro-Electric Projects in Periyar

The stream flow in Periyar is heavily regulated and controlled by several major dams and barrages. These are mainly constructed for hydroelectric purpose and also irrigation purpose. Besides this one of the functions of the dam also includes flood protection that it can attenuate the flow of water and its impact downstream. Most of the dams in the basin are under the ownership of KSEB and Bhoodhathankettu barrage is under Irrigation department of Kerala. The major irrigation projects in the basin are Periyar Valley irrigation project and Idamalayar irrigation project. The major inter-basin transfer project from Periyar river basin are Mullaperiyar dam (to Vaigai river, Tamil Nadu) and Idukki Hydroelectric project (to Muvattupuzha river, Kerala) and minor water transfer to Bharathapuzha river also exist in this basin.


HYDEL DEVELOPMENT IN PERIYAR BASIN

Major Hydro-Electric Projects in Periyar

1. Idukki hydroelectric project
2. Pallivasal hydroelectric project
3. Chenkulam hydro-electric project
4. Panniyar hydro-electric project
5. Neriyamangalam hydro-electric project
6. Neriyamangalam extension
7. Lower Periyar hydro-electric project
8. Mattupetti hydro electric project
9. Idamalayaar hydroelectric project

The periyar river basin has Idukki Hydroelectric project(HEP) (780 MW), Lower Periyar HEP (180 MW), Idamalayar HEP (75 MW), Neriyamangalam HEP (52.65 MW), Shengulam HEP (51.20 MW), Pallivasal HEP (37.5 MW), Panniyar HEP (32.4 MW), Neriyamangalam extension HEP (25 MW), Vellathooval small HEP (3.6 MW) and Mattupetty HEP (2 MW) under the control of KSEB. Besides this 2 private hydroelectric power project namely Kuthungal (21 MW) and Eruttukanam(4.5 MW) is also located on Periyar basin. Also several diversion structures are also owned KSEB .

കേരള സംസ്ഥാന വൈദ്യുതിബോർഡ് ലിമിറ്റഡ്

പെരിയാർ നദി ബേസിനുമായി ബന്ധപ്പെട്ടു പ്രവർത്തിച്ചുവരുന്ന

വൈദ്യുതിനിലയങ്ങളുടെ വിവരങ്ങൾ

ക്രമ നമ്പർ	ജലവൈദ്യുതിപദ്ധതിയുടെ പേര്	സ്ഥാപിതശേഷി	പൂർണശേഷിയിൽ വൈദ്യുതി ഉല്പാദിപ്പിക്കുവാൻ ഉപയോഗിക്കുന്ന വെള്ളത്തിന്റെ അളവ് (m3/sec)
1	മാട്ടുപെട്ടി	2MW	8
2	പള്ളിവാസൽ	37.50 MW	7.89
3	ചെങ്കുളം	48 MW	16.92
4	പന്നിയാർ	32MW	17.65.
5	നേര്യമംഗലം	52.50MW	30.36.
6	നേര്യമംഗലം എക്സ്റ്റൻഷൻ	25MW	15.30.
7	ലോവർ പെരിയാർ	180 MW	110.
8	ഇടുക്കി	780 MW	147.
9	ഇടമലയാർ	75MW	83.34.

ഡെപ്യൂട്ടി ചീഫ് എഞ്ചിനീയർ

New Hydroelectric proposals in Idukki District under KSEB

There are 4 new hydroelectric proposals under KSEB in Idukki district namely Grahams Land scheme, Letchmi scheme, Upper Rajamala and Bison valley. All these dams are proposed for the intention of Power generation and located on the Tributeries of Periyar river. The details of these newly proposed projects are given as below.

1.GRAHAMS LAND (Scheme)

Salient Features

State –kerala
District – Idukki
Taluk – Devikulam
Grama Panchayath - Devikulam
Latitude – 10.3845 N
Longitude – 76.3810 E
River – Mattupettyar
Basin – Periyar
Catchment Area – 50 Sqkm
Gross Storage – 20M M3
Installed Capacity – 4MW

1. LETCHMI (Scheme)

Salient Features

State –kerala
District – Idukki
Taluk – Devikulam
Grama Panchayath – Devikulam,Pallivasal
Latitude – 11.10780N
Longitude – 72.3550 E
River – Letchmi
Basin – Periyar
Catchment Area – 18 Sqkm
Gross Storage – 80M M3
Type of Dam –Concrete Gravity overflow type
RRL - +1535

2. Upper Rajamala

Salient Features

State –kerala
District – Idukki
Taluk – Devikulam
Grama Panchayath – Devikulam,Pallivasal
River – Rajamala aar
Basin – Periyar
Catchment Area – 18.50 Sqkm
Gross Storage – 22M M3
Type of Dam –Concrete Gravity overflow type
Average Rain fall 5.50m
MSL- 1700m

3. Bisonvalley

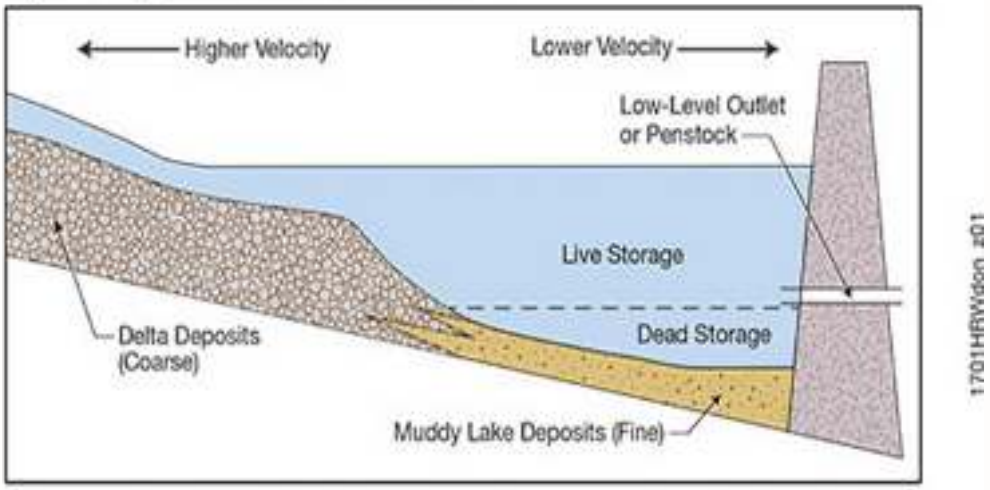
Salient Features

State –kerala
District – Idukki
Taluk – Devikulam
Grama Panchayath – bison valley
Basin – Periyar
Catchment Area – 25 to 30 Sqkm
Gross Storage – 10M M3
Type of Dam –Concrete Gravity overflow type

SEDIMENTATION IN DAMS

Sedimentation in dams is a momentous problem and has several consequences on the water management, flood control and production of energy. As the river flows into the reservoir, the sediments that travel along with it get deposited and thereby reduces the capacity of the reservoir.

Figure 1 — Typical Reservoir Sediment Profile*



Typically, sedimentation in the reservoir behind a dam takes the form of progressively finer materials being deposited as the flows approach the dam.

*Adapted from Morris, G.L. and J. Fan, *Reservoir Sedimentation Manual*, McGraw-Hill, New York, 1998.

The table below gives the amount of sediment load trapped in the reservoirs of Periyar river basin as a part of study conducted in the year 2009. The sediment amount is expected to significantly increase after the flood and could have reduced the capacity of the reservoirs.

Table. 4 Details of Sediment Load trapped in the Reservoirs of Periyar river Basin

Sl No	Name of Dam	Year of Completion	Height (m)	Gross Reservoir Capacity (Mm^3)	Sediment Load trapped (Mm^3)
1	Kundala	1946	32.30	7.79	3.001049
2	Matupetty	1956	85.34	55.23	5.006364
3	Sengulam	1957	26.80	0.71	0.101964
4	Kallarkutty	1961	43.00	6.88	3.67189
5	Ponmudi	1963	59.00	51.54	13.28768
6	Anayirangal	1965	34.00	49.84	3.405628
7	Idukki	1974	168.90	1998.57 (Common reservoir)	34.04504
8	Cheruthoni	1976	138.20		
9	Kulamavu	1977	100.00		
10	Bhutathankettu	1980	37.00	6.9	3.379288
11	Idamalayar	1985	102.80	1089.8	17.08835
12	Erattayar	1989	20.00	5.35	0.60291
13	Kallar	1989	12.20	0.79	0.175392
14	Lower Periyar	1999	39.00	5.3	1.019224

CONCLUSION

Periyar river basin is considered as the backbone of hydroelectric power generation of Kerala as 60% of the hydroelectric power generation in the state rely on the power produced from Periyar river basin. Also 75 % of the water storage of dams under KSEB is maintained in the dams in Periyar river basin. The dams under KSEB in Periyar river basin besides producing 1264.85 MW electricity also helps to maintain flow in rivers during dry seasons and also in flood control.

The Periyar river basin consists of 17 dams of which 15 are under the control of KSEB and 2 dams are maintained by Irrigation Department. The basin also includes 2 private hydroelectric projects namely Kuthungal (21 MW) and Iruttukanam (4.5 MW). The major irrigation projects in the basin are Periyar Valley irrigation project and Idamalayar irrigation project. The major inter-basin transfer project from Periyar river basin are Mullaperiyar dam (to Vaigai river, Tamil Nadu) and Idukki Hydroelectric project (to Muvattupuzha river, Kerala) and minor water transfer to Bharathapuzha river also exist in this basin.

New Observation From our Study

Two new massive storage projects: Pooyamkutty dam and Perinjaamkutty dam are under the proposal of KSEB. The Pooyamkutty dam is having a catchment area of 272 Sq Km and storage capacity of 425 Mm3. The Perinjaamkutty dam is having a storage capacity of 700 Mm3. These dams are under investigation and DPR is being to be prepared. The proposed dams besides providing power generation can aid in flood control as the 2018 Kerala floods has seriously affected the reach covering the newly proposed Pooyamkutty dam site and a Dam in this reach could reduce the uncontrolled overflow of water in the area. The newly proposed dams are a necessity with regard to power generation and flood control and can be benefited to both KSEB and Irrigation Department.

LIFT IRRIGATION SCHEMES IN PERIYAR RIVER IN ERNAKULAM DISTRICT.

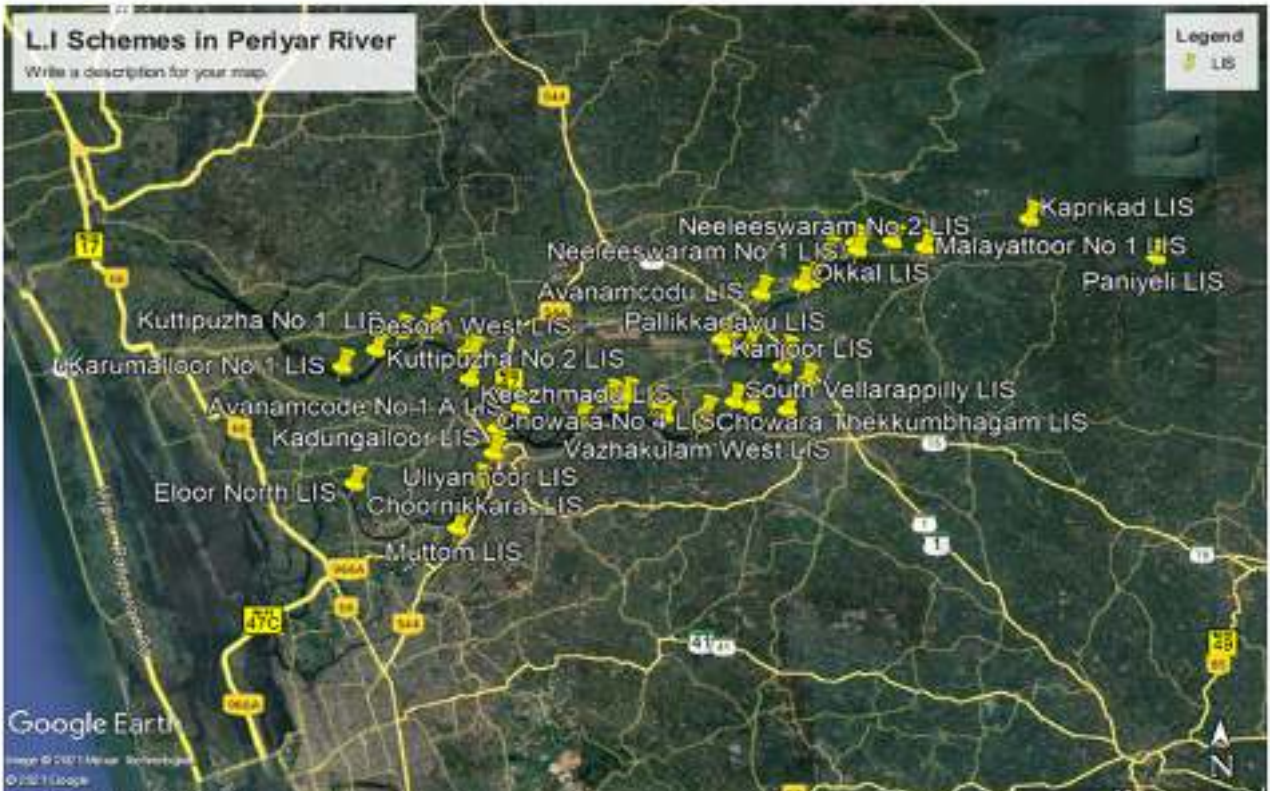
Introduction and importance of L.I Schemes

Prior to independence, the impending role of irrigation in agricultural development was not well recognized in Kerala. Thus, Kerala does not have a very long history of evolution of organized irrigation systems. However, there are some traditional irrigation systems in Kerala which are still in use. Post-independence period observed incredible changes in respect of policies towards irrigation development in the State. This has been due to the growing demand for food grains in the immediate post-war period. It was realized that there was a need for conserving rainwater abundantly available during monsoon to increase cropping intensity and expand agricultural production.

Agricultural production relies primarily on climatic conditions. The natural climatic hurdles in production cannot be beaten by man. These factors are very important in considering the productivity and economy of the state. Our state receives about 90% of the annual rainfall during the monsoon months from June to August and from October to November. The remaining period from December to May is generally dry. Most of the rain water received during monsoon period flows to sea within 48 hours of rainfall due to the character of the geographic terrain of the state. Thus, it was seen that irrigation is a must for the successful cultivation of crops in Kerala. During 1960's and 70's the State faced acute shortage of food grains. Though there are various methods for providing irrigation water, the best and the most reliable method which can be used for Kerala is the construction of storage reservoirs for impounding water during the monsoon and utilizing the water in the reservoir for critical periods of the crops when there is insufficiency. Hence, major and medium projects were taken up and a major portion of the cultivable land could be irrigated ayacut under these projects.

Whenever types of irrigation are referred, lift irrigation comes first. Lift Irrigation is a mode of irrigation which involves transporting water against the gravity with the help of pumps or surge pools and transported to the location where it is to be used.First significant attempt to supply water
on controlled basis was through a Lift Irrigation scheme constructed in 1942. The scheme consisted of lifting water from Periyar River by electric pumping and feeding through channels for paddy cultivation.
Lift Irrigation Schemes are adopted at locations where flow irrigation is not possible. A general lift irrigation system is combined of two main functionalities:
1. A pumping mechanism to carry the water to a chamber which is located at elevation higher than the land which is to be irrigated. The sources of water are usually ponds, streams and rivers.
2. A distribution mechanism which will properly distribute this water to the crop planted in the land. This distribution happens purely by the force of gravity.

The details of each lift irrigation schemes functioning from periyar river as follows: -



1. Paniyeli L I Scheme

The PaniyeliL.I Scheme was implemented and commissioned in 1980 and located on left bank of PeriyarRiverat Ch: 190.75 KMand globally which is located at LatitudeN 10.178994 & Longitude E 76.585384. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 145.08hectares of ayacut through its 5.044 Km of canal net work and passes through VengoorPanchayath.ThePaniyeli LI Scheme is designed for maximum discharge 0.205m3/s . The total quantity of water intake from River Periyar in an year is 2.214 MCM

2. Kaprikad L I Scheme

The KaprikadL I Scheme was implemented and commissioned in 1966 and located on left bank of PeriyarRiveratCh: 196.82 Km and globally which is located at Latitude N 10.193884 & Longitude E 76.539385. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 52.23hectares of ayacut through its 2.835 Km of canal net work and passes through KoovappadyPanchayath.TheKaprikadLI Scheme is designed for maximum discharge 0.210m3/s . The total quantity of water intake from River Periyar in an year is 1.134 MCM .

3. Malayatoor No.1. L I Scheme

The Malayatoor No.1 L I Scheme was implemented and commissioned in 1960 and located on right bank of PeriyarRiverat Ch: 201.600 KM and globally which is located at Latitude N 10.1829993 & Longitude E 76.50165. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 60.18 hectares of ayacut through its 2.805 Km of canal net work and passes through Malayatoor–NeeleeswaramPanchayath. The Malayatoor No.1 LI Scheme is designed for maximum discharge 0.321m3/s . The total quantity of water intake from River Periyar in an year is 3.476 MCM

4. Malayatoor No.2. L I Scheme

The Malayatoor No.2 L I Scheme was implemented and commissioned in 1972 and located on right bank of Periyar River at Ch:203.020KM and globally which is located at Latitude N 10.18528& Longitude E 76.489997 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 73.75hectares of ayacut through its 2.070 Km of canal net work and passes through Malayatoor–Neeleeswaram Panchayath. The Malayatoor No.2LI Scheme is designed for maximum discharge 0.245m3/s . The total quantity of water intake from River Periyar in an year is 1.985 MCM

5. CheranalloorLI Scheme

The CheranalloorL.I Scheme was implemented and commissioned in 1950 and located on left bank of Periyar River at Ch: 204.36 KMand globally which is located at Latitude N 10.181981 & Longitude E 76.477438 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 176.28hectares of ayacut through its 9.160Km of canal net work and passes through KoovappadyPanchayath.TheCheranalloorL.I Scheme is designed for maximum discharge 0.566m3/s . The total quantity of water intake from River Periyar in an year is 6.144 MCM

6. Neeleeswaram No.1. L I Scheme

The Neeleeswaram No.1L.I Scheme was implemented and commissioned in 1958 and located on right bank of Periyar River at Ch:204.610 KM and globally which is located at Latitude N 10.184804& Longitude E 76.476514 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating89.09hectares of ayacut through its 3.470Km of canal net work and passes through Malayatoor–Neeleeswaram Panchayath. The Neeleeswaram No.1 LI Scheme is designed for maximum discharge 0.152m3/s . The total quantity of water intake from River Periyar in an year is 1.948 MCM .

7. Neeleeswaram No.2. L I Scheme

The Neeleeswaram No.2 L I Scheme was implemented and commissioned in1972 and located on right bank of Periyar River at Ch: 205.700 KM and globally which is located at Latitude N 10.18075 & Longitude E 76.46653 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 149.58hectares of ayacut through its 2.120Km of canal net work and passes through Malayatoor -Neeleeswaram Panchayath. The Neeleeswaram No.2L.I Scheme is designed for maximum discharge 0.350m3/s . The total quantity of water intake from River Periyar in an year is 3.78 MCM .

8. Edavoorkara L I Scheme

The EdavoorkaraL.I Scheme was implemented and commissioned in 1965 and located on left bank of Periyar River at Ch:206.64 KM and globally which is located at Latitude N 10.169942 & Longitude E 76.460761 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 79.19 hectares of ayacut through its 4.518Km of canal net work and passes through OkkalPanchayath. The EdavoorkaraL.I Scheme is designed for maximum discharge 0.280m3/s . The total quantity of water intake from River Periyar in an year is 2.268 MCM .

9. Okkal L I Scheme

The OkkalL.I Scheme was implemented and commissioned in 1950 and located on left bank of Periyar River at Ch:207.05 KM and globally which is located at Latitude N 10.168472 & Longitude E 76.457328 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating269.38 hectares of ayacut through its 6.771 Km of canal net work and passes through OkkalPanchayath. The OkkalL.I Scheme is designed for maximum discharge 0.465m3/s . The total quantity of water intake from River Periyar in an year is 6.966 MCM

10. Avanamcode NO.1 L I Scheme

The Avanamcode No.1L I Scheme was implemented and commissioned in 1949 and located on right bank of Periyar River at Ch:208.950 KM and globally which is located at Latitude N 10.165134& Longitude E 76.442448 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating744.32 hectares of ayacut through its 13.280 Km of canal net work and passes through Kalady, Kanjoor, NedumbasseryPanchayath and Angamaly Municipality. The Avanamcode No.1L.I Scheme is designed for maximum discharge 0.562m3/s . The total quantity of water intake from River Periyar in an year is 7.59 MCM .

11. Perumattom L I Scheme

The PerumattomL I Scheme was implemented and commissioned in 1971 and located on left bank of Periyar River at Ch:210.55 KM and globally which is located at Latitude N 10.1502192 & Longitude E 76. 4316554. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating72.17 hectares of ayacut through its 2.143 Km of canal net work and passes through Okkal Panchayath. The Perumattom LI Scheme is designed for maximum discharge 0.210m3/s. The total quantity of water intake from River Periyar in an year is 1.701 MCM

12. Kanjoor L I Scheme

The KanjoorL I Scheme was implemented and commissioned in 1972 and located on right bank of Periyar River at Ch: 211.550 KM and globally which is located at Latitude N 10.147142 & Longitude E 76.428192 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 359.27hectares of ayacut through its 11.365 Km of canal net work and passes through KanjoorandSreemoolanagarmPanchayath. The KanjoorL.I Scheme is designed for maximum discharge 0.522m3/s . The total quantity of water intake from River Periyar in an year is 6.695 MCM.

13. Pallikkadav L I Scheme

The PallikkadavL I Scheme was implemented and commissioned in 1985 and located on right bank of Periyar River at Ch: 212.010KM and globally which is located at Latitude N 10.14371& Longitude E 76.430524 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating95.69 hectares of ayacut through its 1.240 Km of canal net work and passes through KanjoorPanchayath . The PallikkadavLI Scheme is designed for maximum discharge 0.150m3/s . The total quantity of water intake from River Periyar in an year is 1.114 MCM

14. Mooriamangalam L I Scheme

The MooriamangalamL.I Scheme was implemented and commissioned in 1968 and located on right bank of Periyar River at Ch:212.850KM and globally which is located at Latitude N 10.145081 & Longitude E 76.438032 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 96.80 hectares of ayacut through its 1.795 Km of canal net work and passes through Kanjoor Panchayath . The MooriamangalamLI Scheme is designed for maximum discharge 0.326m3/s . The total quantity of water intake from River Periyar in an year is 3.521 MCM.

15. Chelamattom L I Scheme

The ChelamattomL.I Scheme was implemented and commissioned in 1961 and located on left bank of Periyar River at Ch:213.56 KM and globally which is located at LatitudeN10.141892 & Longitude E 76.451415. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating98.95 hectares of ayacut through its 3.294 Km of canal net work and passes through Panchayath. The ChelamattomL.I Scheme is designed for maximum discharge 0.268m3/s . The total quantity of water intake from River Periyar in an year is 2.171 MCM

16. Thiruvilanchuzhy L I Scheme

The ThiruvilanchuzhyL I Scheme was implemented and commissioned in 1977 and located on right bank of Periyar River at Ch: 214.920 KMand globally which is located at Lattitude N 10.13695 & Longitude E 76.450167 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 299.70 hectares of ayacut through its 5.531 Km of canal net work and passes through Kanjoor Panchayath. The ThiruvilanchuzhyLI Scheme is designed for maximum discharge 0.206m3/s . The total quantity of water intake from River Periyar in an year is 2.781 MCM.

17. Vallom L I Scheme

The VallomL I Scheme was implemented and commissioned in 1956 and located on left bank of Periyar River at Ch:215.30 KM and globally which is located at Latitude N 10.131129 & Longitude E 76.458611. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating113.34 hectares of ayacut through its 4.561 Km of canal net work and passes through Perumbavoor Municipality and OkkalPanchayath. The VallomLI Scheme is designed for maximum discharge 0.418m3/s . The total quantity of water intake from River Periyar in an year is 2.257 MCM

18. Mudickal L I Scheme

The Mudickal L I Scheme was implemented and commissioned in 1960 and located on left bank of PeriyarRiver at Ch: 216.75 Km and globally which is located at LatitudeN 10.11982 & Longitude E 76.451987. It is a main source of water in these areas for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 159.34 hectares of ayacut through its 7.832 Km of canal net work and passes through Vazhakulam Panchayath. The Mudickal LI Scheme is designed for maximum discharge 0.313 m3/s . The total quantity of water intake from River Periyar in an yearis3.38MCM

19. Vazhakulam East L I Scheme

The Vazhakulam East L I Scheme was implemented and commissioned in 1952 and located on left bank of PeriyarRiver at Ch: 218.32 Kmand globally which is located at LatitudeN 10.121178& Longitude E 76.43892. It is a main source of water in these areas for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 109.26hectares of ayacut through its 8.217 Km of canal net work and passes through VazhakulamPanchayath.TheVazhakulam East LI Scheme is designed for maximum discharge 0.333 m³/s . The total quantity of water intake from River Periyarin an year is 3.596 MCM

20. South Vellarappilly L I Scheme

The South VellarappillyL I Scheme was implemented and commissioned in 1974 and located on right bank of Periyar River at Ch: 219.170KM and globally which is located at Latitude N 10.123164& Longitude E 76.432804 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating139.90 hectares of ayacut through its 3.534 Km of canal net work and passesthrough Sreemoolanagaram Panchayath. The South Vellarappilly LI Scheme is designed for maximum discharge 0.240m3/s . The total quantity of water intake from River Periyar in an year is 1.782 MCM

21. CHOWARA THEKKUMBHAGHAM L I SCHEME

The Chowara thekkumbhagam L I Scheme was implemented and commissioned in 1950 and located in the right side of Periyar river at Ch: 220.2 KM and globally located at latitude N10.118607 and longitude E 76.422421. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 76.66 hectares of ayacut through its 2.269 km of canal network and passes through Sreemoolanagaram Panchayath. The Chowara thekkumbhagam L I Scheme is designed for a maximum discharge 0.26 m3/s.The total quantity of water intake from River Periyar in an year is 4.212 MCM.

22.VazhakulamWest L.I Scheme

The VazhakulamWest L I Scheme was implemented and commissioned in 1953 and located on left bank of PeriyarRiver at Ch: 220.60 Kmand globally which is located at LatitudeN 10.113821& Longitude E 76.420454. It is a main source of water in these areas for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 67.01hectares of ayacut through its 9.645 Km of canal net work and passes through VazhakulamPanchayath.TheVazhakulamWest LI Scheme is designed for maximum discharge 0.313m3/s . The total quantity of water intake from River Periyarin an year is 3.38 MCM.

23.CHALAKKAL L I SCHEME

The Chalakkal L I Scheme was implemented and commissioned in 1952 and located in the left side of Periyar river at Ch:222 KM and globally located at latitude N 10.117616 and longitude E 76.407482. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 48.366 hectares of ayacut through its 2.962 km of canal network and passes through Keezhmadu Panchayath. The Chalakkal L I Scheme is designed for a maximum discharge0.27m3/s.The total quantity of water intake from River Periyar in an year is 4.3875 MCM.

24.Sreebhoothapuram L I Scheme

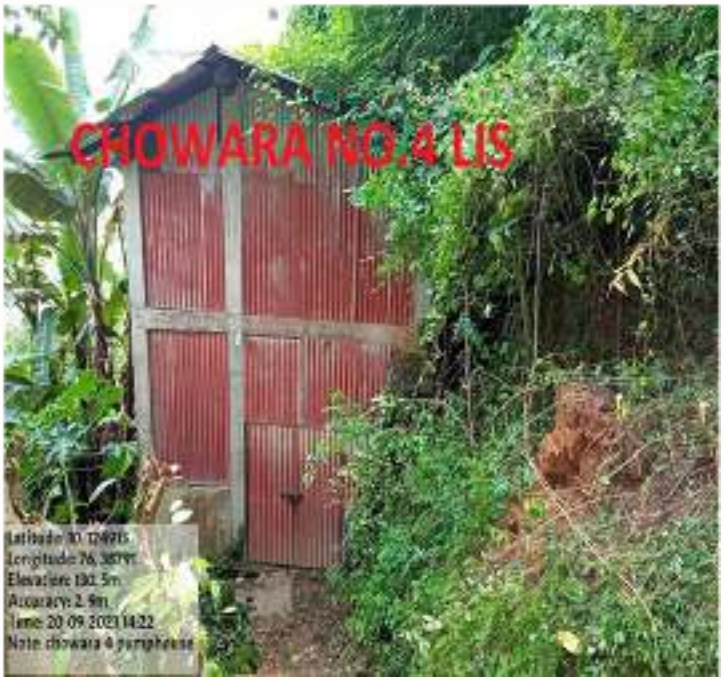
The SreebhoothapuramL I Scheme was implemented and commissioned in1953 and located on right bank of Periyar River at Ch: 222.750KM and globally which is located at Latitude N 10.123111 & Longitude E 76.404191 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigating 210 hectares of ayacut through its 3.390 Km of canal net work and passes through Sreemoolanagaram Panchayath . The SreebhoothapuramLI Scheme is designed for maximum discharge 0.218m3/s . The total quantity of water intake from River Periyar in an year is 1.619 MCM

25.CHOWARA No.3 L I SCHEME

The Chowara No. 3 L I Scheme was implemented and commissioned in 1950 and located in the right side of Periyar river at Ch: 223.7 KM and globally located at latitude 10.125526 and longitude76.393708. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 116.952 hectares of ayacut through its 2.074 km of canal network and passes through Sreemoolanagaram Panchayath . The Chowara No. 3 L I Scheme is designed for a maximum discharge 0.06 m3/s.The total quantity of water intake from River Periyar in an year is 0.972 MCM.

26.KUTTAMASSERY L I SCHEME

The Kuttamassery L I Scheme was implemented and commissioned in 1952 and located in the left side of Periyar river at Ch:224 KM and globally located at latitudeN10.121935and longitude E 76.391426 . It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate63.121 hectares of ayacut through its3.500 km of canal network and passes through Keezhmadu Panchayath. The Kuttamassery L I Scheme is designed for a maximum discharge 0.2 m3/s.The total quantity of water intake from River Periyar in an year is 3.24 MCM.



27.CHOWARA No.4 L I SCHEME

The Chowara No. 4 L I Scheme was implemented and commissioned in 1950 and located in the right side of Periyar river in Sreemoolanagaram Panchayath at Ch: 224.40 KM and globally located at latitude N10.124873 and longitude E 76.387736. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 116.952 hectares of ayacut through its 2.262 km of canal network and passes through Sreemoolanagaram Panchayath . The Chowara No. 4 L I Scheme is designed for a maximum discharge .06 m3/s.The total quantity of water intake from River Periyar in an year is 1.458 MCM.

28.KEEZHMADU L I SCHEME

The Keezhmadu L I Scheme was implemented and commissioned in 1962 and located in the left side of Periyar river at Ch:226 KM and globally located at latitude N 10.115668 and longitude E76.376918 . It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate158.324 hectares of ayacut through its3.0492km of canal network and passes through Keezhmadu Panchayath. The Keezhmadu L I Scheme is designed for a maximum discharge0.2 m3/s.The total quantity of water intake from River Periyar in an year is 3.321 MCM.

29.KADUNGALLOOR L I SCHEME

The Kadungalloor L I Scheme was implemented and commissioned in 1949 and located in the right side of Periyar river at Ch:229.5 KM and globally located at latitude N10.112533 and longitude E 76.347039. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate286.913 hectares of ayacut through its 11.680 km of canal network and passes through Sreemoolanagaram Panchayath. The Kadungalloor L I Scheme is designed for a maximum discharge 0.73 m3/s.The total quantity of water intake from River Periyar in an year is 11.88 MCM.

30.ULIYANNOOR L I SCHEME

The Uliyannoor L I Scheme was implemented and commissioned in 1961 and located in the right side of Periyar river at Ch: 230.6 KM and globally located at latitude N 10.103152 and longitudeE 76.345757 . It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate77.53hectares of ayacut through its 6.665km of canal network and passes through Kadungalloor Panchayath. The Uliyannoor L I Scheme is designed for a maximum discharge 0.143 m3/s.The total quantity of water intake from River Periyar in an year is 2.322 MCM.

31.CHOORNIKKARA L I SCHEME

The Choornikkara L I Scheme was implemented and commissioned in 1950 and located in the left side of Periyar river at Ch: 232.3 KM and globally located at latitude N 10.092061 and longitude E 76.340357 . It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 75.38 hectares of ayacut through its 2.600 km of canal network and passes through Choornikkara Panchayath . The Choornikkara L I Scheme is designed for a maximum discharge 0.15 m3/s.The total quantity of water intake from River Periyar in an year is 2.43 MCM.

32.MUTTOM L I SCHEME

The Muttom L I Scheme was implemented and commissioned in 1959 and located in the left side of Muttar river (which is a tributary of Periyar river) at Ch: 1.46 KM and globally located at latitude N 10.074041 and longitude E76.332671. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 18.75 hectares of ayacut through its 1740m of canal network and passes through Choornikkara Panchayath. The Muttom L I Scheme is designed for a maximum discharge 0.045 m3/s. The total quantity of water intake from River Muttar in an year is 0.729 MCM.

33.ELOOR NORTH L I SCHEME

The Eloor North L I Scheme was implemented and commissioned in 1950 and located in the left side of Periyar river at Ch: 239.3 KM and globally located at latitude N 10.091407 and longitude E 76.295455 . It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 30.54 hectares of ayacut through its1.113 km of canal network and passes through Eloor Municipality. The Eloor North L I Scheme is designed for a maximum discharge0.05 m3/s.The total quantity of water intake from River Periyar in an year is 0.918 MCM.

34.AVANAMCODE NO.1 A L I SCHEME

The Avanamcode No.1 A L I Scheme was implemented and commissioned in 1949 and located in the right side of Mangalapuzha ,branch of Periyar river at Ch:0.7 KM and globally located at latitude N 10.120666 and longitude E76.35567. It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 237.1 hectares of ayacut through its 15.900 km of canal network and passes through Nedumbassery Panchayath.

The Avanamcode No.1 A L I Scheme is designed for a maximum discharge.90 m3/s.The total quantity of water intake from River Periyar in an year is 14.715 MCM.

35.VELIYATHUNADU EAST L I SCHEME

The Veliyathunadu east L I Scheme was implemented and commissioned in 1958 and located on left bank of Periyar River at Ch:3.042 KM (from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.131812 & Longitude E 76.337218. It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 41.00 hectares of ayacut through its 1050 m of canal net work and passes through Karumalloor Panchayath .The Veliyathunadu east LI Scheme is designed for maximum discharge 0.123m3/s . The total quantity of water intake from River Periyar in an year is 1.998 MCM

36.DESOM WEST L I SCHEME

The Desom West L I Scheme was implemented and commissioned in 1962 and located in the left side of Mangalapuzha ,branch of Periyar river at Ch: 4.2 KM and globally located at latitude N10.141995 and longitudeE 76.338226 . It is a major source of water in this area for both irrigation and drinking water purposes. The scheme was envisaged to irrigate 71.24 hectares of ayacut through its2.115 km of canal network and passes through Chengamanadu Panchayath. The Desom West L I Scheme is designed for a maximum discharge 0.134m3/s.The total quantity of water intake from River Periyar in an year is 2.183 MCM.

37.VELIYATHUNADU NO.2 L I SCHEME

The Veliyathunadu No.2 L I Scheme was implemented and commissioned in 1958 and located on left bank of Periyar River at Ch: 4.22 KM (from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.142428 & Longitude E 76.336222 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 345.14 hectares of ayacut through its 1675 m of canal net work and passes through Karumalloor Panchayath . The Veliyathunadu No.2 LI Scheme is designed for maximum discharge 0.12 m3/s . The total quantity of water intake from River Periyar in an year is 1.944 MCM

38.SOUTH ADUVASSERY L I SCHEME

The South Aduvassery L I Scheme was implemented and commissioned in 1949 and located on right bank of Periyar River at Ch:6.004 KM (from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.153083 & Longitude E 76.323799 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 16.10 hectares of ayacut through its 1000 m of canal net work and passes through Kunnukara Panchayath . The South Aduvassery LI Scheme is designed for maximum discharge 0.0266m3/s . The total quantity of water intake from River Periyar in an year is 0.432 MCM

39.VELIYATHUNADU NO.1 L I SCHEME

The Veliyathunadu No.1 L I Scheme was implemented and commissioned in 1958 and located on left bank of Periyar River at Ch: 6.45 KM (from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.149922 & Longitude E 76.321048 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 345.14 hectares of ayacut through its 7587 m of canal net work and passes through Karumalloor and Alangad Panchayath .The Veliyathunadu No.1 LI Scheme is designed for maximum discharge 0.542m3/s . The total quantity of water intake from River Periyar in an year is 8.775 MCM

40.KUTTIPUZHA NO.1 L I SCHEME

The Kuttipuzha No.1 L I Scheme was implemented and commissioned in 1949 and located on Right bank of Periyar River at Ch: 7.5 KM (from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.150112 & Longitude E 76.3123266 . It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 372.02 hectares of ayacut through its 7666 m of canal net work and passes through Kunnukara Panchayath . The Kuttipuzha No.1 LI Scheme is designed for maximum discharge 0.50m3/s . The total quantity of water intake from River Periyar in an year is 8.10 MCM .

41.KUTTIPUZHA NO.2 L I SCHEME

The Kuttipuzha No.2 L I Scheme was implemented and commissioned in 1949 and located on right bank of Periyar River at Ch: 8.396 KM (from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.143265 & Longitude E 76.303342 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 372.02 hectares of ayacut through its 2515 m of canal net work and passes through Kunnukara Panchayath . The Kuttipuzha No.2 LI Scheme is designed for maximum discharge 0.216m3/s . The total quantity of water intake from River Periyar in an year is 2.947 MCM .

42.KARUMALOOR NO.1 L I SCHEME

The Karumalloor No.1 L I Scheme was implemented and commissioned in 1949 and located on left bank of Periyar River at Ch:10.07 KM(from sivarathri manappuram to mangalapuzha) and globally which is located at Lattitude N 10.136637 & Longitude E 76.29123 It is a main source of water in these area for both irrigation and drinking water purposes. The scheme was envisaged for irrigate 111.82 hectares of ayacut through its 1840 m of canal net work and passes through Karumalloor Panchayath . The Karumalloor No.1 LI Scheme is designed for maximum discharge 0.425m3/s . The total quantity of water intake from River Periyar in an year is 6.885 MCM .

CONCLUSION

Ernakulam district has 136 lift irrigation schemes and is the life line of the agricultural activities in the district. Total length of canal network comes to 335 kms and ayacut 12552 Hectares. Out of that 42nos of lift irrigation schemes are effectively functioning from chainage 190.75 Km (paniyeli LIS), to chainage 239.30Km (Eloor North LIS) of Periyar River. These schemes were envisaged for irrigating 5878.50 hectares of ayacut through its 195.85Km of canal network.

E-FLOW ANALYSIS

Periyar river – At a glance.

The River profile in the high land region is of steep slope and water stored during rainy seasons in the above dams and during the summer season water is released to the River got water and flows and the water scarcity not a severe problem in the Periyar.

Idukki Sub-plateau

The portion west of the main Periyar channel which flows from south to north here, is the true Idukki sub-plateau. This is the lowest part of the Cardamom Hills sloping towards the north in which the Idukki reservoir is located. It is separated from the rest of the Cardamom Hills by the deep channel of the Periyar River. The sub-plateau extends north from near Ayyappankoil to near Neriamangalam. Its western border is the clearly demarcated scarp face of the Ghats descending to the plains of Thodupuzha. This 900-to-1,000-metre (3,000 to 3,300 ft) high western crestline separates the Periyar catchment from the Manimala, Meenachil and Moovattupuzha drainage basins. It ends in the north along the channel of Periyar from Neriamangalam to Panamkutty. The catchment of Kattappana Ar located beyond the southeastern corner of the Idukki reservoir also falls in this portion. A southwest to northeast ridge called the Chekuthan Mala separates the Idukki Sub-plateau from the Peermade Plateau as well as the main mass of Cardamom Hills. Its eastern boundary is a northwest to southeast ridge separating the Idukki reservoir from the Kallar/Perinjankutty tributary of Periyar which drains the main Cardamom Hills. The Idukki Subplateau is at an average elevation of 700 metres (2,300 ft). This area was heavily forested till the 1950s but now only three small fragments of forest vegetation alone remain. The largest is within the Idukki Wildlife Sanctuary.[22] South of Vagamon, the tributaries of Meenachil, Manimala and Pamba have eroded away extensive areas of the Periyar basin between Ayyappankovil and Vallakkadavu. The Periyar only has a narrow strip of the Cardamom Hill tableland to flow northward here.

High Range Plateau

The High Range Plateau is located around Munnar and Devikulam. It has an average elevation of about 1,800 metres (5,900 ft) and drains to the south through Muthirapuzha into Periyar. The high Rajamala-Anamudi-Umayamala part of the main Anamalai ridge forms its northern boundary. A spur ridge starting from the main Anamalai ridge, going south immediately to the west of Munnar and continuing on to Parvathi Mala forms the western boundary of the High Range Plateau. This ridge separates the High Ranges from the Lower Periyar Valleys further to the west. The eastern edge of the High Range plateau runs north from Kolukkumala, at the junction of the High Range Plateau with the Cardamom Hills, and continues onto the Top Station along the border between Kerala and Tamil Nadu. The High Range portion is essentially the south and west draining slopes of the main Anamalai ridge with the Cardamom Hills located to its south. All the northern slopes of the main Anamalai ridge falling within Kerala drain into Idamalayar and Pooyamkutty Ar, both tributaries of Periyar.

The High Range Plateau has been almost totally transformed by tea plantations and hydroelectric dams. The original forest was mostly of the Shola-Grassland type. From the biodiversity value, this unit is of special importance because of its specialized high altitude flora and fauna.

Lower Periyar Valleys

The lower valleys of Idamalayar and Pooyamkutty Ar constitute the Lower Periyar Valleys. The exceedingly violent impact of very heavy rainfall on a likely geologically unstable part of the Western Ghats where there is extensive faulting has caused accelerated weathering and erosion, carving out a complex of deep valleys on the western face of the High Range Plateau. This topographically complex segment of the Western Ghats extends from near Neriamangalam in the southwest to Panamkutty in the southeast along the Periyar River and continues north up to the watershed divide between the Periyar and the Chalakudy Basins. Its eastern border is the main Anamalai ridge. This section of western slope of the Western Ghats is deeply dissected and has geographical as well as ecological characteristics found nowhere in the Western Ghats. To the south of this section is the Idukki sub-plateau and to the southeast, the Cardamom Hills. The western edge of Panniyar and Muthirapuzha Basins form the eastern border of this section. The Parvathimudi-Umayamala ridge forms the northeastern corner of the Lower Periyar Valleys.

Towards north, the Lower Periyar Valleys and the Periyar Basin extend up to the Idamala gorge cut by Periyar's northernmost tributary – Idamalayar. The basin is bounded in the north by the ridge separating Sholayar from the Idamala River. This ridge is a spur hill extending from near Valaparai in Tamil Nadu, projecting far west into Kerala.The Idamala gorge separates the Sholayar forests in the Nelliyampathies towards the north from the southern Anamudi Reserved Forest and High Range Plateau. The area belonging to Tamil Nadu in the Periyar basin is situated here. This area forms the north-eastern corner of the Periyar basin. It is drained by the tributary Nirar, which runs in a South Westerly Direction and falls into Idamalayar. Within this section there are a series of deep west-sloping valleys where the valley floors are often at elevations less than 300 metres (980 ft). Separating these valleys are a jumble of steep hills and flat topped plateaux with scarp faces rearing up to elevations of around 900 to 1,500 metres (3,000 to 4,900 ft). The Idamala and Pooyamkutty rivers drain most of this section while its southern edge drains into the main Periyar. This tract is almost entirely forested and the forests extend northwest between Periyar and Chalakudy rivers along the plains almost up to Kalady.

Periyar Midlands and Lowlands

To the west of the Lower Periyar Valleys are the midlands, which are characterized by undulating topography with small hills separated by valleys. The general gradient is towards the west here. The lowlands occur as a narrow belt almost parallel to the present shoreline. The landforms of this section are broad valleys, submerged lands with swamps and marshes and subdued sand dunes. Many parts of the area are directly connected to the backwaters with a network of canals. The river bifurcates near Aluva into two major distributaries; one continues to flow through Desam as Mangalappuzha and finally drains into the Lakshadweep Sea. The Chalakudy river also joins to this branch of the Periyar 10 kilometres (6 mi) south-east of Kodungalloor which expands to its maximum width at Munambam. The Marthandavarma branch flows southwards, again dividing into two near Kunjunnikkara Island, and finally drains into the Vembanad backwaters at Varapuzha. The most industrialized zone of Periyar lies in this part of the basin between Angamaly and Cochin, with over 50 large and medium scale industries. The Edayar branch of Periyar caters to the needs of these industries.

CLIMATE

The temperature is more during the months of February to May and less during November, December and January. The average mean monthly maximum temperature ranges from 29.2°C to 33.4°C and minimum temperature ranges from 19.7°C to 25°C. The relative humidity is generally high, during the morning hours, it goes up to 79 % and during evening hours it is around 76%. The general direction of wind is from east to north-east during morning hours and west to north-west direction during evening hours. The wind speed ranges from 6.7 to 10.9 km/h.

RIVER HYDROLOGY

The annual rainfall ranges from 2848 to 4888 mm and the major contribution of rainfall is South West monsoon followed by the North East monsoon. The analysis of rainfall data reveals that the distribution of rainfall increases from lowland to high land. Flooding of the low-lying areas are common in the monsoon period and most of the adjacent areas of the river banks have undergone flooding in the past few years by the heavy rains within a short period. Hydrology wing of the Irrigation department is running different river gauge stations in the Periyar River and is involving a major role for identifying the flood prone area of the river basin. With the help of the river gauge reading at different times in a day, the water level in the various branches of the river streams can be monitored and is able to give timely intimation of flood level of the river. From the data of the past few years it is clear that the banks of the various branches of the river have crossed its danger levels several times during the rainy season. 11 Thousands of people are evacuated to camps by the disaster management wing for several days during the low pressure and monsoon times. There are five rain gauge stations in the Periyar river basin situated at F.C.S Painavu, Kumali,Nedumkandam, Vandanmedu & Chinnar

GROUND WATER

Ground water occurs under water-table conditions in alluvium, laterites and weathered mantle of the crystalline rocks whereas in the deep fractured crystalline rocks, groundwater occurs under semi-confined to confined conditions.

SOIL CHARACTERISTICS

The soil types occurring in Idukki and Ernakulam district can be broadly grouped into four types on the basis of their physio-chemical properties and morphological features. They are: –

(a) Lateritic soil, which is the predominant soil type and covers almost the entire midland areas of the Kottayam district. The surface soil is mostly reddish brown to yellowish red in colour and the texture ranges from gravelly loam to gravelly clay loam. It is well drained and the presence of organic content is low.

(b) Riverine alluvium soils, which are restricted along the river courses and their tributaries. They show wide variation in their physio-chemical properties depending on the nature of the alluvium that is deposited and the characteristics of the catchments area drained by the river. They are very deep soils with surface textures ranging from sandy loam to clay loam. These soils are characterized by 13 moderate amount of organic matter, nitrogen, potassium and presence of mica flakes.

(c) Brown hydromorphic soil is mostly confined to valley bottoms between undulating topography in the midland and in low-lying areas. They have been formed as a result of transportation and sedimentation of material from adjoining hill slopes and also through deposition by local streams. These soils are very deep and brownish in colour and exhibiting wide variation inphysico-chemical properties and morphological features. The surface soil texture varies from sandy loam to clay.

(d) Forest loam soil is the products of weathering of crystalline rocks under forest cover. They are occurring in the eastern hilly areas. These are dark reddish brown to black in colour. The surface texture varies from loam to silt loam. They are characterized by a surface layer very rich in organic matter.

E- FLOW OR ENVIRONMENTAL FLOW

a. INTRODUCTION

Amazingly, it wasn't until the 1990s that the importance of flow regime to healthy freshwater ecosystems gained recognition. In the 1950s-60s, attention focused on water resource development, leading to the damming and diversion of millions of rivers and streams. In the 1970s, the focus shifted to remediating the

consequences of development, particularly water quality degradation. In some places, minimum flows were required to ensure pollution dilution and, later, to keep rivers minimally wetted for targeted fish species.

A river's hydrologic, or flow regime consists of environmental flow component, each of which can be described in terms of its magnitude, frequency, duration, timing and rate of change. The integrity of freshwater systems depends on the natural dynamic character of these flow components to regulate ecological processes. Environmental flows are the quantity and timing of water flows required to maintain the components, functions, processes and resilience of aquatic ecosystems and the goods and services they provide to people. Unlike the natural flow regime, the environmental flow regime allows for some degree of hydrologic alteration. Major causes of hydrologic alteration include dams, withdrawals, climate change and land use.
Environmental flows provide the means for integrated management of river flows to meet the needs of people, agriculture, industry, energy and ecosystems within the limits of available supply and under a changing climate. Environmental flows are a practical tool for managing allocation in the water-energy-food nexus.
Taking too much water out of a river or lake causes stress to fish and other organisms that rely on this water. For example, water withdrawals can affect the water chemistry, such as temperature and dissolved oxygen. Fish have specific tolerances for temperature and dissolved oxygen is what they need to breathe. A change in temperature or dissolved oxygen can have important consequences for fish and other aquatic organisms. The Environmental Flows Program works at understanding what is 'too much' and interacts with others to protect these flows. Environmental flows allocate water among competing uses, within the limits of availability, integrating the water needs of ecosystems with those of other sectors and stakeholders.

Loss of natural flow regimes disrupts the productivity of freshwater and fisheries and of flood-recession agriculture. An environmental flow provides tools to coordinate upstream-downstream water allocations in order to maintain healthy ecosystems and vital services.

Applying environmental flows in practice, policy and law allows a society to build the knowledge, capacities and institutions needed to implement integrated water resource management (IWRM), and to adapt to climate change. Integrating environmental flows into water management policy and practice requires communication, stakeholder participation, awareness raising, adaptive management and demonstration of the benefits of flows for people and nature.

Environmental flows, also known as in stream flows or in stream flow needs, are a measure of the amount and quality of water flowing in a freshwater stream or river over time. This measure is based on how well the overall water flow supports and sustains a freshwater ecosystem and the life (including humans) that depends on it.

Flow in a river is naturally variable, with changes in flow within a year and changes in flow from one year to the next. All elements of the natural flow regime play a critical role in sustaining native biodiversity and overall ecosystem integrity in rivers.

All rivers have variable flow values (for example, high flows, low flows) and this variability is critical to their well-being. Variation in flow is important since it periodically restores different physical, chemical and biological functions essential to the ecosystem. In any given river, some species do well in high flow years and other species do well in low flow years. Therefore, a single flow value (minimum, optimal or otherwise) cannot simultaneously meet the requirements for all species or maintain a fishery.

Dams can remove natural variability in river flows. For example, the highwater flows that are necessary to move the sediment which maintains the shape and structure of river channels.

Environmental flows describe the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems. In the Indian context river flows required for cultural and spiritual needs assumes significance. Through implementation of environmental flows, water managers strive to achieve a flow regime, or pattern, that provides for human uses and maintains the essential processes required to support healthy river ecosystems. Environmental flows do not necessarily require restoring the natural, pristine flow patterns that would occur absent human development, use, and diversion but, instead, are intended to produce a broader set of values and benefits from rivers than from management focused strictly on water supply, energy, recreation, or flood control.

Rivers are parts of integrated systems that include floodplains and riparian corridors. Collectively these systems provide a large suite of benefits. However, the world's rivers are increasingly being altered through the construction of dams, diversions, and levees. More than half of the world's large rivers are dammed, a figure that continues to increase. Almost 1,000 dams are planned or under construction in South America and 50 new dams are planned on China's Yangtze River alone. Dams and other river structures change the downstream flow patterns and consequently affect water quality, temperature, sediment movement and deposition, fish and wildlife, and the livelihoods of people who depend on healthy river ecosystems. Environmental flows seek to maintain these river functions while at the same time providing for traditional off stream benefits.

b. METHODS OF E-FLOW CALCULATIONS

More than 200 methods are used worldwide to prescribe river flows needed to maintain healthy rivers. However, very few of these are comprehensive and holistic, accounting for seasonal and inter-annual flow variation needed to support the whole range of ecosystem services that healthy rivers provide. Such comprehensive approaches include DRIFT (Downstream Response to Imposed Flow Transformation), BBM (Building Block Methodology), and the "Savannah Process" for site-specific environmental flow assessment, and ELOHA (Ecological Limits of Hydrologic Alteration) for regional-scale water resource planning and management. The "best" method, or more likely, methods, for a given situation depends on the amount of resources and data available, the most important issues, and the level of certainty required. To facilitate environmental flow prescriptions, a Due to the seasonal nature of the Monsoons in India, a great many facilities exist for the purposes of water storage and for the utility-based distribution of water. A great amount of regulations thus exists to manage water flow in flowing freshwater bodies in India such as for hydro power generation, irrigation, domestic and industrial use and for controlling floods. Development activities also are at the same time impacting amounts of water flowing in flowing freshwater bodies. For example, development activities are increasing the amount of sediment load carried by flowing freshwater bodies that can change the regime of environmental flow in these ecosystems. To cite another example, ecology is also impacted by discharges of waste in flowing freshwater bodies.

Although dam building in India remains a controversial issue especially in terms of managing the flow of freshwater, dams can assume great importance over the issue of managing environmental flows. While dams can abruptly alter the natural flow of flowing freshwater bodies, water flow that is sometimes released

downstream from dams, for maintaining the environmental balance, is sometimes included as a measure in India for managing environmental flows (Jain & Kumar, 2014). In reality however, the building of the dams themselves greatly alters the flow of water, leaving many rivers dry and polluted downstream. The need for a sustainable approach is even greater when we see that socio - economic needs in India have greatly dominated over the needs of conserving ecosystems in flowing freshwater bodies, with many actions for conservation being mere concessions as compared to the widespread human intervention to fulfil socio-economic needs.

The effects of pollution can be more severe when lack of water in flowing freshwater bodies causes effluents to accumulate in places along the course of the water body. This can be severely harmful to ecology in these flowing freshwater ecosystems. A minimum ecological flow in this case would require either prevention of the dumping of effluents and/or appropriate water flow to prevent excess accumulation of effluents in these ecosystems. The problem can be worse when a dam upstream causes less release of water downstream, thus leading to the accumulation of effluents. Apart from finding a balance between conservation and socio-economic needs, as seen in this scenario, building sustainability in managing environmental flows needs to look also at the impacts of developmental processes on flowing freshwater ecology.

c. METHODS OF E-FLOW CALCULATION

Considering the differences among ecosystem structures, Environment flow Assessment studies have been conducted for rivers, wetlands, estuaries, forest and grassland ecosystem. There are many methods to calculate the E flow of a particular aquatic ecosystem The various methods adopted for e flow calculation are Hydrological Tennants method, wetted perimeter method and MoEF method (Ministry of Environment and Forests method).

In brief the Assessment criteria is :

- As per the order of National Green Tribunal (NGT) dated 09.08.2017
- Hydrological - Tennants method
- Hydraulic rating method - Wetted perimeter concept
- Ministry of Environment, Forest and Climate change norms
- Soft wares like Flow Health

d. As per the order of National Green Tribunal (NGT)

As per NGT norms All the rivers in the Country shall maintain minimum 15 % to 20% of the average lean season flow of that river because the reduced flow in any river system shall, Fragment and degrade the habitat of aquatic life, Affect the flow of other ecosystem services from the river, Increase the sedimentation in riverbed, Affect the Dilution factor for pollution in the downstream areas, Adversely affect the natural self-purification process.

BEFORE THE NATIONAL GREEN TRIBUNAL,
PRINCIPAL BENCH, NEW DELHI

Original Application No. 498 of 2015
(M.A. No. 628/2016)

IN THE MATTER OF:

Pushp Saini Vs. Ministry of Environment, Forest & Climate Change & Ors.

CORAM : HON'BLE MR. JUSTICE SWATANTER KUMAR, CHAIRPERSON
HON'BLE MR. JUSTICE RAGHUVENDRA S. RATHORE, JUDICIAL MEMBER
HON'BLE MR. BIKRAM SINGH SAJWAN, EXPERT MEMBER

Present:	**Applicant:**	
		Ms. Shibani Ghosh, Adv. for Intervenor
	Respondent No. 1 :	Mr. Divya Prakash Pande , Adv.
	Respondent Nos. 15&26:	Mr. Mukesh Verma, Adv.
		Mr. Nishe Rajen Shonker and Ms. Anu K. Joy, Advs. for State of Kerala
	Respondent No. 19:	Ms. K. Enateli Sema, Adv. For Nagaland SPCB and Mr. Amith J, Adv.,
	Respondent No. 22:	Mr. Shiv Mangal Sharma, AAG, Mr. Saurabh Rajpal, Adv., and Mr. Adhiraj Singh, Adv. for State of Rajasthan
		Respondent Nos. 28&29: Mr. Nikhil Nayyar, Adv., Ms. Smriti Shah, Advs. for APPCB & TSPCB
		Mr. G.M. Kawoosa, Adv. and Ms. Palak Mittal, Adv. for State of J&K
		Mr. Guntur Prabhakar, Mr. Pramod Kumar and Mr. Gautam Prakhakar, Advs. for State of AP
		Mr. Devraj Ashok, Adv. for State of Karnataka
		Mr. A.K. Panda and Mr. M. Paikaray, Advs. for SPCB, Odisha
	Respondent No. 37:	Mr. Atul Jha, Adv. For State of Chhattisgarh
		Mr. Ranjan Mukherjee and Ms. Aprajita Mukherjee, Advs. For State of Meghalaya
		Mr. Raja Chatterjee and Mr. Chanchal Kumar Ganguly, Advs., Mr. Piyush Sachdev, Adv. for State of WB
		Mr. Aruna Mathura, Mr. Avneesh Arputham, Ms. Simran Jeet and Ms. Anuradha Arputham, Advs. For State of Sikkim
		Mr. Edward Belho, Mr. K. Luikung Michael and Mr. Hoineithiam, Advs. for State of Nagaland
		Ms. Yogmaya Agnihotra, Adv. for CECB

	Date and Remarks	Orders of the Tribunal
	Item No. 21 August 09, 2017 sn	The Learned Counsel appearing for Ministry of Environment, Forest and Climate Change submits that the Ministry has already completed river basin study of 6 river basins i.e. Siang River Basin, Twang River Basin, Bichom River Basin, Subansiri River Basin, Dibang River Basin and Lohit River Basin and upon study the Ministry has recommended the minimum flow of the river to be 18% of the average of lean season flow of the river. However, in some of the cases, it has stated to be even 20%. The Tribunal in the recent Judgment pronounced on river Ganga had directed 20% minimum environment flow to be maintained from Haridwar onwards on the basis of the average lean season flow. In light of the above and the clear stand being taken by the Ministry, we direct that all the rivers in the Country shall maintain minimum 15 % to 20% of the average lean season flow of that river. However, whichever State is unable to adhere to this average percentage, in that event we grant liberty to that State

e. Hydrological - Tennant Method Hydrological approaches have been developed for broad scale planning & which are fully dependent on the historical flow records. Among all these methods the best known method is Tennant method (1976), which defines seven classes ranging from severe degradation to outstanding ecological condition. According to Tennant classification a different percentage of the annual flow is allocated during the high flow periods and low flow periods. The Tennant method developed by Tennant (1976) is the most common hydrological method applied worldwide and has been used by at least 25 countries. This method is based on empirical relationships between the specified percent of the Mean Annual Runoff (MAR) and the prescribed ecological condition of the river. The Tennant method uses a percentage of the MAR for two different 6-month periods to define conditions of flow related to fishery, wildlife, recreational, and environmental resources.

Table showing the Description of flows and recommended base flow in The Tennant method (1976).

Narrative description of flows	Recommended flow (% of MAF)*	
	October – March	April – September
Flushing or maximum	200	200
Optimum range	60 – 100	60 – 100
Outstanding	40	60
Excellent	30	50
Good	20	40
Fair or degrading	10	30
Poor or minimum	10	10
Severe degradation	< 10	< 10

*For streams in Montana, Wyoming, and Nebraska (Tennant 1976).
†MAF, mean annual flow.

Methodology

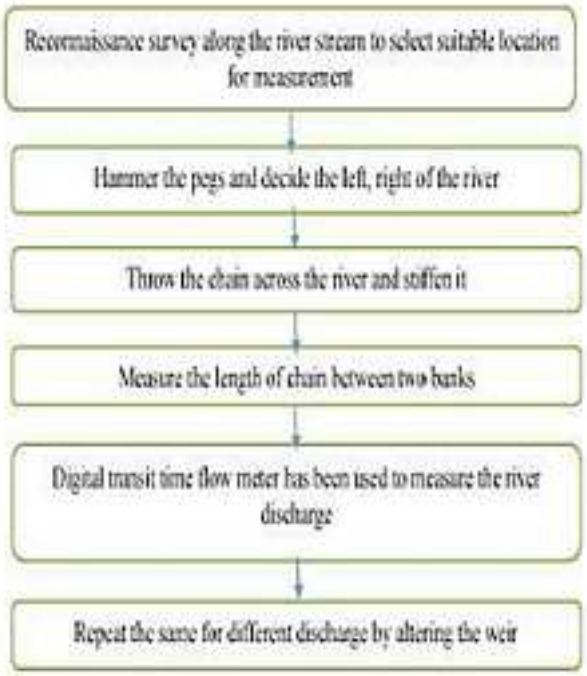
Environmental flow Researchers have stated the hydrological methods based on morphology, ecology & location of rivers are very successful in application. Hence the commonly methods are used in this study for estimation of Environmental flow. The Tennant method assumes, some proportion of the average / mean Annual flow (MAF) is required to sustain the biological integrity of a river ecosystem. Tennant (1976) recommended percentage values of MAF for 'low'&' high' flow season and a periodic flushing flow of 200% of the MAF. Looking into the importance of the flow variability in the river system, the constant allowance for environmental flow based on the mean annual flow (MAF) will be not adequate for the Indian River system which has a large variation in the flow during the monsoon and non-monsoon periods. According to Tessman in 1980 modified the Tennant's Method to include a more detailed monthly variation of environmental flow.

f. Wetted perimeter method

The wetted perimeter method is one of the most commonly used methods in case of the unavailability of the past flow records. This method assesses the hydraulic characteristics and correlates with the flow measured to meet the habitat requirements. In regulated rivers, the relationship between wetted perimeter and discharge is sometimes used as an expedient technique for determining the minimum flow allowable for environmental purposes. The critical minimum discharge is supposed to correspond to the point where there is a break in the shape of the curve (usually a logarithmic or power function). Below this discharge, wetted perimeter declines rapidly.

Methodology

The experiment methodology involves using the 30 m chain, pegs, staff gauge, discharge measuring instrument, and field data sheet. Wetted perimeter methodology is as shown in figure below.



Wetted perimeter methodology The weir gate will be closed to allow limited discharge into the river and the chain is thrown across the river to measure the wetted perimeter. The crosssection is taken as a trapezoidal shape. The wetted perimeter is two times the average depth plus the wetted width. Wetted Perimeter = Wetted Width + (2 * Average Depth) Each river depth is noted, and the width of the river profile is also noted. The average of the depth calculated is multiplied by 2 and the wetted width is added to it to get the wetted perimeter. The advantage of this method is related to various parameters of the hydraulic geometry of a watercourse channel to discharge. Analysis of present data can be applied. This disadvantage of the method an examination of each cross-sectional area leads to negative results in terms of time, data consumption, and tedious fieldwork required. The term wetted perimeter refers to the perimeter of a cross-sectional area of a stream bed from wetted edge to wetted edge, where water depth is measurable to at least 0.01 ft. The wetted perimeter - discharge curve can then be used to identify a break point, which defines the threshold below which aquatic habitat conditions for benthic invertebrates rapidly decline. The break point is found at the curve's point of maximum curvature. The break point represents the lower threshold for critically important food production. In theory, the break point represents the transition from rapidly declining to critically. A graph is plotted between the discharge in the x-axis and the wetted perimeter in the y-axis and corresponding interference is made. Break point is noted which is the threshold point below which the river habitat can't survive without the necessary flow.

g. MoEF method (Ministry of Environment and Forest Method)

As per MoE norms the rivers in the Country shall maintain minimum flow of 15 - 20% of Lean season,30 % of Monsoon Season,25% in non- Monsoon and non- Lean season corresponding to 90% dependable year • Environmental flows should consider – minimum amount of flow – variation in flow regimes • low flows • seasonal highs • flood peaks • extraordinary events • Environmental Flows Should be – legally defensible – scientifically defensible – administratively feasible A Standard Operating Procedures for monitoring and implementation of environmental flows in rivers has been evolved based discussions during review meetings. Efforts have been made to keep the procedure simple and easy to implement while keeping intact the spirit of Govt Order.

Methodology

Monitoring Interval

The data of inflows, diversions, downstream releases and changes in storage to be monitored on hourly basis. The flow data of each project shall be transmitted to Eflow Web Portal/ CWC on real time basis (preferably on hourly basis).Till installation of automatic data acquisition and transmission, the hourly flow data for the entire previous day shall be transmitted by project authorities to CWC on daily basis by 11am.

Flow calculation:

Flows at any location can be split into two parts: Baseline flows and flood fluxes. Baseline flows may be defined as the lower envelope of flows observed during past years say last 5 years. These baseline flows normally follow the seasonaltrend, being highest in the month July or August. This component of flows is normally stable and predictable. Flood fluxes which is the component of variable flows resulted from high rainfall in the catchment. The flood fluxes last for few days and are stochastic in nature. Their occurrence is random and is difficult to predict. Looking at the characteristics of flows during monsoon period, the Eflows may constitute of two components, one based on baseline flows and other based on flood fluxes. As flood fluxes are stochastic in nature, e-flows corresponding to flood fluxes may be released any time during the month preferably at the time of high flood wave(s).

h. Software tools like FLOW HEALTH

Several soft wares can also be used for effectively quantifying and assessing the environmental flow requirements and developing management practices for ensuring the ecological health of the river. The environmental flow regime was evaluated using an index 'Flow Health Score' (FHS), based on a Flow Health Tool. River flows naturally vary about a mean condition, and therefore, any explanation for the good conditions of environment needed to comprise of a range of normal variability.

Methodology

The model was simulated for three conditions-Virgin condition, Managed condition, and Modified condition for Upper and Lower Son separately. Virgin condition assumed no hydraulic interventions, while managed condition incorporated the existing management practices, and modified condition corresponded to the management practices modified in this study for ensuring environmental flow. Flow health assessment indicates whether reservoirs and irrigation diversions have severely affected the high flows, and low flows.

Table 1. Flow health score range and its alteration condition

Sl no	Flow Health score	Alteration condition
1	0.8-1	Very small
2	0.6-0.8	Small
3	0.4-0.6	Moderate
4	0.2-0.4	High
5	0.0-0.2	Very High

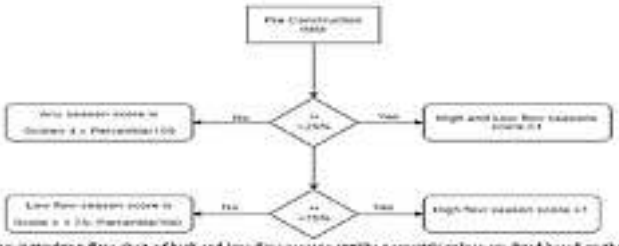


Fig. 2 Working flow chart of high and low flow season (**The percentile values are fixed based on the Post construction period data)

The Flow health tool classifies annual river management objectives based on a reasonable range of variation in hydrological characteristics. This range was distinguished by an average range, such as ±1 standard deviation from the mean, i.e., 25th to 75th percentile range. This technique suggests that flow regime characteristics should lie within this targets for the same percentage of time as they were before the start of the regulation. For the 12 months, this range (25th to 75th percentile) is assumed based on the natural flow series. If the flow characteristics of post-construction series lie within this range, hydrological health score would be 1 whereas beyond this range, score will be less than 1. If the flow is greater than the 75th percentile value, on high flow seasons score is equal to1 and for low flow seasons, score is calculated by using an Equation written below. If the flows are less than 25th percentile, in any seasons score is calculated by using another equation written below. Minimum monthly EFR is calculated by assuming score as 1 for 12 months by comparing with the pre-period flow. The calculated EFR flow regime condition follows natural flow pattern as in the pre-period flow but requires a high percentage of water. Derivation of EFR for each month will be with a score value of 1-0 range. The score values and the corresponding alteration conditions are given in Table 1. The working flow chart of Low flow (LF) and High flow (HF) seasons is presented in Fig. 2

If flow is greater than 75th percentile in flow season

Low flow Season score= 1.75Percentile/100

If flow is less than 25th percentile in any season

Score= 4 x Percentile/100.

E-FLOW ANALYSIS – PERIYAR RIVER

METHODOLOGY

E-flow is the minimum limit of flow required to maintain a river in the desired environmental state. E-flows are a regime of flow in a river that mimics the natural pattern of the river's flows. It refers to the quality, quantity and timing of water flows required to maintain the components, functions, processes and resilience of aquatic ecosystems that provide goods and services to people. It also defines the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems.

The methodology is explained in following

steps:

1. Last 20 years Average Rain fall details of Rain Gauge stations are collected.
2. last 3years of average Monthly discharge from each structure on Periyar river is taken for study. The details are given
3. Find out the average monthly Eflow for all months
4. Find the percentage flow as per criteria.
   - 30% in Monsoon Season
   - 20%in lean season
   - 25%in other months
6. Calculate the average monthly pristine flow in mm3.

The Flow health tool classifies annual river management objectives based on a reasonable range of variation in hydrological characteristics. This range was distinguished by an average range, such as ±1 standard deviation from the mean, i.e., 25th to 75th percentile range. This technique suggests that flow regime characteristics should lie within this targets for the same percentage of time as they were before the start of the regulation. For the 12 months, this range (25th to 75th percentile) is assumed based on the natural flow series. If the flow characteristics of post-construction series lie within this range, hydrological health score would be 1 whereas beyond this range, score will be less than 1. If the flow is greater than the 75th percentile value, on high flow seasons score is equal to1 and for low flow seasons, score is calculated by using an Equation written below. If the flows are less than 25th percentile, in any seasons score is calculated by using another equation written below. Minimum monthly EFR is calculated by assuming score as 1 for 12 months by comparing with the pre-period flow. The calculated EFR flow regime condition follows natural flow pattern as in the pre-period flow but requires a high percentage of water. Derivation of EFR for each month will be with a score value of 1-0 range. The score values and the corresponding alteration conditions are given in Table 1. The working flow chart of Low flow (LF) and High flow (HF) seasons is presented in Fig. 2

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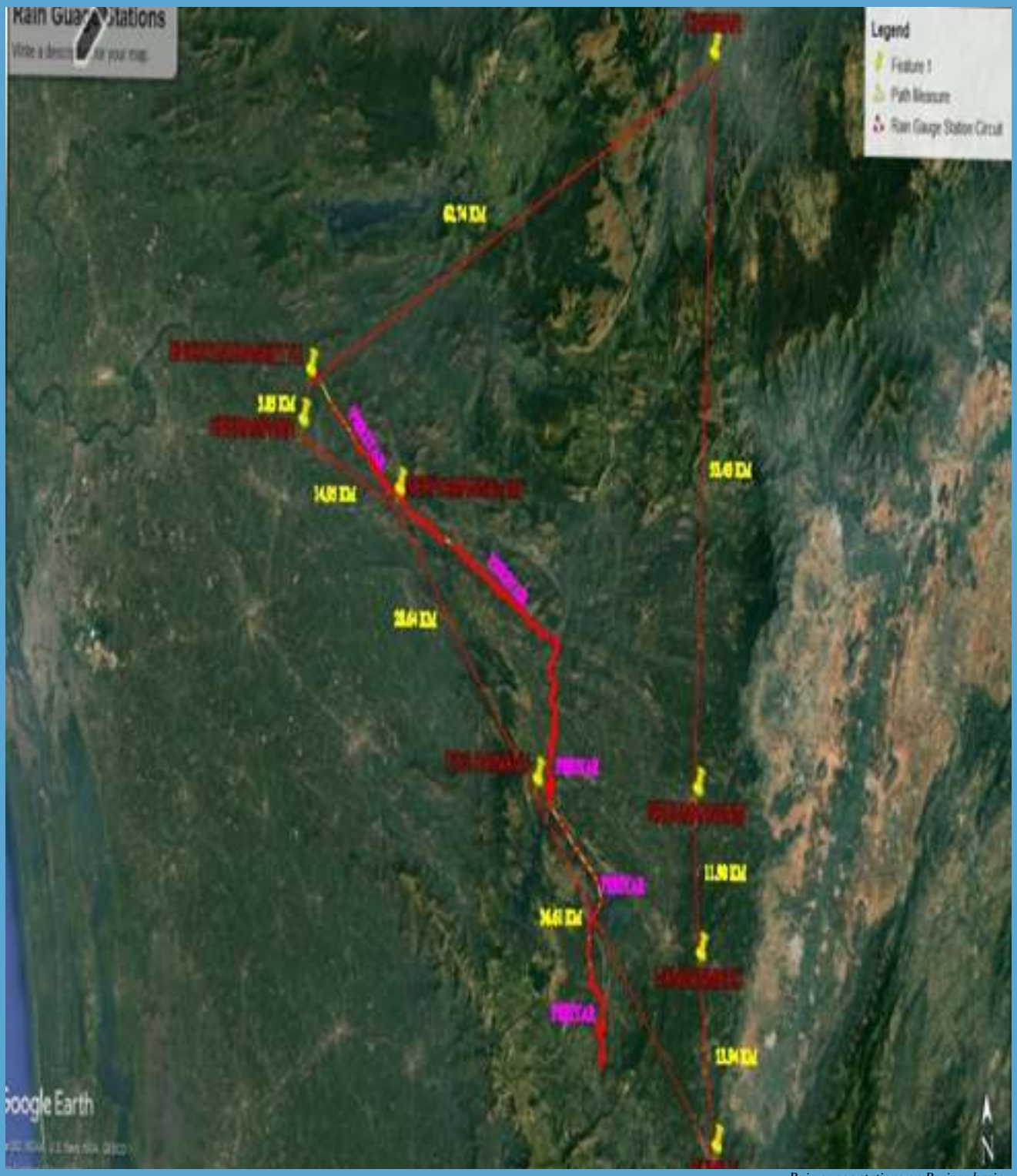


Rain guage stations on Periyar basin

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
Ernakulam								
	ALUVA	1990	1.0	0.0	3.5	39.5	609.9	412.5
		1991	0.0	0.0	10.5	97.5	109.1	1058.2
		1992	0.0	1.5	0.0	6.8	277.4	705.3
		1993	0.0	21.5	20.3	59.0	214.2	729.0
		1994	23.9	2.3	9.2	144.4	184.4	852.5
		1995	0.0	0.0	50.1	192.3	562.1	621.6
		1996	35.0	0.5	2.0	122.6	20.4	471.0
		1997	0.0	6.8	95.7	18.0	91.3	458.6
		1998	0.0	0.0	9.2	7.2	35.1	573.4
		1999	0.0	35.0	0.0	83.5	582.2	685.1
		2000	32.4	20.5	10.2	41.1	156.1	675.0
		2001	1.4	8.3	10.2	150.3	298.8	796.1
		2002	0.0	22.4	12.2	76.8	542.9	539.1
		2003	0.0	50.1	25.1	136.4	57.2	480.5
		2004	0.0	4.1	27.3	25.1	742.3	629.9
		2005	10.0	0.0	0.0	196.0	87.9	874.3
		2006	13.0	0.0	62.5	39.0	533.6	692.4
		2007	0.0	0.0	0.0	117.6	165.2	809.9
		2008	0.0	23.8	232.8	109.8	102.3	472.9
		2009	0.0	0.0	39.6	34.8	204.6	611.0
		2010	0.0	0.0	12.8	134.4	297.2	805.7
		2011	2.2	6.8	45.0	73.4	191.4	703.9
		2012	10.4	27.0	15.3	480.6	117.6	401.8
		2013	0.0	58.4	31.1	21.6	78.9	1109.4
		2014	0.0	8.6	27.8	70.9	302.9	538.2
		2015	0.0	0.0	11.2	110.2	152.8	498.0
		2016	0.2	80.6	0.0	10.6	197.4	515.5
		2017	0.8	0.0	62.1	8.7	234.1	587.3
		2018	0.0	8.2	41.8	173.9	200.6	641.2
		2019	0.0	18.6	1.4	128.6	76.4	263.3
		2020	5.8	8.9	49.9	69.7	187.8	439.1
		Average in Mm3	**4.4**	**13.4**	**29.6**	**96.1**	**245.6**	**633.9**
		Average in m3/se	**1.6**	**5.5**	**11.1**	**37.1**	**91.7**	**244.6**
		90% Dependable value	0.0	0.0	0.0	9.1	61.0	417.8
		Eflow	15.5	3.5	3.5	3.5	3.5	80.8
	BOOTHATH	1995	0.0	0.0	0.0	3060.0	4300.0	1895.0
		1996	60.0	40.0	25.0	325.0	45.0	515.0
		1997	5.0	15.0	75.0	140.0	300.0	325.0
		1998	0.0	0.0	0.0	140.0	145.0	695.0
		1999	0.0	0.0	35.0	150.0	555.0	540.0
		2000						
		2001	20.5	38.9	23.4	391.0	192.3	759.4

Jul	Aug	Sep	Oct	Nov	Dec	Total
580.1	267.6	93.6	256.0	196.1	0.0	**2459.8**
667.2	532.2	13.5	375.1	106.1	0.0	**2969.4**
941.9	431.8	250.3	293.9	199.7	1.2	**3109.8**
798.1	294.0	294.0	390.2	67.5	60.4	**2948.2**
772.3	374.8	255.0	327.3	129.9	0.0	**3076.0**
777.5	388.1	295.9	379.6	172.3	0.0	**3439.5**
588.2	311.4	434.7	233.4	59.0	147.8	**2426.0**
670.5	420.5	341.9	137.6	246.4	100.1	**2587.4**
540.4	363.1	538.2	399.1	85.2	49.1	**2600.0**
525.8	141.6	105.1	390.2	34.9	4.3	**2587.7**
312.8	596.7	69.4	145.8	34.9	4.3	**2099.2**
575.6	394.2	169.2	508.1	196.0	8.1	**3116.3**
362.9	884.8	109.3	493.3	108.1	0.0	**3151.8**
573.4	329.9	77.6	354.1	101.5	0.0	**2185.8**
449.7	356.2	117.2	398.7	78.4	0.0	**2828.9**
885.3	353.7	466.7	198.9	115.8	4.6	**3193.3**
478.6	381.3	542.3	493.4	416.4	0.0	**3652.5**
1040.5	430.6	679.0	422.5	26.5	13.0	**3704.8**
442.6	296.2	572.0	360.8	11.6	3.4	**2628.2**
771.7	319.9	347.3	136.7	342.5	7.8	**2815.9**
571.1	325.1	337.5	393.9	355.0	17.8	**3250.5**
602.5	509.7	584.1	121.9	110.4	39.2	**2990.5**
317.0	454.2	291.6	126.0	156.0	2.8	**2400.3**
747.1	372.9	272.1	319.3	81.6	26.1	**3118.5**
644.4	771.0	265.8	386.2	62.4	109.2	**3187.4**
313.8	278.2	315.5	299.7	319.0	144.3	**2442.7**
499.3	165.9	61.7	130.6	64.6	20.7	**1747.1**
367.4	377.7	421.7	251.0	162.1	17.6	**2490.5**
773.0	503.8	41.1	335.8	145.2	59.6	**2924.2**
506.7	1020.7	494.2	483.1	84.2	48.2	**3125.4**
493.4	524.9	518.9	232.5	165.4	39.5	**2735.8**
599.7	**424.9**	**302.5**	**315.3**	**143.1**	**30.0**	**2838.5**
223.9	**158.6**	**116.7**	**117.7**	**55.2**	**11.2**	
326.2	269.7	63.2	131.8	34.9	0.0	
80.8	80.8	80.8	61.8	46.4	30.9	
745.0	680.0	325.0	365.5	265.0	0.0	**11635.5**
793.0	495.0	615.0	215.0	180.0	145.0	**3453.0**
1020.0	555.0	500.0	385.0	325.0	20.0	**3665.0**
770.0	475.0	680.0	740.0	105.0	125.0	**3875.0**
245.0	0.0	0.0	0.0	180.0	0.0	**1705.0**
	811.2	283.8	231.3	159.9	34.0	**1520.2**
760.1	397.4	240.3	443.3	327.2	17.6	**3611.4**

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
		2002	4.5	16.0	123.7	183.9	503.7	580.0
		2003	0.0	88.7	130.1	284.0	351.6	540.2
		2004	8.3	0.0	136.9	173.3	633.3	809.6
		2005	22.8	7.4	31.0	289.1	370.7	764.9
		2006	77.5	0.0	95.1	151.3	731.3	484.7
		2007	0.0	2.1	3.2	226.5	316.0	845.4
		2008	0.0	63.7	204.0	108.3	217.3	520.8
		2009	0.0	0.0	62.2	100.7	458.9	489.9
		2010	43.4	0.0	22.3	211.0	208.6	851.7
		2011	3.2	98.7	71.9	257.6	201.0	933.6
		2012	0.0	63.2	56.2	315.8	123.7	568.1
		2013	0.0	13.7	167.0	145.0	166.7	1268.7
		2014	15.0	7.0	12.5	137.7	499.1	566.5
		2015	0.0	2.0	90.7	341.6	330.6	603.1
		2016	0.0	28.6	7.6	74.3	328.0	700.7
		2017	28.3	0.0	162.4	109.7	255.7	620.4
		2018	0.0	50.9	48.6	265.6	616.0	820.3
		2019	0.0	11.0	17.8	210.0	130.0	418.5
		2020	0.0	0.0	64.4	214.0	359.6	568.0
		Average in Mm3	11.5	21.9	66.6	320.2	493.6	707.4
		Average in m3/se	4.3	9.0	24.9	123.5	184.3	272.9
		90% Dependable value	0.0	0.0	1.9	105.3	127.5	458.2
		Eflow	19.2	11.7	11.7	11.7	11.7	107.6
	KEERAMPA	2000				155.2	124.4	
		2001	48.8	51.7	38.6	378.9	191.7	768.3
		2002	14.8	7.5	134.8	205.2	363.8	525.2
		2003	29.2	93.6	103.0	445.2	162.6	527.6
		2004	24.2	2.1	112.5	153.3	630.4	826.8
		2005	0.0	0.0	71.7	355.5	495.2	847.2
		2006	58.8	0.0	47.4	217.0	775.5	488.2
		2007	1.4	12.1	48.1	193.2	290.9	855.7
		2008	0.5	62.8	167.6	174.6	167.3	549.3
		2009	1.7	0.0	101.8	169.5	334.2	478.8
		2010	30.4	4.2	14.4	301.7	313.2	1000.1
		2011	18.6	109.7	69.8	181.4	230.6	764.9
		2012	0.0	95.8	52.3	304.8	223.2	561.3
		2013	12.1	11.8	184.6	128.8	130.7	1327.8
		2014	0.0	4.2	34.5	149.2	339.5	518.9
		2015	6.9	0.0	62.6	295.0	354.2	603.2
		2016	0.0	26.9	7.9	129.5	360.5	640.4
		2017	19.5	0.0	194.7	98.3	243.5	657.1
		2018	0.0	38.0	42.2	308.8	729.2	753.8
		2019	0.0	19.0	5.0	116.9	111.2	391.2

Jul	Aug	Sep	Oct	Nov	Dec	Total
531.4	634.1	111.5	455.2	217.8	1.3	**3363.1**
582.3	600.7	190.4	578.3	112.3	0.0	**3458.6**
653.1	541.1	186.4	488.8	166.0	0.0	**3796.8**
1244.8	481.4	649.3	409.7	169.7	29.2	**4470.0**
847.9	531.2	540.3	439.2	408.6	37.4	**4344.5**
1271.9	675.2	782.0	624.4	132.9	33.5	**4913.1**
797.7	742.1	362.1	349.3	40.2	18.2	**3423.7**
817.1	648.3	561.6	282.4	284.2	133.0	**3838.3**
675.6	523.5	493.3	615.7	618.3	20.2	**4283.6**
737.7	796.5	568.0	373.4	295.5	100.6	**4437.7**
556.1	724.5	322.4	371.8	45.6	4.3	**3151.7**
1143.0	758.5	478.8	510.1	174.3	30.7	**4856.5**
1112.5	1116.7	616.3	495.7	263.0	68.4	**4910.4**
543.5	285.9	413.0	342.2	278.1	225.8	**3456.5**
628.6	370.0	165.9	239.2	32.5	11.0	**2586.4**
425.8	663.1	765.5	390.9	196.4	18.4	**3636.6**
1264.9	1125.1	156.1	614.2	174.9	45.6	**5182.2**
700.4	1274.0	571.8	726.8	187.6	15.8	**4263.7**
841.9	662.6	803.0	239.6	186.0	27.0	**3966.1**
788.4	637.2	437.8	420.3	212.5	44.7	**4162.1**
294.3	237.9	168.9	156.9	82.0	16.7	
489.2	344.8	142.7	226.4	44.0	0.0	
107.6	107.6	107.6	76.7	57.5	38.4	
		165.8	258.8	150.5	95.2	**949.9**
783.6	456.5	299.5	616.1	367.9	29.0	**4030.6**
553.4	600.9	126.5	477.6	213.7	0.0	**3223.4**
599.9	611.3	185.4	620.5	138.0	0.0	**3516.3**
826.8	728.5	196.6	556.1	77.7	0.0	**4135.0**
1117.8	437.4	616.0	463.7	205.0	56.1	**4665.6**
787.1	570.3	616.9	702.4	521.2	0.0	**4784.8**
1187.2	632.0	851.7	641.0	141.3	31.1	**4885.7**
725.6	657.4	284.4	448.9	53.3	38.6	**3330.3**
822.2	698.7	574.9	303.1	443.6	79.4	**4007.9**
704.4	575.9	510.0	641.2	639.7	39.4	**4774.6**
771.9	778.0	585.7	315.6	278.2	82.4	**4186.8**
671.4	708.9	242.2	360.0	107.6	3.5	**3331.0**
1098.0	760.8	453.0	391.3	256.5	19.0	**4774.4**
890.7	987.3	392.3	479.2	283.8	79.0	**4158.6**
507.2	372.2	328.9	250.6	331.0	319.0	**3430.8**
647.5	410.2	182.0	234.7	40.5	13.2	**2693.3**
443.5	659.5	738.3	340.9	311.3	45.2	**3751.8**
1213.9	1052.0	123.7	519.0	161.6	26.9	**4969.1**
673.2	1178.2	552.4	588.6	138.9	17.8	**3792.4**

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
		2020	0.0	4.4	33.6	208.8	283.0	551.0
		Average in Mm3	**13.3**	**27.2**	**76.4**	**222.4**	**326.4**	**681.8**
		Average in m3/se	**5.0**	**11.1**	**28.5**	**85.8**	**121.9**	**263.1**
		90% Dependable value	0.0	0.0	8.6	119.3	125.7	479.7
		Eflow	20.5	12.7	12.7	12.7	12.7	115.4
	NERIYAMA	1990	23.5	111.0	108.8	65.0	648.2	748.6
		1995	27.2	22.2	34.5	286.9	585.2	833.4
		1996	65.4	74.0	18.6	223.6	262.4	548.6
		1997	19.4	11.4	114.0	233.0	375.2	566.0
		1998	56.4	10.0	94.4	286.8	213.2	864.3
		1999	0.0	62.2	85.4	238.0	592.2	608.2
		2000	5.0	113.3	57.7	310.1	163.6	987.6
		2001	1.4	29.6	116.8	381.8	214.4	931.6
		2002	11.0	107.4	137.4	230.4	500.9	579.4
		2003	8.0	158.0	136.6	240.2	310.8	636.4
		2004	4.6	0.0	133.0	210.2	551.0	833.2
		2005	91.6	18.6	77.8	478.0	321.2	762.4
		2006	13.2	0.0	228.6	212.6	751.8	599.0
		2007	1.0	19.0	25.0	270.8	373.0	923.6
		2008	0.0	34.8	115.0	207.0	282.6	704.8
		2009	2.0	0.0	102.0	307.5	538.5	744.5
		2010	67.0	20.6	131.4	218.4	267.8	1351.8
		2011	14.0	99.4	88.0	438.0	392.0	938.8
		2012	46.8	12.8	85.2	283.2	310.2	675.4
		2013	6.0	89.4	129.0	156.2	162.0	1398.0
		2014	3.0	7.8	36.8	136.0	415.2	564.0
		2015	1.4	47.0	160.4	318.4	364.6	840.8
		2016	3.2	57.6	59.2	80.4	326.0	578.8
		2017	28.2	0.0	306.8	120.4	345.0	683.4
		2018	15.2	30.6	86.6	257.1	724.6	859.2
		2019	0.0	151.2	9.8	132.0	165.4	557.2
		2020	0.0	24.6	117.0	222.6	453.4	570.0
		Average in Mm3	**19.1**	**48.6**	**103.5**	**242.4**	**393.0**	**773.7**
		Average in m3/se	**7.1**	**19.9**	**38.7**	**93.5**	**146.7**	**298.5**
		90% Dependable value	0.0	0.0	23.7	112.4	165.0	562.6
		Eflow	23.1	15.1	15.1	15.1	15.1	130.7
Idukki								
	CHINNAR	2000						
		2001	31.2	27.2	73.7	454.3	140.2	904.0
		2002	9.0	9.0	56.2	164.4	432.0	503.8
		2003	0.0	47.0	188.4	143.6	81.2	460.8

Jul	Aug	Sep	Oct	Nov	Dec	Total
785.4	682.2	754.8	269.8	153.3	51.7	**3778.0**
790.5	**677.9**	**418.1**	**451.4**	**238.8**	**48.9**	**3973.2**
295.2	**253.1**	**161.3**	**168.5**	**92.1**	**18.3**	
511.8	412.9	134.4	252.2	58.2	0.0	
115.4	115.4	115.4	82.2	61.6	41.1	
756.7	710.8	219.4	818.0	301.2	40.2	**4551.4**
977.8	898.2	660.1	356.9	410.3	0.0	**5092.7**
892.2	700.4	689.5	424.6	164.2	204.0	**4267.5**
1231.6	648.6	456.2	534.6	509.0	113.0	**4812.0**
1063.2	919.6	822.6	749.2	312.6	118.0	**5510.3**
1133.2	489.8	251.9	856.2	150.2	9.6	**4476.9**
458.4	384.8	258.0	159.0	69.6	33.5	**3000.6**
1023.2	498.6	390.0	606.4	374.8	10.4	**4579.0**
767.1	635.6	131.0	549.8	360.0	2.0	**4012.0**
808.8	613.8	248.2	887.4	99.8	7.0	**4155.0**
807.2	611.4	315.0	451.8	172.2	0.0	**4089.6**
1174.2	581.4	982.8	445.0	316.0	81.8	**5330.8**
882.2	612.0	670.6	428.2	675.0	0.0	**5073.2**
1244.0	675.4	751.0	584.2	78.2	29.0	**4974.2**
900.2	627.4	429.7	393.2	103.0	25.0	**3822.7**
1318.0	935.0	985.5	408.0	379.0	50.0	**5770.0**
1065.0	744.0	512.0	702.0	573.2	80.0	**5733.2**
804.6	874.0	569.8	331.2	155.0	131.0	**4835.8**
776.4	942.4	367.0	392.4	130.1	0.0	**4021.9**
1188.4	796.4	510.2	375.2	316.6	96.0	**5223.4**
1085.8	1143.4	390.6	775.8	299.6	104.4	**4962.4**
501.3	411.7	468.4	231.0	362.2	206.4	**3913.6**
812.4	491.5	186.0	172.0	96.8	10.2	**2874.1**
449.0	713.0	778.0	478.8	189.6	54.8	**4147.0**
1546.6	1215.8	271.4	479.2	406.8	11.6	**5904.7**
750.4	1225.2	709.2	632.0	196.6	56.2	**4585.2**
829.6	760.0	791.8	359.4	209.8	48.2	**4386.4**
935.1	**735.6**	**511.7**	**503.0**	**274.5**	**56.4**	**4596.5**
349.1	**274.6**	**197.4**	**187.8**	**105.9**	**21.1**	
492.7	474.2	212.7	219.2	93.1	0.0	
130.7	130.7	130.7	92.5	69.4	46.2	
		125.4	112.0	227.4	71.6	**536.4**
898.2	462.2	341.0	327.4	179.0	5.0	**3843.4**
512.2	540.6	191.2	319.0	169.2	12.0	**2918.6**
566.4	678.6	138.8	687.7	37.0	5.0	**3034.5**

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
		2004	20.0	24.0	76.6	126.4	586.0	734.8
		2005	41.6	3.0	79.8	223.2	89.6	673.0
		2006	2.0	39.2	98.4	152.6	655.9	415.0
		2007	5.0	14.2	0.0	116.6	149.6	891.0
		2008	13.0	91.4	176.4	117.6	50.0	549.5
		2009	0.0	0.0	82.0	22.0	152.0	491.0
		2010	14.6	0.0	29.2	137.5	169.8	827.8
		2011	2.4	57.8	43.6	364.4	211.1	770.9
		2012	0.0	0.0	97.7	224.2	14.6	505.8
		2013	0.0	11.9	38.1	128.6	165.4	1375.4
		2014	0.0	22.0	60.1	210.7	144.3	581.8
		2015	0.0	31.8	47.2	548.0	115.0	458.0
		2016	0.0	0.0	51.0	37.0	274.0	593.0
		2017	2.0	0.0	176.0	74.0	203.0	673.0
		2018	0.0	40.0	36.0	108.0	294.0	795.0
		2019	0.0	18.0	35.0	104.0	26.0	192.0
		2020	0.0	0.0	45.0	129.0	159.0	313.0
		Average in Mm3	**7.0**	**21.8**	**74.5**	**179.3**	**205.6**	**635.4**
		Average in m3/se	**2.6**	**8.9**	**27.8**	**69.2**	**76.8**	**245.2**
		90% Dependable value	0.0	0.0	29.8	40.7	28.4	323.2
		Eflow	14.8	4.9	4.9	4.9	4.9	78.8
	KUMALI	**2000**			1.0	69.6	57.8	281.8
		2001	142.8	31.4	23.6	190.0	64.8	224.9
		2002	0.0	30.2	97.0	43.2	132.1	111.2
		2003	0.0	35.8	60.2	78.6	56.6	125.2
		2004	0.0	0.0	7.0	157.4	159.8	256.6
		2005	0.0	0.0	0.0	177.4	136.4	202.8
		2006	19.6	0.0	140.0	167.2	209.2	199.4
		2007	0.0	0.0	0.0	58.6	0.0	409.4
		2008	0.0	0.0	265.8	19.0	39.2	90.0
		2009	11.4	0.0	0.0	10.4	52.8	50.6
		2010	25.0	0.0	7.4	284.0	289.2	848.6
		2011	21.2	132.6	30.6	133.8	27.4	413.4
		2012	0.0	0.0	0.0	92.5	16.0	73.5
		2013	0.0	40.2	40.6	100.0	99.6	459.8
		2014	0.0	0.0	51.0	0.0	455.8	132.8
		2015	0.0	0.0	58.0	218.4	185.2	332.8
		2016	0.0	3.0	0.0	31.8	70.2	343.2
		2017	96.4	7.0	156.2	57.4	121.4	181.2
		2018	0.0	13.2	100.8	48.0	322.2	308.0
		2019	0.0	0.0	12.6	48.2	197.4	105.8
		2020	0.0	0.0	12.2	26.4	72.5	132.8
		Average in Mm3	**15.8**	**14.7**	**50.7**	**95.8**	**131.7**	**251.6**

Jul	Aug	Sep	Oct	Nov	Dec	Total
436.0	570.4	227.0	233.2	52.0	0.0	**3086.4**
1871.8	379.8	710.1	154.6	230.0	52.8	**4509.3**
739.4	459.0	417.0	400.2	192.8	0.0	**3571.5**
1392.8	572.2	622.8	493.6	31.4	45.8	**4335.0**
584.0	497.0	448.0	319.0	47.0	0.0	**2892.9**
1014.2	305.0	542.2	315.7	186.3	71.6	**3182.0**
657.6	546.8	379.0	425.9	281.9	18.6	**3488.7**
636.7	707.0	320.3	345.8	158.5	44.5	**3663.0**
426.1	506.4	241.4	182.2	109.2	2.3	**2309.9**
1064.2	729.3	556.7	350.7	167.3	9.8	**4597.4**
907.5	741.8	346.0	382.3	60.5	24.0	**3481.0**
458.0	301.0	309.0	205.0	174.0	110.0	**2757.0**
459.0	221.0	133.0	116.0	36.0	6.0	**1926.0**
286.2	566.0	547.0	191.0	64.0	36.0	**2818.2**
1065.0	1201.0	177.0	278.0	85.0	0.0	**4079.0**
256.0	767.0	396.0	283.0	49.0	0.0	**2126.0**
340.0	677.0	688.0	246.0	138.0	56.0	**2791.0**
728.6	**571.5**	**374.1**	**303.3**	**127.4**	**27.2**	**3255.8**
272.0	**213.4**	**144.3**	**113.2**	**49.2**	**10.2**	
291.6	301.4	134.2	123.7	36.2	0.0	
78.8	78.8	78.8	59.1	44.3	29.5	
102.1	497.4	101.0	65.2	116.4	201.0	**1493.3**
292.0	100.8	89.8	281.6	239.9	46.0	**1727.6**
102.6	228.2	64.0	272.6	136.4	46.8	**1264.3**
107.4	70.6	0.0	486.8	143.2	12.8	**1177.2**
55.6	185.8	169.0	224.6	156.0	64.8	**1436.6**
721.6	111.6	230.8	125.4	281.0	156.2	**2143.2**
189.2	114.8	135.6	322.2	266.4	0.0	**1763.6**
476.2	228.2	335.2	656.4	133.0	165.4	**2462.4**
270.0	146.4	116.9	324.8	131.4	41.6	**1445.1**
172.8	33.0	113.2	121.8	375.9	61.8	**1003.7**
550.4	233.6	606.2	294.4	1468.8	231.2	**4838.8**
249.6	467.0	499.2	490.6	368.0	0.0	**2833.4**
154.5	211.4	119.4	384.4	113.0	20.2	**1184.9**
392.0	240.6	131.2	168.6	99.6	32.0	**1804.2**
310.2	311.0	146.2	379.6	303.4	86.2	**2176.2**
205.4	108.8	177.2	121.6	333.8	204.4	**1945.6**
183.8	49.2	41.4	53.8	23.8	72.2	**872.4**
60.2	230.6	346.8	104.2	255.8	204.0	**1821.2**
408.0	461.4	237.0	310.0	154.0	10.6	**2373.2**
150.2	533.2	186.2	295.6	138.0	22.6	**1689.8**
236.0	443.4	244.6	143.2	169.8	67.4	**1548.3**
256.7	**238.4**	**194.8**	**268.0**	**257.5**	**83.2**	**1858.8**

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
		Average in m3/se	**5.9**	**6.0**	**18.9**	**37.0**	**49.2**	**97.1**
		90% Dependable value	0.0	0.0	0.0	12.1	18.3	76.8
		Eflow	3.4	1.5	1.5	1.5	1.5	18.4
	NEDUMKA	**2000**			0.0	86.0	71.1	
		2001	3.4	26.8	5.0	255.4	65.6	334.2
		2002	0.0	14.6	24.6	50.8	146.2	161.4
		2003	0.0	20.2	172.4	42.2	83.4	111.2
		2004	5.2	0.0	11.6	125.8	208.6	385.4
		2005	20.2	18.2	89.6	203.2	85.6	219.2
		2006	38.0	0.0	67.8	77.4	210.4	117.0
		2007	12.2	15.0	0.0	137.0	68.0	383.0
		2008	4.0	20.6	151.4	39.2	3.8	180.2
		2009	15.0	0.0	26.8	95.4	54.0	169.4
		2010	8.8	0.0	0.0	136.8	57.4	204.0
		2011	92.2	40.6	6.2	194.2	11.2	249.6
		2012	0.0	0.0	7.8	77.8	49.4	155.8
		2013	0.0	38.2	12.8	43.7		489.2
		2014	6.0	0.8	14.2	44.6	202.8	113.6
		2015	0.0	13.6	83.6	198.8	160.2	270.2
		2016	0.0	0.0	7.4	29.0	223.0	311.2
		2017	28.6	0.4	137.2	28.5	102.2	254.6
		2018	1.8	23.8	25.6	101.4	179.0	276.8
		2019	0.0	4.8	8.2	105.2	46.0	95.6
		2020	1.8	0.0	59.4	70.0	67.0	126.8
		Average in Mm3	**11.9**	**11.9**	**43.4**	**102.0**	**104.7**	**230.4**
		Average in m3/se	**0.0**	**4.9**	**16.2**	**39.4**	**39.1**	**88.9**
		90% Dependable value	0.0	0.0	0.0	31.0	14.7	111.4
		Eflow	6.5	2.3	2.3	2.3	2.3	34.8
	PAINAVU	**2000**						
		2007	0.0	1.0	1.0	100.1	114.2	871.2
		2009	1.4	0.0	120.9	65.7	185.9	525.6
		2010	9.1	0.0	39.3	155.1	218.8	887.1
		2011	77.0	26.2	7.2	196.5	121.1	823.6
		2012	5.2	0.0	12.8	167.6	136.3	555.0
		2013						
		2014	0.0	4.8	37.8	49.4	206.4	640.8
		2015	17.4	26.0	37.0	236.3	262.1	639.5
		2016	0.0	0.0	64.6	0.0	300.8	534.7
		2017	8.6	0.0		7.6		
		2018	1.6	46.4	26.1	98.4	331.6	940.1
		2019	0.0	0.0	4.3	126.6	9.5	282.6

Jul	Aug	Sep	Oct	Nov	Dec	Total
95.8	**89.0**	**75.2**	**100.0**	**99.3**	**31.1**	
68.6	53.5	45.9	73.0	102.3	2.1	
18.4	18.4	18.4	13.5	10.1	6.7	
		237.0	51.4	90.4	51.0	**586.9**
397.6	278.4	91.6	279.8	210.8	14.4	**1963.0**
184.6	265.2	92.4	362.0	148.2	0.0	**1450.0**
231.4	202.4	43.8	514.4	149.4	9.8	**1580.6**
181.4	266.2	173.0	338.0	129.8	0.0	**1825.0**
637.2	305.0	510.6	382.0	284.7	168.8	**2924.3**
650.8	252.4	284.6	439.8	331.4	0.0	**2469.6**
509.6	223.2	362.2	327.0	78.8	133.8	**2249.8**
323.4	460.4	236.2	242.8	58.0	15.6	**1735.6**
390.4	115.2	262.4	161.4	253.2	22.6	**1565.8**
373.4	166.0	96.8	271.2	306.0	20.4	**1640.8**
257.2	258.2	114.2	217.0	169.8	1.8	**1612.2**
198.4	210.0	99.2	159.6	125.4	1.4	**1084.8**
473.0	258.2	196.2	97.7	152.4	41.4	**1802.8**
464.4	459.2	224.4	264.0	112.2	32.0	**1938.2**
235.0	135.5	201.8	146.6	226.8	56.2	**1728.3**
234.8	113.8	41.6	86.6	71.0	10.8	**1129.2**
117.0	329.0	257.6	250.2	97.2	138.6	**1741.1**
681.6	751.6	249.4	341.8	185.4	4.0	**2822.2**
212.4	430.4	282.2	140.8	62.0	33.4	**1421.0**
282.2	431.0	323.8	138.2	169.6	60.2	**1730.0**
351.8	**295.6**	**208.6**	**248.2**	**162.5**	**38.9**	**1809.9**
131.3	**110.4**	**80.5**	**92.7**	**62.7**	**14.5**	
181.7	117.2	53.4	88.8	63.8	0.0	
34.8	34.8	34.8	26.0	19.5	13.0	
		317.8				**317.8**
1444.1	641.2	832.3	386.1	115.5	46.0	**4552.7**
1286.1	561.0	583.9	319.8	275.2	62.6	**3988.1**
1019.1	882.0	352.1	497.5	274.4	64.4	**4398.9**
936.2	959.9	450.1	259.8	175.0	42.4	**4075.0**
844.8	919.2	366.0	10.4			**3017.3**
		625.6	383.2			**1008.8**
1263.6	1097.0	595.5	395.0	95.2	40.2	**4425.7**
775.4	512.4	232.0	162.2	226.7	164.6	**3291.6**
686.9	489.5	288.2	225.6	11.3	18.1	**2619.7**
587.7		477.1	271.1	345.0	36.1	**1733.2**
1890.0	1754.9	223.5	295.9	145.5	9.1	**5763.1**
692.4	0.0	604.3	0.0	199.2	0.0	**1918.9**

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
		2020	0.0	0.0	55.4	74.6	586.6	328.5
		Average in Mm3	**10.0**	**8.7**	**36.9**	**106.5**	**224.8**	**639.0**
		Average in m3/se	**3.7**	**3.6**	**13.8**	**41.1**	**83.9**	**246.5**
		90% Dependable value	0.0	0.0	1.7	2.3	30.4	291.8
		Eflow	17.7	1.7	1.7	1.7	1.7	90.3
	VANDANM	**2000**						
		2001	39.6	16.2	26.4	105.2	30.8	469.0
		2002	0.0	15.6	27.4	88.0	131.8	162.1
		2003	0.0	69.6	90.8	67.6	0.0	234.8
		2004	20.0	0.0	50.0	32.0	129.0	591.2
		2005	0.0	0.0	38.0	161.6	12.6	200.0
		2006	4.0	0.0	6.0			203.4
		2007	5.0	0.0	0.0	108.8	4.2	374.8
		2008	4.0	13.0	109.6	9.0	115.0	315.2
		2009	4.0	0.0	32.6	40.6	133.4	246.2
		2010	8.0	0.0	0.0	101.4	58.0	309.8
		2011	10.4	26.8	28.6	147.0	75.0	315.4
		2012	2.0	0.0	58.0	88.0	23.0	184.0
		2013	0.0	39.0	47.0	86.0	64.4	521.8
		2014	0.0	0.0	4.0	65.0	228.7	111.0
		2015	0.0	0.0	0.0	215.2	222.4	412.2
		2016	0.0	0.0	0.0	15.2	41.0	306.8
		2017	41.6	2.0	125.6	75.6	137.0	316.8
		2018	0.0	0.0	77.0	82.4	352.0	469.4
		2019	0.0	0.0	3.2	71.0	56.6	148.2
		2020	0.0	0.0	20.2	21.2	138.0	146.0
		Average in Mm3	**6.9**	**9.1**	**37.2**	**83.2**	**102.8**	**301.9**
		Average in m3/se	**2.6**	**3.7**	**13.9**	**32.1**	**38.4**	**116.5**
		90% Dependable value	0.0	0.0	0.0	15.2	4.2	146.2
		Eflow	6.6	1.0	1.0	1.0	1.0	33.9
Kollam								
	PARAVOOI	**2001**	18.2	59.8	0.0	286.8	253.1	413.2
		2002	0.0	7.3	11.8	92.5	227.5	229.6
		2003	0.0	44.0	42.6	113.2	172.4	239.4
		2004	1.8	40.2	30.8	52.8	111.8	234.5
		2005	33.4	27.0	14.0	347.0	204.2	441.8
		2006	4.2	0.0	137.4	86.8	289.4	154.2
		2007	0.0	0.0	6.8	154.4	297.8	524.0
		2008	0.0	29.2	120.6	65.6	265.4	147.6
		2009	8.8	0.0	42.4	195.8	175.4	232.6
		2010	14.2	7.2	57.8	180.0	301.8	267.0

Jul	Aug	Sep	Oct	Nov	Dec	Total
586.6	1097.4	688.0	342.8	141.6	38.6	**3940.1**
1001.1	**810.4**	**474.0**	**273.0**	**182.2**	**47.5**	**3814.2**
373.8	**302.6**	**182.9**	**101.9**	**70.3**	**17.7**	
586.9	97.9	227.8	4.2	28.1	1.8	
90.3	90.3	90.3	70.9	53.2	35.4	
		137.4	51.4	104.0	83.2	**376.0**
542.4	278.8	132.2	331.8	152.0	19.0	**2143.4**
342.0	348.0	46.0	239.0	63.6	10.4	**1473.9**
182.0	195.0	0.0	324.0	55.6	0.0	**1219.4**
166.6	276.8	147.2	82.2	54.4	0.0	**1549.4**
365.2	36.2	63.6	60.6	23.0	7.0	**967.8**
359.6	266.2	268.0	299.6	126.0	0.0	**1532.8**
502.6	261.6	290.4	245.6	65.0	60.0	**1918.0**
359.6	291.0	174.2	281.0	73.6	37.6	**1782.8**
416.0	164.0	309.2	152.8	267.4	10.0	**1776.2**
504.8	199.8	185.8	130.8	216.4	26.2	**1741.0**
490.0	479.4	81.6	417.0	88.8	67.2	**2227.2**
74.0	223.0	54.0	102.0	42.0	0.0	**850.0**
849.8	459.6	166.6	0.0	22.0	18.0	**2274.2**
334.0	357.6	60.6	396.0	75.0	18.0	**1649.9**
205.2	116.2	416.8	220.0	176.6	83.8	**2068.4**
177.0	193.6	96.8	68.0	69.8	40.2	**1008.4**
133.6	463.4	432.1	178.2	145.8	169.6	**2221.3**
698.0	731.5	194.0	216.6	119.4	0.0	**2940.3**
261.6	632.4	270.0	166.7	52.0	30.8	**1692.5**
253.6	527.2	385.0	203.2	126.6	37.4	**1858.4**
360.9	**325.1**	**186.3**	**198.4**	**100.9**	**34.2**	**1746.9**
134.7	**121.4**	**71.9**	**74.1**	**38.9**	**12.8**	
136.9	121.0	47.6	53.2	26.8	0.0	
33.9	33.9	33.9	26.3	19.7	13.2	
328.9	230.9	312.0	122.5	166.2	5.2	**2196.8**
102.4	213.6	70.4	586.4	227.4	0.0	**1768.9**
46.4	88.8	30.8	338.7	46.6	17.6	**1180.5**
128.6	107.6	115.8	338.6	150.2	7.2	**1319.9**
181.6	50.4	202.8	247.2	148.0	106.0	**2003.4**
207.0	133.2	309.0	518.8	59.6	6.0	**1905.6**
373.8	259.8	224.6	378.8	179.6	12.6	**2412.2**
387.6	108.8	235.6	290.6	86.2	0.0	**1737.2**
314.8	151.6	294.0	206.6	266.4	0.0	**1888.4**
331.6	224.8	203.4	401.4	257.8	182.6	**2429.6**

District	Station Name	Year	Jan	Feb	Mar	Apr	May	Jun
		2011	34.6	28.6	19.2	210.6	105.6	312.6
		2012	25.6	0.0	43.6	140.0	305.2	175.0
		2013	8.8	31.6	13.0	32.6	197.4	780.0
		2014	0.0	0.0	6.0	90.2	276.2	230.6
		2015	26.6	11.4	17.2	194.2	419.6	516.2
		2016	0.0	0.0	4.2	54.2	654.4	579.8
		2017	6.8	0.0	107.2	48.4	388.4	485.9
		2018	0.0	0.0	13.6	55.6	401.4	444.0
		2019	0.0	34.4	10.4	35.4	49.6	306.8
		2020	2.6	0.0	76.2	61.0	299.4	423.8
		Average in Mm3	**9.3**	**16.0**	**38.7**	**124.9**	**269.8**	**356.9**
		Average in m3/se	**3.5**	**6.6**	**14.5**	**48.2**	**100.7**	**137.7**
		90% Dependable value	0.0	0.0	4.4	36.7	106.2	156.3
		Eflow	3.7	7.4	7.4	7.4	7.4	25.9
Thrissur								
	MATHILAK	2000	0.0	0.0				
		2001	0.0	24.2	0.0	91.0	341.8	876.6
		2002	0.0	0.0	0.4	64.6	402.4	661.3
		2003	0.0	122.2	11.6	80.4	71.8	575.8
		2004	0.4	2.4	10.8	17.4	693.0	703.6
		2005	7.4	0.2	0.0	153.8	73.8	815.4
		2006	0.2	0.0	43.2	66.0	637.6	730.8
		2007	0.2	0.0	7.0	109.7	375.0	907.0
		2008	0.0	29.5	205.0	157.1	177.4	644.8
		2009	0.0	0.0	97.7	45.3	305.8	688.3
		2010	17.5	0.0	30.7	65.5	254.1	862.6
		2011	0.0	86.5	9.9	57.3	270.6	762.7
		2012	2.7	0.0	37.8	208.8	123.3	437.8
		2013	0.0	7.5	2.7	37.8	156.4	940.1
		2014	0.0	0.1	1.3	31.7	182.7	506.1
		2015	0.0	0.0	48.2	180.4	116.9	638.0
		2016	0.0	1.1	0.0	23.3	219.4	551.9
		2017	7.2	0.0	22.9	12.2	303.7	582.2
		2018	0.0	5.6	21.3	49.1	300.4	622.6
		2019	0.0	2.2	16.5	64.9	37.6	574.4
		2020	0.0	3.1	62.6	66.2	325.7	586.9
		Average in Mm3	**1.7**	**13.6**	**31.5**	**79.1**	**268.5**	**683.4**
		Average in m3/se	**0.6**	**5.1**	**11.8**	**29.5**	**100.2**	**255.2**
		90% Dependable value	0.0	0.0	0.0	18.0	72.0	510.7
		Eflow	14.2	4.5	4.5	4.5	4.5	75.6

Jul	Aug	Sep	Oct	Nov	Dec	Total
200.0	60.6	190.6	362.2	280.8	32.6	**1838.0**
136.4	189.8	132.0	139.2	142.8	27.0	**1456.6**
403.0	193.2	366.2	135.0	190.0	26.6	**2377.4**
219.6	402.6	159.6	317.4	83.0	69.8	**1855.0**
95.8	129.6	358.8	205.8	281.5	21.0	**2277.7**
237.4	76.4	31.8	88.0	54.6	1.8	**1782.6**
118.8	268.4	402.2	287.8	364.4	119.2	**2597.5**
452.2	482.0	22.4	195.2	100.2	0.0	**2166.6**
256.2	301.0	244.0	358.4	61.6	21.4	**1679.2**
250.0	517.2	640.8	197.4	26.6	33.4	**2528.4**
238.6	**209.5**	**227.3**	**285.8**	**158.7**	**34.5**	**1970.1**
89.1	**78.2**	**87.7**	**106.7**	**61.2**	**12.9**	
96.5	62.2	30.9	123.8	47.4	0.0	
25.9	25.9	25.9	14.9	11.1	7.4	
177.2	455.1	124.1	226.8	31.5	12.8	**1027.5**
527.2	222.4	245.4	440.3	101.6	0.0	**2870.5**
272.0	448.9	133.0	556.4	91.0	0.0	**2630.0**
512.8	316.8	107.4	272.4	41.0	0.0	**2112.2**
357.2	377.0	163.6	410.6	144.0	0.0	**2880.0**
771.4	333.6	509.8	299.6	154.8	3.0	**3122.8**
472.8	493.0	509.2	505.0	359.6	4.0	**3821.4**
1188.3	647.1	639.0	596.3	61.3	12.1	**4543.0**
471.5	291.9	470.4	280.6	1.9	20.2	**2750.3**
793.5	342.7	476.2	126.5	284.8	93.9	**3254.7**
556.9	213.8	314.0	682.1	278.6	30.9	**3306.7**
568.6	547.2	461.7	299.9	109.5	8.9	**3182.8**
211.7	492.6	228.6	159.8	93.2	12.5	**2008.8**
515.4	277.4	170.0	378.3	131.6	0.1	**2617.3**
508.5	568.2	165.8	268.2	59.1	31.9	**2323.6**
475.9	241.2	228.9	218.6	144.3	46.2	**2338.6**
494.1	131.0	45.7	175.9	10.6	44.5	**1697.5**
354.7	405.5	381.2	290.9	98.9	11.9	**2471.3**
821.8	558.6	29.7	363.6	37.4	29.7	**2839.8**
474.0	1181.5	503.4	465.8	153.1	20.1	**3493.5**
383.8	504.0	582.5	228.0	118.0	2.9	**2863.7**
519.5	**430.9**	**309.0**	**345.0**	**119.3**	**18.4**	**2819.9**
194.0	**160.9**	**115.4**	**128.8**	**44.6**	**6.9**	
223.8	215.5	58.0	163.0	14.8	0.0	
75.6	75.6	75.6	56.9	42.7	28.4	

Last 20 years Average Rainfall in Raingu						
Rain Guage Station	January	Februaary	March	april	may	june
Aluva	1.64	5.47	11.07	37.09	91.70	244.57
Bhoothathankettu	4.31	8.96	24.88	123.54	184.28	272.91
Keerampaara	4.98	11.14	28.51	85.81	121.87	263.06
Neriyamangalam	7.11	19.92	38.66	93.52	146.72	298.48
Chinnar	2.63	8.94	27.82	69.18	76.78	245.15
kumali	5.91	6.01	18.92	36.96	49.17	97.07
Nedumkandom	0.00	4.87	16.21	39.36	39.11	88.90
Painavu	3.74	3.56	13.79	41.08	83.95	246.52
vandanmedu	2.59	3.73	13.90	32.10	38.38	116.48
Monthly Average rainfall in m3/sec	3.66	8.07	21.53	62.07	92.44	208.13

As per NGT (20% of avearge leanflow)

(Average 25% of for other month

Station

Rain Guage Station	January	Februaary	March	april	Average lean flow	20% of avearge leanflow)m 3/sec	may	(Average 25% of for other month
Aluva	1.64	5.47	11.07	37.09	13.82	2.76	91.70	22.93
Bhoothathankettu	4.31	8.96	24.88	123.54	40.42	8.08	184.28	46.07
Keerampaara	4.98	11.14	28.51	85.81	32.61	6.52	121.87	30.47
Neriyamangalam	7.11	19.92	38.66	93.52	39.80	7.96	146.72	36.68
Chinnar	2.63	8.94	27.82	69.18	27.14	5.43	146.72	36.68
kumali	5.91	6.01	18.92	36.96	16.95	3.39	49.17	12.29
Nedumkandom	0.00	4.87	16.21	39.36	15.11	3.02	39.11	9.78
Painavu	3.74	3.56	13.79	41.08	15.55	3.11	83.95	20.99
vandanmedu	2.59	3.73	13.90	32.10	13.08	2.62	38.38	9.59

COMPARISON BETWEEN REQUIRED						
Sl no	**Months**	**Eflow required**	**Mullaperiyar to Idukki**		**Idukki to Lower Periyar**	
			Mullaperiyar dam	**Eflow maintained or not**	**Maduppetti dam**	**Eflow maintained or not**
1	January	8.08	0	No	9.2	Yes
2	February	8.08	0	No	12.77	Yes
3	March	8.08	0	No	9.16	Yes
4	April	8.08	0	No	11.81	Yes

age stations in m3/sec

july	august	september	october	november	december
223.90	158.65	116.69	117.72	55.19	11.19
294.34	237.92	168.89	156.91	82.00	16.69
295.15	253.10	161.32	168.53	92.13	18.25
349.12	274.63	197.42	187.81	105.90	21.05
272.02	213.36	144.34	113.22	49.15	10.15
95.82	89.02	75.16	100.05	99.35	31.06
131.34	110.35	80.49	92.67	62.69	14.51
373.76	302.57	182.88	101.94	70.31	17.72
134.74	121.37	71.86	74.08	38.93	12.77
241.13	195.66	133.23	123.66	72.85	17.04

(Average 30% for monsoon months

june	july	august	september	october	november	december	Average for monsoon months	Average 30% for monsoon months
244.57	223.90	158.65	116.69	117.72	55.19	11.19	132.56	39.77
272.91	294.34	237.92	168.89	156.91	82.00	16.69	175.66	52.70
263.06	295.15	253.10	161.32	168.53	92.13	18.25	178.79	53.64
298.48	349.12	274.63	197.42	187.81	105.90	21.05	204.92	61.47
245.15	272.02	213.36	144.34	113.22	49.15	10.15	149.63	44.89
97.07	95.82	89.02	75.16	100.05	99.35	31.06	83.93	25.18
88.90	131.34	110.35	80.49	92.67	62.69	14.51	82.99	24.90
246.52	373.76	302.57	182.88	101.94	70.31	17.72	185.10	55.53
116.48	134.74	121.37	71.86	74.08	38.93	12.77	81.46	24.44

EFLOW AND DISCHARGE FROM DAMS

DISCHARGE

Lower periyar to Bhoothathankettu		**Idamalayar to Bhoothathankettu**		**Bhoothathankettu to lower end**	
Lower periyar dam	**Eflow maintained or not**	**Idamalayar Dam**	**Eflow maintained or not**	**Bhoothathankettu Dam**	**Eflow maintained or not**
24.248	Yes	33.286	Yes	60.95	Yes
14.61	Yes	41.714	Yes	33.01	Yes
13.259	Yes	47.346	Yes	32.23	Yes
16.397	Yes	50.617	Yes	57.91	Yes

CONCLUSION

The project team was divided in to Six teams to carry out the field study and to prepare detailed reports. The observations/conclusion arrived is explained below.

Reach I – From Origin to Karimanal Bridge – Ch: 0.00m to 154.40Km

The silt accumulation, deviation of rivers path, delta formation and accumulation of bio mass etc. are the main issue which affecting the smooth flow of monsoon flood. The holding capacity of the river has been reduced and the flood prone area are considerably increased due to absence of regular cleaning of rivers. Approximate quantity of silt deposit for the main river for a length of 154.40km comes to 4,76,278 $m^3$and Left bank tributaries for a length of 241km comes to 92,781 m^3 and Right bank tributaries for a length of 66km comes to 3,82.930m^3. There are a total of 26 structures in the main river out of which 4 are damaged, 197 structures in the Left tributaries out of which 10 are damaged and 486 structures in Right tributaries out of which 7 are damaged. Effluent from the Nallathanni Tea factory is discharged in to Nallathanni river and this is in ward no: 17 of Munnar grama Panchayath.

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas
Periyar	154.40	20	6	4	476278	2	0	3	2
LB	241.64	107	90	10	92781	30	0	4	0
RB	66.16	221	265	7	382930	40	1	6	5
Total	**462.20**	**348**	**361**	**21**	**951989**	**72**	**1**	**13**	**7**

As the depth of silt deposit is less, MGNREGS workers may be deployed to clear the vegetation and silt on the rock bed. The vegetations on the banks of the river may also be removed by the MGNREGS workers. An action plan is to be prepared to evict the encroachments and to reduce pollution. In many places deltas / shoals have been developed and waterway is shrunken which are obstructing the free flow of the River which ultimately reducing the carrying capacity of the River. For flood control, the method of improving the channel by improving the hydraulic conditions of the River channels by desilting, dredging to enable the River to carry its discharges within its banks has been often advocated. Hence, over laden silt only has been recommended to be removed by dredging / desilting operations for improvement of carrying capacity of drainage channel of the River without disturbing the original River bed.

Reach II – From Karimanal Bridge to Bhoothathankettu Barrage – Ch: 154.40Km to 179.55Km

The natural depth of the river course became shallow at the upstream stretches of Kuwait bridge due to the deposition of huge quantity of silt, mud and rock boulders during flood. Which lead to the drastic reduction in the carrying capacity of the river in the upstream of Chainage 16.95 Km.(10°08´14.71" ; 76°55´53.57"). A quantum of 27000 m^3(900 x30x1.00m) of silt and rock boulders have to be removed from the upstream stretches of Kuwait bridge to enhance the carrying capacity of the river. This stretch of the river belongs to Ward Nos. 2 & 4 of Mankulam Panchayath. Consequent to the recurring flood occurred during yester years, this area became flood prone due to the increase in bed load in the river as well as the corresponding decrease in bank height.

Approximate quantity of silt deposit for the Left tributaries for a length of 119.68km comes to 34,852m^3 and for Right tributary comes to 1708m^3. There are a total of 37 structures in the left tributary out of which 1 is damaged . There are 16 structures in Right tributaries.

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas
Periyar	0	0	0	0	0	0	0	0	0
LB	119.68	13	24	1	34,852	0	0	0	0
RB	37.26	15	1	0	1708	0	0	0	0
Total	**156.94**	**28**	**25**	**1**	**36560**	**0**	**0**	**0**	**0**

One of the major problem is there is delta formation at Anakkayam at Ch:60.070 km of Idamalayar river. This sand deposit delta was formed due to the effects of flood 2018. The sand deposits has a height of 3 to 4 m and this has to be addressed and taken care of. Major portion of the river and tributaries passes through the forest and Kannan Devan Tea plantations. No prominent waste deposits are found across the stream. Small scale silt deposits have been found near the curves and bends of the river also near the structures, especially in forests and which will not obstruct the flow. Pollution of streams and rivers are not seen in this reach.

Reach III – From Bhoothathankettu Barrage to Kalady Bridge – Ch: 179.55Km to 209.55Km

The approximate quantity of silt deposit for the main river for a length of 30km is 21,03,410m^3 and Left bank tributaries for a length of 19.74km is 9404m^3 and Right bank tributaries for a length of

35.72km is 2139m^3. There are a total of 6 structures in the main river , 23 structures in the Left bank tributaries out of which 1 is in damaged condition and 28 structures in Right bank tributaries out of which 1 is in damaged condition. Effluent from nearby milk industry is disharged in to Krariyeli thodu in Vengoor grama panchayath .

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas
Periyar	30	3	3	0	2103410	0	0	0	0
LB	19.74	12	11	1	9404	0	1	0	0
RB	35.72	12	16	1	2139	0	0	0	0
Total	**85.46**	**27**	**30**	**2**	**2114953**	**0**	**1**	**0**	**0**

Steps to adopt as remedial measures.

- Clearing light, thick and thorny jungle including vegetation growths on LHS and RHS of tributaries.
- Pruning branches of trees grown into the tributary.
- De-silting and removal of debris from stream bed as well as banks at periodic intervals.
- Removal of water weeds from various stretches of the tributaries.
- Dismantling old concrete remains of foot bridge in Thottua thodu.
- Removal of partially destroyed Check Dam near the U/S of Perumbavoor Paniely Road bridge in Krariyeli tributary.
- Removal and reconstruction of damaged culvert in Palluppetta thodu.
- Protection of the slipped sides in Palluppetta thodu.
- Removal of concrete remainings of the demolished bridge in Mukkadai thodu.
- Dismantling and reconstruction of Kottamam bridge to restore the width of the Mukkadai thodu. Survey of tributaries to fix the boundaries.

Reach IV – From Kalady Bridge to Marthandavarma bridge – Ch : 209.55Km to 230.13Km

The approximate quantity of silt deposit for the main river for a length of 20.58Km is 9,84,447m^3 and Left bank tributaries for a length of 43km is 2,19,415m^3 and Right bank tributaries for a length of 39km is 4,42,754m^3. There are a total of 9 bridges in the main river, 44 structures in the Left bank

tributaries and 43 structures in the Right bank tributaries out of which 2 are damaged. Effluent from a plywood company is discharged in to Periyar river in Vazhakkulam grama panchayath.

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas
Periyar	20.58	9	0	0	984447	0	1	0	0
LB	43.06	39	5	0	219415	0	0	0	0
RB	39.02	37	6	2	442754	0	0	0	0
Total	**102.66**	**85**	**11**	**2**	**1646616**	**0**	**1**	**0**	**0**

Steps to be adopted as remedial measures.

- Clearing the thick growth of vegetation along the sides of the Periyar.
- Cut down branches of trees grown into the river.
- De-siltation and removal of debris from river bed as well as banks.
- Regular maintenance & upkeep of river and banks is necessary.
- Large deltas were identified at some locations, which needs to be removed to ensure the smooth flow of water
- Proper maintenance of structures across the river has to be done.

Reach V – From Marthandavarma bridge to Vaduthala

The approximate quantity of silt deposit for the main river for a length of 32.45km is 4990580 m^3 and Left bank tributaries for a length of 25km is 143922 m^3 and Right bank tributaries for a length of 30 km is 832363 m^3.There are a total of 35 structures in the main river, 46 structures in the Left bank tributaries and 71 structures in the Right bank tributaries out of which 36 are damaged. There are 18 domestic waste deposit points and 12 industrial waste disposal points identified in this reach in ward no:s 9,17 and 18 of Kadungalloor garama panchayath, ward no: 6 of Eloor grama panchayath and ward no:12 of Kalamassery municipality. The wastes are from FACT, BINANI, SUDCHEMI, CMRL outlet, IRE and dumping yard.

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas

Periyar	32.45	17	18	0	4990580	1	12	0	12
LB	25.41	37	9	0	143922	9	0	0	0
RB	30.14	26	45	36	832363	8	0	0	1
Total	**88.00**	**80**	**72**	**36**	**5966865**	**18**	**12**	**0**	**13**

Measures should be adopted to ensure the efficiency of the Effluent Treatment Plants of the industries mentioned above and also to remove the accumulated silt in this reach.

Reach VI – From Marthandavarma bridge to Munambam

The approximate quantity of silt deposit for the main river for a length of 27km is 3587344m^3 and Left bank tributaries for a length of 68.74km is 459696m^3 and Right bank tributaries for a length of 190.96km is 3096079m^3. There are a total of 9 bridges in the main river of this reach and 75 structures in the Left bank tributary and 60 structures in the Right Bank tributaries.

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas
Periyar	27.47	9	0	0	3587344	5	0	0	0
LB	68.74	40	35	0	459696	4	0	0	0
RB	190.96	35	25	0	3096079	7	0	0	0
Total	**287.17**	**84**	**60**	**0**	**7143119**	**16**	**0**	**0**	**0**

- Waste deposited from anchored fishing boat need to be addressed.

All reaches combined:

Total quantity of silt that need to be removed from Periyar river comes to 1,21,76,912m^3 and Left bank comes to 9,26,927m^3 and Right bank comes to 47,57,973m^3. There are a total number of 346 bridges and 46 structures are in damaged condition.

Main/LB/RB	Total Length in Km	No: of Bridges	No: of other structures	No: of damaged structures	Qty of silt deposit in m^3	Domestic waste points	Industrial waste points	No: of dams	Flood plane areas
Periyar	264.90	71	51	5	12176912	8	13	3	14

LB	518.26	250	151	11	926927	43	1	4	0
RB	399.26	346	358	46	4757973	55	1	6	6
Total	**1182.41**	**667**	**560**	**62**	**17861812**	**106**	**15**	**13**	**20**

Dams in Periyar River basin

The Periyar river basin consists of 17 dams of which 15 are under the control of KSEB and 2 dams are maintained by Irrigation Department. The basin also includes 2 private hydroelectric projects namely Kuthungal (21 MW) and Iruttukanam (4.5 MW). The major irrigation projects in the basin are Periyar Valley irrigation project and Idamalayar irrigation project. The major inter-basin transfer project from Periyar river basin are Mullaperiyar dam (to Vaigai river, Tamil Nadu) and Idukki Hydroelectric project (to Muvattupuzha river, Kerala) and minor water transfer to Bharathapuzha river also exist in this basin.

Lift Irrigation Schemes in Periyar River Basin

Ernakulam district has 136 lift irrigation schemes and is the life line of the agricultural activities in the district. Total length of canal network comes to 335 kms and ayacut 12552 Hectares. Out of that 42nos of lift irrigation schemes are effectively functioning from chainage 190.75 Km (paniyeli LIS), to chainage 239.30Km (Eloor North LIS) of Periyar River. These schemes were envisaged for irrigating 5878.50 hectares of ayacut through its 195.85Km of canal network.

The canal boundary is not visible in most of the locations. The demarcation of Tributary boundary is needed to assess the actual width of canal by comparing it with original land records. The Re-alignment of Chinese Fishing Nets and Fishing Nests are necessary in this reach to have free flow of water through the river during flood. The existing installed arrangements for fishing obstruct the flow of water in broad spectrum. The unauthorized ownership of an island in the Tributary has to be verified with the original land records available with Revenue Department. The activities like de-siltation, clearing light, thick & thorny jungle grown into the river, removal of all types of debris and removal of all obstructions in river also have to be executed to clear waterway to the maximum possible extent. The de-siltation and jungle clearance have to be done in consultation with the respective Local Bodies. The de-siltation and removal of all types of jungle should be done periodically. The removed silt can be used to replenish River Banks by forming Embankments on both sides. In this reach **Flood Banks** are necessary due to the formation of different Islands (Thuruthus) in River Course. The Flood Banks should be formed around all

Islands and River Banks. It prevents flooding the adjacent places around Main River. Moreover the River Banks should have at least 3m depth of water to maintain sufficient flow during all seasons.

All types of waste disposal into the river have to be regulated in coordination with the respective local bodies. The installation of Sewage Treatment Plants at regular intervals on the banks can be considered as preventive measure to prevent pollution of river. Thus it can be ensured that only treated water flows into the river making pollution to minimum extent. The treatment of effluents can be done in two stages; Primary and Secondary. It has to be decided after a detailed study in consultation with Local Self Government Institutions. The demarcation of river boundary with original land records is also required to bring back River to its original shape. There should be a vivid law and order to install Chinese Fishing nets, Fishing Nests, Vertical Posts and Electric wires in the Periyar Main River as they are obstructing the flow of water during flood times. This has to be done in consultation with Irrigation, Fisheries, Revenue, KSEB Departments and stakeholders. Above all there should be regular public awareness campaign by Local Self Government Institutions not to pollute River, Tributaries and ultimately any type of Water Bodies for the wellbeing of next generation. The law enforcing agencies like Police and Vigilance Department can also play a vital role in implementing Water Conservation Act published by Kerala Government. The offenders may be given warning for the first time and the repetition of the activity may be charged under Water Conservation Act by imposing heavy fine / imprisonment or both.

The Local Self Government Institutions and Government Departments can play a vital role for the Room for River Activity initiated by Government. The Acquisition of Land or Freezing all types of Construction / Man-made Activities on both Banks of River can be considered by Government. The concept of Building Line as mentioned in Kerala Building Rules (KBR) is also applicable to River Banks and should be implemented without any delay.

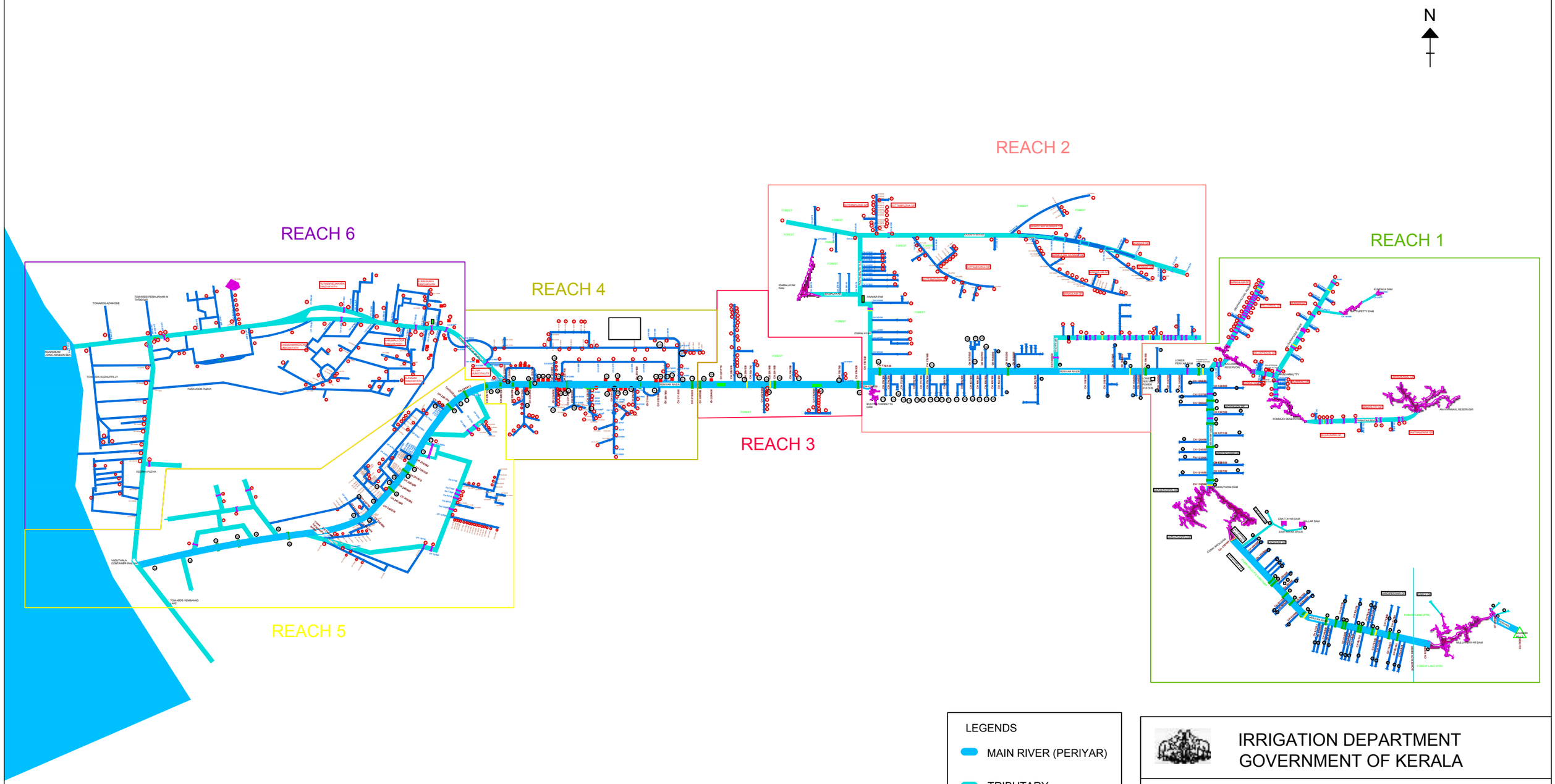
The boundary of Minimum Land Acquisition / Freezing Zone should be 3m and Maximum be 5m from existing River Bank. The extent of acquisition may be decided by Public Hearing in co-ordination with Elected Representatives at all level. The acquired land acts as **Buffer Zone** to prevent flooding of Islands in River and Banks of River. The rapid growing Grass, Bamboos / Ramacham or any other fast growing trees may be planted in Buffer Zones and they will protect the River Banks from erosion. The medicinal plants like Ramacham, Amla, Neem and Arya Vepu can be planted along the banks of River. Their roots absorb pollutants from water and thus the extent of pollution in River can be minimised. The majority of River Bank protection may be done with environment friendly materials. The conventional protection measures like Rubble, Laterite and Concrete Walls may also be adopted at suitablelocations

By doing all the above activities in coordination with all Government Departments and participation from Public the concept of **"Room for River"** can be easily achieved.

SCHEMATIC DRAWINGS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- KEY PLAN



LEGENDS

- MAIN RIVER (PERIYAR)
- TRIBUTARY
- THODU
- RESERVOIR

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

PERIYAR RIVER SEDIMENTATION STUDY

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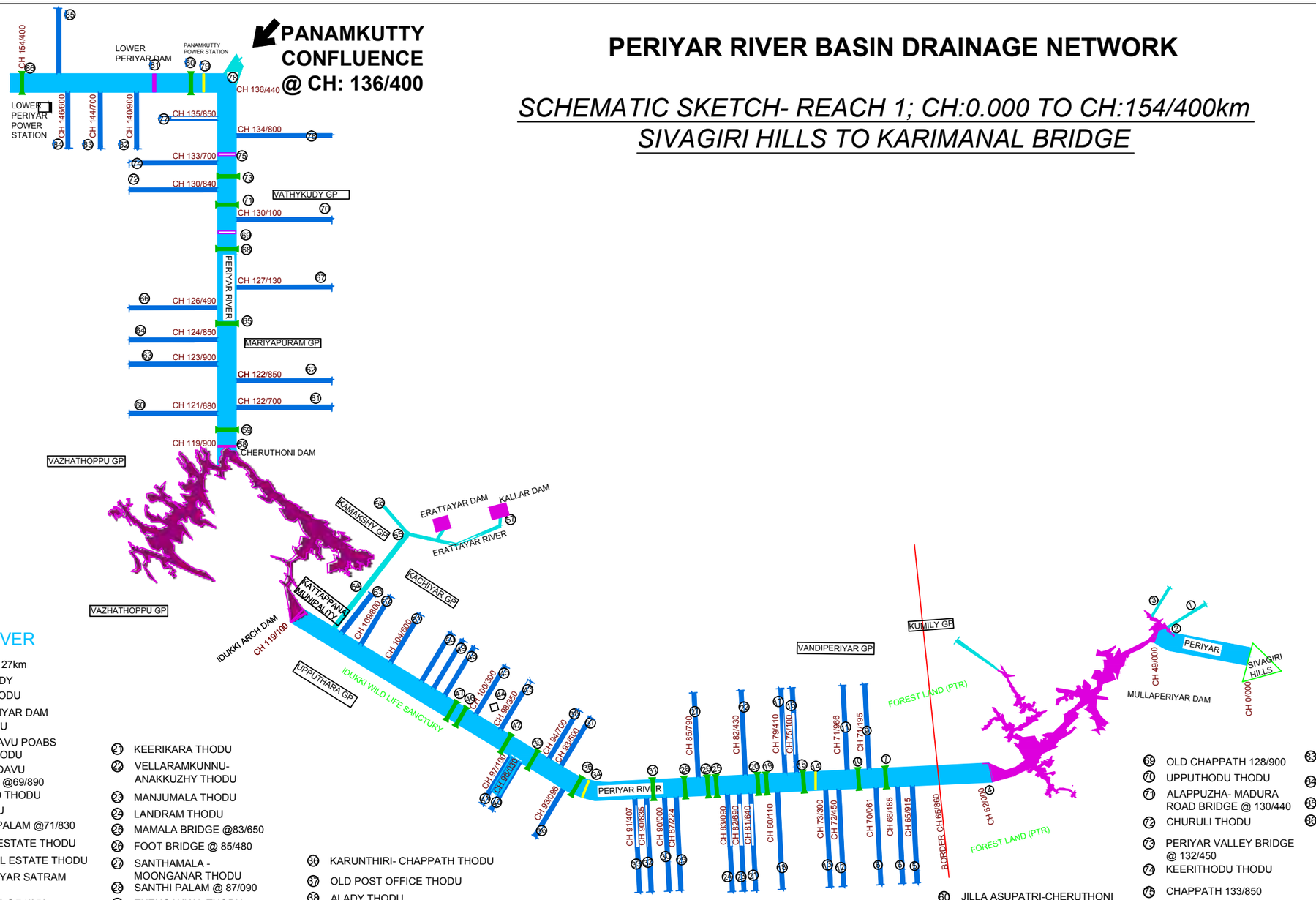
SHEET NO: 1	DATE: 31-12-2021	SCALE: NOT IN SCALE

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 1; CH:0.000 TO CH:154/400km
SIVAGIRI HILLS TO KARIMANAL BRIDGE



PERIYAR RIVER

1. MULLAYAR 27km
2. MULLAKKUDY
3. KUMILY THODU
4. MULLAPERIYAR DAM
5. GAVI THODU
6. VALLAKADAVU POABS ESTATE THODU
7. VALLAKKADAVU CHAPPATH @69/890
8. KOCOKKAD THODU
9. HPC THODU
10. KARUPPU PALAM @71/830
11. INJAKADU ESTATE THODU
12. ARANAKKAL ESTATE THODU
13. VANDIPERIYAR SATRAM THODU
14. CHECKDAM @74/050
15. VANDIPERIYAR BRIDGE @ 75/000
16. CHOTTUPARA THODU
17. ANAKUZHY THODU
18. CHANDRAVANAM THODU
19. CHANDRAVANAM BRIDGE @ 80/230
20. KEERIKKARA BRIDGE @ 80/490
21. KEERIKARA THODU
22. VELLARAMKUNNU-ANAKKUZHY THODU
23. MANJUMALA THODU
24. LANDRAM THODU
25. MAMALA BRIDGE @83/650
26. FOOT BRIDGE @ 85/480
27. SANTHAMALA - MOONGANAR THODU
28. SANTHI PALAM @ 87/090
29. THENGAKKAL THODU
30. HELIBURIA 5TH NO. THODU
31. VALLAKKADAVU BRIDGE@ 90/410
32. HELIBURIA THODU
33. CHINNAR THODU
34. MALANKARA TEA FACTORY CD @91/716
35. CHAPPATH BRIDGE @ 92/890
36. KARUNTHIRI- CHAPPATH THODU
37. OLD POST OFFICE THODU
38. ALADY THODU
39. COLLAPSIBLE ALADY- PORIKKANI BRIDGE @ 94/720
40. AKKUPALAM THODU
41. KALLUKKAD- ILLIPALAM THODU
42. UPPUTHARA BRIDGE @97/600
43. OORAMPARA THODU
44. KWA PUMPHOUSE AT THONIPADY
45. AYYAPPANKOVIL-SASTHAMKANDAM THODU
46. AYYAPPANKOVIL BRIDGE @ 100/450
47. AYYAPPANKOVIL HANGING BRIDGE @100/500
48. VELLILAMKANDAM THODU
49. MATTAPALLY THODU
50. MURIKKATTUKUDY THODU
51. KOZHIMALA THODU
52. PALAKKADA THODU
53. KATTAPANAYAR
54. ANJURULY TUNNEL
55. ERATTAYAR TURNING POINT
56. THANKAMANI ERATTAYAR THODU
57. KALLAR TUNNEL
58. CHERUTHONI DAM @ 119/900
59. CHERUTHONI BRIDGE @ 121/650
60. JILLA ASUPATRI-CHERUTHONI THODU
61. MARIYAPURAM THODU
62. MARIYAPURAM THODU
63. PEPPARA THODU
64. VAZHATHOPPU-PALLITHAZHAM THODU
65. THADIYAMPADY CHAPPATH @125/630
66. PALKULAMEDU ASOKA JN THODU
67. VIMALAGIRI THODU
68. KARIMBAN BRIDGE
69. OLD CHAPPATH 128/900
70. UPPUTHODU THODU
71. ALAPPUZHA- MADURA ROAD BRIDGE @ 130/440
72. CHURULI THODU
73. PERIYAR VALLEY BRIDGE @ 132/450
74. KEERITHODU THODU
75. CHAPPATH 133/850
76. PERINJAMKUTTY AAR
77. PAKUTHYPALAM THODU
78. PANAMKUTTY CONFLUENCE @ 136/400
79. CHECKDAM 136/600
80. PANAMKUTTY BRIDGE @ 136/750
81. LOWER PERIYAR DAM @139/650
82. PAMPALA THODU
83. PAZHIYIRIKKANDAM-THATTEKKANI THODU
84. VANCHIKANAL THATTEKKANI THODU
85. TRIBUTORY
86. KARIMANAL BRIDGE @ 154/400

LEGENDS

- MAIN RIVER (PERIYAR)
- TRIBUTARY
- THODU
- RESERVOIR
- BRIDGES IN PERIYAR RIVER
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- CH: CHAINAGE IN PERIYAR

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

PERIYAR RIVER SEDIMENTATION STUDY

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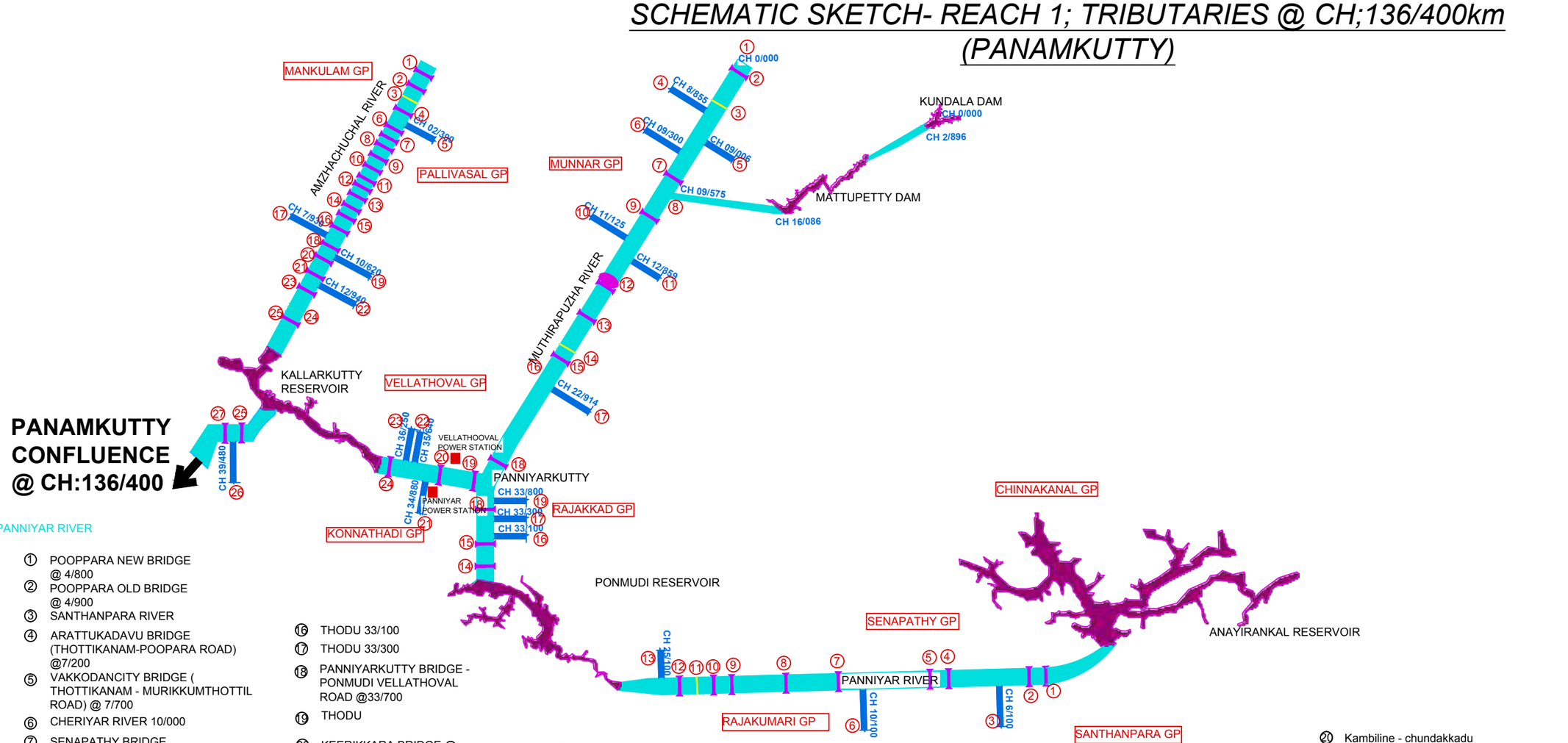
SHEET NO: 1/1	DATE: 31-12-2021	SCALE: NOT IN SCALE

ALL CHAINAGES ARE IN KILOMETERS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 1; TRIBUTARIES @ CH;136/400km (PANAMKUTTY)



PANNIYAR RIVER

1. POOPPARA NEW BRIDGE @ 4/800
2. POOPPARA OLD BRIDGE @ 4/900
3. SANTHANPARA RIVER
4. ARATTUKADAVU BRIDGE (THOTTIKANAM-POOPARA ROAD) @7/200
5. VAKKODANCITY BRIDGE (THOTTIKANAM - MURIKKUMTHOTTIL ROAD) @ 7/700
6. CHERIYAR RIVER 10/000
7. SENAPATHY BRIDGE (SENAPATHY RAJAKUMARI BRIDGE) @10/700
8. RAJAKUMARI AVANAKUMCHA ROAD BRIDGE (SENAPATHY RAJAKUMARI)
9. KANAKKAPUZHA BRIDGE (RAJAKAD- UDUMBACHOLA BRIDGE) @20/700
10. VAKKACITY- MUKUDIL BRIDGE (VAKKAKUDY MUKKUDIL ROAD)@ 21/700
11. KUTHUNKALDAM @24/100
12. KUTHUNKAL BRIDGE (SENAPATHY- RAJAKKAD ROAD) 24/300
13. THODU @25/300
14. PONMUDI SUSPENSION BRIDGE (PONMUDI RAJAKADU ROAD) @32/400
15. CHAPPATH WHOLESALE BRIDGE (PONMUDI-RAJAKAD CUT ROAD) @33/000
16. THODU 33/100
17. THODU 33/300
18. PANNIYARKUTTY BRIDGE - PONMUDI VELLATHOVAL ROAD @33/700
19. THODU
20. KEERIKKARA BRIDGE @ 80/490

MUTHIRAPUZHA RIVER

1. NAYAMAKKADU
2. PERIYAVARAI BRIDGE @ 6/175
3. CHECKDAM NEAR NALLATHANI
4. NALLATHANI RIVER
5. COLONY THODU
6. NADAYAR RIVER
7. BRIDGE AT MAIN JUNCTION MUNNAR @ 9/425
8. KUNDALA RIVER
9. BYPASS BRIDGE AT MUNNAR @9/985
10. LAKSHMI THODU
11. CHOCKNAD THODU
12. MUNNAR HEAD WORK @ 13/225
13. ATTUKADU BRIDGE @ 15/225
14. CHECKDAM NEAR RIVULET HOTEL
15. KUNJITHANI BRIDGE @ 21/004
16. KWA PUMP HOUSE @22/810
17. UPPAR RIVER
18. ELLAKKAL BRIDGE @23/320
19. PANNIYARKUTTY AMBULENCE BRIDGE (UDUMBANCHOLA - RAJAKKADU ROAD) @26/350
20. VELLATHOVAL BRIDGE (VELLATHOVAL PONMUDYROAD) @33/400
21. THODU
22. THODU
23. THODU
24. KALLARKUTTY BRIDGE (ADIMALY-RAJAKAD ROAD) 36/600
25. KALLARKUTTY BRIDGE (ADIMALY-NEDUMKANDAM ROAD) 37/600
26. THODU
27. BRIDGE TO ST JOSEPH CHURCH PANAMKUTTY @40/350

AMZHACHUCHAL RIVER

1. KSEB Power House Bridge@0/227.
2. Kallarmankulam road Bridge D/S of Power house@1/270.
3. Check dam by jalanidhi @1/500
4. Peechad bridge@3/361
5. Thodu
6. Private bridge near wild spice trails resort@ 4/245
7. Samsung estate - vengayapara bridge@ 4/603
8. Private bridge to swiss nest@ 5/262
9. Private bridge to private land near swiss nest @ 5/307
10. 9. Private bridge to flower valley @5/371
11. Private bridge to home@5/684
12. Kurishupara bridge@6/037
13. Bridge to pallivasal samskarikanilayam kurisupara@6/196
14. Bridge near bubbly falls@6/637
15. Bridge near kallar valley anganvadi@7/004
16. Bridge near kallrvalley waiting shed@7/307
17. Thodu
18. Kallar ridge@8/759
19. thodu
20. Kambiline - chundakkadu bridge@11/434
21. Kambiline check dam@11/578
22. THODU
23. Ambazhachal bridge@13/016
24. Iruttukanam small hydel power project check dam@13/448
25. Mankadavu bridge@16/322

LEGENDS

- MAIN RIVER (PERIYAR)
- TRIBUTARY
- THODU
- RESERVOIR
- BRIDGES IN PERIYAR RIVER
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- CH: CHAINAGE IN TRIBUTORY

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

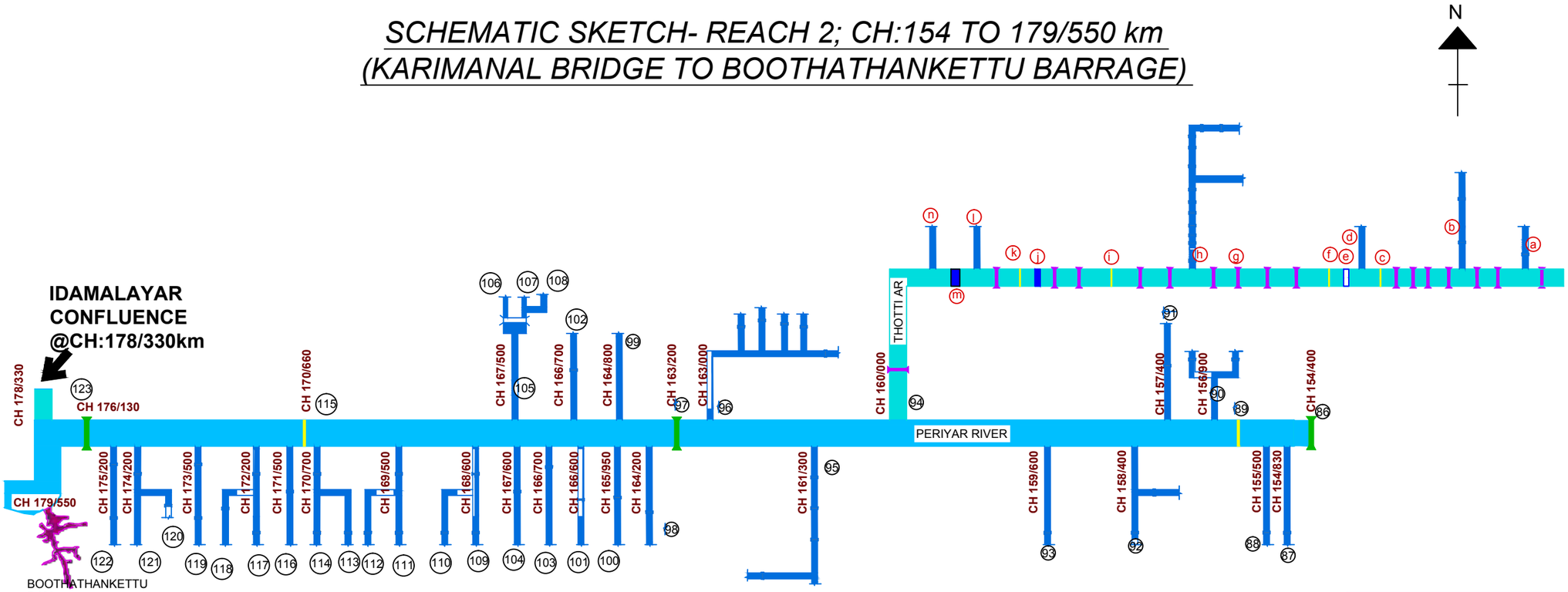
PERIYAR RIVER SEDIMENTATION STUDY

DRAWN BY,	CHECKED BY,	APPROVED BY,
SHEET NO: 1/2	DATE: 31-12-2021	SCALE: NOT IN SCALE

ALL CHAINAGES ARE IN KILOMETERS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 2; CH:154 TO 179/550 km
(KARIMANAL BRIDGE TO BOOTHATHANKETTU BARRAGE)



PERIYAR RIVER

- 86 KARIMANAL BRIDGE @ 154/400
- 87 RSP KUNNU THODU
- 88 NEEDAPARA VAYANASALA PADY THODU
- 89 SUSPENSION BRIDGE
- 90 INJAPATHAL THOOKUPALAM THODU
- 91 INJAPATHAL THODU
- 92 CHEMBANKUZHY THODU
- 93 MANIYAMPARA THODU
- 94 THOTTI AR
  - a TRIBUTARY
  - b POLINJAPALAM THODU
  - c VCB CUM BRIDGE
  - d THODU NEAR EASTERN SCHOOL
  - e VCB
  - f CHECKDAM
  - g DAMAGED FOOT BRIDGE
  - h PADIKAP THODU
  - i CHAPPATH
  - j THOTTIYAR HYDRO ELECTRIC PROJECT (BY KSEB Ltd.
  - k CHECKDAM
  - l CHILLI THODU
  - m VALARA WATERFALLS
  - n CHIYYAPPARA WATERFALLS
- 95 NARIYAMANGALAM COLONY THODU
- 96 CAMBILINE THODU
- 97 NERIYAMANGALAM BRIDGE
- 98 NERIYAMNAGALAM KRISHIBHAVAN THODU
- 99 CHARUPAKADAVU OPPOSITE THODU
- 100 MANIMARUTHUMCHAL THODU
- 101 POTHUPARA THODU
- 102 AAVOLICHAL OPPOSITE THODU
- 103 POTHUPARA THODU1
- 104 AAVOLICHAL THODU
- 105 INCHATHOTTI POST OFFICE THODU
- 106 INCHATHOTTI POST OFFICE THODU -1
- 107 MANIMARUTHINCHATHOTTI POST OFFICE THODU -2
- 108 INCHATHOTTI POST OFFICE THODU -3
- 109 CHAARUPAARA VALIYA THODU -2
- 110 CHAARUPAARA VALIYA THODU -1
- 111 CHAARUPAARA KADAVU THODU
- 112 CHAARUPAARA THODU -1
- 113 INJATHOTTI THODU -2
- 114 INJATHOTTI THODU -1
- 115 HANGING BRIDGE INJATHOTTI
- 116 CHEEKODU THODU 3
- 117 CHEEKODU THODU
- 118 CHEEKODU THODU 1
- 119 PALAMATTOM THODU
- 120 KONDAMATTOM THODU (KAAALATHODU)
- 121 QUARRY THODU (KAALATHODU)
- 122 NAADUKAANI THODU (KOORUKULAM) (ODAPPANAAL THODU
- 123 THATTEKKADU BRIDGE @176/130

LEGENDS

- MAIN RIVER (PERIYAR)
- TRIBUTARY
- THODU
- RESERVOIR
- BRIDGES IN PERIYAR RIVER
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- BRIDGES/CULVERTS IN THODU
- CH: CHAINAGE IN PERIYAR

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

PERIYAR RIVER SEDIMENTATION STUDY

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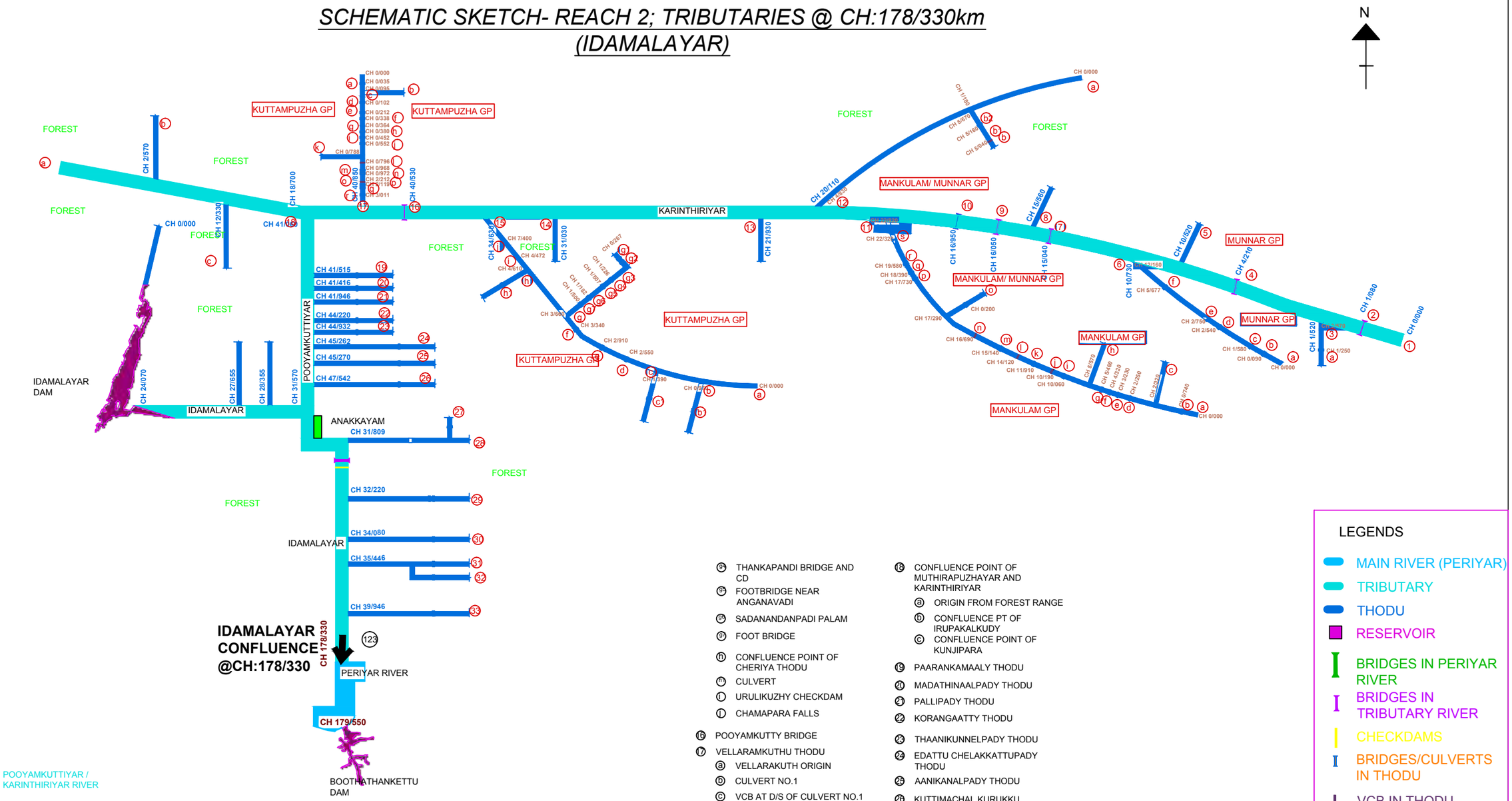
ALL CHAINAGES ARE IN KILOMETERS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 2; TRIBUTARIES @ CH:178/330km (IDAMALAYAR)



① ORIGIN PETTIMUDY
② BRIDGE
③ TRIBUTORY LEFT SIDE
ⓐ BRIDGE
④ BRIDGE
⑤ TRIBUTORY RIGHT SIDE
⑥ ORIGIN
ⓐ BRIDGE
ⓑ BRIDGE
ⓒ BRIDGE
ⓓ BRIDGE
ⓔ BRIDGE
ⓕ BRIDGE
⑦ KUWAIT CITY FOOT BRIDGE @15/040
⑧ TRIBUTORY R/S

⑨ HANGING BRIDGE NEAR GEORGIAN CHURCH 16/050
⑩ POOYAMKUTTY MANKULAM BRIDGE @16/950
⑪ MANKULAM THODU
ⓐ ORIGIN KALLAR ESTATE
ⓑ BRIDGE
ⓒ TRIBUTORY
ⓓ MANKULAM NEERAR BRIDGE
ⓔ CULVERT NO.1
ⓕ CULVERT NO.2
ⓖ CULVERT NO.3
ⓗ TRIBUTORY
ⓘ VIRIPARA BRIDGE
ⓙ VIRIPARA DIVERSION WEIR
ⓚ CULVERT NO.4
ⓛ NAKSHATRAKADATHU WATERFALLS

ⓜ PAMBUKAYAM BRIDGE
ⓝ CHAPPATH
ⓞ TRIBUTORY
ⓞI BRIDGE
ⓟ THALUMKANDAM BRIDGE
ⓠ CULVERT NO.5
ⓡ CULVERT NO.6
ⓢ BRIDGE NEAR PERUMBANKUTHU
⑫ ETTACHOLAYAR
ⓐ ORIGIN FOREST RANGE
ⓑ TRIBUTORY FROM FOREST
ⓑI CHECKDAM
ⓑ2 BRIDGE
⑬ VATHYKUDY THODU
⑭ KUMJIAR TRIBUTARY

⑮ MAMALA THODU
ⓐ ORIGIN NERYAMANGALAM FOREST RANGE
ⓑ TRIBUTARY FROM FOREST
ⓑI CULVERT
ⓒ TRIBUTARY FROM FOREST
ⓒI CULVERT
ⓓ MAMALA CHAPPATH
ⓔ FOOT BRIDGE
ⓕ ELAMBLASSERY BRIDGE AND CHECKDAM
ⓖ CONFLUENCE POINT OF ELAMBLASSERY THODU
ⓖI VENUNARAYANANPADI BRIDGE
ⓖ2 FOOT BRIDGE NEAR KERALA STATE BAMBOO CORP
ⓖ3 CONFLUENCE POINT

ⓖ4 THANKAPANDI BRIDGE AND CD
ⓖ5 FOOTBRIDGE NEAR ANGANAVADI
ⓖ6 SADANANDANPADI PALAM
ⓖ7 FOOT BRIDGE
ⓗ CONFLUENCE POINT OF CHERIYA THODU
ⓘ CULVERT
ⓘI URULIKUZHY CHECKDAM
ⓘ CHAMAPARA FALLS
⑯ POOYAMKUTTY BRIDGE
⑰ VELLARAMKUTHU THODU
ⓐ VELLARAKUTH ORIGIN
ⓑ CULVERT NO.1
ⓒ VCB AT D/S OF CULVERT NO.1
ⓓ CULVERT NO.2
ⓔ CULVERT NO.3
ⓕ CULVERT NO.4
ⓖ VCB AT D/S OF CULVERT NO.5
ⓗ CULVERT NO.5
ⓘ CULVERT NO.6
ⓘ CULVERT NO.7
ⓚ CULVERT
ⓛ VCB
ⓜ PARAMESWARAPADI FOOT BRIDGE
ⓝ PARAMESWARAPADI BRIDGE
ⓞ VCB AT U/S FOOT BRIDGE
ⓟ FOOT BRIDGE
ⓠ BRIDGE
ⓡ BRIDGE NEAR ANAKULAM FOREST STATION

⑱ CONFLUENCE POINT OF MUTHIRAPUZHAYAR AND KARINTHIRIYAR
ⓐ ORIGIN FROM FOREST RANGE
ⓑ CONFLUENCE PT OF IRUPAKALKUDY
ⓒ CONFLUENCE POINT OF KUNJIPARA
⑲ PAARANKAMAALY THODU
⑳ MADATHINAALPADY THODU
㉑ PALLIPADY THODU
㉒ KORANGAATTY THODU
㉓ THAANIKUNNELPADY THODU
㉔ EDATTU CHELAKKATTUPADY THODU
㉕ AANIKANALPADY THODU
㉖ KUTTIMACHAL KURUKKU THODU (APPAKKAL KUNNU THODU)
㉗ KNACHERY THDU
㉘ KUTTANPUZHAYAR (URULANTHANNITHODU)
㉙ KOOTTAMBARA THDU
㉚ ARAMBANKUDY THDU
㉛ VENGASSERY THDU
㉜ VENGASSERY LINK THDU
㉝ ALIYARPADI THDU

LEGENDS

- MAIN RIVER (PERIYAR)
- TRIBUTARY
- THODU
- RESERVOIR
- BRIDGES IN PERIYAR RIVER
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- BRIDGES/CULVERTS IN THODU
- VCB IN THODU
- CH: CHAINAGE IN PERIYAR
- CH: CHAINAGE IN TRIBUTORY
- CH: CHAINAGE IN THODU

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

PERIYAR RIVER SEDIMENTATION STUDY

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SHEET NO: 1/4	DATE: 31-12-2021	SCALE: NOT IN SCALE

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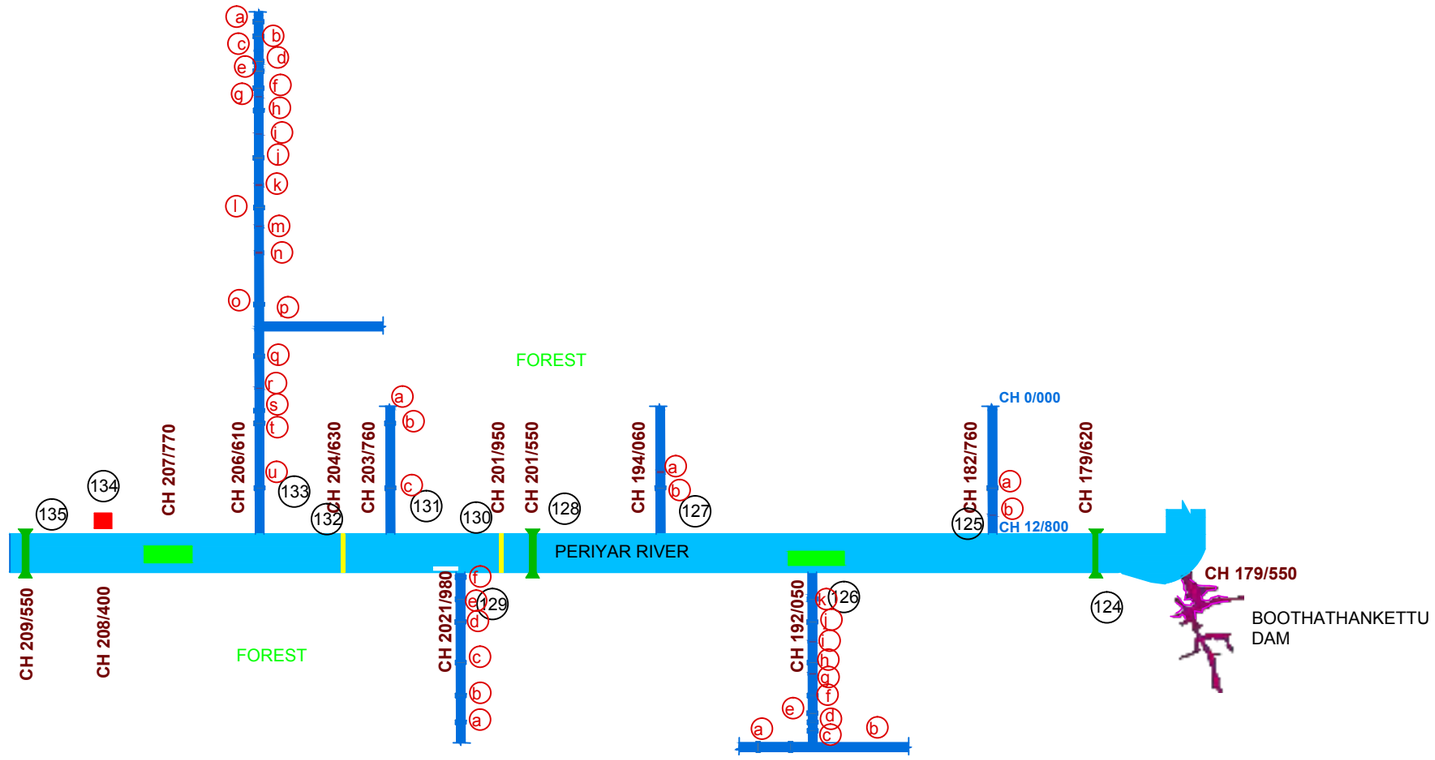
PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 3; CH:179/550 TO 209/550 (BOOTHATYHANKKETTU BARRAGE TO KALADY BRIDGE)

N



PERIYAR RIVER

124 BOOTHATHANKETTU NEW BRIDGE @179/620

125 THUNDAM THODU 12.80km
- ⓐ IIP CANAL AQUEDUCT @ CH 12.62 KM
- ⓑ FOREST ROAD @ CH 12.66KM

126 KRARIYELI THODU 7.90km
- ⓐ RIGHT BRANCH THODU (1.93KM LENGTH)
- ⓑ LEFT BRANCH THODU (2.74 KM LENGTH)
- ⓒ FOOT BRIDGE @ CH 0.73 KM
- ⓓ BRIDGE @ CH 1.99 KM
- ⓔ CULVERT @ CH 1.91 KM
- ⓕ CULVERT @ CH 1.91 KM
- ⓖ CANAL AQUEDUCT@CH 2.67km
- ⓗ BRIDGE @ CH 3.09 KM
- ⓘ CROSS BAR @ CH 4.47 KM
- ⓙ BRIDGE @ CH 4.98 KM
- ⓚ BRIDGE @ CH 6.67 KM

127 ILLITHODU THODU 3.56km
- ⓐ MOOLAMKUZHI AQUEDUCT @ CH 2.77 KM
- ⓑ BRIDGE @ CH 3.1 KM

128 KODANADU BRIDGE

129 CHECKDAM

130 THOTTUVA THODU 7.775km
- ⓐ BRIDGE @ CH 0.20 KM
- ⓑ BRIDGE @ CH 1.48 KM
- ⓒ BRIDGE @ CH 4.18 KM
- ⓓ WOODEN BRIDGE @ CH 5.46KM
- ⓔ BRIDGE @ CH 5.47 KM
- ⓕ BRIDGE @ CH 7.68 KM

131 PALLIPETTA THODU 3.835km
- ⓐ SUPERPASSAGE @ CH 0.000 KM
- ⓑ BRIDGE @ CH 3.493 KM
- ⓒ CULVERT @ CH 1.780 KM

132 CHECKDAM

133 MUKKADAI THODU 15.108km
- ⓐ BRIDGE @ CH 1.023KM
- ⓑ BRIDGE @ CH 2.958 KM
- ⓒ VCB @ CH 4.380 KM
- ⓓ BRIDGE @ CH 4.518 KM
- ⓔ BRIDGE @ CH 4.745 KM
- ⓕ BRIDGE @ CH 4.758 KM
- ⓖ AQUEDUCT @ CH 5.201 KM
- ⓗ BRIDGE @ CH 5.215 KM
- ⓘ CULVERT @ CH 5.276KM
- ⓙ BRIDGE @ CH 6.034 KM
- ⓚ VCB @ CH 7.090 KM
- ⓛ BRIDGE @ CH 7.10KM
- ⓜ MANJAPRA MINI DAM @ CH 8.804 KM
- ⓝ VCB @ CH 9.798 KM
- ⓞ NADUVATTAM -CHANDRAPPURA BRIDGE @ CH 9.814 KM
- ⓟ LEFT BRANCH THODU (0.415 KM LENGTH) @ CH 9.858 KM
- ⓠ FOOT BRIDGE @ CH 10.398 KM
- ⓡ CULVERT@ CH 10.843 KM
- ⓢ FOOT BRIDGE @ CH 12.318 KM
- ⓣ MUKKADAI BRIDGE @ CH 12.928 KM
- ⓤ KOTTAMAM BRIDGE @ CH 14.385 KM

134 PUMPHOUSE

135 KALADY BRIDGE

LEGENDS
- MAIN RIVER (PERIYAR)
- THODU
- RESERVOIR
- BRIDGES IN PERIYAR RIVER
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- BRIDGES/CULVERTS IN THODU
- VCB IN THODU
- LIFT IRRIGATION SCHEMES
- CH: CHAINAGE IN PERIYAR
- CH: CHAINAGE IN TRIBUTORY

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

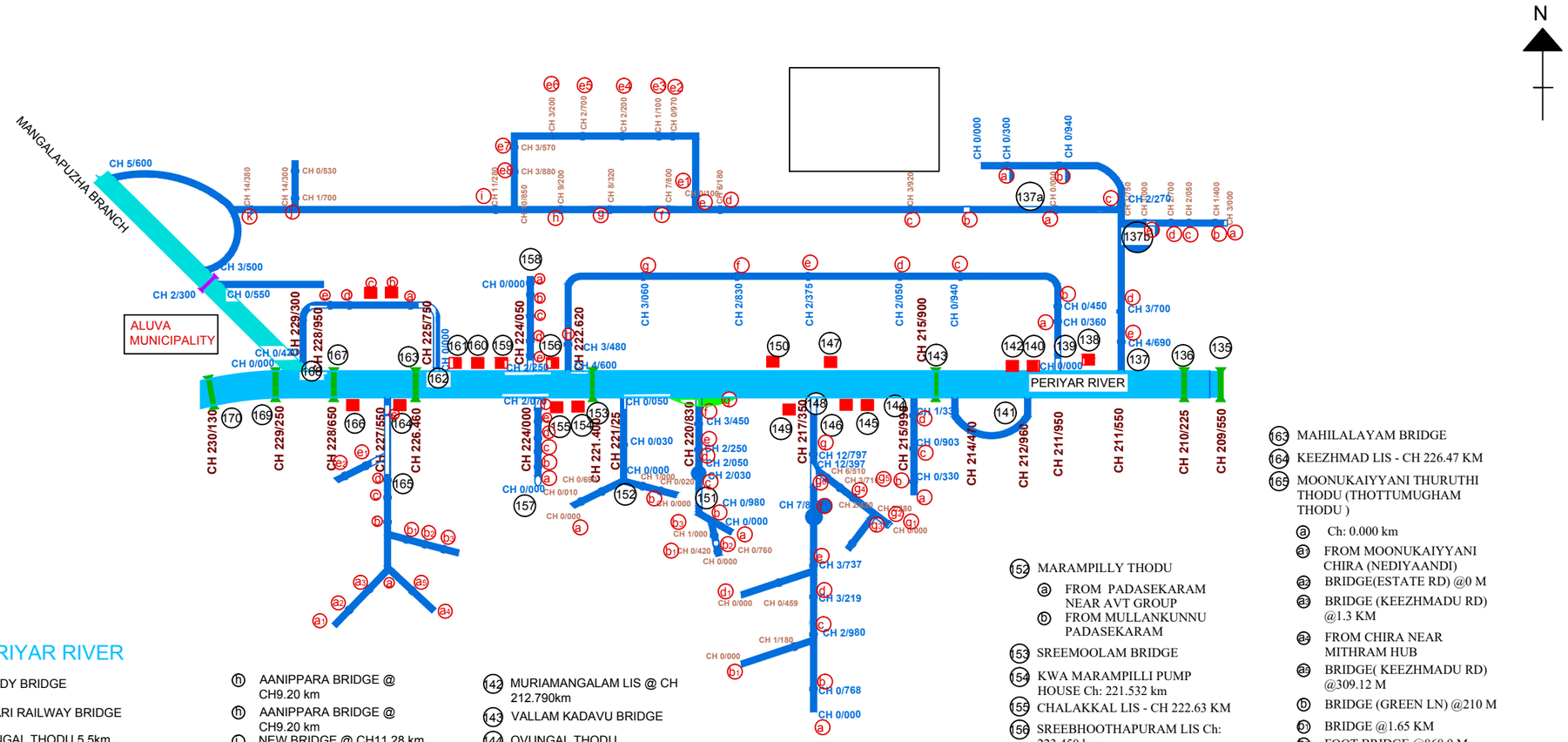
PERIYAR RIVER SEDIMENTATION STUDY

DRAWN BY,	CHECKED BY,	APPROVED BY,
SHEET NO: 1/5	DATE: 31-12-2021	SCALE: NOT IN SCALE

ALL CHAINAGES ARE IN KILOMETERS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 4; CH: 209/550 TO 230/130
(KALADY BRIDGE TO ALUVA MARTHANDAVARMA BRIDGE)



PERIYAR RIVER

(135) KALADY BRIDGE

(136) SABARI RAILWAY BRIDGE

(137) CHENGAL THODU 5.5km
- (a) CANAL AQUEDUCT@CH 2.67km
- (b) KANJOOR BRIDGE
- (c) BRIDGE @ CH 4.98 KM
- (d) CROSS BAR @ CH 4.47 KM
- (e) BRIDGE @ CH 3.09 KM

(137a) CHENGAL THODU DIVERSION 14.50KM
- (a) NEW BRIDGE@CH 0.00km
- (b) CHENGAL THODU DIVERSION @ CH 0.45km
- (c) NEW BRIDGE 3.92km
- (d) NADUVANNOOR BRIDGE @ CH 6.18km
- (e) KUZHIPALLAM THODU 4.37km BRIDGE @ CH 3.09 KM
- (e1) BRIDGE @0.1km
- (e2) RAIL BRIDGE @0.97km
- (e3) CHAPPATH @1.10km
- (e4) BRIDGE @2.20km
- (e5) PARTIALLY DEMOLISHED BRIDGE @2.70km
- (e6) VCB DEMOLISHED @3.20km
- (e7) BRIDGE @3.57km
- (e8) CULVERT @3.88km
- (f) NODUVANNOOR LIS 7.80km
- (g) RAILWAY BRIDGE @ CH8.32 km
- (h) AANIPPARA BRIDGE @ CH9.20 km
- (h) AANIPPARA BRIDGE @ CH9.20 km
- (i) NEW BRIDGE @ CH11.28 km
- (j) PANAYAM THODU @ 1.70 km
- (k) BRIDGE @CH 14.38 km

(137b) UDUMPUZHA THODU 3.75km
- (a) FROM MANIKKAMANGALAM CHIRA @CH 0.00km
- (b) MATTOOR ROAD CULVERT @ CH 1.40km
- (c) MC ROAD CULVERT 2.05km
- (d) RAILWAY CULVERT @CH 2.70km
- (e) CULVERT @CH 3.00km

(138) KANJOOR EDANAD LIS @CH 211.700

(139) KANJOOR THODU LENGTH 4.60km
- (a) BRIDGE @CH 0.36km
- (b) NEW CULVERT @ CH 0.45km
- (c) NEW BRIDGE 0.94km (BLOCKED FROM CH 1.15km-1.30km AND 1.40km TO 1.50km)
- (d) CULVERT @CH 2.05km
- (e) CULVERT @CH 2.375km
- (f) CULVERT @CH 2.830km
- (g) CULVERT @CH 3.06km
- (h) CULVERT @CH 3.48km

(140) PALLIKKADAVU LIS @CH 212.050km

(141) OKKAL THURUTH

(142) MURIAMANGALAM LIS @ CH 212.790km

(143) VALLAM KADAVU BRIDGE

(144) OVUNGAL THODU
- (a) FROM CHELAMATTOM CHOVAZHCKA KAVU PADASEKHARAM
- (b) ROAD BRIDGE
- (c) BRIDGE
- (d) BRIDGE

(145) VALLAM LIS @CH 216.06km

(146) KWA VALLAM PUMP HOUSE @CH 216.149km

(147) THIRUVILAMCHUZHI LIS @CH 216.310km

(148) VALLAM THODU LENGTH 13.391km
- (a) FROM ALLAPRA - RAYAMANGALAM PADSEKARAM
- (b) BRIDGE 768 M
- (b1) FROM THURUTHIPLY PADASEKARAM - 1.5 KM
- (c) BRIDGE
- (d) MC ROAD VATTAKKATTUPADI BRIDGE
- (d1) FROM PALAKKATTUTHAZHAM - 645M KANDANTHARA PADASEKARAM
- (e) PATHIPALAM BRIDGE 757 M (AM ROAD CROSSING
- (f) CHIRA
- (g) BRIDGE
- (g1) From Koduvelichira
- (g2) Koduveli bridge
- (g3) From Pooppani
- (g4) MC road crossing
- (g5) Bridge under construction
- (g6) Vallam LIS

(149) VAZHAKULAM LIS @CH 218.850km

(150) SOUTH VELLARAPPILLY LIS @CH 219.740km

(151) KUNNUVAZHY TEMPLE THODU
- (a) FROM MUDIKKAL PADASEKHARAM
- (b) FROM ORNA PADASEKARAM / KUTTIPADAM PADASEKARAM
- (b1) BRIDGE
- (b2) POND
- (b3) BRIDGE
- (c) CHERUVELIKKUNNUTHURA
- (d) CHERUVELIKKUNNUTHURA SHUTTER
- (e) BRIDGE
- (f) BRIDGE
- (g) DELTA FORMED

(152) MARAMPILLY THODU
- (a) FROM PADASEKARAM NEAR AVT GROUP
- (b) FROM MULLANKUNNU PADASEKARAM

(153) SREEMOOLAM BRIDGE

(154) KWA MARAMPILLI PUMP HOUSE Ch: 221.532 km

(155) CHALAKKAL LIS - CH 222.63 KM

(156) SREEBHOOTHAPURAM LIS Ch: 223.450 km

(157) CHALACKAL THODU (KAROTTAPPURAM CANAL)
- (a) FROM THUMBICHAL RESERVOIR
- (b) BRIDGE (MOSKO RD)
- (c) FOOT BRIDGE @280 M
- (d) PONGAM VELI BRIDGE (KAROTTAPPURAM RD)@1.18km
- (e) BRIDGE (ALUVA-MUNNAR RD) @1.39 KM
- (f) BRIDGE @1.96 KM

(158) THONIKKADAVU THODU
- (a) CULVERT @0.040km
- (b) CULVERT @0.550km
- (c) CULVERT @1.125km
- (d) CULVERT @1.570km
- (e) CULVERT @2.080km

(159) VKR MENON LIS Ch: 224.450 km

(160) CHOWWARA LIS Ch: 225.065 km

(161) KWA CHOWARA PUMP HOUSE Ch: 225.270 km

(162) THUMBA THODU
- (a) THURUTH CHOVVARA BRIDGE Ch: 0.50 km
- (b) VARRIAKKAD LIS Ch: 0.60 km
- (c) MATHER COMPOUND LIS Ch: 0.60 km
- (d) BRIDGE Ch: 1.90 km
- (e) BRIDGE Ch: 3.70 km

(163) MAHILALAYAM BRIDGE

(164) KEEZHMAD LIS - CH 226.47 KM

(165) MOONUKAIYYANI THURUTHI THODU (THOTTUMUGHAM THODU)
- (a) Ch: 0.000 km
- (a1) FROM MOONUKAIYYANI CHIRA (NEDIYAANDI)
- (a2) BRIDGE(ESTATE RD) @0 M
- (a3) BRIDGE (KEEZHMADU RD) @1.3 KM
- (a4) FROM CHIRA NEAR MITHRAM HUB
- (a5) BRIDGE(KEEZHMADU RD) @309.12 M
- (b) BRIDGE (GREEN LN) @210 M
- (b1) BRIDGE @1.65 KM
- (b2) FOOT BRIDGE @868.9 M
- (b3) BRIDGE @788.73 M
- (c) AQUEDUCT @480 M
- (d) BRIDGE (EDAYAPURAM RD)@1.01 KM
- (e) THOTTUMUGHAM BRIDGE (ALUVA-MUNNAR RD)@280m
- (e1) BRIDGE@ 1.05 KM
- (e2) BRIDGE (GAS GODOWN RD) @426.19 M

(166) KWA ALUVA PUMP HOUSE Ch: 228.43 km

(167) ALUVA RAILWAY BRIDGE Ch: 228.65 km

(168) MANGALAPUZHA BRANCH (PERIYAR)

(169) ALUVA SIVARATHRI BRIDGE Ch: 229.25 km

(170) ALUVA MARTHANDAVARMA BRIDGE Ch: 230.13 km

LEGENDS
- MAIN RIVER (PERIYAR)
- TRIBUTARY
- THODU
- BRIDGES IN PERIYAR RIVER
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- BRIDGES/CULVERTS IN THODU
- VCB IN THODU
- LIFT IRRIGATION SCHEMES
- CH: CHAINAGE IN PERIYAR
- CH: CHAINAGE IN TRIBUTORY
- CH: CHAINAGE IN THODU

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

PERIYAR RIVER SEDIMENTATION STUDY

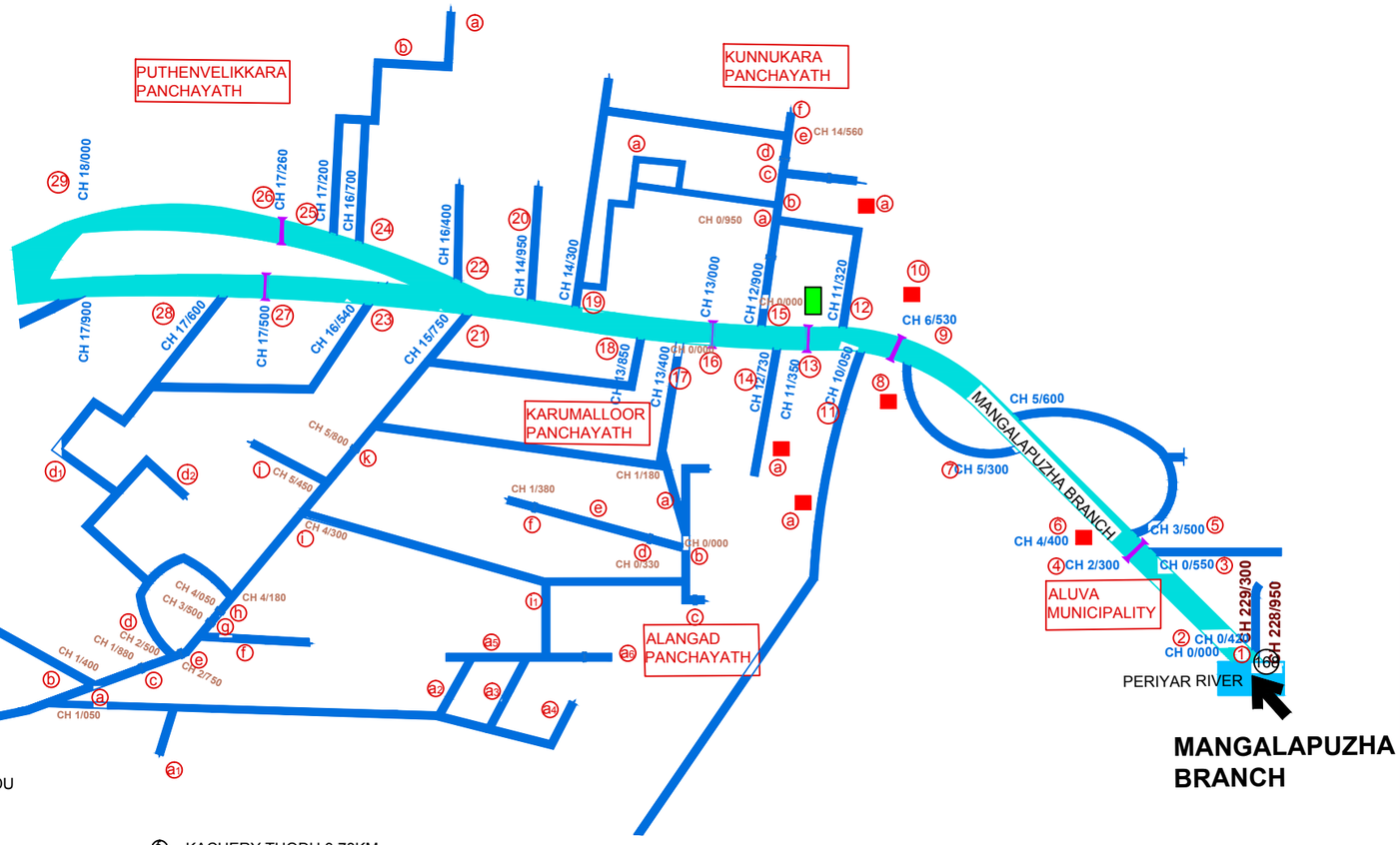
DRAWN BY,	CHECKED BY,	APPROVED BY,
SHEET NO: 1/6	DATE: 31-12-2021	SCALE: NOT IN SCALE

ALL CHAINAGES ARE IN KILOMETERS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 6; MANGALAPUZHA BRANCH @ CH: 0/000 TO 18/000km

N



MANGALAPUZHA BRANCH

1. ALUVA SIVARATHRI MANAPPURAM
2. THOOMBA THODU
3. IRRIGATION CANAL
4. MANGALAPUZHA BRIDGE
5. KARINTHIRIYAR
6. VELIYATHUNADU NO.2 PUMP HOUSE
7. ATTIPUZHA
8. VELIYATHUNADU NO.1 PUMP HOUSE
9. THADIKKALKADAVU BRIDGE
10. KUTTIPUZHA NO.1 PUMP HOUSE
11. NARNI THODU
    - a. KARUMALLOOR NO.2 PUMP HOUSE
12. CHERIYATHEKKANAM THODU
    - a. KUTTIPUZHA NO.2 PUMP HOUSE
13. PURAPPILLYKKAVU REGULATOR BRIDGE
14. KALLIKKUZHY THODU
    - a. KARUMALLOOR NO.1 PUMP HOUSE
15. MANJALI PUZHA
    - a. CHERIYATHEKKANAM THODU
    - b. KANNAKKA THODU
    - c. THODU NEAR RYAN SCHOOL
    - d. OOZHAMAKADAVU BRIDGE
    - e. PUTHENTHODU
    - f. STARTING AT PUTHENPALAM
16. MANJALI BRIDGE
17. NADUVILATHATTU THODU
    - a. ANACHAL THODU
    - b. KAIPETTY PUZHA
    - c. CHERIYAPPILLY BRIDGE
    - d. SLUICE CUM BRIDGE
    - e. KESAVA THURUTH THODU
    - f. ATHANI BRIDGE
18. KARUKKADAMOOPPU THODU
19. CHALAKKUDY PUZHA
    - a. CHETTINADU THODU
20. PANDIPADAM THODU
21. PARAVOOR PUZHA
    - a. PUTHENTHODU
    - a1. kongini thodu @Ch5.5km
    - a2. kayikkara thodu @Ch3.97km
    - a3. kundekavu thodu @Ch3.4km
    - a4. kuzhuveli thodu @Ch0.00km
    - a5. kannachira thodu
    - a6. Ezhikkara Puzha
    - b. POOYAPPILLY THODU
    - b1. kaipram
    - c. MATTUMMAL BRIDGE
    - d. PARAYAKAD VELANKADAVU THODU
    - d1. Thachapilly puzha
    - d2. Manakkodam thodu Karimbadam
    - e. THATTUKADAVU BRIDGE
    - f. KACHERY THODU 3.78KM LENGTH
    - g. KOTTICHIRAPADAM BRIDGE
    - h. CHENDAMANGALAM BRIDGE
    - i. PASHNI THODU
    - i1. Kundekavu cheriyappilly thodu
    - j. ALUNKAL KADAVU THODU
    - k. MUNDUTHURUTHI BRIDGE
22. KUTTIKKATTUPALLAM THODU
23. KORAKKARA THODU
24. PAYIKATTUPALLAM THODU
    - a. STARTING KEEZHURPADA,
    - b. SLUICE AT THAZHANCHIRA PADAM
25. THONDAL THODU
26. STATION KADAVU BRIDGE
27. PAZHAMPILLY THURUTH BRIDGE
28. PALIYAM THODU
29. VP THURUTH

LEGENDS

- TRIBUTARY
- THODU
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- BRIDGES/CULVERTS IN THODU
- CH: CHAINAGE IN TRIBUTORY
- CH: CHAINAGE IN THODU

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

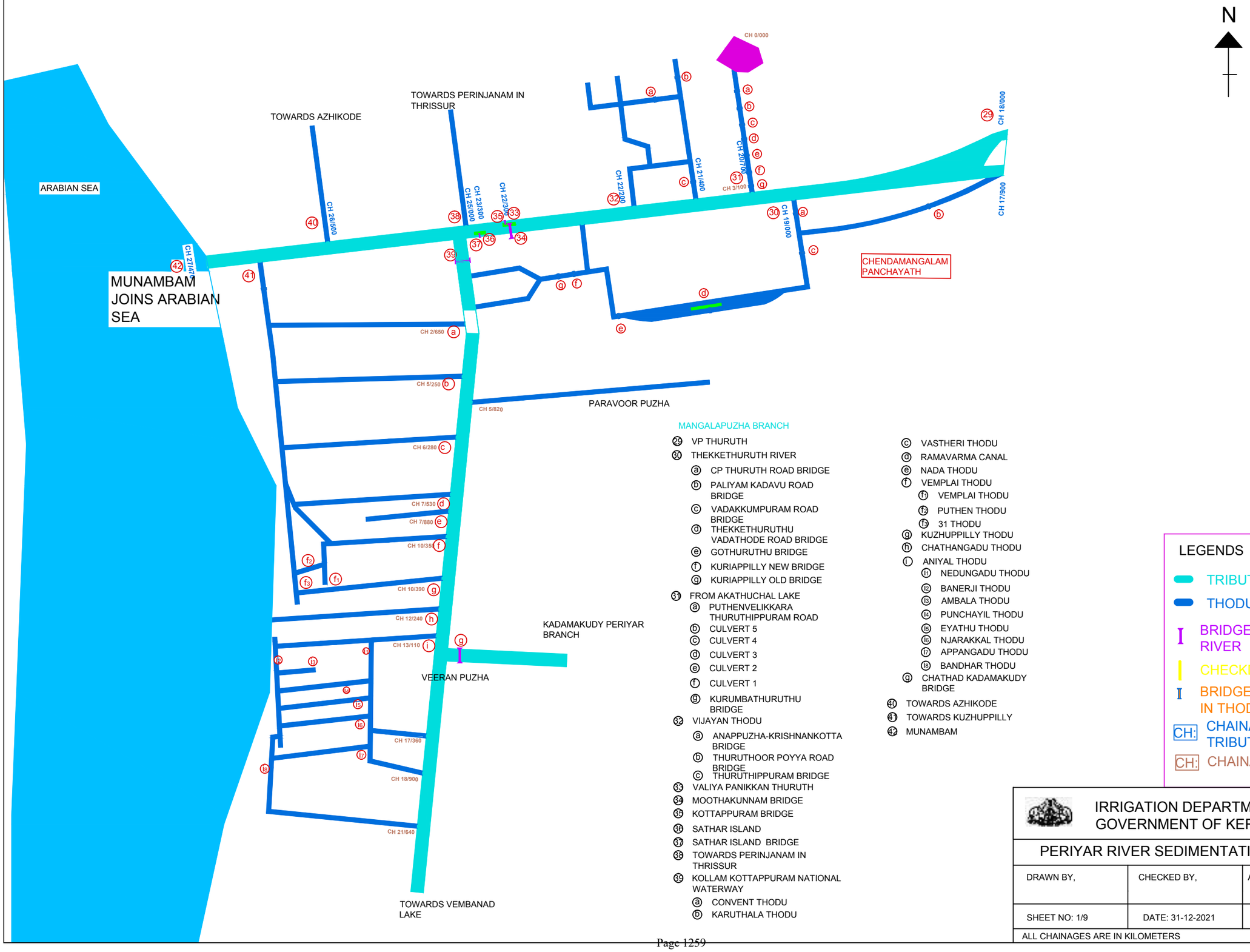
PERIYAR RIVER SEDIMENTATION STUDY

DRAWN BY,	CHECKED BY,	APPROVED BY,
SHEET NO: 1/8	DATE: 31-12-2021	SCALE: NOT IN SCALE

ALL CHAINAGES ARE IN KILOMETERS

PERIYAR RIVER BASIN DRAINAGE NETWORK

SCHEMATIC SKETCH- REACH 6; MANGALAPUZHA BRANCH@ CH: 18/000 TO 27/470



MANGALAPUZHA BRANCH

- 29 VP THURUTH
- 30 THEKKETHURUTH RIVER
  - a CP THURUTH ROAD BRIDGE
  - b PALIYAM KADAVU ROAD BRIDGE
  - c VADAKKUMPURAM ROAD BRIDGE
  - d THEKKETHURUTHU VADATHODE ROAD BRIDGE
  - e GOTHURUTHU BRIDGE
  - f KURIAPPILLY NEW BRIDGE
  - g KURIAPPILLY OLD BRIDGE
- 31 FROM AKATHUCHAL LAKE
  - a PUTHENVELIKKARA THURUTHIPPURAM ROAD
  - b CULVERT 5
  - c CULVERT 4
  - d CULVERT 3
  - e CULVERT 2
  - f CULVERT 1
  - g KURUMBATHURUTHU BRIDGE
- 32 VIJAYAN THODU
  - a ANAPPUZHA-KRISHNANKOTTA BRIDGE
  - b THURUTHOOR POYYA ROAD BRIDGE
  - c THURUTHIPPURAM BRIDGE
- 33 VALIYA PANIKKAN THURUTH
- 34 MOOTHAKUNNAM BRIDGE
- 35 KOTTAPPURAM BRIDGE
- 36 SATHAR ISLAND
- 37 SATHAR ISLAND BRIDGE
- 38 TOWARDS PERINJANAM IN THRISSUR
- 39 KOLLAM KOTTAPPURAM NATIONAL WATERWAY
  - a CONVENT THODU
  - b KARUTHALA THODU
  - c VASTHERI THODU
  - d RAMAVARMA CANAL
  - e NADA THODU
  - f VEMPLAI THODU
    - f1 VEMPLAI THODU
    - f2 PUTHEN THODU
    - f3 31 THODU
  - g KUZHUPPILLY THODU
  - h CHATHANGADU THODU
  - i ANIYAL THODU
    - i1 NEDUNGADU THODU
    - i2 BANERJI THODU
    - i3 AMBALA THODU
    - i4 PUNCHAYIL THODU
    - i5 EYATHU THODU
    - i6 NJARAKKAL THODU
    - i7 APPANGADU THODU
    - i8 BANDHAR THODU
  - g CHATHAD KADAMAKUDY BRIDGE
- 40 TOWARDS AZHIKODE
- 41 TOWARDS KUZHUPPILLY
- 42 MUNAMBAM

LEGENDS

- TRIBUTARY
- THODU
- BRIDGES IN TRIBUTARY RIVER
- CHECKDAMS
- BRIDGES/CULVERTS IN THODU
- CH: CHAINAGE IN TRIBUTORY
- CH: CHAINAGE IN THODU

IRRIGATION DEPARTMENT
GOVERNMENT OF KERALA

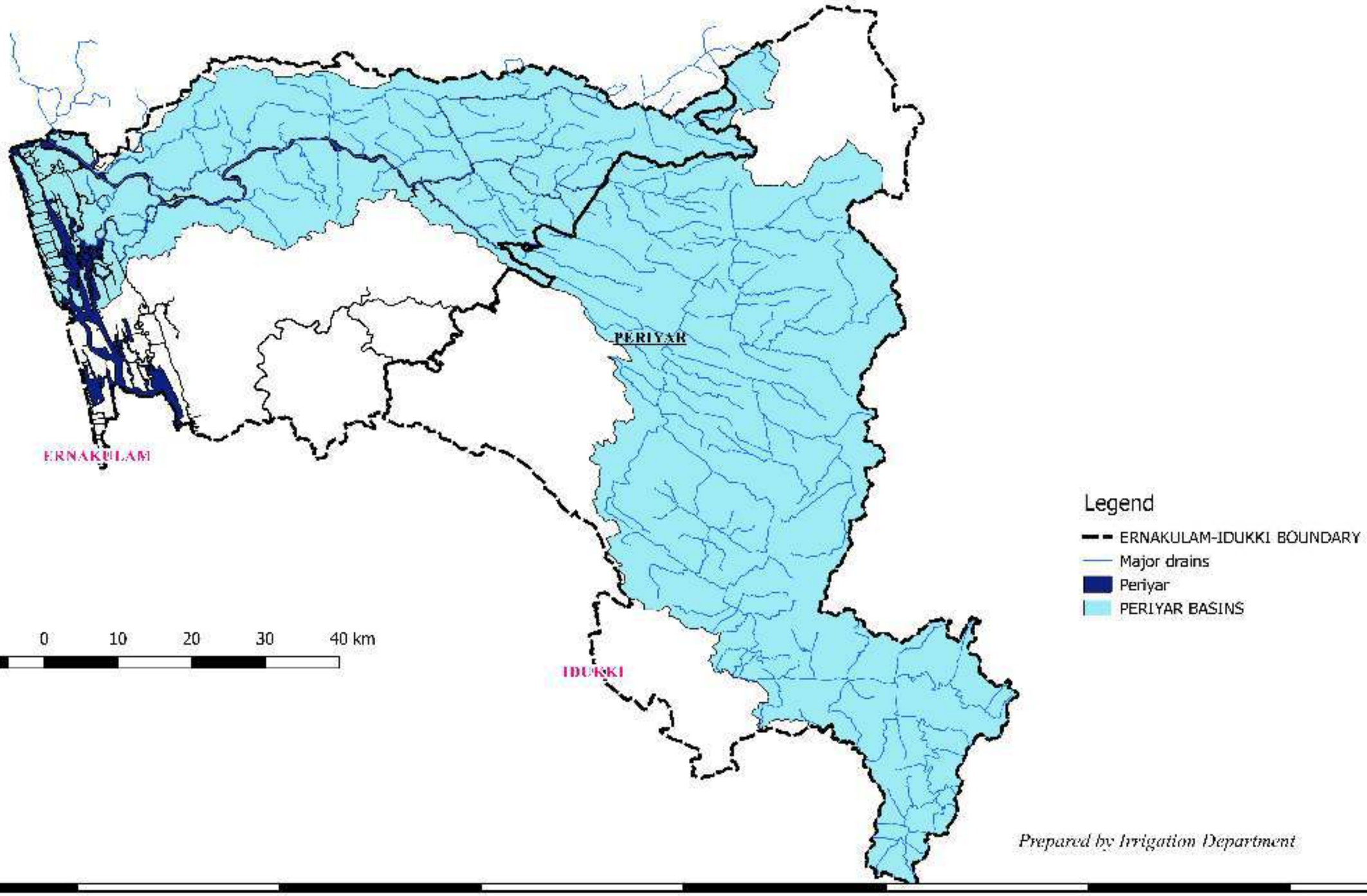
PERIYAR RIVER SEDIMENTATION STUDY

DRAWN BY,	CHECKED BY,	APPROVED BY,
SHEET NO: 1/9	DATE: 31-12-2021	SCALE: NOT IN SCALE

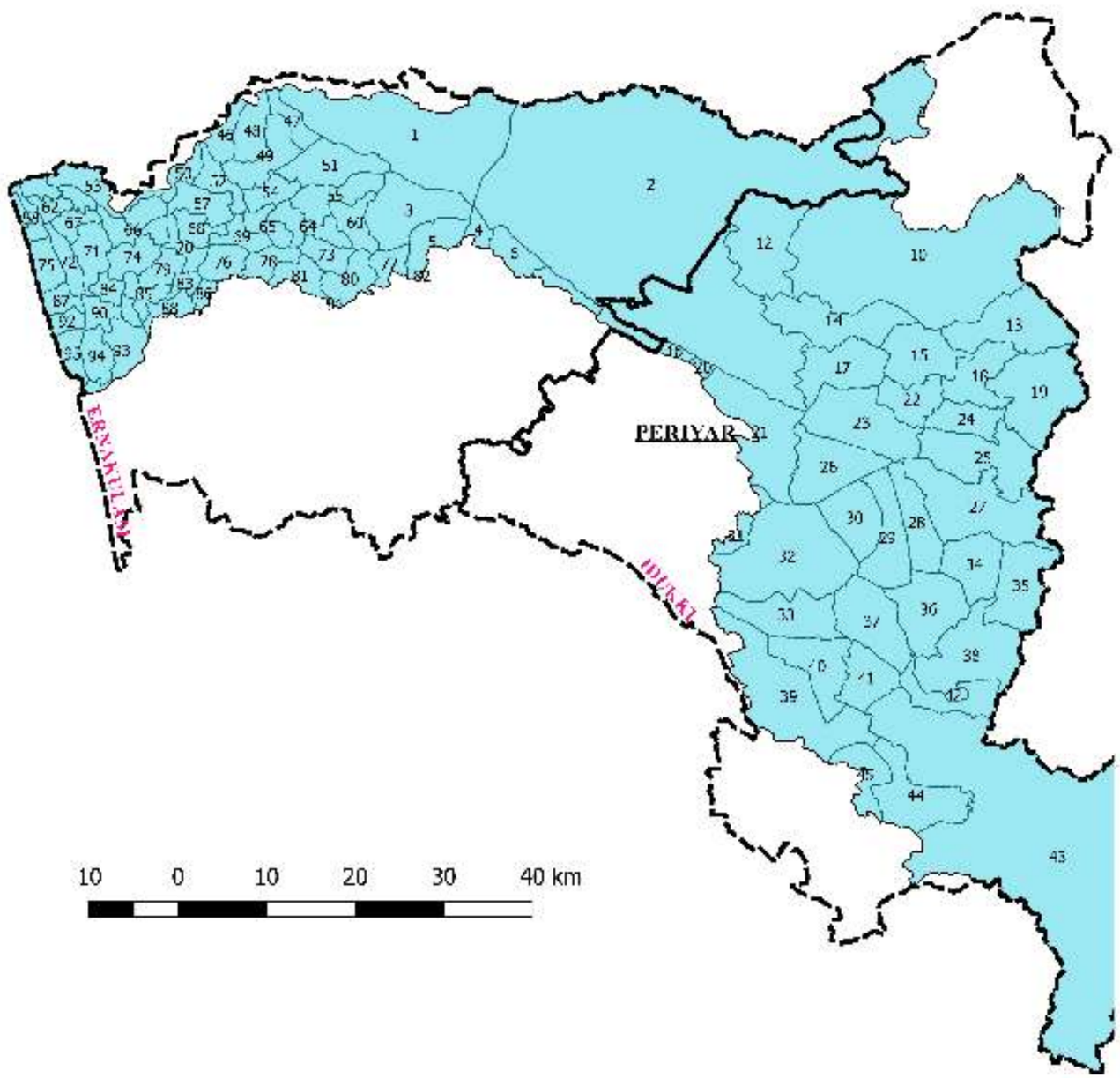
ALL CHAINAGES ARE IN KILOMETERS

QGIS
MAPS

PERIYAR BASIN IN ERNAKULAM & IDUKKI DISTRICT



PANCHAYATHS IN PERIYAR BASIN



Legend

- Main_Rivers
- ERNAKULAM-IDUKKI BOUNDARY

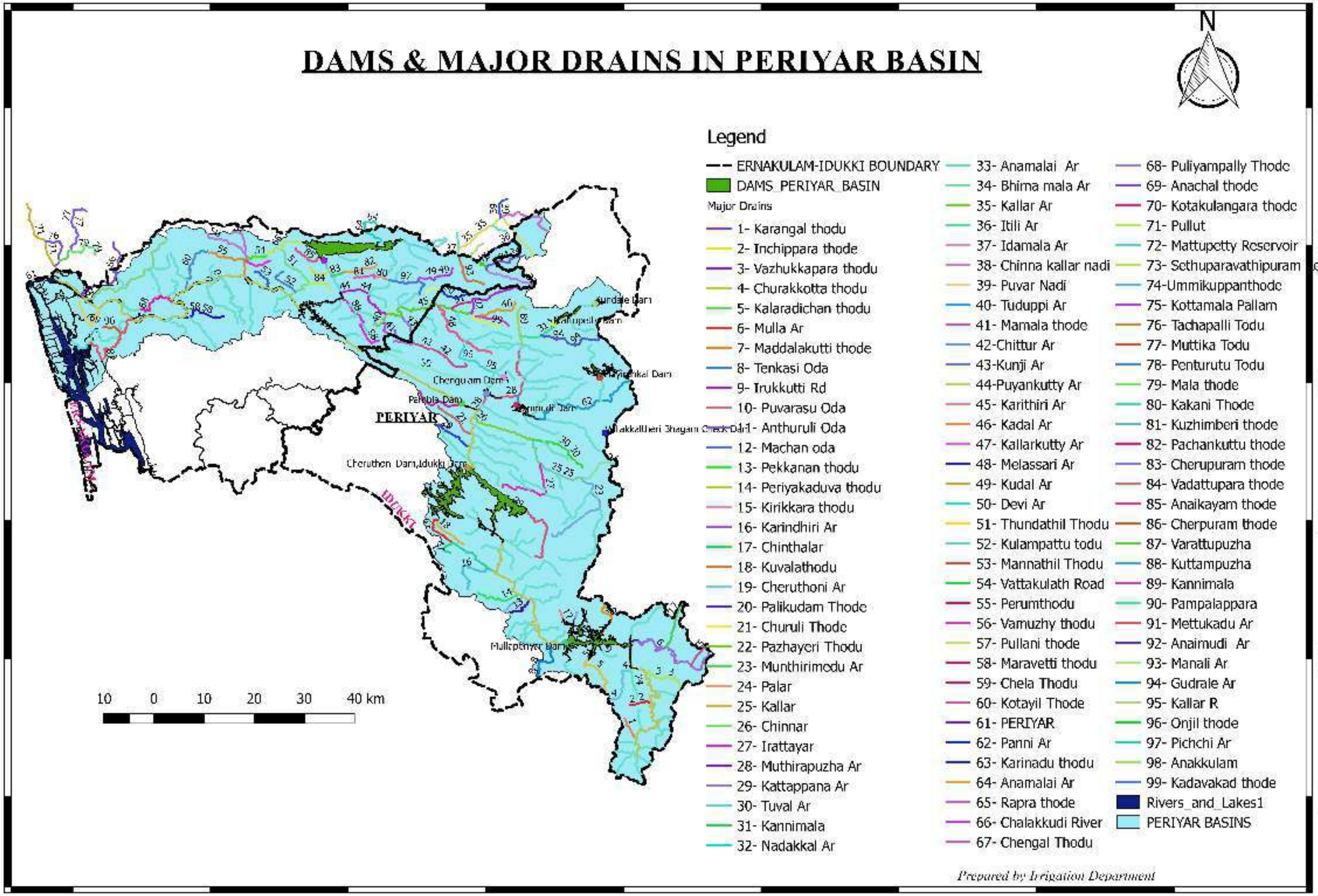
Ernakulam_Idukki_Panchayaths

1-Ayyampuzha
2-Kuttampuzha
3-Vengoor
4-Pindimana
5-Kottappadi
6-Keerampara
7-Kavalangade
8-Marayoor
9-Kanthalloor
10-Munnar
11-Vattavada
12-Mankulam
13-Chinnakanal
14-Pallivasal
15-Bisonvally
16-Vannapuram
17-Vellathooval
18-Rajakumari
19-Santhanpara
20-Karimannoor
21-Udumbannoor
22-Rajakkad
23-Konnathady
24-Senapathi
25-Udumbanchola
26-Vathikudy
27-Nodumkandam
28-Irattayar
29-Kamakshy
30-Mariyapuram
31-Kanjikuzhy
32-Vazhathope
33-Arakulam
34-Pampadumpara
35-Karunapuram
36-Kattappana
37-Kanchiyar
38-Vandanmedu
39-Elappara
40-Upputhara
41-Ayyappancoil
42-Chakkupallam
43-Kumily
44-Vandiperiyar
45-Peerumade
46-Karukutty
47-Manjapra
48-Mookkannur
49-Thuravoor
50-Parakkadavu
51-malayattoor
52-Aangamali
53-Puthenvelikara
54-Kalady
55-Koovappady
56-Vadakkekkara
57-Nedumbassery
58-Pallippuram
59-Chendamangalam
60-Mudakuzha
61-Kuzhuppily
62-Chittattukara
63-Kunnukara
64-Ockal
65-Kanjoor
66-Karumalloor
67-Paravoor
68-Chengamanad
69-Sreemoolanagaram
70-Aluva
71-Kottuvally
72-Ezhikkara
73-Perumbavoor
74-Alangad
75-Edavanakkade
76-Keezhmad
77-Asamannoor
78-Vazhakkulam
79-Kadungallur
80-Rayamanglam
81-Vengola
82-Nellikkuzhi
83-Choornnikkara
84-Varapuzha
85-Eloor
86-Edathala
87-Nayarambalam
88-Kalamassery
89-Cheranallur
90-Kadamakkudy
91-Mazhuvannoor
92-Njarakkal
93-Kochi
94-Mulavukade
95-Elamkunnapuzha

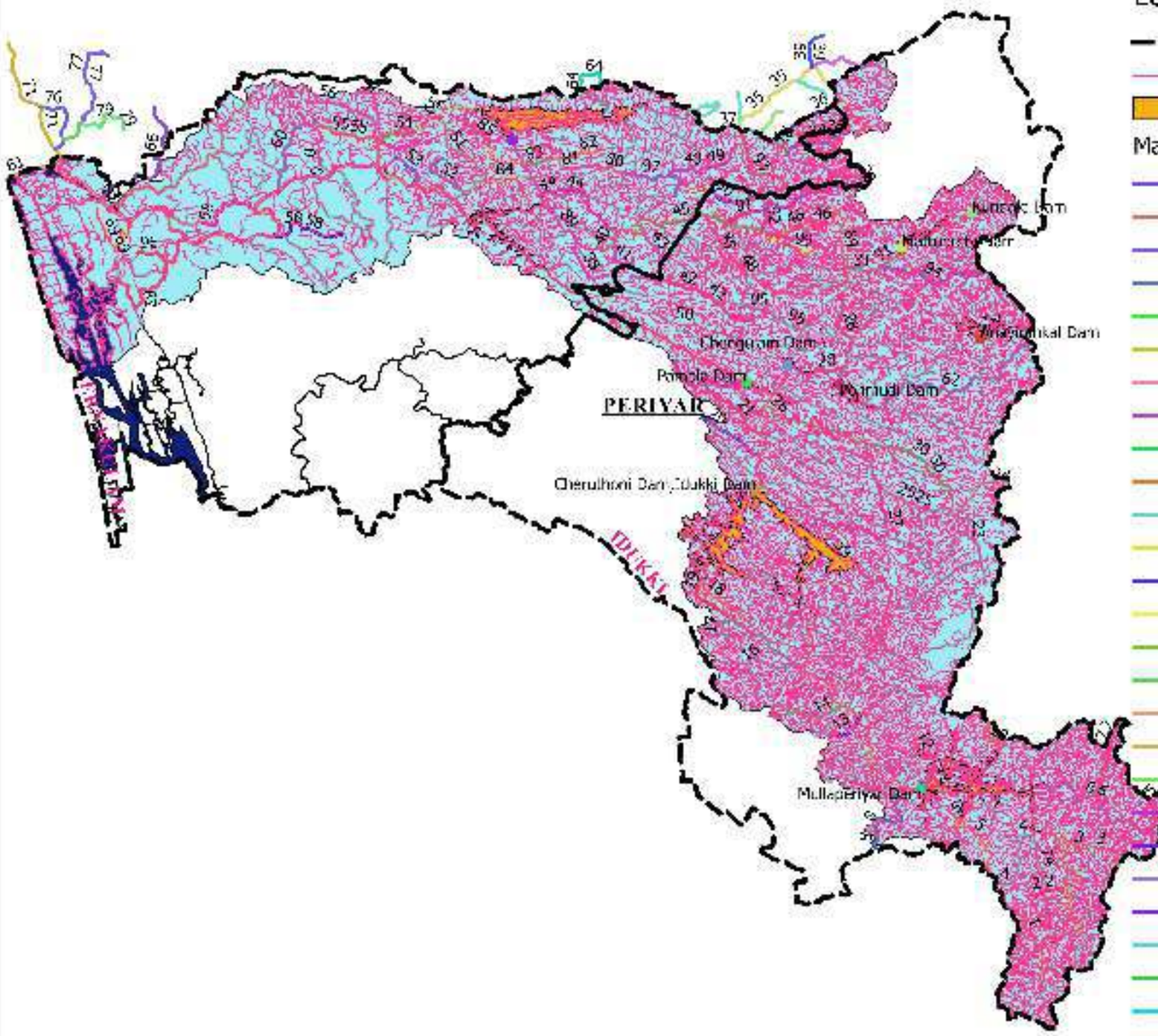
PERIYAR BASINS

Prepared by Irrigation Department

DAMS & MAJOR DRAINS IN PERIYAR BASIN



MAJOR & MINOR DRAINS IN PERIYAR BASIN



Legend

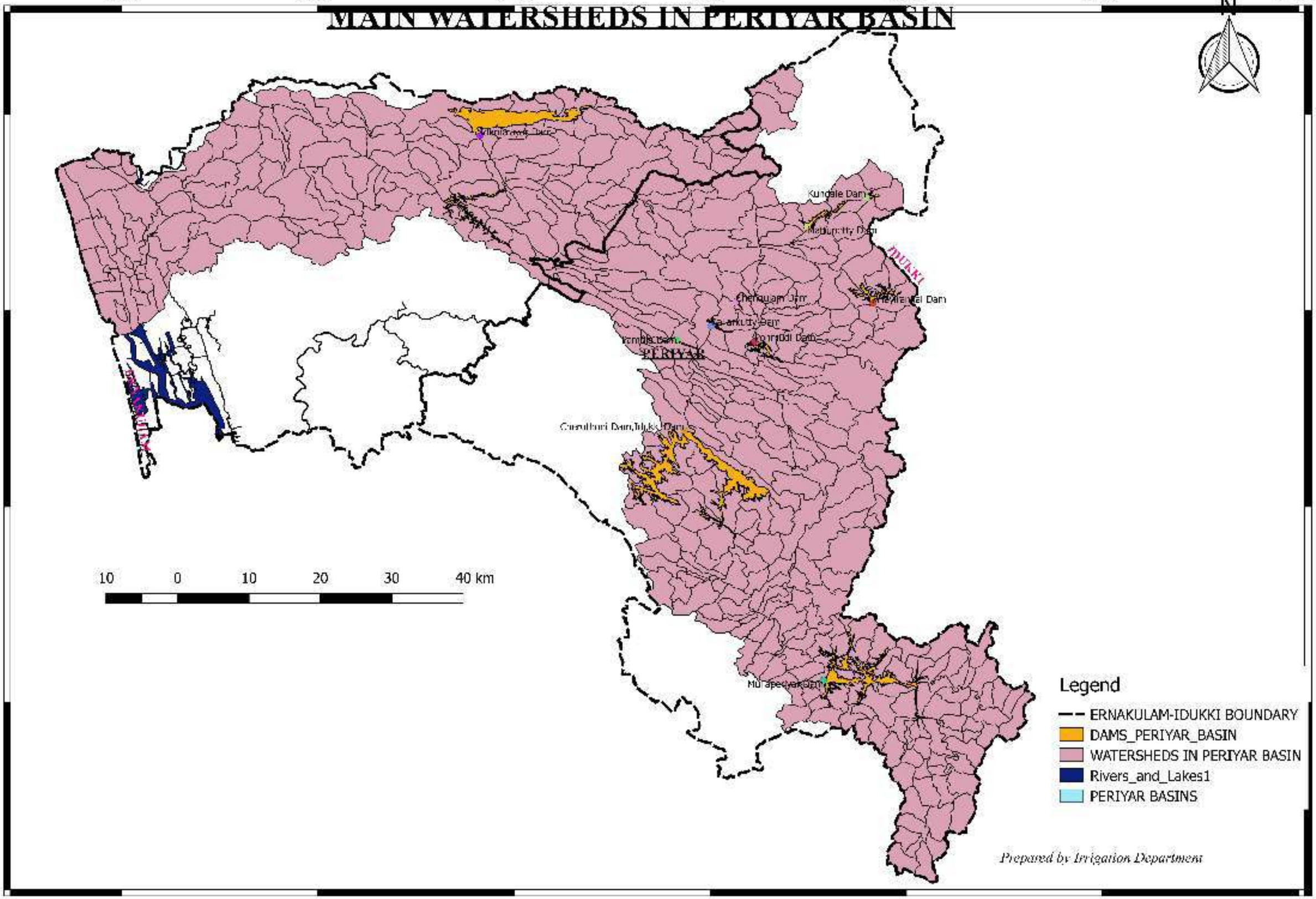
- ERNAKULAM-IDUKKI BOUNDARY
- MINOR DRAINS
- DAMS_PERIYAR_BASIN

Major_drains

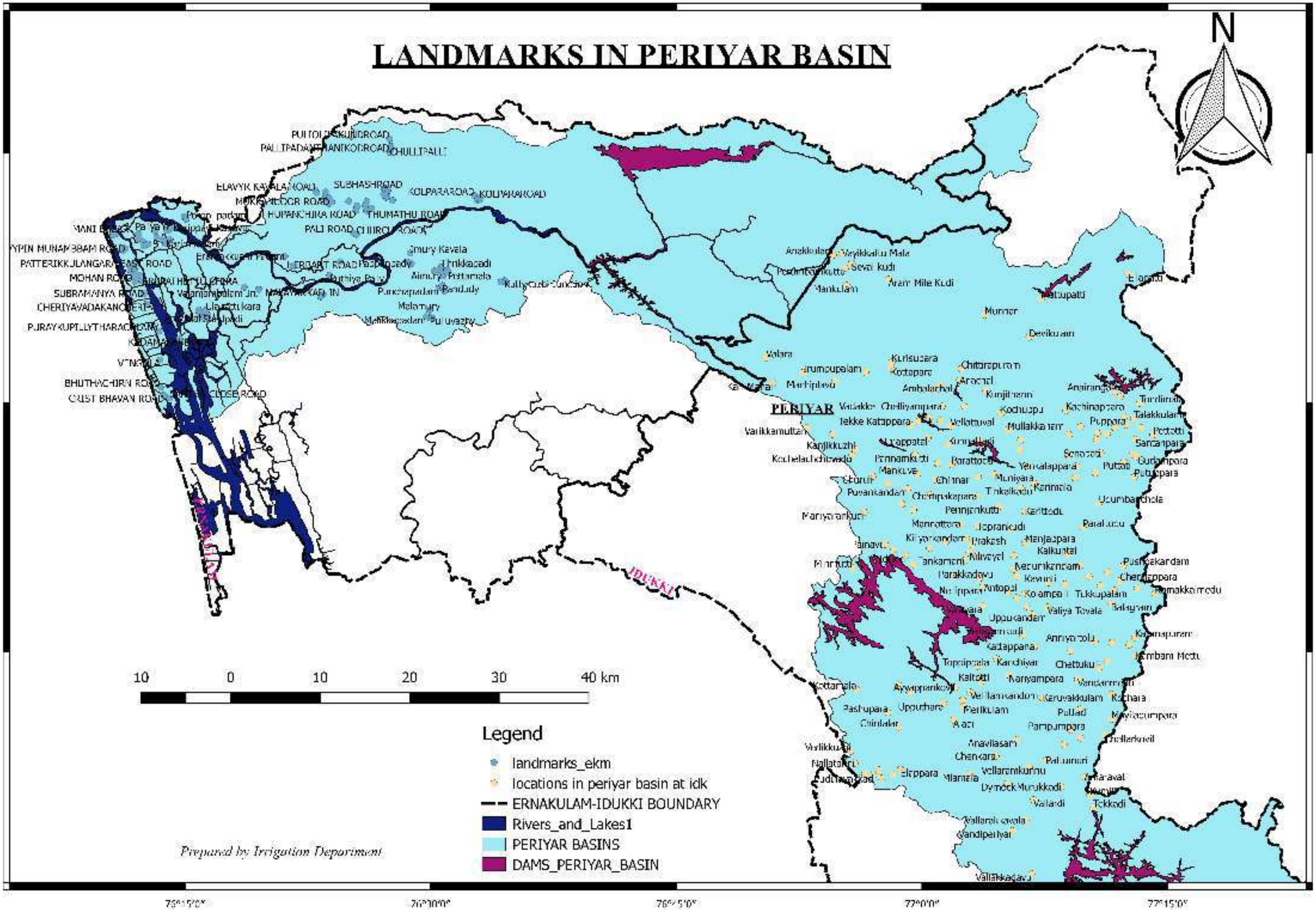
- 1- Karangal thodu
- 10- Puvarasu Oda
- 11- Anthuruli Oda
- 12- Machan oda
- 13- Pekkanan thodu
- 14- Periyakaduva thodu
- 15- Kirikkara thodu
- 16- Karindhiri Ar
- 17- Chinthalar
- 18- Kuvalathodu
- 19- Cheruthoni Ar
- 2- Inchippara thode
- 20- Palikudam Thode
- 21- Churuli Thode
- 22- Pazhayeri Thodu
- 23- Munthirimedu Ar
- 24- Palar
- 25- Kallar
- 26- Chinnar
- 27- Irattayar
- 28- Muthirapuzha Ar
- 29- Kattappana Ar
- 3- Vazhukkapara thodu
- 30- Tuval Ar
- 31- Kannimala
- 32- Nadakkal Ar
- 33- Anamalai Ar
- 34- Bhima mala Ar
- 35- Kallar Ar
- 36- Itili Ar
- 37- Idamala Ar
- 38- Chinna kallar nadi
- 39- Puvar Nadi
- 4- Churakkotta thodu
- 40- Tuduppi Ar
- 41- Mamala thode
- 42-Chittur Ar
- 43-Kunji Ar
- 44-Puyankutty Ar
- 45- Karithiri Ar
- 46- Kadal Ar
- 47- Kallarkutty Ar
- 48- Melassari Ar
- 49- Kudal Ar
- 5- Kalaradichan thodu
- 50- Devi Ar
- 51- Thundathil Thodu
- 52- Kulampattu todu
- 53- Mannathil Thodu
- 54- Vattakulath Road
- 55- Perumthodu
- 56- Vamuzhy thodu
- 57- Pullani thode
- 58- Maravetti thodu
- 59- Chela Thodu
- 6- Mulla Ar
- 60- Kotayil Thode
- 61- PERIYAR
- 62- Panni Ar
- 63- Karinadu thodu
- 64- Anamalai Ar
- 65- Rapra thode
- 66- Chalakkudi River
- 67- Chengal Thodu
- 68- Puliyampally Thode
- 69- Anachal thode
- 7- Maddalakutti thode
- 70- Kotakulangara thode
- 71- Pullut
- 72- Mattupetty Reservoir
- 73- Sethuparavathipuram R
- 74-Ummikuppanthode
- 75- Kottamala Pallam
- 76- Tachapalli Todu
- 77- Muttika Todu
- 78- Penturutu Todu
- 79- Mala thode
- 8- Tenkasi Oda
- 80- Kakani Thode
- 81- Kuzhimberi thode
- 82- Pachankuttu thode
- 83- Cherupuram thode
- 84- Vadattupara thode
- 85- Anaikayam thode
- 86- Cherpuram thode
- 87- Varattupuzha
- 88- Kuttampuzha
- 89- Kannimala
- 9- Irukkutti Rd
- 90- Pampalappara
- 91- Mettukadu Ar
- 92- Anaimudi Ar
- 93- Manali Ar
- 94- Gudrale Ar
- 95- Kallar R
- 96- Onjil thode
- 97- Pichchi Ar
- 98- Anakkulam
- 99- Kadavakad thode
- Rivers_and_Lakes1
- PERIYAR BASINS

Prepared by Irrigation Department

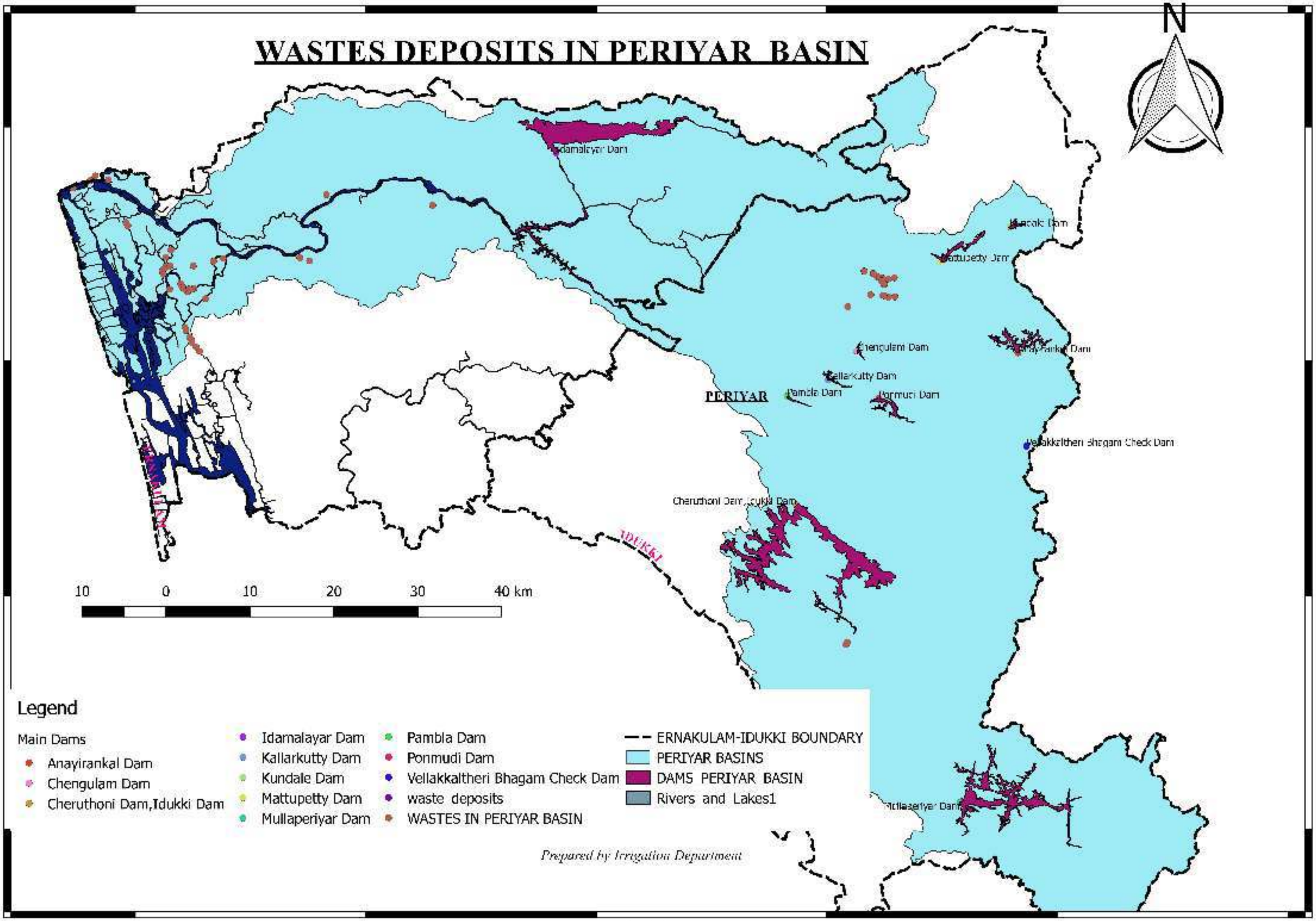
MAIN WATERSHEDS IN PERIYAR BASIN



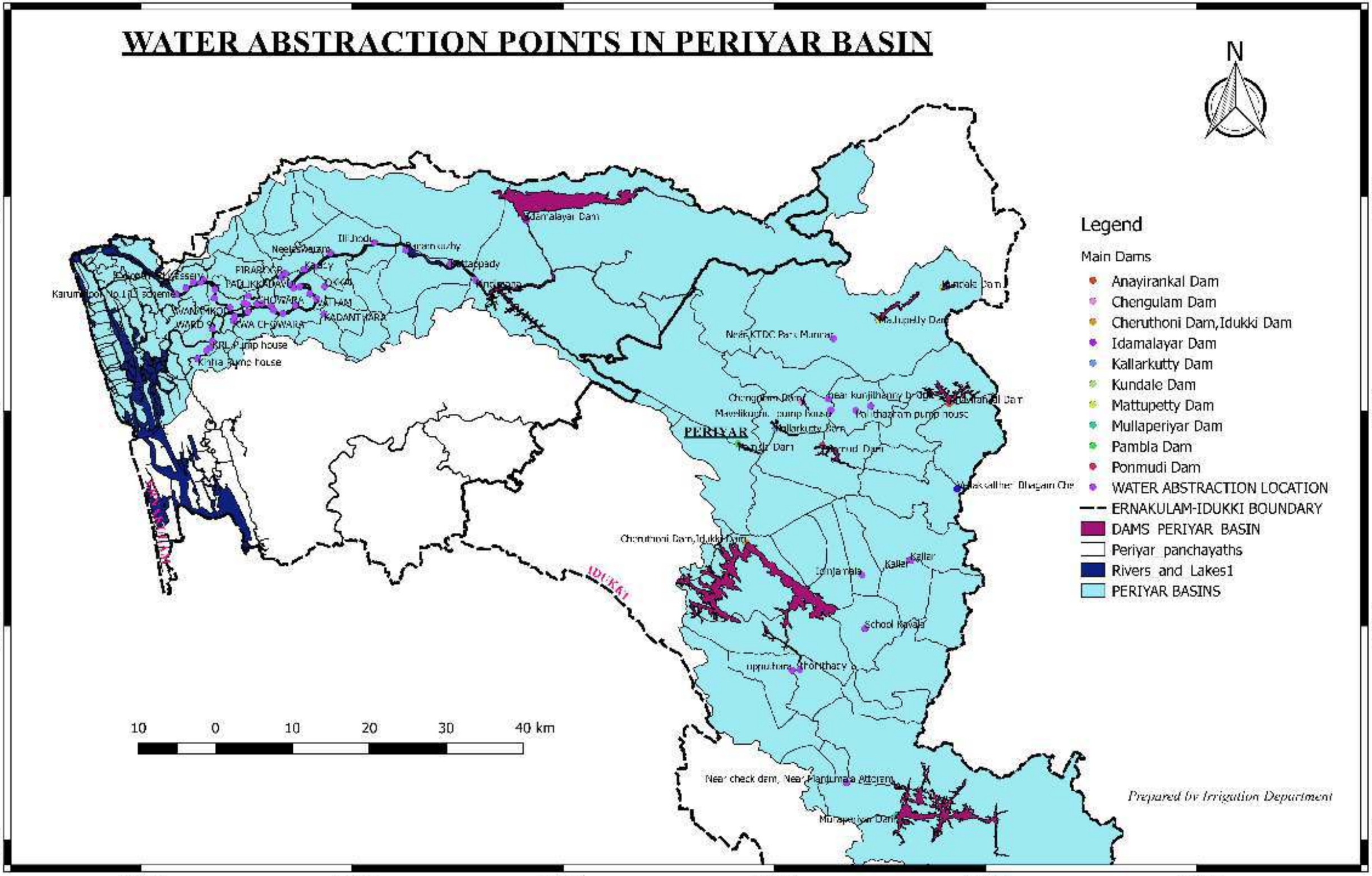
LANDMARKS IN PERIYAR BASIN



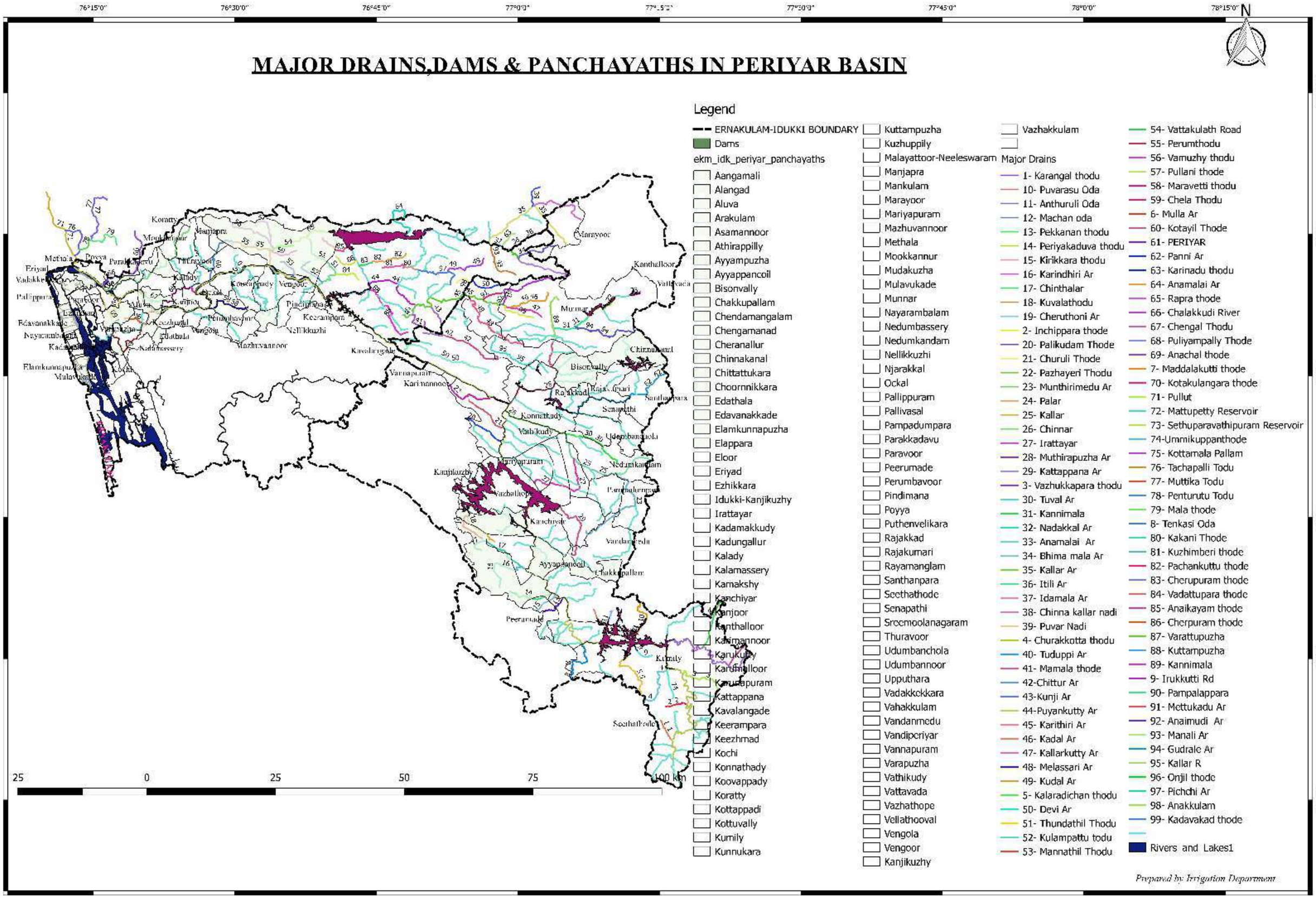
WASTES DEPOSITS IN PERIYAR BASIN



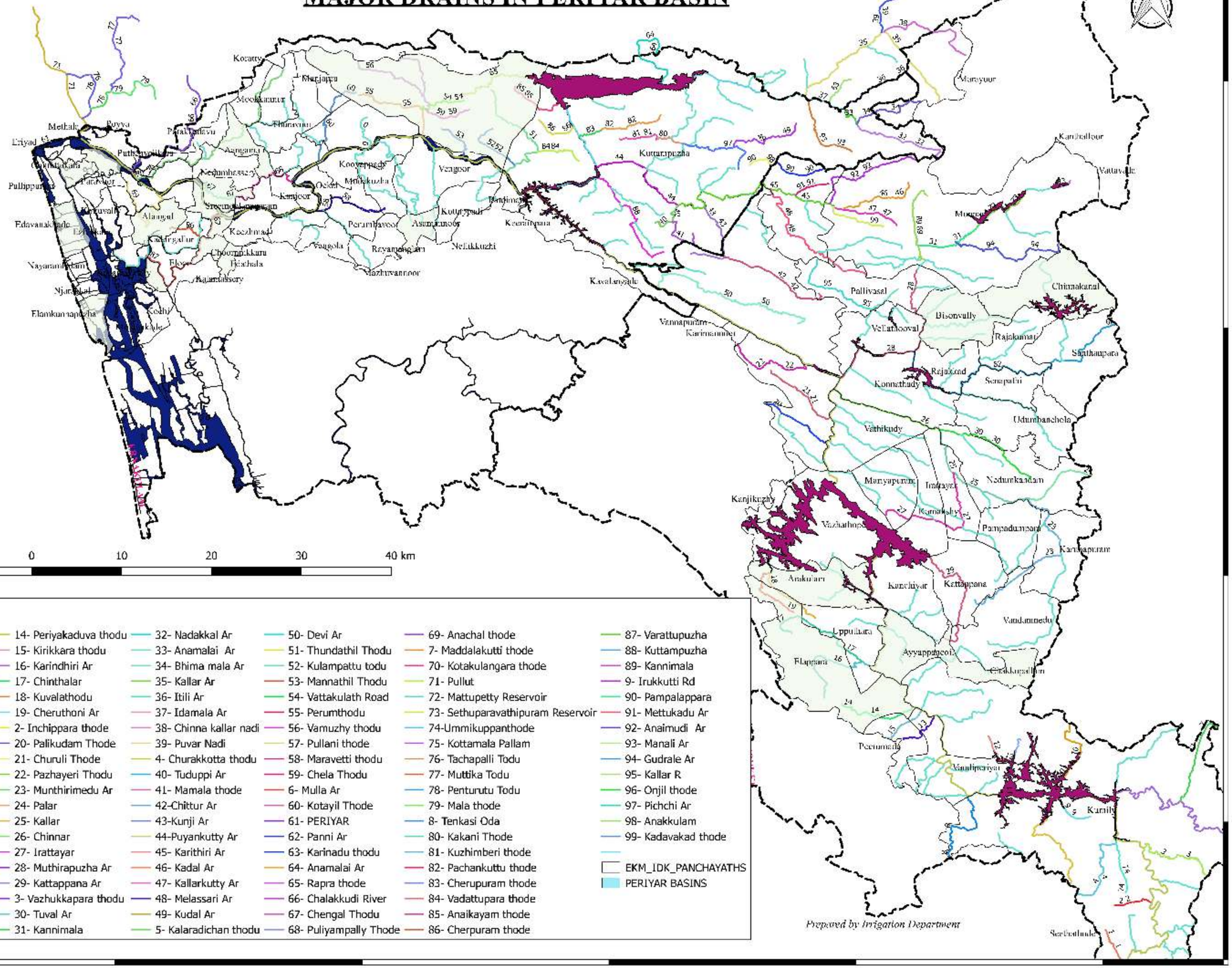
WATER ABSTRACTION POINTS IN PERIYAR BASIN



MAJOR DRAINS,DAMS & PANCHAYATHS IN PERIYAR BASIN



MAJOR DRAINS IN PERIYAR BASIN



Legend

Main Dams

- Anayirankal Dam
- Chengulam Dam
- Cheruthoni Dam,Idukki Dam
- Idamalayar Dam
- Kallarkutty Dam
- Kundale Dam
- Mattupetty Dam
- Mullaperiyar Dam
- Pambla Dam
- Ponmudi Dam
- Vellakkaltheri Bhagam Check Dam
- ERNAKULAM-IDUKKI BOUNDARY

Major Drains in Periyar basin

- 1- Karangal thodu
- 10- Puvarasu Oda
- 11- Anthuruli Oda
- 12- Machan oda
- 13- Pekkanan thodu
- 14- Periyakaduva thodu
- 15- Kirikkara thodu
- 16- Karindhiri Ar
- 17- Chinthalar
- 18- Kuvalathodu
- 19- Cheruthoni Ar
- 2- Inchippara thode
- 20- Palikudam Thode
- 21- Churuli Thode
- 22- Pazhayeri Thodu
- 23- Munthirimedu Ar
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- 26- Chinnar
- 27- Irattayar
- 28- Muthirapuzha Ar
- 29- Kattappana Ar
- 3- Vazhukkapara thodu
- 30- Tuval Ar
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- 33- Anamalai Ar
- 34- Bhima mala Ar
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- 36- Itili Ar
- 37- Idamala Ar
- 38- Chinna kallar nadi
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- 4- Churakkotta thodu
- 40- Tuduppi Ar
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- 51- Thundathil Thodu
- 52- Kulampattu todu
- 53- Mannathil Thodu
- 54- Vattakulath Road
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- 56- Vamuzhy thodu
- 57- Pullani thode
- 58- Maravetti thodu
- 59- Chela Thodu
- 6- Mulla Ar
- 60- Kotayil Thode
- 61- PERIYAR
- 62- Panni Ar
- 63- Karinadu thodu
- 64- Anamalai Ar
- 65- Rapra thode
- 66- Chalakkudi River
- 67- Chengal Thodu
- 68- Puliyampally Thode
- 69- Anachal thode
- 7- Maddalakutti thode
- 70- Kotakulangara thode
- 71- Pullut
- 72- Mattupetty Reservoir
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- 74-Ummikuppanthode
- 75- Kottamala Pallam
- 76- Tachapalli Todu
- 77- Muttika Todu
- 78- Penturutu Todu
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- 80- Kakani Thode
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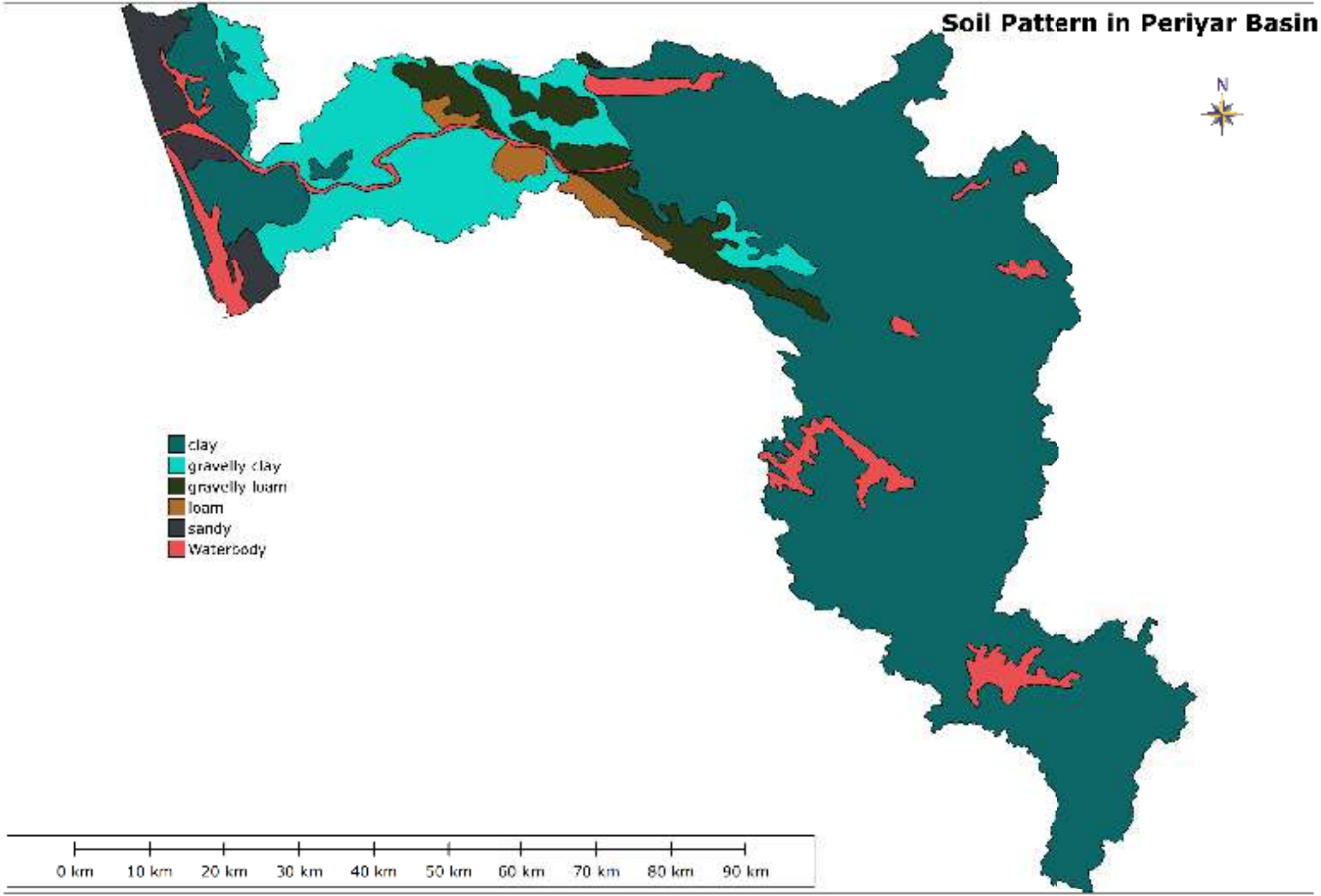
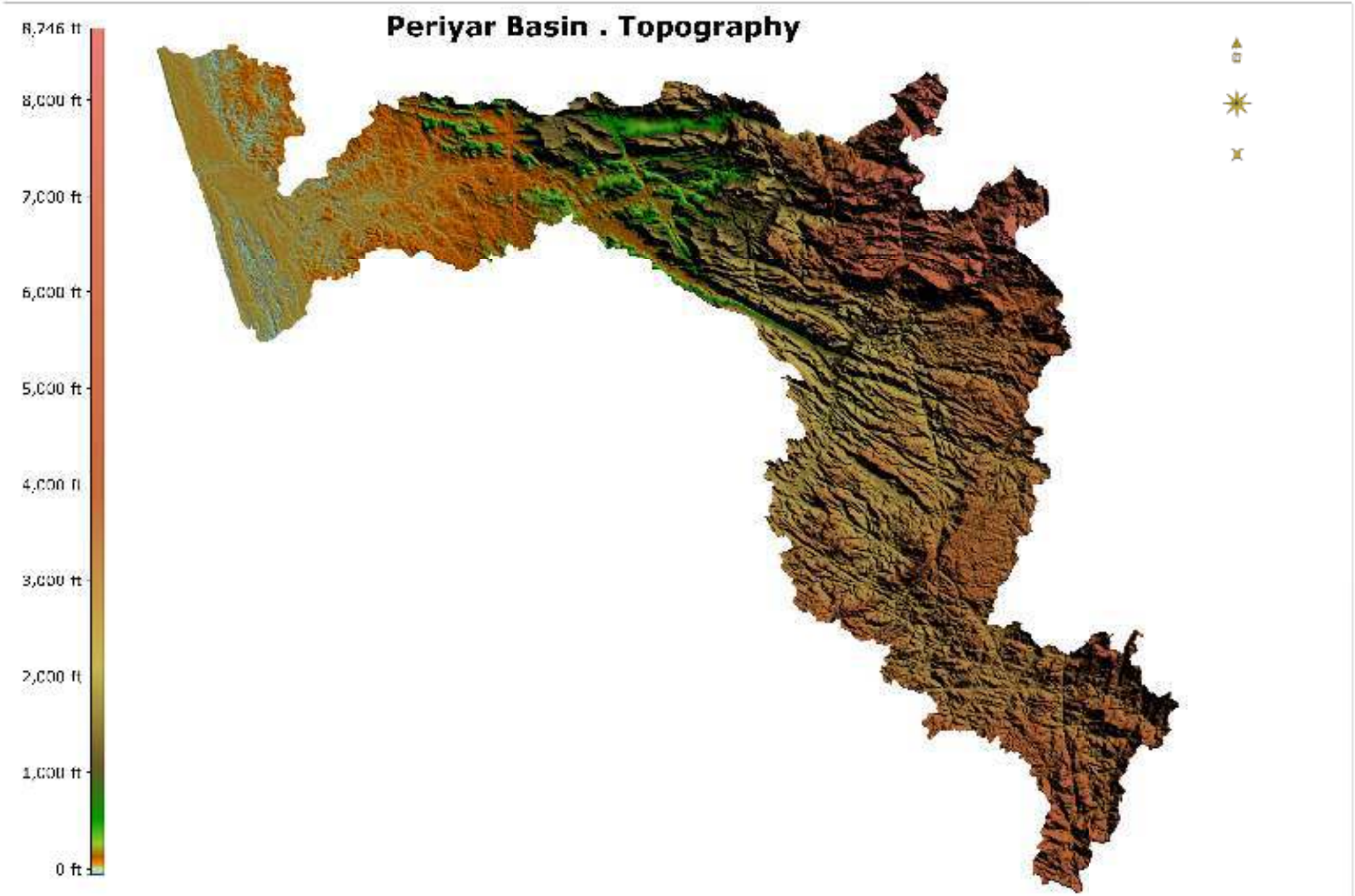
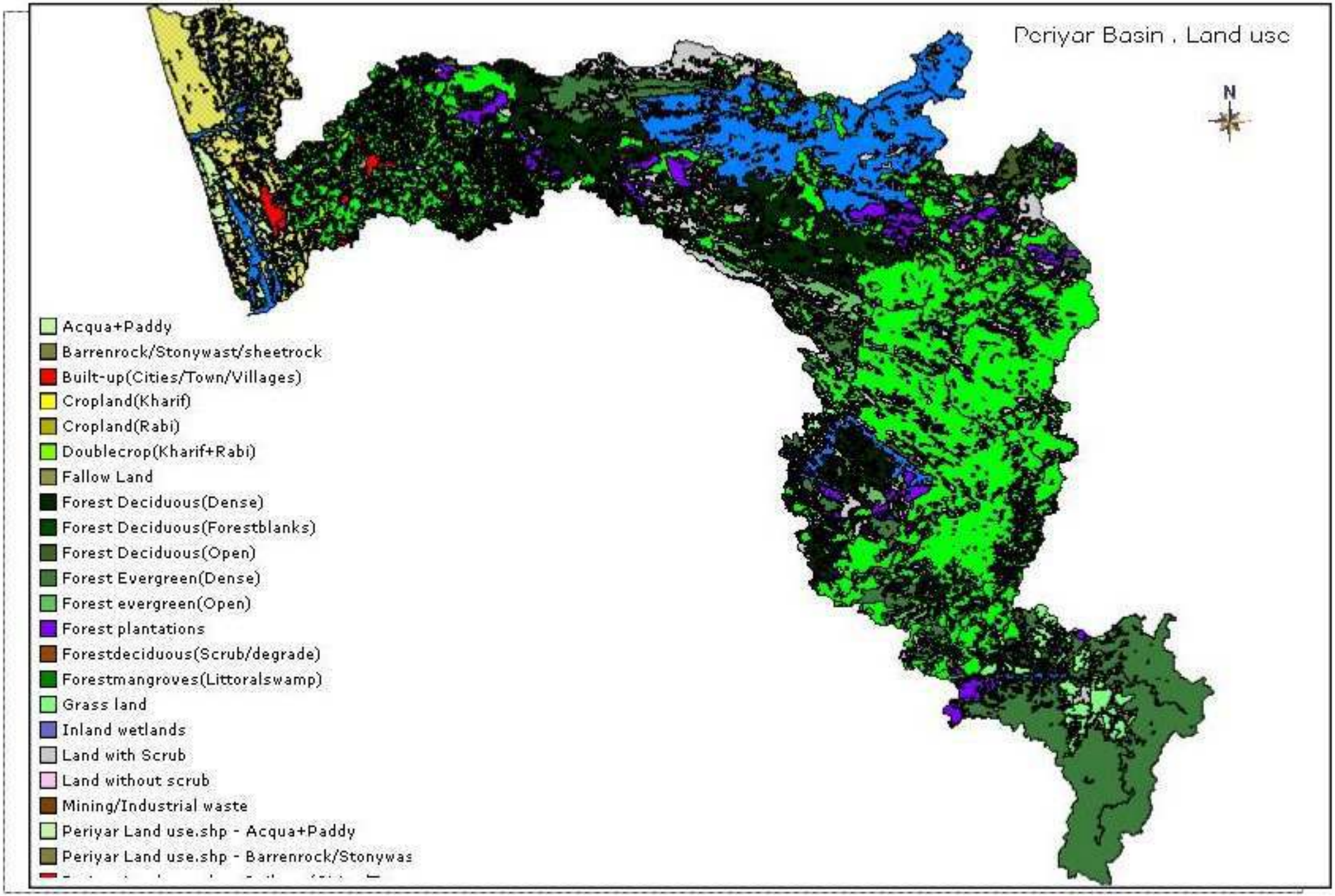
- 82- Pachankuttu thode
- 83- Cherupuram thode
- 84- Vadattupara thode
- 85- Anaikayam thode
- 86- Cherpuram thode
- 87- Varattupuzha
- 88- Kuttampuzha
- 89- Kannimala
- 9- Irukkutti Rd
- 90- Pampalappara
- 91- Mettukadu Ar
- 92- Anaimudi Ar
- 93- Manali Ar
- 94- Gudrale Ar
- 95- Kallar R
- 96- Onjil thode
- 97- Pichchi Ar
- 98- Anakkulam
- 99- Kadavakad thode
- EKM_IDK_PANCHAYATHS
- PERIYAR BASINS


Soil Pattern in Periyar Basin
N
clay
gravelly clay
gravelly loam
loam
sandy
Waterbody
0 km
10 km
20 km
30 km
40 km
50 km
60 km
70 km
80 km
90 km


Periyar Basin . Topography
8,746 ft
8,000 ft
7,000 ft
6,000 ft
5,000 ft
4,000 ft
3,000 ft
2,000 ft
1,000 ft
0 ft


Periyar Basin . Land use
N
Acqua+Paddy
Barrenrock/Stonywast/sheetrock
Built-up(Cities/Town/Villages)
Cropland(Kharif)
Cropland(Rabi)
Doublecrop(Kharif+Rabi)
Fallow Land
Forest Deciduous(Dense)
Forest Deciduous(Forestblanks)
Forest Deciduous(Open)
Forest Evergreen(Dense)
Forest evergreen(Open)
Forest plantations
Forestdeciduous(Scrub/degrade)
Forestmangroves(Littoralswamp)
Grass land
Inland wetlands
Land with Scrub
Land without scrub
Mining/Industrial waste
Periyar Land use.shp - Acqua+Paddy
Periyar Land use.shp - Barrenrock/Stonywas

DETAILS OF PERIYAR RIVER

REACH I

PERIYAR RIVER -MAIN STRETCH

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
62.00	Mullaperiyar Dam	9.525	77.145833	365.85	rock		forest					forest		Dam				Forest						yes
63.62		9.527923	77.131371	forest			forest					forest												yes
64.84		9.531986	77.12134	forest			forest					forest												yes
65.00		9.530891	77.119623	forest			forest					forest												yes
65.19	Chappath near forest checkpost	9.52732	77.11293	90	silt	N	forest	silt			silt	forest	N	Bridge										yes
66.10		9.528273	77.11221	13	silt	N	forest	silt			silt	forest	N					0.30	Silt & Clay	80% silt & 20%clay				yes
66.22		9.529054	77.111449	12.5	silt	N	forest	silt			silt	forest	N					1.00	Silt & Clay	80% silt & 20%clay				yes
66.35		9.530559	77.110865	27	silt	N	private	silt			silt	forest	N					0.50	Silt & Clay	80% silt & 20%clay				yes
66.42		9.531131	77.110724	16.5	silt	N	private	silt			silt	forest	N					1.00	Silt & Clay	80% silt & 20%clay				yes
66.79		9.5338	77.108497	19	silt	N	private	silt			silt	forest	N					0.50	Silt & Clay	80% silt & 20%clay				yes
67.00		9.535496	77.107453	16	silt	N	private	silt			silt	forest	N					1.00	Silt & Clay	80% silt & 20%clay				yes
67.42		9.53721	77.104197	12.5	silt	N	private	silt			silt	forest	N					0.20	Silt & Clay	80% silt & 20%clay				yes
68.23		9.540743	77.097869	32	silt	N	private	silt			silt	forest	N					0.50	Silt & Clay	80% silt & 20%clay				yes
69.00		9.5463	77.095479	46	silt	N	private	silt			silt	forest	N					1.00	Silt & Clay	80% silt & 20%clay				yes
69.68		9.550425	77.094356	30	silt	N	private	silt			silt	Private	N					0.20	Silt & Clay	80% silt & 20%clay				yes
69.98	Vallakadavu chappath	9.551446	77.092234	105	rock	Y	private	rock			rock	Private	Y	Bridge										yes
70.15		9.551919	77.090381	17	silt	N	private	silt			silt	Private	N					1.00	Silt & Clay	80% silt & 20%clay				yes
71.83	karuppu palam	9.562861	77.094621	58	Rock	Y	private	rock			rock	Private	Y	Bridge										yes
72.80		9.561057	77.085418	20	silt	N	private	silt			silt	Private	N					0.50	Silt & Clay	80% silt & 20%clay				yes
72.90		9.561077	77.084351	13	silt	N	private	silt			silt	Private	N					1.00	Silt & Clay	80% silt & 20%clay				yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
73.90		9.567054	77.084621	55	silt	N	private	silt			silt	Private	N					0.50	Silt & Clay	80% silt & 20%clay				yes
74.05	check Dam vandiperiyar	9.56708	77.08577	65	Rock	Y	private	rock			rock	Private	Y	Check Dam										yes
75.00	vandiperiyar bridge	9.57272	77.0915	98	Rock	Y	private	rock			rock	Private	Y	Bridge										yes
75.11	D/S of Vandiperiyar Bridge	9*57'47"N	77*08'82"E	50 m	Rock	N	Private	Silt	2	2	Silt	Private	N	-	-	-	-	0.30	Silt, Sand and clay	70% silt,25% sand & 5% clay	-	-	-	Y
78.43	Manjumala	9*60'09"N	77*08'79"E	76 m	Rock	N	Private	Silt	2	2	Silt	Private	N	-	-	-	-	0.30	Silt, Sand and clay	70% silt,25% sand & 5% clay	-	-	-	Y
79.46	Chandravanam	9*60'88"N	77*08'27"E	75 m	Rock	N	Private	Silt	2	2	Silt	Private	N	-	-	-	-	0.50	Silt, Sand and clay	70% silt,25% sand & 5% clay	-	-	-	Y
80.23	Chandravanam bridge	9'60'83"N	77'07'79"E	60	Rock	Y	Private	Silt	2	2	Silt	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	Y
80.63	d/ s of chanddravanam briidge	9.6077	77.0739	30	Silt	-	-	-	1.50	1.00	Silt	Private	N	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
80.73	d/ s of chanddravanam briidge	9.60729	77.07367	15	Silt	N	Private	Silt	2.00	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
80.83	d/ s of chanddravanam briidge	9.60793	77.07219	23	Silt	N	Private	Silt	2.00	2.00	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
81.08	d/ s of chanddravanam briidge	9.6096	77.0718	12	Silt	N	Private	Silt	2.00	2.00	Private	Silt	N	-	-	-	-	0.75	Silt and clay	80% silt,20% clay	-	-	-	Y
81.13	d/ s of chanddravanam briidge	9.61054	77.07128	30	Silt	N	Private	Silt	1.50	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
81.29	d/ s of chanddravanam briidge	9.6119	77.0706	10	Silt	N	Private	Silt	1.00	1.00	Silt	Private	N	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
81.29	d/ s of chanddravanam briidge	9.6119	77.0706	12	Silt	N	Private	Silt	2.00	1.50	Silt	Private	N	-	-	-	-	0.75	Silt and clay	80% silt,20% clay	-	-	-	Y
81.38	u/s side of Keerikkara bridge	9.6126	77.0699		Silt	N	Private	Silt	1.50	2.00	-	-	-	-	-	-	-	0.75	Silt and clay	80% silt,20% clay	-	-	-	Y
81.46	u/s side of Keerikkara bridge	9.6126	77.0697		Silt	N	Private	Silt	1.00	1.00	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
81.49	Keerikkara bridge	9.612648	77.0696	40	Silt	N	Private	Silt	1.00	1.00	Silt	p	Y	Bridge	handrails damaged	Y	Y	-	-	-	-			
81.51	d/s side of Keerikkara bridge	9.6127	77.0695	20	Silt	N	Private	Silt	1.00	1.00		-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
81.51	d/s side of Keerikkara bridge	9.6131	77.0696	24	Silt	-	-	-	1.00	1.00	Silt	Private	N	Silt	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
81.68	d/s side of Keerikkara bridge	9.6134	77.0685	12	Silt	-	-	-	1.00	1.00	Silt	Private	N	Silt	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
81.78	d/s side of Keerikkara bridge	9.61375	77.06758	13	Silt	-	-	-	1.50	1.50	Silt	Private	N	Silt	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
82.09	d/s side of Keerikkara bridge	9.6145	77.0649	19	Silt	N	P	Silt	1.50	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
82.24	d/s side of Keerikkara bridge	9.6156	77.0635	24	Silt	N	P	Silt	1.50	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
82.41	d/s side of Keerikkara bridge	9.6166	77.0621	20	Silt	N	Private	Silt	1.50	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
82.58	d/s side of Keerikkara bridge	9.6174	77.0597	27	Silt	-	-	-	1.00	1.00	Silt	Private	N					1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
82.79	d/s side of Keerikkara bridge	9.6174	77.059	17	Silt	N	Private	Silt	1.00	1.00	Silt	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
82.96	d/s side of Keerikkara bridge	9.6176	77.0574	35	Silt	N	Private	Silt	1.00	1.00	Silt	-	-	-	-	-	-	0.75	Silt and clay	80% silt,20% clay	-	-	-	Y
82.96	d/s side of Keerikkara bridge	9.6182	77.0566	20	Silt	-	-	-	1.00	1.00	Silt	Private	N	-	-	-	-	0.75	Silt and clay	80% silt,20% clay	-	-	-	Y
83.34	d/s side of Keerikkara bridge	9.6195	77.0549	31	Silt	N	P	Silt	1.00	1.00	Silt	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
83.65	Mlamala Bridge	9.62145	77.05315	59	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	Y
83.94	d/s side of Mlamala bridge	9.62215	77.05004	20	Silt	N	P	Silt	1.00	1.00	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
83.94	d/s side of Mlamala bridge	9.6223	77.0504	20	Silt	-	-	-	1.00	1.00	Silt	Private	N	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
84.40	d/s side of Mlamala bridge	9.6242	77.0469	23	Silt	N	P	Silt	1.00	1.00	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
84.59	d/s side of Mlamala bridge	9.62603	77.04816	46	Silt	N	P	Silt	1.50	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
84.83	d/s side of Mlamala bridge	9.6275	77.0494	34	Silt	-	-	-	1.50	1.50	N	P	Silt	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
85.27	U/s of foot bridge	9.63232	77.05112	40	Silt	-	-	-	1.50	1.50	Silt	Private	N	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
85.48	Foot bridge	9.6315	77.051	70	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Bridge	half portion collapsed	damaged portions	Yes	-	-	-	-	-	-	Y
85.60	d/s of foot bridge	9.63597	77.05031	50	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Bridge	-	y	Yes	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
86.04	d/s of foot bridge	9.6366	77.0514	48	Silt	Silt	Private	N	1.50	1.50	-	-	-	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
86.64	d/s side of foot bridge	9.6402	77.0478	40	Silt	-	-	-	1.50	1.50	Silt	Private	N	-	-	-	-	1.00	Silt and clay	80% silt,20% clay	-	-	-	Y
86.74	d/s side of foot bridge	9.6400	77.0466	18	silt	Silt	Private	y	2.00	2.00	Silt	Private	N	-	-	Y	No	2.00	Silt and clay	80% silt,20% clay	-	-	-	Y
86.84	d/s side of foot bridge	9.6399	77.0454	18	silt	Silt	Private	y	2.00	2.00	-	-	-	-	-	-	-	2.00	Silt and clay	75% silt,25% clay	-	-	-	Y
87.09	Santhipalam	9.640564	77.043426	70m	Rock	N	Private	Silt	3m	N	Private	Silt	3m	RR Masonry	-	Width of River at this portion is 70m, but the width of vent way is 25.70m	Yes	2m	Silt	80% Silt and 20% clay	-	-	-	-
87.20	Island formation starts	9.640533	77.043595	70m	Laterite	N	Private	Silt	3m	N	Private	Silt	3m	-	-	-	-	2.00, 2.50	Silt	80% Silt and 20% clay	-	-	-	-
87.24	Thengakal thodu join to periyar River	9.640641	77.043546	30 m	Laterite	N	Private	Silt	3m	N	Private	Silt	3m	-	-	-	-	-	-	-	-	-	-	-
89.30	Elappara Vallakkadavu bhagam	9.647504	77.030801	67m	Rock	N	Private	Silt	2.50m	N	Private	Silt	3m	-	-	-	-	1.5	Silt	80% Silt and 20% clay	-	-	-	-
92.63	Elappara Vallakkadavu bhagam Bridge	9.653653	77.019076	79m	Rock	N	Private	Silt	3.50m	N	Private	Silt	3.50m	RCC	-	Width of River at this portion is 79m, but the width of vent way is 68m and depth of vent way is 3.50m	Yes	1.50, 1.50 & 2.00	Silt	80% Silt and 20% clay	-	-	-	-
93.61	Moonattumukk bhagam	9.658379	77.016685	45m	Silt	N	Private	Silt	4m	N	Private	Silt	4m	-	-	-	-	4.00, 3.00	Silt	80% Silt and 20% clay	-	-	-	-
93.93	Malankara Tea Factory check dam	9.658379	77.016685	90m	Rock	N	Private	Silt	4m	N	Private	Silt	3.50m	RCC	-	L = 90m	N	-	-	-				
94.40	Upstream side of Chappath bridge	9.65911	77.019293	76m	Rock	N	Company	Silt	7m	N	Private	Silt	7m	-	-	-	-	2.50	Silt	80% Silt and 20% clay	-	-	-	-
92.89	Chappath bridge	9.666622	77.021717	125 m	rock	N	govt	gravel	2m	2.5 m	gravel	govt	N	bridge	safe	tree trunks	no	0	rock	NA	NA		no	yes
94.72	collapsed Alady porikanni Bridg	9.6783411	77.0273455	NA	rock	N	govt	gravel	2.5 m	3m	gravel	govt	N	bridge	collapsed	no	yes	0	rock	NA	NA		no	yes
97.60	Upputhara Bridge	9.697583	77.022348	150 m	rock	N	govt	gravel/ silt	2.5m	2.5m	gravel/ silt	govt	N	bridge	safe	no	No	0	rock	NA	LB	both	yes	yes
100.45	Ayyapankovil Bridge	9.716803	77.032643	110 m	silt/clay	N	govt	gravel/silt	3m	3m	gravel/silt	govt	N	bridge	drowned	no	yes	0	rock	NA	NA		no	no
100.50	ayyapankovil Hanging bridge	9.716503	77.032643	160 m	silt/clay	N	govt	gravel/silt	3m	3m	gravel/silt	govt	N	bridge	safe	no	No	0	rock	NA	NA		no	no
119.90	Cheruthoni Dam	9°50'49.53"N	76°58'6.67"E	650m	Rock	N0	govt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	govt	N0	Dam	STABLE	N0	N0	0.3	Silt & Clay	80% & 20%	N0	N0	N0	N0

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
121.65	Cheruthoni Submercible bridge	9°51'27.52" N	76°57'48.7" E	46.2m	Rock	NO	Pvt	FOREST LOAM SOIL	5m	5m	FOREST LOAM SOIL	Pvt	NO	Submercible bridge	STABLE	NO	NO	0.5	Silt & Clay	80% & 20%	NO	NO	NO	NO
125.63	Thadiyambadu Chappath	9°52'43.95" N	76°58'13.51" E	170m	Rock	NO	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	NO	Chappath	STABLE	NO	NO	0.6	Silt & Clay	80% & 20%	NO	NO	NO	NO
128.80	Karimban Bridge	9°53'55.86" N	76°58'27.56" E	210m	Rock	NO	Pvt	FOREST LOAM SOIL	6m	6m	FOREST LOAM SOIL	Pvt	NO	Bridge	STABLE	NO	NO	0.6	Silt & Clay	80% & 20%	NO	NO	NO	NO
128.90	Karimban	9.899051	76.974737	85 m	sandy soil	N	Private	red earth	2	2	Red earth	Private	N	Chappathu	OLD	Y	Y	NA	NA	NA	Nil	NA	NA	Y
130.44	alappuzha- madurai Rd	9.908646	76.975798	90 m	Rock	N	Private	red earth	4	4	Red earth	Private	N	Bridge	NEW	Y	N	NA	NA	NA	Nil	NA	NA	Nil
132.45	Periyar Valley	9.924261	76.977876	100 m	Rock	N	Private	red earth	2	2	Red earth	Private	N	Bridge	OLD	Y	Y	NA	NA	NA	Nil	NA	NA	Y
133.85	Periyar Valley	9.933023	76.971985	70 m	sandy soil	N	Private	red earth	2	2	Red earth	Private	N	Chappathu	OLD	Y	Y	0.5	Silt & Clay	80% & 20%	Nil	NA	NA	Y
136.40	Panamkutty	9.9524598	76.98092	110 m	sandy soil	N	Private	red earth	3	3	Red earth	Private	N	Chappathu	OLD	Y	y	0.5	Silt & Clay	70% & 30%	Nil	NA	NA	Nil
136.60	Panamkutty Old check dam	9.96148	76.980765	100	rock		Private					Private		Check dam	Damaged	No	yes				Nil			
136.75	Panamkutty bridge	9.96148	76.980765	110	rock		Private					Private		Bridge		No					Nil			
139.60	Lower Periyar dam	9.96148	76.9567799	284	rock		KSEB					KSEB		Dam	Working	No					Nil			
DETAILS OF LEFT BANK OF PERIYAR RIVER																								
GAVI Thodu																								
0/4.00	Bridge	9.52419	77.11247	3.00	silt	N	forest	rock			rock	forest	N	Bridge	Good	NO	NO							
Vallakadavu poabs Estate thodu																								
0/0.256	Check Dam	9.527975	77.098232	15.00	...		estate	silt	silt	silt	silt	estate	N	Check Dam				2	Silt	70% silt & 30%clay				
0/0.598	Foot Bridge	9.527975	77.098232	12.00	silt	N	estate	silt	silt	silt	silt	estate	N	Foot Bridge				1.5	Silt	80% silt & 20%clay				
0/1.545	Culvert	9.528905	77.108367	4.00	Rock	N	estate	silt	silt	silt	silt	estate	N	Culvert				0.5	Silt	80% silt & 20%clay				
0/1.950	Culvert	9.528672	77.111038	12.00	Rock	N	Private	silt	silt	silt	silt	Private	N	Culvert				0.5	Silt	80% silt & 20%clay				
Kocokkad thodu																								
0/0.00	Check Dam	9.550025	77.09117	30.00	Rock	N	Private	silt	silt	silt	silt	Private	N	Check Dam				2	silt	75% silt & 25%clay				
0/0.09	Culvert	9.550833	77.091578	3.50	Rock	N	Private	silt	silt	silt	silt	Private	N	Culvert				0.5	silt	80% silt & 20%clay				
Aranakkal Estate thodu																								
0/0.000	Check Dam	9.53785	77.072697	40.00	Rock	N	estate	silt			silt	estate	N	Check Dam					silt	70% silt & 30%clay				
0/2.992	Check Dam	9.555492	77.084353	40.00	Rock	N	estate	silt			silt	estate	N	Check Dam				2	silt	70% silt & 30%clay				
Vandiperiyar Sathram thodu																								

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0/0.000	Check Dam	9.54339	77.06607	35.00	Rock	N	estate	silt			silt	estate	N	Check Dam				0.5	silt	70% silt & 30%clay				
0/3.099	Culvert	9.56185	77.0769	5.00	Rock	N	estate	silt			silt	estate	N	Culvert				0.5	silt	80% silt & 20%clay				
0/3.345	Bridge	9.56349	77.07812	18.00	Rock	N	estate	silt			silt	estate	N	Bridge				0.5	silt	80% silt & 20%clay				
0/1.144 Branch tributary	Bridge	9.56562																						
80.11 Km	**Chandravanam Thodu (Tributary)**																							
0.030 km	Chandravanam Bridge	9°60'84"N,	77°07'82"E	4.3	Silt	N	Private	Silt	4	4	Silt	Private	N	Bridge	Good	No	No	-	NA	NA	NA	NA	no	Y
0.150 km	Chandravanam Checkdam	9°60'88"N	77°07'78"E	9	Silt	N	Estate	Silt	4.5	4	Silt	Estate	N	Checkdam	Maintenace required	No	No	-	NA	NA	NA	NA	no	Y
0.670 Km	Peckanam Check dam	9°60'87"N	77°07'78''E	40	Silt	N	Estate	Silt	5	4	Rock	Estate	N	RCC Checkdam	Good	No	No	-	NA	NA	NA	NA	no	Y
81.64 Km	**Keerikkara thodu (Tributary)**																							
0.300KM	Culvert No.1	9°61'25"N,	77°06'43"E.	5.6	Rock	Y	Private	Rock	2.00	2.00	Rock	Private	Y	Culvert2	Good	No	No	3.5	silt	80% silt,20% clay	NA	NA	no	Y
4.10KM	Ranikovil checkdam	9°58'49"N,	77°03'71"E	28	Silt	N	Estate	clay	1.50	1.50	clay	Estate	N	Checkdam	Maintenace required	No	Yes	1.5	Silt	80% silt,20% clay	NA	NA	no	Y
4.46KM	Culvert No.2	9°58'54"N	77°03'17"E	4	clay	N	Estate	clay	1.00	1.00	clay	Estate	N	Culvert	Good	No	No	-	NA	NA	NA	NA	no	Y
	Ranikovil kaythodu (Sub Tributary of Keerikkara thodu)																							
1.63KM	Ranikovil kaythodu	9°59'7"N	77°04'59''E	3	Rock	N	Estate	Rock	1.50	1.50	Rock	Estate	N	Stone culvert	damaged	No	Yes	-	NA	NA	NA	NA	no	Y
83.09 Km	**Ladrum thodu. (Tributary)**																							
0.70KM	100adi palam	9°61'58" N,	77°05'55" E	34	Silt	N	Private	Silt	3.00	3.00	Silt	Private	N	Bridge	half portion of old bridge collapsed	yes	Yes	-	NA	NA	NA	NA	no	Y
1.07KM	Checkdam No.1	9°59'97"N,	77°02'11"E	18	silt	N	Estate	silt	3.00	3.00	silt	Estate	N	Checkdam	Good	No	No	0.5	Silt and clay	75% silt,20% clay, 5%sand	NA	NA	no	Y
2.74KM	Mlamala bridge.	9°59'95" N,	77°03'67" E	18	Rock	N	Estate	Rock	3.00	3.00	Rock	Estate	N	Bridge	Good	No	No	0.5	Silt and clay	75% silt,25% clay	NA	NA	no	Y
4.16KM	Culvert	9°60'00" N,	77°02'75" E.	15	Silt	N	Estate	Silt	2.50	2.50	Silt	Estate	N	Culvert	damaged	No	Yes	0.5	Silt and clay	75% silt,25% clay	NA	NA	no	Y
4.95KM	Well mouth of KSEB Tunnel from Azhutha diversion dam	9°60'35" N,	77°02'53" E		rock	Y	Estate	silt	4.00	4.00	silt	Estate	Y	Tunnel	good	-	-	-	NA	NA	NA	NA	no	Y
5.05KM	Checkdam No.2	9°59'97" N	77°02'11" E.	10	silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Checkdam	Good	No	No	-	NA	NA	NA	NA	no	Y
84.15KM	**Manjumalathodu (tributary)**																							N
0.23KM	Culvert No.1	9°62'26" N,	77°04'69" E	3	silt	Y	Private	Silt	2.00	2.00	Silt	Private	Y	Culvert	Good	No	No	1	Silt and clay	80% silt,20% clay	NA	NA	no	Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.51KM	Foot bridge	9°62'11" N,	77°04'59" E	7	silt	N	Estate	Silt	1.50	1.50	Silt	Estate	N	Foot bridge	Good	No	No	0.5	Silt and clay	75% silt,25% clay	NA	NA	no	Y
0.53KM	Checkdam No.1	9°62'11" N,	77°04'59" E.	10	silt	N	Estate	Silt	1.50	1.50	Silt	Estate	N	Checkdam	Wing walls did not have enough height	yes	Yes	0.75	Silt and clay	75% silt,25% clay	NA	NA	no	Y
0.90KM	Kannadimadam bridge	9°62'04" N	77°04'33" E	7	silt	N	Estate	Silt	1.50	1.50	Silt	Estate	Y	Bridge	Good	yes	No	0.5	Silt and clay	80% silt,20% clay	NA	NA	no	Y
2.86KM	Culvert No.2	9°62'51"N,	77°03'11"E	4	Silt	N	Estate	Silt	1.50	1.50	Silt	Estate	N	Culvert	Good	No	No	0.5	Silt	100% silt	NA	NA	no	N
3.68KM	Culvert No.3	9°62'65" N,	77°02'58"E	4	Rock	N	Estate	Rock	2.00	2.00	Rock	Estate	N	Culvert	Good	No	No	-	NA	NA	NA	NA	no	Y
3.69KM	Checkdam No.2	9°02'64" N,	77°02'56"	10	Rock	N	Estate	Rock	4.00	4.00	Rock	Estate	N	Checkdam	Good	No	No	1	Silt	80% silt,20% clay	NA	NA	no	Y
91.407 Km	**Chinnar Thodu (Tributary)**																							
0	Moonaattumukku	9.659232	77.012394	25m	Silt	N	Private	Silt	4m	5m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
0.271 km	Near Moonaattumukku	9.660765	77.010648	20m	Silt	N	Private	Silt	4m	5m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
0.390 km	Malankara Tea Estate Pumb house	9.662001	77.010363	20m	Silt	N	Private	Silt	3m	4m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
1 km	karimthiri School bhagam bridge	9.662987	77.004291	20m	Rock and silt	N	Private	Silt	5m	7m	Silt	Private	N	Concrete	Safe	No	N	2m	NA	80% Silt and 20% clay	NA	NA	no	N
1.95 km	Erambadam	9.66193	76.996906	100m	Silt	N	Private	Silt	2m	2.50m	Silt	Private	N	-	-	-	-	2m	NA	80% Silt and 20% clay	NA	NA	no	N
2.66 km	4th Mile	9.658315	76.997483	20m	Rock	N	Private	Silt	1.50 m	2m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
3.05 km	4th Mile Bridge	9.659593	76.994152	18m	Rock	N	Private	Silt	5 m	4m	Silt	Private	N	-	-	-	-	2m	NA	80% Silt and 20% clay	NA	NA	no	N
3.06 km	4th Mile Foot Bridge	9.659595	76.99416	7m	Rock	N	Private	Silt	5 m	4m	Silt	Private	N	Concrete	Not Safe	Yes	Y	-	NA	NA	NA	NA	no	N
3.75 km	Kodaikanal palam	9.659616	76.988466	20m	Rock	N	Private	Silt	4m	5m	Silt	Private	Y	Concrete	Unsafe	Yes	Y	-	NA	NA	NA	NA	no	N
5.65 km	Karimkuttical bhagam bridge	9.665888	76.972796	20m	Rock and silt	N	Private	Silt	4m	4m	Silt	Private	Y	Concrete	safe	No	N	1.50m	Silt and clay	80% Silt and 20% clay	NA	NA	no	N
6.234 Km	Near Elapadam Steel Foot bridge	9.665821	76.968929	18m	rock	y	Private	Silt	4m	4m	Silt	Private	Y	Steel	Unsafe	Yes	Y	-	NA	NA	NA	NA	no	N
6.94 km	Eettathodu Palam (Board Pady)	9.665859	76.968962	15m	Rock and Silt	N	Private	Silt	3m	4m	Silt	Private	Y	Concrete	Unsafe	Yes	Y	-	NA	NA	NA	NA	no	N
7.84 km	Near Karimthiri ST. Thomas Church	9.667889	76.957126	15m	Rock	N	Private	Silt	3m	3m	Silt	Private	Y	-	-	-	-	-	NA	NA	NA	NA	no	N
7.84 km	Arappukadu thodu joins to Chinnar thodu	9.667718	76.956572	10m	Rock and Silt	Y	Private	Silt	2m	2m	Silt	Private	Y	-	-	-	-	-	NA	NA	NA	NA	no	N
7.99 km	Nellikunnel bhagam bridge	9.666344	76.956908	17m	Rock	N	Private	Silt	3m	3m	Silt	Private	Y	Concrete	Safe	No	N	-	NA	NA	NA	NA	no	N
8.83 km	Apakadapalam	9.6597	76.9576	18m	Rock and silt	N	Private	Silt	3m	3m	Silt	Private	Y	Concrete	Safe	No	N	1.50m	Silt and clay	80% Silt and 20% clay	NA	NA	no	N
9.190 km	Hanging Bridge at Kochukarimthiri	9.661082	76.955739	12m	Silt	N	Private	Silt	2.50 m	2m	Silt	Private	N	Iron	Unsafe	Yes	Y	-	NA	NA	NA	NA	no	N
9.943 km	Bridge at Kochukarimtharuvi	9.663013	76.950543	12m	Rock and silt	N	Private	Silt	3m	3m	Silt	Private	Y	Concrete	Damaged	Yes	Y	-	NA	NA	NA	NA	no	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
11.32 km	Bridge at Palozhukumpara	9.658596	76.940103	15m	Rock	N	Private	Silt	3m	3m	Silt	Private	Y	Concrete	Safe	Yes	Y	-	NA	NA	NA	NA	no	N
13.346 km	At Palozhukumpara	9.650009	76.947416	17m	Rock	N	Private	Silt	5m	5m	Silt	Private	Y	Concrete	safe	No	N	-	NA	NA	NA	NA	no	N
15.546 km	Bridge at Nallathanny bhagam at Chinnar thodu	9.637765	76.933706	3m	Rock	N	Private	Silt	2m	2m	Silt	Private	Y	RRM	safe	No	N	-	NA	NA	NA	NA	no	N
	Passurpara Thodu (sub tributary of chinnar thodu)																							
0	Pasupara thodu join to Chinnar thodu	9.659232	77.012394	20m	Silt	N	Company	Silt	3m	3m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
0.43 km	Karimthiri New Bridge	9.665428	77.004454	15m	Rock and Silt	N	Company	Silt	4m	4m	Silt	Company	N	Concrete	Safe	No	N	-	NA	NA	NA	NA	no	N
0.605 KM	Karimthiri Old Bridge	9.665776	77.003187	20m	rock	N	Road	Silt	8m	8m	Silt	Road	N	RRM	Safe	No	N	-	NA	NA	NA	NA	no	N
0.89 km	Cross Bar near Karimthiri old bridge	9.666133	77.002999	22m	Rock and Silt	N	Company	Silt	8m	8m	Silt	Private	N	Concrete	Safe	No	N	-	NA	NA	NA	NA	no	N
3.09 km	Cheenthalar bhagam	9.676788	76.986561	15m	Silt	N	Company	Silt	4m	4m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
3.17 km	Cheenthalar bhagam bridge	9.676788	76.986561	15m	Rock and Silt	N	Company	Silt	5m	5m	Silt	Company	N	Concrete	Safe	No	N	-	NA	NA	NA	NA	no	N
5.04 km	Pasupara AVT estate bhagam bridge	9.686872	76.977891	20m	Rock	N	Company	Silt	3m	3m	Silt	Company	N	RRM	Safe	No	N	-	NA	NA	NA	NA	no	N
6.062 km	Cross Bar near Alampally Pump House	9.695423	77.014257	20m	Rock	N	Private	Silt	3m	3m	Silt	Private	N	concrete	Not Safe	Yes	Y	-	NA	NA	NA	NA	no	N
6.153 km	Foot bridge near Alampally pump house	9.693244	76.970675	20m	Rock and Silt	N	Private	Silt	3m	3m	Silt	Private	N	concrete	Not Safe	Yes	Y	-	NA	NA	NA	NA	no	N
7.26 km	Plamood thodu join to Pasupara thodu	9.693137	76.971047	10m	Silt	N	Company	Silt	2.50 m	2.50 m	Silt	Company	N	-	-	-	-	-	NA	NA	NA	NA	no	N
7.335 km	Bridge at Pasuppara Estate bhagam	9.6953	76.961795	8 m	Silt	N	Company	Silt	2m	2m	Silt	company	N	RRM	Safe	No	N	-	NA	NA	NA	NA	no	N
7.97 km	Bridge at 8th number bhagam	9.698155	76.95816	12 m	Silt and rock	N	Company	Silt	2m	2m	Silt	company	N	RRM	Safe	No	N	-	NA	NA	NA	NA	no	N
8.696 km	Ezham Number bridge at Pasupara thodu	9.701491	76.95421	11m	Silt and rock	N	Private	Silt	3m	5m	Silt	Private	N	Concrete	Safe	No	N	-	NA	NA	NA	NA	no	N
9.546 km	At Ezham Number bhagam	9.705139	76.946784	8m	Silt and rock	N	Private	Silt	3m	5m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
11.712 km	Meenmutty bhagam bridge	9.708539	76.937172	8m	Rock	N	Private	Silt	3m	3m	Silt	Private	N	Concrete	Safe	No	N	-	NA	NA	NA	NA	no	N
13.212 km	At Vattapathal waiting shed bhagam	9.708084	76.932209	5m	Rock	N	Private	Silt	3m	2m	Silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
	Elappara thodu (sub tribtary of chinnar Thodu)																							
0	Kottadimakkal bhagam (Elappara thodu join to Chinnar thodu)	9.657792	76.997903	15m	Silt	N	Private	silt	4m	3m	Silt	Private	N	-	-	-	-	2.00m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N
0.180km	Vadakkekara bhagam bridge	9.656592	76.997837	15m	silt and rock	N	Private	silt	4m	4m	silt	Private	N	RRM	Damaged	Yes	Yes	-	NA	NA	NA	NA	no	N
0.350km	Eettichuvadu bhagam bridge	9.655825	76.997683	10m	silt and rock	N	Private	silt	2m	2m	silt	Private	N	Concrete	Unsafe	Yes	Yes	1.00m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.419 km	Cherthalakuzhiyil bhagam	9.655583	76.996493	4 m	Silt	N	Private	silt	2m	2m	silt	Private	N	-	-	-	-	2m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N
4.31 km	Near Muslimpally bhagam	9.653029	76.994212	15m	Rock	Y	Muslimpally	silt	2.50M	3m	silt	Private	N	-	-	-	-	-	NA	NA	NA	NA	no	N
4.50 km	Elappara Town bhagam Bridge	9.632497	76.978982	10m	Rock	Y	Private	silt	3m	3m	silt	Private	Y	Concrete	good	Yes	Yes	-	NA	NA	NA	NA	no	N
4.74 km	Foot Bridge near Elappara Temple	9.632396	76.977152	14m	Silt	Y	Temple	silt	2.50 m	2.50 m	silt	Private	Y	Concrete	good	No	N	1.50 m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N
4.80 km	Bridge near Elappara Temple	9.632057	76.97722	14m	Silt	Y	Temple	silt	3 m	3 m	silt	Private	Y	Concrete	good	No	N	-	NA	NA	NA	NA	no	N
4.81 km	Cross bar near Elappara Temple	9.631965	76.977305	13m	silt	Y	Temple	silt	2.50 m	4 m	silt	Private	Y	Concrete	good	No	N	1.50 m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N
5.70 km	Bridge near Way Side Aminity Centre	9.625779	76.97482	8m	silt and rock	N	Company	silt	2.50 m	2.50 m	silt	Private	Y	Concrete	good	No	N	-	NA	NA	NA	NA	no	N
5.70 km	Cross bar near Way Side Aminity Centre	9.625822	76.975028	7m	silt and rock	Y	Company	silt	2.00 m	2.00 m	silt	Private	Y	Concrete	good	No	N	-	NA	NA	NA	NA	no	N
7.84 km	Bridge at Tyfoid Estate bhagam	9.623077	76.959705	6m	silt and rock	N	Company	silt	2.00 m	2.00 m	silt	Private	Y	RRM	good	No	N	-	NA	NA	NA	NA	no	N
8.22 km	Cross bar at Tyfoid Estate bhagam	9.623058	76.959693	6m	Rock	Y	Company	silt	2.00 m	2.00 m	silt	Company	Y	Concrete	good	No	N	-	NA	NA	NA	NA	no	N
8.22 km	Bridge near Cross bar at Tyfoid Estate	9.620253	76.959672	6m	Rock	Y	Company	silt	2.00 m	2.00 m	silt	Company	Y	Concrete	good	No	N	-	NA	NA	NA	NA	no	N
8.43 km	Bridge Near Tyfoid Estate Hospital	9.620057	76.959584	3m	Rock	Y	Company	silt	1.50 m	1.50 m	silt	Company	Y	RRM	good	No	N	-	NA	NA	NA	NA	no	N
	Arappukadu thodu (sub Tributary of Chinnar Thodu)																							
0	Arappukadu thodu join to Chinnar thodu	9.667718	76.956572	8m	Silt and rock	N	Road	silt	2.50 m	3m	silt	Private	N	-	-	-	-	1.50m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N
0.08 km	Kochukarimthiri Cheenthalar bridge	9.668164	76.957185	8m	Silt and rock	Y	Road	silt	2.50 m	3m	silt	Private	N	Concrete	Safe	No	N	2.00m	Silt and clay	80% Silt and 20% Clay	NA	NA	no	N
8.00 km	Vazhikkadavu Diversion Scheme	9.683188	76.897943	8m	Rock	Y	Private	silt	2.50 m	3m	silt	govt	N	Concrete	Safe	No	N	-	Silt and clay	NA	NA	NA	no	N
93.096 Km	**Karinthiri Thodu (tributary)**																							
0.020 Km	Culvert @ dharmasastha temple padi	9.66777	77.02094	4.4	silt /clay	Y	govt	Silt	1.6	1.6	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	N
0.120Km	culvert	9.668159	77.019484	3.5	silt/sand /silt	N	private	Silt	1.8	1.8	Silt	private	N	culvert	safe	yes	No	0	NA	NA	NA	NA	no	N
0.560 Km	culvert inside Malankara Estate	9.669081	77.019484	3	silt ,clay	Y	private	silt	1.8	1.8	Silt	private	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	N
1.030Km	culvert inside Malankara Estate	9.671753	77.01314	3	silt ,clay	Y	private	silt	1.8	1.8	Silt	private	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	N
1.580Km	culvert inside Malankara Estate	9.671719	77.008218	3	silt ,rock	Y	private	rock	2	2	rock	private	Y	culvert	safe	No	No	1	NA	NA	NA	NA	no	N
96.630 Km	**Akkuppalam Thodu (tributary)**																							
0.030 Km	Akkuppalam Bridge	9.692774	77.024155	4.4	silt /clay	Y	govt	Silt	1.2	1.2	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.040Km	culvert	9.69275	77.02415	4	silt/sand /silt	N	govt	Silt	1	1	Silt	govt	N	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.150 Km	culvert	9.692077	77.023522	3	silt ,clay	N	private	silt	1.2	1.2	Silt	private	N	culvert	safe	yes	No	0	NA	NA	NA	NA	no	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.380 Km	culvert	9.691515	77.021516	3.3	silt ,clay	Y	private	silt	1.5	1.5	Silt	private	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
1.492 Km	culvert	9.687953	77.013464	3	silt ,rock	Y	private	silt	1.5	1.5	silt	private	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
97.100 Km	**Kallukad Illipalam Thodu(Tributary)**																							
0.050 Km	Illippalam Bridge	9.6955781	77.021354	7	silt /clay	Y	govt	Silt	2	2	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.190Km	culvert	9.694913	77.020326	6.2	silt /clay	Y	govt	Silt	1.25	1.25	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.290 Km	culvert	9.692077	77.023522	4	silt ,clay	Y	govt	silt	1.8	1.8	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.400 Km	culvert	9.695142	77.018498	4	silt ,clay	Y	govt	silt	1.5	1.5	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.420 Km	culvert on st peters believers' church bhagom	9.695183	77.01828	4	silt ,clay	Y	govt	silt	1.5	1.5	silt	private	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.450 Km	steel culvert	9.695233	77.018097	4.5	silt ,clay	Y	govt	silt	1.5	1.5	silt	private	Y	culvert	safe	No	No	0	NA	NA	NA	NA	no	on banks only
0.470Km	culvert at Aerathu Communications bhagom	9.695118	77.017769	4.5	silt/clay	Y	govt	Silt	1	1	silt	private	N	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.510 Km	culvert	9.695121	77.017553	3.7	silt/clay	Y	govt	Silt	1.2	1.2	silt	private	y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
1.030 km	culvert	9.692594	77.014134	4.5	silt/rocky	y	govt	silt	1.2	1.2	silt	private	y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
1.378Km	Thavarna Bridge	9.691076	77.011805	4.5	silt/rocky	N	govt	silt	2	2	silt	govt	y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
1.753 Km	Launtry estate Bridge	9.690871	77.009232	3	clay/silt	N	Private	silt	2	2	silt	Private	N	culvert	safe	no	No	1	NA	NA	NA	NA	no	on banks only
97.8 Km	**Eettakanam thodu (Tributary)**																							
0.030 Km	Upputhara Central junction bridge	9.700245	77.022035	5	silt /clay	Y	govt	Silt	3.6	3.6	Silt	govt	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
0.420 Km	kuzhiyamppakal padi bhagom culvert	9.701641	77.022035	4.5	silt,laterite ,silt	N	govt	Silt	3	3	Silt	govt	N	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
1.340 Km	culvert	9.702914	77.011502	3.6	silt,laterite ,silt	N	govt	silt	2	2	Silt	govt	N	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
2.840 km	culvert at muthumakuzhiyil padi	9.706721	76.999306	3	silt ,clay	Y	govt	silt	2.45	2.45	Silt	govt	N	culvert	safe	yes	No	1	NA	NA	NA	NA	no	on banks only
1.492 Km	culvert	9.687953	77.013464	3	silt ,rock	Y	private	silt	1.5	1.5	silt	private	Y	culvert	safe	yes	No	0	NA	NA	NA	NA	no	on banks only
Kottar																								
11.8	Vandanmedu	9°43'00" N	77°08'29.72" E	3m	Rock	N0	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	N0	Bridge	STABLE	N0	N0				N0	N0	N0	yes
10.2	Vandanmedu	9°43'36.44"	77°08'57.65" E	5m	Rock	NO	Pvt	FOREST LOAM SOIL	1.8M	1.8M	FOREST LOAM SOIL	Pvt	NO	Bridge	STABLE	NO	NO				NO	NO	NO	NO
9.1	Pumbhosepadi	9°43'58.90"	77°09'13" E	7m	Rock	NO	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	NO	SH Bridge	STABLE	NO	NO				NO	NO	NO	yes
8.16	near puliyanmala	9°44'26.13"	77°09'22.85" E	7m	Rock	NO	Pvt	FOREST LOAM SOIL	1.8M	1.8	FOREST LOAM SOIL	Pvt	NO	Bridge	STABLE	NO	NO				NO	NO	NO	NO

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
7.3	Hemakadavu	9°44'45.70"	77°09'29.21" E	7m	Rock	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Check Dam	STABLE	NO	NO	0.3	silt	100%	NO	NO	NO	NO
7.28	Hemakadavu	9°44'45.82"	77°09'29.66" E	7m	Rock	YES	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	YES	Bridge	STABLE	NO	NO				NO	NO	NO	NO
3.66	Aniyartholu	9°45'51.28"	77°10'53.36" E	7m	Rock	NO	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	NO	Anyartholu Bridge	STABLE	NO	NO				NO	NO	NO	NO
3.64	Aniyartholy	9°45'51.69"	77°10'54.06" E	7m	Rock	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Private Bridge	STABLE	NO	NO	0.3	silt	100%	NO	NO	NO	NO
3.15	Alliyar	9°45'56.55"	77°11'08.53" E	7m	Rock	NO	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	NO	Bridge	STABLE	NO	NO				NO	NO	NO	NO
0.43	Angekoottar	9°46'12.61"	77°12'15.24" E	8m	Rock	YES	Pvt	FOREST LOAM SOIL	1.5M	15.M	FOREST LOAM SOIL	Pvt	YES	Bridge	STABLE	NO	NO				NO	NO	NO	NO
0	Angekoottar	9°46'14.13"	77°12'26.98" E	10m	Rock	NO	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	NO	Confluence poin	STABLE	NO	NO				NO	NO	NO	NO
Sub Tributory Balagram Puliyanmala Thodu																								
0	Puliyanmala	9. 76°N	77.16227 °E	1M	Rock	No	govt	Forest loam soil	2m	2m	Forest loam soil	pvt	No	Bridge	STABLE	NO	NO				NO	NO	NO	NO
3.96	Mamoodu	9.78799°N	77. 17727°E	3M	Rock	No	govt	Forest loam soil	1.8m	1.8m	Forest loam soil	pvt	No	Foot bridge	STABLE	NO	NO				NO	NO	NO	NO
4.94	Saniyasiyoda	9.79512 °N	77.18167 °E	3.5M	Rock	No	govt	Forest loam soil	2m	2m	Forest loam soil	pvt	No	Bridge	STABLE	NO	NO				NO	NO	NO	NO
5.13	Saniyasiyoda	9.7963 °N	77.18282 °E	3.8M	Rock	No	govt	Forest loam soil	1.5m	1.5m	Forest loam soil	pvt	No	Panchayath bridge	STABLE	NO	NO	0.5	Silt	100%	NO	NO	NO	NO
5.32	Panakkal	9.79804 °N	77.1836 °E	4.2M	Rock	No	govt	Forest loam soil	1.8m	1.8m	Forest loam soil	pvt	No	Foot bridge	STABLE	NO	NO				NO	NO	NO	NO
5.53	Balagram	9.79908 °N	77.18479°E	4.5M	Rock	No	pvt	Forest loam soil	2m	2m	Forest loam soil	pvt	No	Foot bridge	STABLE	NO	NO				NO	NO	NO	NO
5.67	Balagram	9.80027 °N	77.18536°E	4M	Rock	yes	pvt	Forest loam soil	1.5m	1.5m	Forest loam soil	pvt	yes	Foot bridge	STABLE	NO	NO	0.6	Silt	100%	NO	NO	NO	NO
5.74	Balagram	9.80061 ° N	77.18584 °E	5M	Rock	No	pvt	Forest loam soil	3m	3m	Forest loam soil	pvt	No	Checkdam	STABLE	NO	NO				NO	NO	NO	NO
6.1	Balagram	9.80354 °N	77.18828 °E	4.5M	Rock	No	pvt	Forest loam soil	2m	2m	Forest loam soil	pvt	No	Bridge	STABLE	NO	NO				NO	NO	NO	NO
6.33	Balagram	9.80451°N	77.118895°E	5M	Rock	No	pvt	Forest loam soil	2.5m	2.5m	Forest loam soil	pvt	No	Foot bridge	STABLE	NO	NO				NO	NO	NO	NO
130.00	CHURULI Thodu																							
0/0	Edakkadu	9.93284	76.9484563	3	Rocky	N	PVT	Red earth	2	1	Red earth	PVT	N	NA	NIL	NIL	NA	NA	NA	NA	NA	NA	NA	Nil
0/150	Churuli	9.927926	76.951319	4.5	Rocky	N	PVT	Red earth	1	1	Red earth	PVT	N	Culvert	Old	NIL	NA	NA	NA	NA	NA	NA	NA	Nil
1/600	Churuli	9.923113	76.954805	5	Rocky	N	PVT	Red earth	2	2	Red earth	PVT	Y	Culvert	Old	NIL	NA	NA	NA	NA	NA	NA	NA	Nil
1/950	Churuli town	9.919802	76.955408	7	Rocky	Y	PVT	Red earth	3	3	Red earth	PVT	Y	Bridge	Old	Y	NA	NA	NA	NA	NA	NA	NA	Nil
3/600	Periyar valley	9.911153	76.967915	6	Sandy	N	PVT	Red earth	2	2	Red earth	PVT	N	Culvert	New	Y	N	0.5	sand , silt & clay	30%, 50% & 20%	NA	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4/300	Periyar valley, alappuzha- madurai rd	9.910616	76.970778	10	Sandy	N	PVT	Red earth	3	3	Red earth	PVT	N	Bridge	New	N	N	NA	NA	NA	NA	NA	NA	Nil
133.00	**KEERITHODU Thodu**																							
0/0	Palli jn	9.9422178	76.9615326	3	Rocky	N	PVT	RED Earth	1	1	RED Earth	PVT	N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Nil
0/500	Palllippadi	9.939133	76.963296	4	Rocky	Y	PVT	RED Earth	2	2	RED Earth	PVT	Y	Culvert	Old	Yes	No	NA	NA	NA	NA	NA	NA	Yes
0/750	Keerithodu	9.938377	76.964895	7.5	Rocky	Y	PVT	RED Earth	2	2	RED Earth	PVT	Y	Bridge	Old	Yes	Y	NA	NA	NA	NA	NA	NA	Nil
1/200	Periyar valley	9.93509	76.966245																					
135.00	**Pakuthipalam thodu**																							
89	Mankuva ROAD	9.9433559	76.9780786	10	ROCK	N	PVT	BLACK SOIL	2	2	BLACK SOIL	PVT	N	CULVERT		N	N	NIL	NA	NA	NA	NA	N	N
200	Pakuthipalam	9.943721,	76.977181	12	ROCK	N	PVT	BLACK SOIL	1.5	1.5	BLACK SOIL	PVT	N	CULVERT		N	N	Nil	NA	NA	NA	NA	N	N
140.00	**Pambla thodu**																							
2.30	Mayilappuzha Culvert	9.960416	76.902075	5.5	Rock	y	Private	rock			rock	Private	Y	Culvert	Working	NO	NO							
3.45	Pazhayiri kandam Junction	9.966475	76.909064	8	silt	y	Private	Silt			Silt	Private	Y	Foot Path	Working	NO	NO							
3.70	Pazhayirikandam	9.966753	76.911299	6	Rock	Y	Private	rock			rock	Private	Y	Bridge	Working	NO	NO							
4.55	Pilla City	9.968434	76.913465	14	Rock	Y	Private	rock			rock	Private	y	Check dam	Working	NO	NO							
5.20	Vattompara thodu	9.966055	76.919037	9	Rock	Y	Private	rock			rock	Private	Y	Check dam cum Bridge	Working	NO	NO							
7.10	Vattompara culvert	9.9593	76.92996	10.8	Rock	Y	Private	rock			rock	Private	Y	Culvert	Working	NO	NO							
8.20	Punnayar	9.961724	76.938982	23	Rock	y	Private	rock			rock	Private	y	Check dam cum Bridge	Working	NO	NO							
9.35	Pambla	9.964093	76.946577	12	Rock	Y	Forest	rock			rock	Forest	Y	Culvert	Working	NO	NO							
144.00	**Pazhayarikkamdam –Thattekkanni Tributary**																							
	Thattekanni	9.99157	76.898953	4	Rock	Y	Forest	rock			rock	Forest	Y	Culvert	Working	NO	NO							
145.00	**Vanchikkal – Thattekkanni Tributary**																							
	Thattekanni	9.999851	76.883886	5	Rock	Y	Forest	rock			rock	Forest	Y	Culvert	Working	NO	NO							
DETAILS OF RIGHT BANK OF PERIYAR RIVER																								
Hpc Thodu																								
0/2.997	Culvert	9.55682	77.09471	5	Rock	N	Private	silt			silt	Private	N	Culvert				0.50	Silt	80% silt & 20%clay				Y
Injakkadu Thodu																								
0/0.08	Culvert	9.568382	77.096106	7	Rock	N	Estate	silt			silt	Estate	N	Culvert				0.20	Silt	80% silt & 20%clay				y
0/0.689	Culvert	9.564629	77.094206	6	Rock	N	Estate	silt			silt	Estate	N	Culvert				0.50	Silt	80% silt & 20%clay				y
kumily Thodu																								
0/0.000	Culvert near Chelimada	9.61559	77.15458	5	Rock	N	Private	silt			silt	Private	N	Culvert	Good			0.50	Silt	80% silt & 20%clay				y
0/0.500	Culvert	9.6135	77.15709	4.5	Rock	N	Private	silt			silt	Private	N	Culvert	Good			0.75	Silt	80% silt & 20%clay				y
0/0.900	Culvert	9.61079	77.15866	5	Rock	N	Private	silt			silt	Private	N	Culvert	Good			0.50	Silt	80% silt & 20%clay				y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0/1.22	Culvert	9.60924	77.16097	4.5	Rock	Y	Private	silt			silt	Private	N	Culvert	Good			0.50	Silt	80% silt & 20%clay				y
0/1.640	Culvert Back side KSRTC Depo	9.60735	77.16381	4.5	Rock	N	KSRTC	silt			silt	Private	N	Culvert	Good				Silt	80% silt & 20%clay				y
0/1.84	Kulathupalam Bridge	9.60638	77.16518	7.5	Rock	N	Private	silt			silt	Private	N	Bridge	Good			0.50	Silt	80% silt & 20%clay				y
0/2.26	Anavachal Bridge	9.603483	77.167135	3.5	Rock	N	Private	silt			silt	Private	N	Bridge	Good			0.50	Silt	80% silt & 20%clay				y
0/3.33	Check Dam inside PTR	9.595937	77.171214	25	Rock	N	Forest	silt			silt	Forest	N	Check Dam	old				Silt	70% silt & 30%clay				Forest
75.010 Km	**Chottupara Thodu (Tributary)**																							
0.030 Km	Vandiperiyar	9°57'34" N,	77°09'12" E.	5	Silt	Y	Private	Silt	3	3	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
0.135 Km	Vandiperiyar	9°57'38" N,	77°09'21" E.	5	Silt	Y	Private	Silt	3	3	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
0.28 Km	Vandiperiyar	9°34'26" N,	77°05'31" E.	2.2	Silt	N	Private	Silt	3	3	Silt	Private	Y	RCC	Good	Yes	Yes	NA	NA	NA	L/B & R/B	Both	Yes	N
0.650 Km	Vandiperiyar	9°34'34" N,	77°05'40" E.	1.2	Silt	N	Govt.	Silt	3	3	Silt	Govt.	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
1.3 Km	Periyar PHC Bridge	9°34'48" N,	77°05'54" E.	1.5	Silt	N	Govt.	Silt	3	3	Silt	Govt.	Y	RCC	Good	Yes	Yes	NA	NA	NA	L/B & R/B	Both	Yes	N
1.97 Km	Periyar Beverages Bridge	9°35'01" N,	77°06'08" E.	1.5	Silt	N	Private	Silt	3	3	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
2.85 Km	St. George Jacobite Church	9°34'57" N,	77°06'31" E.	1.3	Silt	N	Private	Silt	3	3	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
3.27 Km	Jawahar Nagar Ist Cross	9°34'58" N,	77°06'42" E.	1.2	Silt	N	Private	Silt	3	3	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
3.53 Km	Jawahar Nagar	9°34'59" N,	77°06'51" E.	1.3	Silt	N	Private	Silt	3	3	Silt	Private	Y	RCC	Good	Yes	Yes	NA	NA	NA	L/B & R/B	Both	Yes	N
3.66 Km	Valardi	9°35'01" N,	77°06'53" E.	1	Silt	N	Private	Silt	3	3	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
4.29 Km	Valardi	9°35'01" N,	77°06'56" E.	1.35	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
4.545 Km	Priyadarsini Nagar	9°34'56" N,	77°07'01" E.	1.2	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
5.19 Km	Priyadarsini Nagar	9°34'56" N,	77°07'03" E.	1	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
5.99 Km	Priyadarsini Nagar	9°35'00" N,	77°07'05" E.	1	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
6.10 Km	Priyadarsini Nagar	9°35'00" N,	77°07'08" E.	1	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
6.24 Km	62th mile	9°35'05" N,	77°07'09" E.	0.95	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	Yes	Yes	NA	NA	NA	L/B & R/B	Both	Yes	N
6.99 Km	62th mile	9°35'07" N,	77°07'11" E.	1.2	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
8.52 Km	Chottupara	9°35'33" N,	77°07'21" E.	1.3	Silt	N	Private	Silt	4	4	Silt	Private	Y	Steel	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
8.68 Km	Chottupara	9°35'35" N,	77°07'17" E.	1.5	Silt	N	Private	Silt	4	4	Silt	Private	Y	Steel	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N
8.75 Km	Chottupara	9°35'43" N,	77°07'24" E.	1.1	Silt	N	Private	Silt	4	4	Silt	Private	Y	RCC	Good	No	No	NA	NA	NA	L/B & R/B	Both	Yes	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
79.410 Km	**Anakuzhi thodu (Tributary)**																							
0.900 km	Anakkuzhy Checkdam	9°60'90" N,	77°09'09" E.	15	Rock	N	Estate	Rock	3	3	Rock	Estate	Y	Checkdam	Good	No	No	NA	NA	NA	RB	Solid	Yes	Y
1.600 km	Ammankovil Bridge	9°57'67" N,	77°05'34" E.	3.6	Silt	N	Estate	Rock	3	3	Silt	Estate	N	Bridge	Good	No	No	NA	NA	NA				Y
82.430 Km	**Vellaramkunnu Anakuzhi thodu (Tributary)**																							
0.09 Km	Culvert	9°61'49"N,	77°06'49"E.	6	silt	N	Private	Silt	1.5	1.5	Silt	Private	N	Culvert	Good	No	No	1.00	Silt and clay	75% silt,25% clay	NA	NA	NA	Y
1.72km	Checkdam No.1	9°62'67"N,	77°07'07"E.	15	silt	N	Estate	Silt	2	2	Silt	Estate	Y	Checkdam	Good	silt deposited	No	0.50	Silt and clay	80% silt,20% clay	NA	NA	NA	Y
1.75KM	60Adipalam	9°62'67N,	77°07'06"E.	15	Rock	N	Private	Rock	3	3	Rock	Private	N	Bridge	Good	No	No	NA	NA	NA	NA	NA	NA	Y
2.10KM	Checkdam No.2	9°63'16" N,	77°07'25" E	10	Silt	N	Estate	Silt	1	1	Silt	Estate	N	Checkdam	Wing walls did not have enough height	No	No	NA	NA	NA	NA	NA	NA	Y
2.65KM	Tavarna palam	9°63'35" N,	77°07'23" E.	7	Silt	N	Estate	Silt	2	2	Silt	Estate	N	Foot bridge	Good	No	No	0.50	Silt	80% silt,20% clay	NA	NA	NA	Y
3.35KM	Anakuzhi VGM hospital bridge	9°37'52" N,	77°4'41" E	6	Silt	N	Estate	Silt	2	2	Silt	Estate	N	Culvert	Good	No	No	0.50	silt	80% silt,20% clay	NA	NA	NA	Y
5.25KM	Anakuzhi bridge	9°37'55" N,	77°55'73" E.	5.6	Silt	N	Estate	Silt	1.5	1.5	Silt	Estate	N	Culvert	Good	No	No	0.50	silt	80% silt,20% clay	NA	NA	NA	Y
6.24KM	Vannampalam culvert	9°62'90" N,	77°09'08" E.	4	Rock	N	Estate	Rock	1	1	Rock	Estate	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
8.50KM	Vellaramkunnu culvert	9°63'44" N,	77°10'78" E.	5	Rock	y	Private	Rock	2	2	Rock	Private	Y	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
	Mathakanam Kuttikaliserithodu(Sub Tributary of Vellaramkunnu Anakuzhi thodu)																							
0.20KM	Culvert	9°63'27"N,	77°10'31"E.	2	Silt	N	Private	Silt	2	2	Silt	Private	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
0.15KM	– Buds school checkdam	9°63'22" N,	77°10'30" E	15	Rock	N	Private	Rock	1.5	1.5	Rock	Private	N	Checkdam	maintenance required	No	No	NA	NA	NA	NA	NA	NA	Y
1.63KM	Kallarakkal palam	9°64'32"N,	77°10'33"E.	7.5	Rock	N	Private	Rock	2	2	Rock	Private	N	Bridge	Good	No	No	NA	NA	NA	NA	NA	NA	Y
1.98KM	Kallarakkal checkdam	9°64'51" N	77°10'52" E.	43	Rock	N	Private	Rock	3	3	Rock	Private	N	Checkdam	Good	No	No	NA	NA	NA	NA	NA	NA	Y
	Sakunnipalamthodu(Sub Tributary of Vellaramkunnu Anakuzhi thodu)																							
0.100 Km	Sankunnipalam Culvert	9°63'03"N	77°10'58"E	3	Silt	N	Private	Silt	2	2	Silt	Private	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
	Chenkarathodu(Sub Tributary of Vellaramkunnu Anakuzhi thodu)																							
0.100 Km	Culvert	9°61'49"N,	77°06'49"E	2	Silt	N	Estate	Silt	1	1	Silt	Estate	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
85.796 Km	**Sasthanada Moogalar thodu(Tributary)**																							
0.02KM	Pathimukku culvert	9°63'91"N	77°05'19"E.	10.5	Silt	N	Estate	Silt	2	2	Silt	Estate	N	Culvert	Good	No	No	0.50	silt	80%silt,20%clay	NA	NA	NA	Y
2.96KM	Chittimala checkdam	9°64'82"N	77°06'54"E.	10	Silt	N	Estate	Silt	1.5	1.5	Silt	Estate	N	Checkdam	Wing walls did not have enough height	No	No	0.50	silt	80%silt,20%clay	NA	NA	NA	Y
3.10KM	Chittimala Bridge	9°64'92"N	77°06'44"E.	14	Silt	N	Estate	Silt	2	2	Silt	Estate	N	Bridge	Good	No	No	0.50	silt	80%silt,20%clay	NA	NA	NA	Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
8.135KM	Kannimala chappath culvert	9°66'66" N	77°08'93" E	4	Silt	Y	Private	Silt	1.5	1.5	Silt	Private	Y	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
8.15KM	Checkdam	9°66'73"N	77°08'87"E	10	Silt	Y	Private	Silt	1.5	1.5	Silt	Private	Y	Checkdam	Good	silt deposited	No	1.00	silt	80%silt,20%clay	NA	NA	NA	Y
9.60KM	Culvert No. 1	9°67'77"N	77°10'97"E.	2.5	Silt	N	Private	Silt	1.5	1.5	Silt	Private	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
12.36KM	Culvert No. 2	9°67'77" N	77°10'97" E.	2.5	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
12.40KM	Culvert No.3	9°67'77" N	77°10'97" E	2.5	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
13.18KM	Culvert No.4	9°67'35" N	77°11'44" E	2.5	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	0.50	silt	80%silt,20%clay	NA	NA	NA	Y
	Korangusasthanada thodu(Sub Tributary of Sasthanada Moogalar thodu)																							
0.020KM	Culvert No1	9°40'41" N	77°06'33" E	2	Silt	Y	Estate	Silt	1	1	Silt	Estate	Y	Culvert	Good	No	No	0.50	NA	NA	NA	NA	NA	Y
0.050KM	Culvert No2	9°40'41" N	77°06'33" E	2	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	0.50	NA	NA	NA	NA	NA	Y
0.075KM	Culvert No3	9°40'41" N	77°06'33" E	2	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	0.50	NA	NA	NA	NA	NA	Y
0.085KM	Culvert No4	9°40'41" N	77°06'33" E	2	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	0.50	NA	NA	NA	NA	NA	Y
0.100KM	Culvert No5	9°40'41" N	77°06'33" E	2	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	0.50	NA	NA	NA	NA	NA	Y
0.120KM	Culvert No6	9°40'41" N	77°06'33" E	2	Silt	Y	Estate	Silt	1.5	1.5	Silt	Estate	Y	Culvert	Good	No	No	0.50	NA	NA	NA	NA	NA	Y
	Chittimala thodu(Sub Tributary of Sasthanada Moogalar thodu)																							
0.09KM	Chittimala culvert	9°39'10"N	77°4'2"E.	3	Silt	N	Private	Silt	1.5	1.5	Silt	Private	N	Culvert	Good	No	No	0.50	silt	80%silt,20%clay	NA	NA	NA	Y
1.47KM	Sangaragiri Culvert	9°65'85"N	77°06'11"E.	4	Rock	N	Private	Rock	2.5	2.5	Rock	Private	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
	Kannikkal thodu(Sub Tributary of Sasthanada Moogalar thodu)																							
0.340KM	Culvert No.1	9°64'92"N	77°06'32"E.	2	Silt	N	Estate	Silt	1.5	1.5	Silt	estate	N	Culvert	Good	No	No	0.50	silt	80%silt,20%clay	NA	NA	NA	Y
1.90KM	Culvert .No.2	9°65'54"N	77°05'02"E	2	Silt	N	Estate	Silt	1.5	1.5	Silt	Estate	N	Culvert	Good	No	No	NA	NA	NA	NA	NA	NA	Y
93.500 Km	**Old Post Office Thodu (Tributary)**																							
0.040 km	culvert	9.670303	77.024057	6	silt /clay	y	govt	gravel	1.5	1.5	gravel	govt	y					0.00	NA	NA	NA	NA	NA	Y
0.403Km	checkdam 2	9.66984	77.07135	11	silt /clay	N	private	gravel	1.5	1.5	gravel	govt	N	checkdam	safe	yes	No	0.00	NA	NA	NA	NA	NA	Y
0.450 Km	checkdam 1	9.669734	77.027629	15	silt /clay	N	private	gravel/ silt	1.5	1.5	gravel/ silt	govt	N	checkdam	safe	yes	No	0.00	NA	NA	NA	NA	NA	Y
94.700 Km	**Alady Thodu (Tributary)**																							
0.040 km	culvert	9.677948	77.027498	6	silt /clay	y	govt	Silt	1.2	1.2	Silt	govt	y	bridge	safe	yes	no	0.00	NA	NA	NA	NA	NA	Y
0.320 Km	culvert	9.676136	77.037908	4	silt /clay	Y	govt	Silt	1	1	Silt	govt	N	bridge	safe	no	No	0.00	NA	NA	NA	NA	NA	Y
98.35 Km	**Oorampara Thodu (Tributary)**																							
0.072 Km	collapsed culvert @ thonythady	9.697511	77.030411	6	silt /clay	N	private	Silt	1.8	1.8	Silt	private	N	culvert	collapsed	yes	yes	0.00	NA	NA	NA	NA	NA	Y
0.400Km	culvert @ thonythady	9.696666	77.033493	5.3	silt /clay	N	private	Silt	1.8	1.8	Silt	private	N	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	Y
0.658 Km	culvert @ thonythady	9.69651	77.035508	6	silt ,sand,clay	Y	govt	silt	1.2	1.2	Silt	govt	Y	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	Y
1.158 Km	Culvert.	9.693629	77.03881	6	silt ,sand,clay	Y	govt	silt	1.2	1.2	silt	govt	Y	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	Y
1.603Km	Culvert	9.690425	77.040232	5	silt ,sand,clay	Y	govt	silt,gravel	1	2	silt,gravel	private	Y	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	N
1.713Km	Culvert	9.690059	77.04023	5	silt ,sand,clay	Y	govt	silt	2	2	silt	private	Y	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	N
1.970Km	Culvert	9.688773	77.041969	4	silt ,sand,clay	Y	govt	silt	1.5	1.5	silt	private	Y	culvert	safe	yes	No	0.00	NA	NA	NA	NA	NA	Y
2.680 Km	Culvert	9.68366	77.04242	5	silt,clay	Y	private	silt,gravel	2	2	silt,gravel	private	Y	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	Y
3.620 Km	Achappankada bridge	9.68755	77.04853	6.3	silt ,clay	N	govt	silt,gravel	1	1	silt,gravel	govt	N	culvert	safe	yes	No	0.00	NA	NA	NA	NA	NA	N
4.026 Km	culvert @ Dorland Kappilumakkapadi	9.688185	77.05204	5	silt ,clay	Y	private	silt,gravel	1.5	1.5	silt,gravel	private	Y	culvert	safe	no	No	0.00	NA	NA	NA	NA	NA	Y
	Edappookulam Thodu (sub tributary of Oorampara Thodu)																							

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.040 Km	Culvert @ thundathil padi	9.68734	77.048435	3.2	silt /clay	Y	private	Silt	1.8	1.8	Silt	private	Y	culvert	safe	yes	No	0.00	NA	NA	NA	NA	NA	Y
0.330Km	culvert	9.68503	77.049425	4	sand /silt	Y	Govt	Silt	1.8	1.8	Silt	govt	N	culvert	safe	yes	No	0.00	NA	NA	NA	NA	NA	Y
1.670 Km	culvert @ Lourdh Matha grotto	9.674417	77.050274	3.6	silt ,sand,clay	N	govt	silt	1.8	1.8	Silt	govt	N	culvert	safe	yes	No	0.00	NA	NA	NA	NA	NA	Y
100. Km	**Vellilamkandam thodu**																							
0/250	Lubbakkada	9.7288	77.058714	3 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	Culvert	Old	Yes	Span of culvert is to be increased	0.50	Silt	100%	Nil	Nil	Nil	
0/935	Mannarmattompady	9.722721	77.056721	3 m	Rock	N	Private	Red earth	3 m	1.5 m	Red earth	Private	N	Culvert	Old	Yes	Span of culvert is to be increased	0.50	Silt	100%	Nil	Nil	Nil	
1/890	Vellilamkandam	9.715258	77.052838	3 m	Rock	Y	Private	Red earth	2 m	1.5 m	Ordiary	Private	Y	Bridge	Old	No	No	0.50	Silt	100%	Nil	Nil	Nil	
100. 50Km	**Mattapilly thodu**																							
0/100	Arayathinalpady	9.739752	77.051868	3 m	Rock	Y	Private	Red earth	1.5m	2 m	Red earth	Private	N	Culvert	Old	No	No	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
2/286	Swaraj- Kozhimala road	9.735266	77.04892	5 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	Bridge	Old	Yes	No	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
100	**Murikkattukudi thodu**																							
2/350	Govt.Ayurveda Hospital	9.735179	77.041232	3 m	Rock	Y	Private	Red earth	2.5m	2.5m	Red earth	Private	Y	Culvert	Old	No	No	0.50	Silt	100%	Nil	Nil	Nil	
2/856	Murikkattukudi Jn	9.735266	77.04892	4 m	Rock	N	Private	Red earth	2 m	2 m	Red earth	Private	N	Bridge	Old	Yes	No	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
104.60	**Kozhimala thodu**																							
0/680	Rajapuram	9.738257	77.023768	4 m	Rock	N	settlement area	Red earth	1.5m	1.5m	Red earth	settlement area	N	Culvert	Old	yes	width of culvert to be increased	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
0/897	Manjapara	9.739541	77.022438	3 m	Rock	N	settlement area	Red earth	1 m	1 m	Red earth	settlement area	N	Culvert	Old	Yes	width of culvert to be increased	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
109.80	**Palakkada thodu**																							
0/322	Govt.PHC Kalhotty	9.721839	77.062165	2.5m	Rock	N	Private	Red earth	1.5m	1.5m	Red earth	Private	N	Culvert	Old	No	No	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
2/310	Penthacost church Labbakada	9.746386	77.070405	2.5m	Rock	N	Private	Red earth	1 m	1 m	Red earth	Private	N	VCB	Old	Yes	No	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
3/500	Palakada	9.744832	77.070524	4 m	soil	N	Private	Red earth	2 m	2 m	Red earth	Private	N	Bridge	Old	No	No	0.00	No					Small vegitations
3/607	Palakada Jn	9.745559	77.070881	4 m	soil	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	Culvert	Old	No	No	0.50	Silt	100%				
3/714	Penthacost church Palakada	9.746386	77.070405	4 m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	VCB	Old	No	No	0.50	Silt	100%				Small vegitations
4/440	Kanchiyar Puthiyapalam	9.751883	77.068304	4 m	Rock	N	Private	Red earth	1.5 m	1.5 m	Red earth	Private	Y	Culvert	Old	No	No	0.00	No					Small vegitations
4/807	Pezhumkandam.	9.754396	77.070197	4 m	Rock	N	Private	Red earth	1.5 m	1.5 m	Red earth	Private	N	Culvert	Old	No	No	0.00	No					
110.50	**Kattappanayar**																							
1/310	Pottamkulam estate	9.712228	77.100433	3 m	Rock	Y	Private	Red earth	1 m	1 m	Red earth	Private	Y	Culvert	Old	No	No	0.00			Nil	Nil	Nil	
2/160	Kadamakuzhi chappath	9.717304	77.10655	5 m	Rock	Y	Private	Red earth	2.5 m	2.5m	Red earth	Private	Y	Culvert	Old	No	No	0.00			Nil	Nil	Nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3/286	Kannamundapady	9.726078	77.108527	6 m	Rock	N	Private	Red earth	1.5m	1.5m	Red earth	Private	N	Bridge	Old	No	No	0.50	Silt	100%				
4/078	Mettukuzhi road	9.732295	77.109264	12 m	Rock	N	Private	Red earth	2 m	2 m	Red earth	Private	N	Check Dam Cum Bridge	Old	No	No	0.50	Silt	100%				
5/003	Near Ambalakavala	9.738633	77.110805	8 m	Rock	Y	Private	Red earth	3 m	3 m	Red earth	Private	Y	Bridge	Old	Yes	Span of Bridge is to be increased	0.00	No	0%				Small vegitations
5/826	Near St.john's Hospital	9.744713	77.108872	10 m	Rock	N	Private	Red earth	3 m	3 m	Red earth	Private	Y	Bridge	Old	No	Span of Bridge is to be increased	0.00	No	0%				Small vegitations
6/922	Irupathekkar	9.747678	77.104435	13 m	Rock	Y	Private	Red earth	1.5 m	2 m	Red earth	Private	N	Bridge	Old	No	No	1.00	Silt	100%				Thick Vegitations
8/249	Anjilipalam	9.750584	77.098029	10 m	Rock	N	Private	Red earth	3m	3m	Red earth	Private	Y	Bridge	Old	Yes	No	0.60	Silt	100%				Small vegitations
8/349	Near IHDP Colony	9.750275	77.097173	12 m	Rock	Y	Private	Red earth	1.5m	1.5m	Red earth	Private	Y	Foot Bridge	Old	No	No	0.00	No	0%				
9/204	Thovarayar	9.748529	77.0911	12 m	Rock		Private	Red earth			Red earth	Private		Bridge	Old	No	No	0.00	No	0%				
9/957	Sumathikkada/Kakkattukada	9.751214	77.08731	12 m	Rock	Y	Private	Red earth	3 m	3 m	Red earth	Private	Y	Bridge	Old	No	No	0.50	Silt	100%				Small vegitations
10/667	Johnykada	9.755873	77.084848	9 m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	Bridge	Old	Yes	Height of Bridge to be Increased	0.00	No	0%				
10/770	Near KWA Pump House	9.755749	77.084556	12 m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	Bed Level Crossbar	Old	No	No	0.00	No	0%				
	Kattappanathodu Sub tributory of Kattappanayar																							
1/130	Parakkadavu jn	9.753326	77.127127	3 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	Pipe Culvert	Old	Yes	Span of culvert is to be increased	0.50	Silt	100%	Nil	Nil	Nil	Small vegitations
2/220	Parakkadavu Bypass	9.748467	77.120644	4 m	Rock	N	Private	Red earth	3 m	1.5 m	Red earth	Private	N	Culvert	Old	No	No	0.00	No	0%	Nil	Nil	Nil	
3/015	Near Martha's conventpady	9.744661	77.114273	4 m	Rock	Y	Private	Red earth	2 m	1.5 m	Red earth	Private	Y	Culvert	Old	No	No	0.00	No	0%	Nil	Nil	Nil	Small vegitations
3/600	Near St.John's Hospital	9.745017	77.110089	7 m	Rock	Y	Private	Red earth	2 m	3 m	Red earth	Private	Y	Bridge	Old	No	No	0.50	Silt	100%				Small vegitations
	Valiyakandam Thodu Sub tributory of Kattappanayar																							
0/116	Vellayamkudi in T/P-Puliyanmala Rd	9.767867	77.09797	2.m	Rock	Y	Private	Red earth	1.m	1.m	Red earth	Private	Y	Pipe Culvert	Old	Yes	New Construction Required	0.5	Silt	100%	Nil	Nil	Nil	Small vegitations
0/670	Kakkattukada Rd Near Vellayamkudi jn	9.767133	77.102251	2.5m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	Culvert	Old	No	No	0.5	Silt	100%	Nil	Nil	Nil	Small vegitations
1/138	Valiyaparambilpady	9.764784	77.105553	3 m	Rock	Y	Private	Red earth	1.5m	2 m	Red earth	Private	Y	V.C.B	Old	No	No	0	No					
1/294	Millenium Road	9.765259	77.106943	3 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	V.C.B	Old	No	No	0.5	Silt	0%				

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2/630	Manamthadampady	9.755004	77.107674	4 m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	N	Culvert	Old	Yes	Widening and De-Silting Required at Upstream	0.5	Silt	100%				
2/969	Near Pentacost Church	9.753891	77.104818	3.5 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	Culvert	Old	Yes	Widening Required at Thodu and Culvert	0.5	Silt	100%				
	Erattayar																							
1/100	Mannakkudi	9.795136	77.130762	10 m	Rock	N	Private	Red earth	1.5m	1.5m	Red earth	Private	N	Foot Bridge	Old	No	No	0	No	0%	Nil	Nil	Nil	
1/290	Mannakkudi	9.793975	77.130127	12 m	Rock	N	Private	Red earth	2 m	1 .5m	Red earth	Private	N	Bridge	Old	No	No	0	No	0%	Nil	Nil	Nil	
4/204	Erattayar	9.798859	77.106932	10 m	Rock	N	KSEB	Red earth	2.5 m	2.5 m	Red earth	KSEB	N	Bridge	Old	No	No	0.5	silt	100%				Small vegitations
4/650	Kumarakam-Cumbum Rd in Erattayar	9.799363	77.103374	12 m	Red Earth	N	KSEB	Red earth	2 m	2 m	Red earth	KSEB	N	Bridge	Old	No	No	0.5	silt	100%				
	Mannakudy Thodu Sub Tributary Erattayar																							
0/435	Ayyanamkuzhypady	9.793658	77.137474	2 m	Rock	N	Private	Red earth	1.5m	1.5m	Red earth	Private	N	Foot Bridge	Old	No		0	No	0%	Nil	Nil	Nil	
0/850	Kollamkunnelpady	9.791622	77.134719	2 m	Rock	Y	Private	Red earth	1.5m	1 .5m	Red earth	Private	Y	Culvert	Old	No		0	No	0%	Nil	Nil	Nil	Small vegitations
1/350	Culvert at Tail End	9.792412	77.130809	3 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	Culvert	Old	No		0.5	Silt	100%				Small vegitations
	Uppukandam Thodu Sub Tributary Erattayar																							
1/160	Kanakkalpady	9.776557	77.124841	2.5m	Rock	N	Private	Red earth	1.5m	1.5m	Red earth	Private	N	Culvert	Old	No		0.5	Silt	100%	Nil	Nil	Nil	Small vegitations
2/365	Colonykavala	9.783872	77.118982	3.5m	Rock	Y	Private	Red earth	1.5 m	1 m	Red earth	Private	Y	Culvert	Old	No		0	No	0%	Nil	Nil	Nil	
2/745	Near Nalukandampady	9.785459	77.11629	3.5 m	Rock	N	Private	Red earth	1.5 m	2 m	Red earth	Private	N	Culvert	Old	No		0.5	Silt	100%				
3/775	Mariyan Industries	9.788831	77.110829	3 m	soil	Y	Private	Red earth	2 m	2.5m	Red earth	Private	Y	Culvert	Old	No		0	No	0%				
4/500	at Kattappana-Erattayar Rd	9.791112	77.105897	3 m	Rock	N	KSEB	Red earth	1.5 m	1.5 m	Red earth	KSEB	N	Culvert	Old	No		0	No	0%				
	Tunnel Site Road	9.789754	77.110829	3m	Rock	N	KSEB	Red earth	1.5 m	1.5 m	Red earth	KSEB	N	Culvert	Old	No		0	No	0%				
	Thankamany Thodu																							
0/135	Harithapady	9.838728	77.039519	2.5 m	Rock	Y	Private	Red earth	1.5 m	1 .5m	Red earth	Private	Y	Culvert	Old	Yes	Height of Bridge is to be increased	0	No		Nil	Nil	Nil	
0/880	Schoolpady	9.835811	77.044514	2.5 m	Rock	Y	Private	Red earth	1.5 m	1.5m	Red earth	Private	Y	Culvert	Old	No	No	0			Nil	Nil	Nil	
2/295	Koothrapallipady	9.828678	77.052178	3 m	Rock	N	Private	Red earth	2 m	1.5m	Red earth	Private	N	Culvert	Old	Yes	Span of culvert is to be increased	0.5	Silt	100%				Small vegitations

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3/270	Pezhnalpurayidam	9.823282	77.052252	4 m	Rock	N	Private	Red earth	2 m	3 m	Red earth	Private	N	Culvert	Old	Yes	Span of culvert is to be increased	0.5	Silt	100%				
3/800	Kumbuluvelipady	9.82563	77.062556	4.5 m	Rock	N	Private	Red earth	1.5 m	2.5m	Red earth	Private	N	Culvert	Old	No	No	0.5	Silt	100%				
4/460	Kumarakam-Cumbum Rd	9.817838	77.066582	4 m	Rock	N	Private	Red earth	2.5m	2 m	Red earth	Private	N	Bridge	Old	Yes	Span of Bridge to be increased	0.5	Sand	100%				
6/000	Nalumukku Jn	9.809478	77.077773	4 m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	Bridge	Old	Yes	Widening Required at Upstream	0	No	0%				
7/210	Kattiyanmalapalam	9.804685	77.086447	6 m	Rock	N	KSEB	Red earth	1.5 m	1.5 m	Red earth	KSEB	N	Bridge	Old	No	No	0	No	0%				
8/390	Near to Erattayar Dam	9.799933	77.095109	6 m	Rock	N	KSEB	Red earth	1.5m	1.5m	Red earth	KSEB	N	Foot Bridge	Old	No	No	0	No	0%				
	Nellippara Thodu Sub Tributary Thankamany Thodu																							
1/060	8th Mile - Thankamany Rd	9.811128	77.043504	4 m	Rock	N	Private	Red earth	1.5m	1.5m	Red earth	Private	N	Culvert	Old	No	No	0.5	No	0%	Nil	Nil	Nil	
1/585	7th Mile - Nellippara Rd	9.810807	77.048033	3 m	Rock	N	Private	Red earth	1.5 m	1.5 m	Red earth	Private	N	Bridge	Old	No	No	0.5	No	0%	Nil	Nil	Nil	
2/455	Mathaipady	9.809028	77.053211	3 m	Rock	Y	Private	Red earth	1.5 m	2 m	Red earth	Private	Y	Culvert	Old	No	No	0.5	No	0%				
4/975	Vazhavara - Nalumukku Rd	9.808759	77.072298	4.5 m	Rock	N	Private	Red earth	1.5 m	1.5m	Red earth	Private	N	Culvert	Old	Yes	Span of culvert is to be increased	0	No	0%				
5/625	Erattyar - Nalumukku Rd	9.808796	77.078097	4 m	Rock	N	Private	Red earth	1.5 m	1.5 m	Red earth	Private	N	Culvert	Old	No	No	0.5	No	0%				
	Idinjamala Thodu Sub Tributary Thankamany Thodu																							
1/250	Idinjamala Jn	9.821227	77.075643	2 m	Rock	N	Private	Red earth	1.5m	2 m	Red earth	Private	N	Culvert	Old	No	No	0	No	0%	Nil	Nil	Nil	
3/050	Theeslangattupady	9.815201	77.090332	5.5m	Rock	Y	Private	Red earth	2 m	2 m	Red earth	Private	Y	V.C.B	Old	No	No	0.5	Silt	100%	Nil	Nil	Nil	Small vegitations
3/460	Idinjamala	9.813643	77.093432	2.6 m	Rock	Y	Private	Red earth	1.5 m	1.5m	Red earth	Private	Y	Culvert	Old	No	No	0	No	0%				
3/950	Idinjamala	9.811922	77.097248	5m	Rock	N	Private	Red earth	2 m	2.m	Red earth	Private	N	V.C.B	Old	No	No	0.5	Silt	100%				Small vegitations
4/400	Chembalam - 7th Mile Rd	9.810993	77.100268	3.6 m	Rock	N	Private	Red earth	2 m	1.5 m	Red earth	Private	N	V.C.B	Old	No	No	0	No	0%				
4/850	Near KWA Pump House	9.809139	77.103774	4 m	Rock	N	KWA	Red earth	1.5 m	1.5 m	Red earth	KWA	N	End Point of Thodu	Old	No	No	0	No	0%				
	Narakakkanam Thodu																							
1/510	Narakakkanam Jn	9.838204	76.998025	2.5 m	Rock	Y	Private	Red earth	1.5m	1.5 m	Red earth	Private	Y	Culvert	Old	Yes	Span of Culvert to be Increased	0		0%	Nil	Nil	Nil	
1/800	Vazhakulampady	9.837779	76.995877	4 m	Rock	Y	Private	Red earth	2 m	1.5 m	Red earth	Private	Y	Check Dam	Old	No	No	0.5	Silt	100%	Nil	Nil	Nil	Small vegitations
	Kallar puzha																							

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0	Kadashikadavu			5m	ROCK	Yes	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Starting Point	Stable	No	No				No	No	No	No
1.2	Anakkara	9°40'44.55" N	77°08'48.43" E	6m	ROCK	Yes	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
2.9	Anakkara	9°40'46.44" N	77°09'40.20" E	7m	ROCK	Yes	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
3.1	Anakkara	9°40'46.78" N	77°09'45.53" E	8m	ROCK	Yes	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
4.2	Anakkara	9°40'58.54" N	77°10'17.90" E	9m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
4.26	8th mile	9°40'58,20" N	77°10'20.34" E	10m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	VCB	Stable	No	No				No	No	No	No
5.08	Kochara	9°40'53.54" N	77°10'42.22" E	11m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
5.78	Kochara	9°41'02.95" N	77°10'53.15" E	13m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Check Dam	Stable	No	No				No	No	No	No
6.32	Kochara	9°41'20.43" N	77°11'04.08" E	14.5m	ROCK	No	Pvt	FOREST LOAM SOIL	2.4m	2.4m	FOREST LOAM SOIL	Pvt	No	VCB	Stable	No	No				No	No	No	No
6.52	Kochara	9°41'20.79" N	77°11'10.16" E	15m	ROCK	No	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
6.89	Kochara	9°41'20.84" N	77°11'19.93" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
7.21	Kochara	9°41'24.29" N	77°11'29.07" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Culvert	Stable	No	No				No	No	No	No
8.51	AKM UP School	9°41'54.57" N	77°11'46.28" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	VCB	Stable	No	No	0.5	silt clay	Sand=15 silt=55, clay=30	No	No	No	No
8.55	AKM UP School	9°41'55.29" N	77°11'47.17" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	AKM UP School Bridge	Stable	No	No				No	No	No	No
9.67	Kochara	9°42'22.80" N	77°11'57.42" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.4m	2.4m	FOREST LOAM SOIL	Pvt	No	VCB	Stable	No	No				No	No	No	No
10.32	Old Kochara	9°42'37.64" N	77°11'59.61" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Kochara Bridge	Stable	No	No				No	No	No	No
11.93	Old Kochara	9°43'16.13" N	77°11'45.42" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	VCB	Stable	No	No				No	No	No	No
12.5	Old Kochara	9°43'31.55" N	77°11'41.39" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Private Bridge	Stable	No	No				No	No	No	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
12.96	Old Kochara	9°43'42.66" N	77°11'48.14" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.6m	2.6m	FOREST LOAM SOIL	Pvt	No	Old Kochara Bridge	Stable	No	No	0.4	Sand=15 silt=55, clay=30	Sand=15 silt=55, clay=30	No	No	No	No
13.18	near kuzhitholu	9°43'46.38" N	77°11'44.02" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Check Dam	Stable	No	No				No	No	No	No
13.2	near kuzhitholu	9°43'46.36" N	77°11'43.20" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No
15	near kuzhitholu	9°44'28.28" N	77°11'57.09" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No
16.1	near kuzhitholu	9°44'59.17" N	77°12'07.07" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No
16.6	Thommithazham	9°45'10.02" N	77°12'16.97" E	16m	ROCK	yes	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Thommithazham Bridge	Stable	No	No				No	No	No	No
17	Parakkadavu	9°45'09.77" N	77°12'28.59" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Check Dam	Stable	No	No				No	No	No	No
18	Parakkadavu	9°45'28.70" N	77°12'40.25" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Parakkadavu Bridge	Stable	No	No				No	No	No	No
19	Angae Koottar	9°45'56.17" N	77°12'30.63" E	16m	ROCK	No	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No
19.2	Angae Koottar	9°46'03.20" N	77°12'29.31" E	18m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Foot Bridge	Stable	No	No				No	No	No	No
19.6	Angae Koottar	9°46'14.05" N	77°12'27.48" E	18m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Angae Koottar Bridge	Stable	No	No	0.6	Sand=15 silt=55, clay=30	Sand=15 silt=55, clay=30	No	No	No	No
20.2	Koottar	9°46'34.46" N	77°12'24.10" E	19m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Foot Bridge	Stable	No	No				No	No	No	No
20.3	Koottar	9°46'36.06" N	77°12'23.45" E	19m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Private Bridge	Stable	No	No				No	No	No	No
20.6	Koottar	9°46'46.57" N	77°12'21.16" E	20m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Koottar Bank Bridge	Stable	No	No				No	No	No	No
21	Koottar	9°46'58.15" N	77°12'18.52" E	20m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Koottar Bridge	Stable	No	No				No	No	No	No
21.6	Third Camp	9°47'15.38" N	77°12'19.02" E	21m	ROCK	yes	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Check Dam	Stable	No	No				No	No	No	No
22.11	Third Camp	9°47'26.32" N	77°12'10.65" E	22m	ROCK	yes	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Third Camp Bridge	Stable	No	No				No	No	No	No
22.82	Third Camp	9°47'41.93" N	77°11'57.09" E	22m	ROCK	yes	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
22.84	Third Camp	9°47'41.97" N	77°11'55.37" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Third Camp Foot Bridge	Stable	No	No				No	No	No	No
24.07	Thookkupalam	9°48'0.78" N	77°11'32.18" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No
24.56	Thookkupalam	9°48'19.92" N	77°11'23.46" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Confluence Point	Stable	No	No				No	No	No	No
24.78	Thookkupalam	9°48'13.23" N	77°11'25.53" E	22m	ROCK	yes	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Panchayath Bridge	Stable	No	No				No	No	No	No
25.83	Thookkupalam	9°48'49.31" N	77°11'35.57" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Foot Bridge	Stable	No	No				No	No	No	No
25.9	Thookkupalam	9°48'51.83" N	77°11'35.77" E		ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Thookkupalam Bridge	Stable	No	No				No	No	No	No
26.07	Thookkupalam	9°48'56.99" N	77°11'36.76" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Check Dam	Stable	No	No				No	No	No	No
26.27	Pushpakandam	9°49'03.03" N	77°11'37.00" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	Pvt	No	Pushpakandam Thodu	Stable	No	No				No	No	No	No
26.89	Mundiyeruma	9°49'09.93" N	77°11'18.15" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Panchayath Bridge	Stable	No	No				No	No	No	No
27.59	Mundiyeruma	9°49'09.34" N	77°10'58.56" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Mundiyeruma Bridge	Stable	No	No				No	No	No	No
28.05	Devagiri	9°49'17.63" N	77°10'46.95" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Pvt	No	Devagiri Bridge	Stable	No	No				No	No	No	No
29	Combayar	9°49'34.65" N	77°10'25.58" E	22m	ROCK	No	Pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	Pvt	No	Bridge	Stable	No	No				No	No	No	No
29.31	Combayar	9°49'40.95" N	77°10'24.77" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	KSEB Catchment area	No	Combayar River Confluence Point	Stable	No	No				No	No	No	No
29.66	Tannimoodu	9°49'44.41" N	77°10'16.29" E	22m	ROCK	yes	KSEB Catchment area	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	KSEB Catchment area	yes	Tannimoodu Bridge	Stable	No	No				No	No	No	No
29.72	Kallar	9°49'43.52" N	77°10'14.16" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	KSEB Catchment area	No	Check Dam	Stable	No	No				No	No	No	No
30.32	Kallar	9°49'43.33" N	77°09'55.50" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	KSEB Catchment area	No	Foot Bridge	Stable	No	No				No	No	No	No
30.65	Kallar	9°49'39.23" N	77°09'46.20" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	KSEB Catchment area	No	Foot Bridge	Stable	No	No				No	No	No	No
31.42	Kallar	9°49'28.52" N	77°09'28.66" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	2.8m	2.8m	FOREST LOAM SOIL	KSEB Catchment area	No	Private Bridge	Stable	No	No				No	No	No	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
31.52	Kallar	9°49'27.30" N	77°09'25.95" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	KSEB Catchment area	No	Kallar Bridge	Stable	No	No				No	No	No	No
31.52	Kallar	9°49'27.30" N	77°09'25.95" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	KSEB Catchment area	No	Kallar Bridge	Stable	No	No				No	No	No	No
32	Kallar	9°49'17.76" N	77°09'13.83" E	22m	ROCK	No	KSEB Catchment area	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	KSEB Catchment area	No	Kallar Tunnel Point	Stable	No	No				No	No	No	No
	Pushpakandom Ramakkalmedu Sub Tributary of Kallar puzha																							
9.43	Kuruvikkanam	9.7954°N	77.22261°E	2.5m	Rock	Yes	Pvt	FOREST LOAM SOIL	8m	8m	FOREST LOAM SOIL	Pvt	Yes	Checkdam	STABLE	NO	NO				NO	NO	NO	no
8.29	Ramakkalmedu	9.79509°N	77.23124 °E	3m	Rock	no	pvt	FOREST LOAM SOIL	2m	2m	FOREST LOAM SOIL	pvt	no	Culvert	STABLE	NO	NO				NO	NO	NO	yes
8.08	Ramakkalmedu	9.79522°N	77.23309 °E	4m	Rock	no	pvt	FOREST LOAM SOIL	2m	2m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO				NO	NO	NO	yes
2.81	Thovalapady	9.81649°N	77.21224°E	5m	Rock	no	pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO				NO	NO	NO	no
2.56	Chottupara	9.816741°N	77.210367°E	3.5m	Rock	no	pvt	FOREST LOAM SOIL	1.8m	1.8m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO				NO	NO	NO	no
2.4	westpara	9.81678°N	77.2089°E	10m	Rock	no	Pvt	FOREST LOAM SOIL	1.8m	1.8m	FOREST LOAM SOIL	Pvt	no	Foot bridge	STABLE	NO	NO				NO	NO	NO	no
2.05	Westpara	9.81646°N	77.20577°E	3.5m	Rock	no	pvt	FOREST LOAM SOIL	1.5m	1.5m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO	0.4	Silt	100%	NO	NO	NO	no
1.91	Westpara	9.81604° N	77.20519°E	3.2m	Rock	no	pvt	FOREST LOAM SOIL	1.6m	1.6m	FOREST LOAM SOIL	pvt	no	Foot bridge	STABLE	NO	NO				NO	NO	NO	no
1.45	pampumukku	9.81343°N	77.20198°E	3.4m	Rock	no	pvt	FOREST LOAM SOIL	1.8m	1.8m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO				NO	NO	NO	no
1.13	pampumukku	9.81335°N	77.199334°E	3.5m	Rock	no	pvt	FOREST LOAM SOIL	2m	2m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO	0.3	Silt	100%	NO	NO	NO	no
1.07	pampumukku	9.81289°N	77.19898°E	4m	Rock	no	Pvt	FOREST LOAM SOIL	2.4m	2.4m	FOREST LOAM SOIL	Pvt	no	Foot bridge	STABLE	NO	NO				NO	NO	NO	no
1.05	pampumukku	9.81294°N	77.1988°E	4m	Rock	no	pvt	FOREST LOAM SOIL	2.2m	2.2m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO	0.5	Silt	100%	NO	NO	NO	no
0.76	Thookkupalam	9.81432° N	77.19713°E	3.5m	Rock	no	pvt	FOREST LOAM SOIL	2.5m	2.5m	FOREST LOAM SOIL	pvt	no	Foot bridge	STABLE	NO	NO				NO	NO	NO	no
0.41	Pushpakandam	9.81724°N	77.19708° E	4m	Rock	no	pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Govt	no	Bridge	STABLE	NO	NO				NO	NO	NO	no
0.33	pushpakandam	9.8179° N	77.19681° E	4.5m	Rock	no	pvt	FOREST LOAM SOIL	3m	3m	FOREST LOAM SOIL	Govt	no	Bridge	STABLE	NO	NO				NO	NO	NO	no

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.22	Kayamkulam padi	9.4904°N	77.1145°E	4m	Rock	no	Pvt	FOREST LOAM SOIL	2m	2m	FOREST LOAM SOIL	Pvt	no	Checkdam	STABLE	NO	NO	1	Silt	100%	NO	NO	NO	no
0	Kayamkulam padi	9.81815° N	77.19422° E	5m	Rock	no	pvt	FOREST LOAM SOIL	2m	2m	FOREST LOAM SOIL	pvt	no	Bridge	STABLE	NO	NO				NO	NO	NO	no
	Combayar Thodu Sub Tributary of Kallar puzha																							
7.1	Anakallu	9°51'41.23" N	77°12'40.54" E	3	Rock	N	Private	Forest Loam soil	1.5	1.5	Forest Loam soil	Private	N	Thodu								N	N	
7.1	Anakallu	9°51'41.11" N	77°12'40.67" E	3	Rock	N	Private	Forest Loam soil	1.5	1.5	Forest Loam soil	Private	N	Bridge	Stable	N	N					N	N	
6.2	Pallipadi Anakallu	9°51'19" N	77°12'24.85" E	3	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Culvert	Stable	N	N					N	N	
6.13	Pallipadi Anakallu	9°51'18.54" N	77°12'23.97" E	3	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Culvert	Stable	N	N					N	N	
5.95	Pallipadi Anakallu	9°51'14.25" N	77°12'21.65" E	4	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Check Dam	stable	N	Y					N	N	
5.37	Palar	9°51'02.48" N	77°12'09.86" E	3	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Bridge	Stable	N	N					N	N	
4.79	Pushpakandam Thodu	9°50'46.27" N	77°12'2.91" E	3	Rock	N	Private	Forest Loam soil	1.5	3	Forest Loam soil	Private	N	Pushpakandam Thodu								N	N	
4.77	Palar	9°50'46.04" N	77°12'1.2" E	4	Rock	N	Private	Forest Loam soil	2	1.5	Forest Loam soil	Private	N	Foot Bridge	Stable	N	N					N	N	
4.38	Munnurekkar Thodu	9°50'39.16" N	77°11'51.35" E	5	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Munnurekkar Thodu								N	N	
4.23	Bridge	9°50'34.19" N	77°11'50.84" E	5	Rock	N	Private	Forest Loam soil	2	3	Forest Loam soil	Private	N	Palar Road Bridge	Un Stable	N	N					N	N	
3.82	Pattathimukku Bridge	9°50'26.73" N	77°11'42.94" E	5	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Pattathimukku Bridge	Stable	N	N					N	N	
3.26	Pallipadi	9°50'14.16" N	77°11'34.18" E	5	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Pallipadi Bridge	Stable	N	N					N	N	
2.79	Pallipadi	9°50'0.1" N	77°11'22.54" E	5	Rock	N	Private	Forest Loam soil	2.5	2.5	Forest Loam soil	Private	N	Bridge	Stable	N	N					N	N	
2.47	Pallipadi	9°49'55.15" N	77°11'19.54" E	5	Rock	Y	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Check Dam	Stable	N	N	0.6	silt clay	Sand=10 % slilt=60% clay=30%		N	N	
2.47	Combayar	9°49'55.15" N	77°11'19.54" E	5		N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Foot Bridge	Stable	N	N					N	N	
2.19	Combayar Pushpakandam Road	9°49'48.32" N	77°11'14.34" E	6	Rock	N	Private	Forest Loam soil	4	4	Forest Loam soil	Private	N	Combayar Pushpakandam Road Bridge	Stable	N	N					N	N	
1.78	Pandalam Padi	9°49'37.68" N	77°11'6.21" E	10	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Pandalam Padi Check Dam	Stable	N	N	0.9	silt clay	Sand=10 % slilt=60% clay=30%		N	N	
1.65	Pandalam Padi	9°49'35.33" N	77°11'3.32" E	19	Rock	N	Private	Forest Loam soil	4	4	Forest Loam soil	Private	N	Pandalam Padi Bridge	Stable	N	N					N	N	
0.9	Checkdam Padi	9°49'42.19" N	77°10'48.67" E	9	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Checkdam Padi Bridge	Stable	N	N					N	N	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.85	Checkdam Padi	9°49'41.97" N	77°10'48.59" E	10	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Checkdam Padi Bridge	Stable	N	N	0.6	silt clay		Sand=10 % slilt=60% clay=30%	N	N	
0.62	Checkdam Padi	9°49'42.88" N	77°10'42.46" E	10	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Check Dam	Stable	N	N					N	N	
0.27	Tanimude	9°49'39.85" N	77°10'32.93" E	10	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Tanimude Foot bridge	Stable	N	N					N	N	
0.19	Tannimude	9°49'40.06" N	77°10'29.46" E	10	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Tannimude Weir	Stable	N	N	0.6	silt clay			N	N	
0	Kallar	9°49'40.34" N	77°10'25.36" E	10	Rock	N	kseb	Forest Loam soil	3	3	Forest Loam soil	kseb	N	Kallar Combayar Thodu Starting point	Stable	N	N						N	
Cheruthoni Jilla Ashupathri Thodu																								
0.4	Culvert	9°50'39.46" N	76°57'34.21" E	3	Rock	N	Private	Forest Loam soil	1.5	2	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	
0.65	Thodu	9°50'41.18" N	76°57'35.43" E	3	Rock	N	Forest	Forest Loam soil	1.5	2	Forest Loam soil	Private	N	Thodu										
0.73	Jilla asupathri Culvert	9°50'54.08" N	76°57'36.33" E	4	Rock	Y	Govt	Forest Loam soil	2	2	Forest Loam soil	Govt	Y	Jilla asupathri Culvert	Stable	N	N	0.3	silt clay	Sand=10 % slilt=60% clay=30%	N	N	N	
1.61	Police Station Culvert	9°51'16.06" N	76°57'41.76" E	4	Rock	N	Govt	Forest Loam soil	4	4	Forest Loam soil	Govt	N	Police Station Culvert	Stable	N	N				N	N	N	
1.78	Culvert	9°51'20.34" N	76°57'42.37" E	4	Rock	Y	Private	Forest Loam soil	2.5	3	Forest Loam soil	Private	Y	Culvert	Stable	N	N	0.3	silt clay	Sand=10 % slilt=60% clay=30%	N	N	N	
1.97	Cheruthoni Town Culvert	9°51'25.06" N	76°57'45.5" E	4	Rock	Y	Private	Forest Loam soil	4	4	Forest Loam soil	Private	Y	Cheruthoni Town Culvert	Stable	N	N				N	N	N	
Nayarupara Thodu																								
5.16	Narakakanam	9.835774N	77001894E	2.5	Rock	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	checkdam	STABLE	NO	NO						NO	NO
4.55	Narakakanam	9.838154 N	76.997879E	2.5	Rock	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO						NO	NO
4.26	Narakakanam	9.837742 N	76.995905E	2.5	Rock	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	checkdam	STABLE	NO	NO						NO	NO
4.1	Narakakanam	9.817459 N	76.994507E	2.5	Rock	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO						NO	NO
4	Narakakanam Tunnel	9.837473N	76.993454E	2.5	Rock	NO	KSEB	FOREST LOAM SOIL	3M	3M	FOREST LOAM SOIL	KSEB	NO	nayarupara tunnel	STABLE	NO	NO						NO	NO
2.88	Nayarupara Bridge	9.842416 N	76.988238E	2.5	Rock	NO	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	NO	nayarupara bridge	STABLE	NO	NO						NO	NO

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.92	Idukki	9.847456 N	76.981429E	2.5	Rock	YES	Pvt	FOREST LOAM SOIL	2.20M	2.20M	FOREST LOAM SOIL	Pvt	YES	Culvert	STABLE	NO	NO						NO	NO
1.49	Idukki	9.849771 N	76.979411E	2.5	Rock	YES	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	YES	Culvert	STABLE	NO	NO						NO	NO
Mariyapuram Thodu																								
1.06	Patham Mile	9°49'57.32" N	77°2'22.99" E	1M	ROCK	NO	Pvt	FOREST LOAM SOIL	1M	1M	FOREST LOAM SOIL	Pvt	NO	Patham Mile Road Culvert	STABLE	NO	NO						NO	NO
1.82	Kamakshi	9°49'49.4" N	77°0'42.34" E	1.1M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Kamakshi Thodu	STABLE	NO	NO						NO	NO
2.03	Mariyapuram SNDP Padi	9°50'32.03" N	77°0'20.23" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Mariyapuram SNDP Padi Road Bridge	STABLE	NO	NO						NO	NO
2.22	Pvt. Culvert	9°50'35.22" N	77°0'14.34" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Pvt. Culvert	STABLE	NO	NO						NO	NO
2.46	Anganvady Millum padi	9°50'39.26" N	77°0'8.89" E	1.2M	ROCK	YES	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	YES	Anganvady Millum padi Road Bridge	STABLE	NO	NO						NO	NO
3.19	Chettikuzhy	9°50'54.96" N	76°59'52.37" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.20M	2.20M	FOREST LOAM SOIL	Pvt	NO	Chettikuzhy Road Bridge	STABLE	NO	NO						NO	NO
3.41	Millum Padi	9°50'59.87" N	76°59'48.46" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	panchayath Check Dam		NO	NO						NO	NO
3.71	Millum Padi	9°51'8.21" N	76°59'4747" E	6M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.8M	2.8M	FOREST LOAM SOIL	Pvt	NO	Millum Padi Bridge	STABLE	NO	NO						NO	NO
4.89	PHC Padi	9°51'19.01" N	76°59'21.88" E	5M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.5M	2.5M	FOREST LOAM SOIL	Pvt	NO	PHC Padi Road Bridge	STABLE	NO	NO						NO	NO
5	PHC Padi	9°51'19.08" N	76°59'18.13" E	4.5M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.5M	2.5M	FOREST LOAM SOIL	Pvt	NO	PHC Padi Check Dam	STABLE	NO	NO	0.5	silt	1			NO	NO
6.22	Mariyapuram	9°51'20.81" N	76°58'40.58" E	4M	ROCK	YES	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	YES	Pvt.Culvert	STABLE	NO	NO						NO	NO
6.6	mariyapuram	9°51'22.16" N	76°58'33.7" E	4M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO	0.3	silt	1			NO	NO
Peppara Thodu																								
0.55	Culvert	9°54'20.53" N	76°55'14.03" E	3	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	Yes
1.28	Culvert	9°54'7.74" N	76°55'30.04" E	3	Rock	N	Private	Forest Loam soil	3	2	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	Yes
1.48	Culvert	9°54'00.52" N	76°55'38.82" E	4	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	Yes
1.71	Culvert	9°53'54.54" N	76°55'46.04" E	4	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	Yes
2.01	Culvert	9°53'51.01" N	76°55'49.60" E	4	Rock	N	Private	Forest Loam soil	1.5	1.5	Forest Loam soil	Private	N	Culvert	stable	N	Y				N	N	N	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.17	Culvert	9°53'46.06" N	76°55'56.52" E	6	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	Yes
2.46	City Bridge	9°53'45.36" N	76°56'02.16" E	6	Rock	N	Private	Forest Loam soil	1.5	3	Forest Loam soil	Private	N	City Bridge	Stable	N	N				N	N	N	Yes
2.68	Private Bridge	9°53'34.66" N	76°56'03.20" E	6	Rock	N	Private	Forest Loam soil	2	1.5	Forest Loam soil	Private	N	Private Bridge	Stable	N	N				N	N	N	Yes
2.9	Panchayath Bridge	9°53'40.14" N	76°56'07.87" E	6	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Panchayath Bridge	Stable	N	N				N	N	N	Yes
4.65	Bridge	9°53'09.69" N	76°56'29.90" E	7	Rock	N	Private	Forest Loam soil	2	3	Forest Loam soil	Private	N	Bridge	Stable	N	N				N	N	N	Yes
5.05	Check Dam	9°52'59" N	76°56'36.95" E	7	Rock	N	Private	Forest Loam soil	4	4	Forest Loam soil	Private	N	Check Dam	Stable	N	N	0.6	silt,clay	slilt=60% clay=40%	N	N	N	Yes
5.07	Bridge	9°52'58.7" N	76°56'37.31" E	6	Rock	N	Private	Forest Loam soil	4	4	Forest Loam soil	Private	N	Bridge	Stable	N	N				N	N	N	Yes
5.51	Bridge	9°52'34.12" N	76°56'55.66" E	6	Rock	N	Private	Forest Loam soil	4	4	Forest Loam soil	Private	N	Bridge	Stable	N	N				N	N	N	Yes
6.21	Peppara Bridge	9°52'33.64" N	76°56'57.9" E	5	Rock	Y	Private	Forest Loam soil	3	3	Forest Loam soil	Private	y	Peppara Bridge	Stable	N	N				N	N	N	Yes
8	Njavalchuvadu Bridge	9°52'2.07" N	76°57'35.19" E	6	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Njavalchuvadu Bridge	Stable	N	N				N	N	N	Yes
8.9	Bridge NH	9°51'53.99" N	76°57'56.37" E	8	Rock	N	Private	Forest Loam soil	5	5	Forest Loam soil	Private	N	Bridge NH	Stable	N	N				N	N	N	Yes
Vazhathopu -Pallithazham Thodu																								
0.9	pallithazham	9°52'29.22" N	76°57'34.89" E	3m	Rock	N0	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	N0	Culvert	STABLE	N0	N0						N0	N0
2.14	pallithazham	9°52'30.14" N	76°57'36.89" E	3m	Rock	NO	Pvt	FOREST LOAM SOIL	1.8M	1.8M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO	0.3	Silt	100%			NO	NO
2.89	pallithazham	9°52'25.71" N	76°57'14.99" E	5m	Rock	NO	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	NO	Bridge NH	STABLE	NO	NO						NO	NO
Palkulamedu Thodu																								
0.43	Palkulamedu	9°54'54.13" N	76°55'31.26" E	4	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	
1.35	Palkulamedu	9°54'41.32" N	76°55'55.73" E	4	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	
2.28	Palkulamedu	9°54'28.1" N	76°56'19.71" E	4	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Culvert	Stable	N	N				N	N	N	
2.82	Palkulamedu	9°54'18.99" N	76°56'33.63" E	4	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Check Dam	Stable	N	N	0.3	silt	100%	N	N	N	
3.51	Mulakuvalli	9°54'13.07" N	76°56'54.12" E	6	Rock	N	Private	Forest Loam soil	1.5	1.5	Forest Loam soil	Private	N	Check Dam	Un stable	N	Y				N	N	N	
3.57	Mulakuvalli	9°54'12.8" N	76°56'55.89" E	6	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Mulakuvalli Bridge	Stable	N	N				N	N	N	
3.61	Mulakuvalli	9°54'13.18" N	76°56'57.05" E	7	Rock	N	Private	Forest Loam soil	1.5	3	Forest Loam soil	Private	N	Mulakuvalli Thodu							N	N	N	
3.77	Mulakuvalli	9°54'9.08" N	76°57'0" E	7	Rock	N	Private	Forest Loam soil	2	1.5	Forest Loam soil	Private	N	Thodu							N	N	N	
3.8	Mulakuvalli	9°54'8.19" N	76°57'2.29" E	7	Rock	N	Private	Forest Loam soil	3	3	Forest Loam soil	Private	N	Culvert	Stable	N	N	0.4	silt+clay	silt-60%clay-40%	N	N	N	
4.1	Mulakuvalli	9°54'1.56" N	76°57'6.94" E	8	Rock	N	Private	Forest Loam soil	2	3	Forest Loam soil	Private	N	Mulakuvalli Chappath	Stable	N	N				N	N	N	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			Vegetation if any
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4.47	Mulakuvalli	9°53'57.43" N	76°57'7.66" E	8	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Mulakuvalli Foot bridge	Stable	N	N				N	N	N	
5.03	Mulakuvalli	9°53'51.52" N	76°57'6.4" E	8	Rock	N	Private	Forest Loam soil	2	2	Forest Loam soil	Private	N	Mulakuvalli Foot bridge	Stable	N	N				N	N	N	
5.44	Manjappara	9°53'30.42" N	76°57'25.29" E	8	Rock	N	Private	Forest Loam soil	2.5	2.5	Forest Loam soil	Private	N	Manjappara Foot bridge	Stable	N	N	0.3	clay	100%	N	N	N	
6.55	Vazhathop Chappath	9°53'14.95" N	76°57'49.73" E	8	Rock	Y	Private	Forest Loam soil	2	2	Forest Loam soil	Private	y	Chappath	Stable	N	N				N	N	N	
7.00	Ashoka junction NH Bridge	9°53'8.8" N	76°58'1.96" E	8	Rock	N	Private	Forest Loam soil	8	8	Forest Loam soil	Private	N	Ashoka junction NH Bridge	Stable	N	N				N	N	N	
Vimalagiri thodu																								
9.1	Nellivayal	9°51'12.53" N	77°2'5.99" E	1M	ROCK	NO	Pvt	FOREST LOAM SOIL	1M	1M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO				NO	NO	NO	yes
8.75	Nellivayal	9°51'16.66" N	77°01'56.19" E	1.1M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO				NO	NO	NO	yes
8.59	Nellivayal	9°51'18.88" N	77°01'51.65" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO				NO	NO	NO	yes
8.34	Nellivayal	9°51'19.27" N	77°01'46.72" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO				NO	NO	NO	yes
6.99	Mariyapuram	9°51'24.33" N	77°01'01.83" E	1.2M	ROCK	YES	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	YES	Culvert	STABLE	NO	NO				NO	NO	NO	yes
6.85	Mariyapuram	9°51'25.22" N	77°00'58.05" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.20M	2.20M	FOREST LOAM SOIL	Pvt	NO	Check Dam	STABLE	NO	NO				NO	NO	NO	NO
6.14	Mariyapuram	9°51'37.25" N	77°00'39.92" E	1.2M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Private bridge	STABLE	NO	NO			1	NO	NO	NO	NO
5.77	Irukutty	9°51'44.49" N	77°00'31.26" E	6M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.8M	2.8M	FOREST LOAM SOIL	Pvt	NO	Culvert	STABLE	NO	NO				NO	NO	NO	NO
5.49	Irukutty	9°51'48.68" N	77°0'23.63" E	5M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.5M	2.5M	FOREST LOAM SOIL	Pvt	NO	Bridge Culvert	STABLE	NO	NO				NO	NO	NO	NO
3.54	Karikum Tholam	9°52'28.88" N	76°59'37.94" E	4.5M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.5M	2.5M	FOREST LOAM SOIL	Pvt	NO	Private bridge	STABLE	NO	NO				NO	NO	NO	NO
3.41	Karikum Tholam	9°52'31.52" N	76°59'34.75" E	4M	ROCK	YES	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	YES	Check Dam	STABLE	NO	NO	0.8	silt	1	NO	NO	NO	NO
2.48	Vimalagiri	9°52'53.57" N	76°59'16.47" E	4M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Foot bridge cum Check Dam	STABLE	NO	NO				NO	NO	NO	NO
1.75	Karimbanvalley	9°53'0.49" N	76°59'1.54" E	4M	ROCK	YES	Pvt	FOREST LOAM SOIL	2.5M	2.5M	FOREST LOAM SOIL	Pvt	YES	Karimbanvalley Check Dam	STABLE	NO	NO	0.5	silt	1	NO	NO	NO	NO
1.64	Chappacity	9°53'1.45" N	76°58'58.05" E	3.5M	ROCK	NO	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	NO	Private bridge	STABLE	NO	NO	0.3	silt	1	NO	NO	NO	NO

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.13	Chappacity	9°53'1.76" N	76°58'44.80" E	5M	ROCK	NO	Pvt	FOREST LOAM SOIL	2.5M	2.5M	FOREST LOAM SOIL	Pvt	NO	Chappath Culvert	STABLE	NO	NO	0.3	silt	1	NO	NO	NO	NO
0.63	Ottanackal	9°53'1.15" N	76°58'31.21"E	4.5M	ROCK	YES	Pvt	FOREST LOAM SOIL	1.5M	1.5M	FOREST LOAM SOIL	Pvt	YES	Foot bridge	STABLE	NO	NO				NO	NO	NO	NO
0.55	Ottanackal	9°53'3.27" N	76°58'29.92"E	6M	ROCK	YES	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	YES	Ottanackal Bridge	STABLE	NO	NO				NO	NO	NO	NO
0	Karimban	9°53'14.04" N	76°58'27.81" E	8m	ROCK	YES	Pvt	FOREST LOAM SOIL	2M	2M	FOREST LOAM SOIL	Pvt	YES	confluence point	STABLE	NO	NO	0.3	silt	1	NO	NO	NO	NO
UPPUTHODU Thodu																								
0.0 m	Udayacity,Upputhodu	9.889276	77.000085	3	Sandy	N	PVT	Red earth	1	1.2	Red earth	PVT	N	NA	GOOD	NO	NA	NIL	NA	NA	Nil	Nil	Nil	Y
1/300	Chalikkada	9.89405	768992165	8.5	Rocky	N	PVT	Red earth	2	2	Red earth	PVT	N	Bridge	GOOD	NO	NO	NIL	NA	NA	Nil	Nil	Nil	NIL
1/650	Chalikkada	9.896749	76.991291	6	Sandy	N	PVT	Red earth	1	2	Red earth	PVT	Y	Culvert	Old	Yes	NO	NIL	NA	NA	Nil	NIL	Nil	Nil
2/460	Karimaruthungalppadi	9.901712	76.990148	7.5	Sandy	N	PVT	Red earth	1	1	Red earth	PVT	N	Culvert	Old	Yes	No	Nil	NA	NA	Nil	NIL	Nil	Nil
3/380	Antopuram	9.905213	76.983141	8	Sandy	N	PVT	Red earth	1	1	Red earth	PVT	N	Culvert	Old	Yes	No	Nil	NA	NA	Nil	NIL	Nil	Nil
Sub Tributary Alappara thodu																								
0/0	Alppara	9.931308	76.937931	3	Rocky	N	PVT	Red earth	1	2	Redearth	PVT	N	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Y
1/500	Churuli	9.920358	76.955193	5	Rocky	Y	PVT	Red earth	2	2	Redearth	PVT	Y	Bridge	New	No	NO	NA	NA	NA	NA	NA	NA	NA
PERIJAMKUTTY Aar																								
0/0	Erattayar DAM	9.810532	77.106441	NA	Red Earth	N	Govt	Red Earth	2	2	Red Earth	GOVT	N	Dam	new	Y	NA	NA	NA	NA	NA	NA	NA	Y
0/340	Erattayar North	9.81293	77.105127	8	Clay	N	PVT	Red Earth	1	1	Red Earth	PVT	N	Culvert	Old	Y	Y	1	Silt & Clay	60% & 40%	NA	NA	NA	Y
1/200	Ettithoppu kavala	9.819401	77.105415	12	Rock	Y	PVT	Red Earth	1	1	Red Earth	PVT	N	Bridge	Old	Y	NA	0.5	Silt & Clay	60% & 40%	NA	NA	NA	Nil
1/840	Karunakaranpadi	9.824987	77.104528	5	Sand	N	PVT	Red Earth	2	1	Red Earth	PVT	N	Culvert	Old	Y	NA	0.5	Silt & Clay	70% & 30%	NA	NA	NA	Y
3/450	Ettakkanam	9.836741	77.101192	8	clay	y	PVT	Red Earth	2	2	Red Earth	PVT	Y	Culvert	Old	Y	NA	1	sand , silt & clay	20%, 50% & 30%	NA	NA	NA	Y
3/740	Ettakkanam	9.867043	77.089586	16	clay	N	PVT	Red Earth	2	2	Red Earth	PVT	N	VCB	Old	Y	Y	1	sand , silt & clay	20%, 50% & 30%	NA	NA	NA	Y
4/200	Ettithoppu	9.842824	77.099713	10	Rock	N	PVT	Red Earth	1	1	Red Earth	PVT	N	Bridge	Old	Y	NA	NA	NA	NA	NA	NA	NA	Nil
4/900	Ettithoppu	9.848864	77.099389	8	Sand	N	PVT	Red Earth	3	2	Red Earth	PVT	N	Foot bridge	Old	N	NA	0.5	Silt & Clay	60% & 40%	NA	NA	NA	Y
5/790	Kallarmukku	9.855378	77.09663	12	Sand	N	PVT	Red Earth	2	2	Red Earth	PVT	N	Bridge	new	Y	NA	0.5	Silt & Clay	60% & 40%	NA	NA	NA	Nil
7/000	Ambalampadi	9.865121	77.092265	8	Sand	N	PVT	Red Earth	1	1	Red Earth	PVT	N	Culvert	Old	Y	NA	NA	NA	NA	NA	NA	NA	Nil
7/500	Melechinnar	9.869379	77.091422	12	Sand	N	PVT	Red Earth	2	2	Red Earth	PVT	N	VCB	Old	Y	Y	0.5	sand , silt & clay	20%, 60% & 20%	NA	NA	NA	Y
8/000	Melechinnar	9.873528	77.090345	16	Rock	N	PVT	Red Earth	2	2	Red Earth	PVT	N	Bridge	Old	Y	NA	NA	NA	NA	NA	NA	NA	Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
8/830	Madampadi	9.875908	77.088475	14	Rock	N	PVT	Red Earth	1	1	Red Earth	PVT	N	Foot bridge	Old	Y	Y	NA	NA	NA	NA	NA	NA	Y
9/850	Bethel	9.875908	77.088475	10	Sand	N	PVT	Red Earth	1	1	Red Earth	PVT	N	Foot bridge	Old	Y	Y	0.5	sand , silt & clay	20%, 60% & 20%	NA	NA	NA	Nil
10/250	Kurishupallippadi	9.888249	77.084658	10	Sand	N	PVT	Red Earth	2	2	Red Earth	PVT	N	Bridge	Old	Y	NA	0.5	sand , silt & clay	20%, 60% & 20%	NA	NA	NA	Nil
10/650	Kattyamalappadi	9.891776	77.084734	16	Sand	N	PVT	Red Earth	1	2	Red Earth	PVT	Y	VCB	Old	Y	Y	1	sand , silt & clay	20%, 60% & 20%	NA	NA	NA	Y
10/700	Kattyamalappadi	9.891713	77.08471	14	Sand	N	PVT	Red Earth	2	2	Red Earth	PVT	N	Foot bridge	Old	N	NA	NA	NA	NA	NA	NA	NA	Y
11/600	Perijamkutty	9.899557	77.082982	18	Rock	N	PVT	Red Earth	3	3	Red Earth	PVT	N	Bridge	Old	Y	NA	NA	NA	NA	NA	NA	NA	Nil
14/400	Chempakappara	9.90671	77.061397	12	Sand	N	PVT	Red Earth	2	2	Red Earth	GOVT	N	Culvert	Old	Y	Y	1	Silt & Clay	80% & 20%	NA	NA	NA	y
20/000	Chinnar	9.922324	77.014988	20	Sand	N	PVT	Red Earth	3	3	Red Earth	PVT	N	Bridge	Old	Y	NA	0.5	Silt & Clay	80% & 20%	NA	NA	NA	Nil
20/30	Chinnar	9.92279	77.014536	12	Sand	N	PVT	Red Earth	2	2	Red Earth	PVT	N	Chappathu	Old	Y	Y	NA	NA	NA	NA	NA	NA	Nil
21/200	Chinnar Dam	9.92538	77.00533	75	Sand	N	Govt	Red Earth	5	4	Red Earth	GOVT	N	Dam	new	Y	NA	NA	NA	NA	NA	NA	NA	NA
21/270	Chinnar	9.924757	77.004028	20	Sand	N	Govt	Red Earth	2	2	Red Earth	GOVT	N	Culvert	Old	Y	Y	NA	NA	NA	NA	NA	NA	Nil
23/200	Mankuva	9.928837	76.988735	16	Rock	N	PVT	Red Earth	3	2	Red Earth	PVT	N	Culvert	Old	Y	NA	NA	NA	NA	NA	NA	NA	Y
KALLAR Thodu																								
0/0	Kallar	9.8254914	77.156031	NA	Rock	N	Govt	Red earth	3	3	Red earth	Govt	N	Dam	Old	Y	NA	NA	NA	NA	NA	NA	NA	Y
3/150	Kurishupara	9.835731	77.130761	12	Sand	N	PVT	Culvert	2	2	Red earth	PVT	N	Culvert	New	Y	NA	1	sand , silt & clay	20%, 60% & 20%	NA	NA	NA	Y
4/200	Thooval	9.840225	77.123292	8	Sand	N	PVT	Culvert	2	2	Red earth	PVT	N	Culvert	Old	Y	Y	NA	NA	NA	NA	NA	NA	Y
5/560	Thooval	9.844868	77.111835	8	Sand	N	PVT	Culvert	2	2	Red earth	PVT	N	Culvert	Old	Y	Y	0.5	sand , silt & clay	20%, 60% & 20%	NA	NA	NA	Nil
5/850	Thooval	9.846516	77.108003	10	Sand	N	PVT	Culvert	2	1	Red earth	PVT	N	Culvert	Old	Y	NA	NA	NA	NA	NA	NA	NA	Y
Muthirauzha River																								
0.00Km	UPPER Naymakkadu (origin of river)	10.149900,	77.068132	7	Rock	NO	Private	Rock	2	2.5	Rock	Private	No	NO	No	NIL	NA	NA	NA	NA	NA	NA	NA	NO
0.880KM	Naymakkadu	10.143703	77.065232	12.0m	Eearth	NO	Private	Rock	2	2.5	Rock	Private	N	Culvert	in use	No	No	N	N	N	N	N	N	Yes vegitation noted in the both bank of river near dam(15x2)
1.173Km	Naymakkadu East	10.14152	77.065482	10.0m	Rock	NO	Private	Rock	2	2.5	Rock	Private	N	Culvert	in use	NO	No	NO	N	N	N	N	N	Yes vegitation noted in the both banks

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3.485Km	Culvert near kannimali tea factory	10.123622	77.058067	10.0m	Rock	NO	Private	Earth	2	3	Earth	Private	N	Culvert	in use	NO	No	NO	N	N	N	N	N	Yes vegitation noted in the both banks
6.175km	Periyavarai bridge)	10.109174	77.058047	32	Silt	Y	Private	Earth	3.5	3	Earth	Govt	Y	Bridge	in use	NO	No	NO	N	N	N	N	N	Yes vegitation noted in the right banks
6.185km	Periyavarai	10.109174	77.058047	30	Silt	N	Govt	Earth	2.5	2	Silt	Govt	N	NA	NA	No	No	1.75	Silt , clay&Sand	sand 80% ,Silt 10%Clay10% and	N	N	N	Yes vegitation noted right banks
8.565km	Check dam	10.091094	77.060388	25m	Silt	N	Govt	Earth	2,5	2.5	Earth	Govt	N	Check dam	newely constructed	No	No	No	No	N	N	N	N	N
8.855km	Nallathanny(confluence of nallathanni river)	10.088845,	77.059789	17.0m	Silt	Y	Govt	Earth	3.5	3.5	Earth	Govt	Y	NA	NA	No	No	0.5	Silt clay,&Sand	sand 60% ,Silt 20%Clay20%	Both	Solid & Liquid	Y	Yes vegitation noted in the right banks
8.926km	Foot bridge (near PWD office)	10.088523,	77.060389	20	Silt	Y	Govt	Earth	4	4	Earth	Govt	Y	Foot Brodge	in use	No	No	1.5	Sillt & sand	sand 60% ,Silt 20%Clay20%	Both	Solid/ Liquid	Y	Yes vegitation noted in the left banks
9.006	Confluence of Colony thodu	10.088523,	77.060389	15	Silt	Y	Govt	Earth	4	2	Earth	Private	Y	NA	NA	NO	No	0.3	Sillt & sand	sand 60% ,Silt 20%Clay20%	Both	Liquid	Y	NO
9.22km	Churchil bridge	10.087327	77.060974	32	Silt	Y	Private	Earth	4	4	Earth	Private	Y	Foot Brodge	in use	No	No	0.5	Sillt & sand	sand 60% ,Silt 20%Clay20%	Both	Liquid	Y	Yes vegitation noted in the left banks
9.351	confluence of Nadayar thodu	10.086028,	77.060251	28	Silt	Y	Private	Earth	6	6	Earth	Private	Y	NA	NA	NO	No	0.8	Sillt & sand	sand 60% ,Silt 20%Clay20%	Both	Liquid	Y	Yes vegitation noted in the left banks
9.425	Munnar Main junction new Brige	10.085986,	77.060912	30	Silt	Y	Govt	Earth	6	6	Earth	Govt	Y	Bridge	in use	No	No	0.5	Sillt & sand	sand 70% Silt 20%Clay 10	Both	Liquid	Y	Yes vegitation noted in the left banks(30x2)
9.435	Munnar Main junction old Brige	10.086032,	77.060912	30	Silt	Y	Govt	Earth	6	6	Earth	Govt	Y	Bridge	in use	No	No	1	Sillt & sand	sand 70% Silt 20%Clay 11	Both	Liquid	Y	Yes vegitation noted in the right banks(40x2)
9.575	Confluence of Periyavarai river & kundala river	10.084707	77.061906	26.0m	Silt	Y	Govt	Earth	6	6	Earth	Private	Y	NA	NA	NO	No	0.75	Sillt & sand	sand 50% ,Silt 30%,Clay 20	Both	Liquid	Y	Yes vegitation noted in the both bank of river ,l eft (20x1.5),right(30x1)

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
9.885	Pipe line bridge near bypass bridge (U/S of bypass bridge)	10.082192	77.062261	45.0m	Silt	Y	Govt	Earth	5	5	Earth	Govt	Y	Iron Bridge	in use	NO	No	1.5	Rock boulders	Rock boulders	Both	Solid	Y	Yes
9.985	Munnar bypass bridge	10.082118,	77.062274	50.0m	Silt	Y	Govt	Earth	6	6	Earth	Govt	Y	Bridge	in use	No	No	0.5	Rock boulders	Rock boulders	R/B	Both	Y	Yes vegitation noted in the bthbank of river near dam(50x1.5),(50x3)
9.985	D/S of Munnar bypass bridge	10.082118,	77.062274	50.0m	Silt	Y	Govt	Earth	6	6	Earth	Govt	N	NA	NA	Yes	NA	1.75	Silt clay,&Sand	sand 40% ,Silt 20%,Clay 20	R/B	Both	Y	Yes vegitation noted in the bthbank of river near dam(300x1.5),(100x2)
13.225km	Munnar head work dam	10.068086	77.06685	50.0m	Rock	Y	Govt	Earth	6	6	Earth	Govt	Y	Dam	in use	NO	No	1.50m	Silt & clay	Silt 30%Clay 40sand 30%	L/B	Liquid	Y	Yes vegitation noted in the left bank of river near dam(35x3)
15.225km	Attukadu bridge pallivassal	10.053367	77.05865	55.0m	Rock	Y	Govt	Rock	8	8	rock	Govt	N	Bridge	in use	No	No	No	Rock	No	No	No	No	N
18.275km	Check dam (near rivulet resort)	10.028793,	77.054548	65.0M	Rock	N	Private	Rock	2	2.25	rock	private	N	Check dam	in use	No	No	No	rock	No	No	No	N	N
18.437km	Bridge (chithirapuram)	10.027517,	77.053854	45.0m	Rock	N	Private	Rock	2	2	rock	private	N	Bridge	in use	No	No	No	rock	No	No	No	N	N
20.98 km	kwa pump house	10.014139,	77.064042	35.0m	Rock	N	Govt	Earth	3.5	4	Earth	private	N	pump house	in use	No	No	No	rock	No	No	No	N	N
21.00km	Kunjithanni bridge	10.014139,	77.064042	35.0m	Rock	N	Govt	Earth	3.5	4	Earth	private	N	Bridge	in use	No	No	No	rock	No	No	No	N	N
22.81 km	Cross bar (near kWA pump House)	10.001453,	77.067044	40m	Earth	N	Govt	Earth	3.5	4	Earth	private	N	Crossbar & pump house	in use	No	No	0.6	Silt 30%	sand 70% ,Silt 10%Clay 19	No	No	N	N
23.12 Km	Mavelikuunu pump house	10.001453,	77.067044	55m	Earth	N	Govt	Earth	3.5	4	Earth	private	N	Jalanidhi pump house	in use	No	No	0.6	Silt 30%	sand 70% ,Silt 10%Clay 19	No	No	N	N
23.320km	Bridge (Ellackal)	9.997457,	77.065701	30.0m	Earth	No	Govt	Earth	3	4	Earth	Govt	N	Bridge	in use	No	NO	0.4	Silt 30%	sand 70% ,Silt 10%Clay 20	No	No	N	N
25.01km	SN Puram water falls	9.986326	77.063079	40	Rock	No	Govt	Rock	1.5	2	Rock	Govt	N	NA	NA	No	No	NO	NA	NA	NA	No	N	N
26.32km	Panniyarkootty	9.977719,	77.057752	45.0m	Earth	No	Govt	Rock	10.0m	8	Earth	Govt	N	Bridge	not in use	No	yes	1	Rock boulders	NA	No	No	N	Y
26.32	Panniyarkutty	$9^0$58'40"N	$77^0$3'31"E	55	Rock	N	N.A	hard soil	…	…	hard soil	N.A	N	…	….	YES	NO	2.5 m	silt	70%silt, 30%sand	Nil	Nil	N.A	Nil
26.40	Panniyarkutty ambulance Bridge(Udumbanchola-Rajakkadu road)	$9^0$58'38"N	$77^0$3'28"E	55	Rock	N	Private	hard soil	10	10	hard soil	Private	N	bridge	Under construction	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
29.65	Vellathooval Bridge(Vellathooval Ponmudi road)	$9^0$58'32"N	$77^0$1'45"E	40	Rock	N	Govt.	hard soil	25	25	hard soil	Govt.	Y	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
33.17	Kallarkutty dam	$9^0$58'49"N	$77^0$00'03"E	182.88	Rock	N	Govt.	hard soil	43	43	hard soil	Govt.	N	dam	good	NO	NO	Sedimentation inside Dam reservoir			Nil	Nil	N.A	Nil
33.93	Kallarkutty bridge (Adimali-Rajakkad road)	$9^0$58'58"N	$77^0$00'01"E	130.0 m	Rock	N	Govt.	hard soil	31.1	31.1	hard soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
33.36	Bridge to St. Joseph Church	$9^0$57'10.5"N	$76^0$59'9.6"E	100	Rock	N	Govt.	hard soil	25	25	hard soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
37.32	Check Dam near Panamkutty Bridge	$9^0$57'7.8"N	$76^0$58'51"E	100	Rock	N	Private	hard soil	30	30	hard soil	Private	N	dam	Damaged	NO	YES	NO	NO	NO	Nil	Nil	N.A	Nil
37.34	Panamkutty bridge (Kallarkutty-Pambla road)	$9^0$57'08.2"N	$76^0$58'50.3"E	105.0 m	silty gravel	N	Govt.	hard soil	12.0	15.0	hard soil	Govt.	N	bridge	good	NO	NO	3.0	silt	60%silt, 40%sand	Nil	Nil	N.A	Nil
Tributary of muthirapuzhayar Nallathanny																								
0.00Km	near Sudalamadan temple	10.093987,	77.031541	3	Earth	n	Private	Earth	1	1	Earth	Private	n	NO	NA	nil	NA	NA	NA	N	N	N	N	Vegetation noted both bank
0.05km	Culvert near instant tea factory	10.095974	77.04066	2.75	Earth	n	Private	Earth	1	1	Earth	Private	N	Culvert	in use	nil	NA	NA	NA	NA	L/B	solid	Y	NO
0.429km	culvert near shristy charitable trust	10.095943	77.0406	3	Earth	n	Private	Earth	2	1.3	Earth	Private	No	Culvert	in use	No	NA	NA	NA	N	R/B	Liquid	Y	Vegetation noted left bank
0.609km	culvert near tea Business support office	10.05813611	77.022711	3.5	Earth	N	Private	Earth	1.5	1.5	Earth	Private	N	Culvert	in use	No	NA	NA	NA	N	L/B	Liquid	Y	No
1.235km	culvert near tea Factry	10.095896,	77.040695	2.75	Earth	N	Private	Earth	1.5	1.3	Earth	Private	N	Culvert	in use	NO	No	NA	NA	N	R/B	Liquid	Y	No
2.525	culvert near tea museum	10.093924,	77.050308	3,50	Earth	N	Private	Earth	1.5	1.7	Earth	Private	N	Culvert	in use	No	No	NA	NA	N	L/B	Liquid	Y	No
2.625	culvert near little flower girls highschool	10.093399,	77.050897	4	Earth	Y	Private	Earth	2	2	Earth	Private	N	Culvert	in use	NO	No	0.8	Silt and clay	Silt 60%,clay40%,	L/B	Liquid	Y	No
3.07	culvert near pentacostal mission	10.090322,	77.054292	4,0	Earth	N	Private	Earth	1.5	2	Earth	Private	N	Culvert	in use	No	No	0.7	Silt and clay	Silt 60%,clay40%,	L/B	Liquid	Y	No
3.465	Near cattle shed near nallathanninriver	10.089210,	77.057179	3	Earth	N	Private	Earth	1.5	1.5	Earth	Private	N	cattle shed	NA	No	No	0.6	Silt and clay	Silt 60%,clay40%,	L/B	BOTH	Y	vegetation noted both bank
3.701	Foot bridge behind sree krishna Hotel	10.088824,	77.059137	5	Earth	Y	Private	Earth	1.5	1.5	Earth	Private	Y	Culvert	in use	No	No	0.85	Silt and clay	Silt 60%,clay40%,	BOTH	BOTH	Y	N
3.975	culvert on munnar marayoor road in nallathanny junction	10.088894,	77.059532	10.0m	Earth	N	Govt	Earth	2.5	2.5	Earth	Govt	Y	Culvert	in use	No	NA	0.9	Silt and clay	Silt 60%,clay40%,	BOTH	BOTH	Y	N
4.00km	Nallathannu confluence to Muthirapuzha	10.088812,	77.059731,	10.0m	Earth	Y	Govt	Earth	2	2	Earth	Govt	Y	NO	in use	No	NA	0.50m	Silt and clay	Silt 60%,clay40%,	BOTH	BOTH	Y	N
Tributary of Muthirapuzha Nadayar thodu																								
0.00km	Nadayar Estate(Near Munnar Naddayar Road)	10.126698,	77.204176	2	Earth	N	private	Earth	1.5	1.5	Earth	private	N	No	NA	NO	No	No	Nil	NA	No	No	No	Vegetation noted both bank

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.3	Checkdam Near EX MLA Residence	10.127060,	77.204101	3	Earth	N	private	Earth	1.5	1.5	Earth	private	N	check dam	damaged	NO	yes	No	Nil	NA	No	No	No	Vegetation noted both bank
0.655	Private shop above Thodu	10.085767,	77.059858	4	Earth	Y	private	Earth	2	2	Earth	Govt	Y	Shop on Iron pillors	In Use	YES	no only demolising	No	Nil	NA	L/B	Liquid	Y	No
0.66	Culvert On Munnar Udmulpet Roaad	10.085759,	77.060011	4	Earth	Y	govt	Earth	1.5	1.5	Earth	Govt	Y	Culvert	In Use	No	NO	No	Nil	NA	L/B	Liquid	Y	No
0.7	Confluence to Muthiraouzha	10.086030,	77.060219	2.5	Earth	Y	govt	Earth	1	0.75	Earth	Govt	Y	NA	NA	No	No	No	Nil	NA	No	No	No	No
Tributary of Muthirapuzha Sevenmala thodu(lakshmi thodu)																								
0.00Km	near lakshmi amman covil	10.07281	77.017808	3	Earth	N	Private	Earth	1.2	1	Earth	Private	NO	NO	NA	NA	NA	NIL	NA	NA	No	No	NO	Vegetation noted both bank
0.795km	culvert near Lakshmiamman kovil	10.059286	77.0174492	3	Earth	N	Private	Earth	2	1.3	Earth	Private	NO	Culvert	in use	No	NA	NIL	NA	NA	No	No	NO	Vegetation noted both bank
1.39KM	culvert near lakshmi UP school	10.05813611	77.022711	3.5	Earth	N	Private	Earth	1.5	1.5	Earth	Private	NO	Culvert	in use	No	NA	NIL	NA	NA	No	No	NO	No
1.924km	culvert D/S of lakshmi UP school	10.057686	77.026737	3	Earth	N	Private	Earth	1.5	1.3	Earth	Private	NO	Culvert	in use	NO	NA	NIL	NA	NA	No	No	NO	No
2.507	culvert on lanour quarters road	10.057402	77.030981	3,50	Earth	N	Private	Earth	1.5	1.7	Earth	Private	NO	Culvert	in use	No	NA	NIL	NA	NA	No	No	NO	No
3.877	Culvert near Ashvattha Resort	10.062683	77.040419	3	Earth	Y	Private	Earth	2	2	Earth	Private	NO	Culvert	in use	NO	NA	NIL	NA	NA	No	No	NO	vegetation noted right bank
5.814	Culvert on Estate road	10.064745	77.045459	3	Earth	N	Private	Earth	1.5	2	Earth	Private	NO	Culvert	in use	No	NA	NIL	NA	NA	No	No	NO	vegetation noted both bank
6.115km	Culvert on Estate road	10.06652	77.046733	3	Earth	N	Private	Earth	1.5	1.5	Earth	Private	NO	Culvert	in use	No	NA	NA	NA	NA	No	No	NO	vegetation noted both bank
6.777km	Culvert on Estate road	10.070149	77.048351	5	Earth	Y	Private	Earth	1.5	1.5	Earth	Private	Y	Culvert	in use	No	No	NA	NA	NA	No	No	NO	vegetation noted right bank
7.597km	Culvert near sevenmala tea estate office	10.070707	77.047688	10.0m	Earth	N	Govt	Earth	3	2.5	Earth	Govt	Y	Culvert	in use	No	NA	NA	NA	NA	L/B	Liquid	y	Yes .noted in the left bank(20x2)
9.227km	Culvert near ksrtc pine plantation	10.070345	77.060844	10.0m	Earth	Y	Govt	Earth	2	2	Earth	Govt	Y	Culvert	in use	No	NA	NA	NA	NA	R/B	Solid	Y	N
9.40km	Confluence at U/S of head work Dam	10.069981	77.061845	15.0m	Earth	N	Govt	Earth	0.5	0.5	Earth	Govt	N	NA	NA	No	NA	NA	NA	NA	Both	Both	yes	N
Tributary of Muthirapuzha colony thodu																								
0.00Km	Upper side of munnar colony(near Surya Cottage)origin of thodu	10.089674,	77.07367	3	earth	N	Private	Earth	1.25	1.25	Earth	Private	N	NO	No	NO	NA	N	N	N	N	NA	NA	Vegeation Noted Both bank
0.065KM	New Colony Road (culvert)	10.089038	77.073396	5.0m	earth	Y	Private	Earth	2.5	2	Earth	Private	N	Culvert	In use	Nil	No	N	N	N	L/B	Both	Y	N
0.100Km	New Colony	10.088703	77.073343	3	earth	N	Private	Earth	2	2.5	Earth	Private	N	Culvert	In use	No	No	N	N	N	L/B	Both	Y	N
0.2km	Culvert near (Regency hotel)	10.127758	77.0564	2.25m	earth	N	Private	Earth	1.5	1.5	Earth	Private	N	Culvert	In use	No	NO	N	N	N	L/B	Both	Y	N
0.34km	Culvert near (grace kudi)	10.087747,	77.073174	2	earth	Y	Private	Earth	2	2.5	Earth	Private	N	Culvert	In use	No	No	N	N	N	L/B	Both	Y	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.365km	Culvert near (Arul mound)	10.087519,	77.073005	3	earth	N	Private	Earth	2	2	Earth	Private	N	Culvert	In use	No	No	N	N	N	L/B	Both	Y	N
0.375km	Culvert near (Ammu cottage)	10.087763	77.072458	3.5	earth	N	Private	Earth	1.5	1.5	Earth	Private	N	Culvert	In use	No	No	N	N	N	L/B	Both	Y	N
0.421km	Culvert on munnar colony road (near SA cottage)	10.087194	77.072508	4	Earth	n	Govt	Earth	1.25	1.25	Earth	Govt	Y	Culvert	In use	No	No	1.5	silt & clay	silt 60%,clay 40%	L/B	Both	Y	yes.vegitation noted both banks of thodu(2*20*1.5)
0.460km	Culvert near juma masjid	10.087743,	77.072456	4.00m	Earth	N	Private	Earth	1.25	1.25	Earth	Private	y	Culvert	In use	No	No	0.3	silt & clay	silt 60%,clay 40%	L/B	Both	Y	N
1.061km	infront of camp munnar hotel	10.087595	77.067325	3	Silt	N	Private	Earth	1	0.4	earth	Private	Y	Foot Bridge	In use	no	No	0.75	silt & clay	silt 60%,clay 40%	L/b	Both	Y	yes.vegitation noted both banks of thodu
1.065	Pumpshed near camp munnar hotel	10.087659	77.065805	2	Silt	N	Govt	Earth	0.5	0.5	earth	Private	N	Pump shed	Not in use	yes	no dimolising only	0.5	silt & clay	silt 60%,clay 40%	L/b	Both	Y	yes.vegitation noted both banks of thodu
1.071 km	culvert on colony thodu	10.087579	77.06735	2	Silt	Y	Private	Silt	1.5	1.5	earth	Private	Y	Foot Bridge	In use	NO	No	0.5	silt & clay	silt 60%,clay 40%	L/b	Both	Y	N
1.135km	Culvert on munnar colony thodu(al buhari hotel)	10.087731	77.066719	3	Earth	Y	Private	Silt	1.5	1.5	earth	Private	Y	Culvert	In use	No	No	1	silt & clay	silt 60%,clay 40%	L/b	Both	Y	N
1.150km	iron foot bridge on colony thodu	10.087739	77.066706	2	Earth	Y	Private	Earth	1.5	1.5	Earth	govt	Y	Iron foot bridge	In use	no	No	0.5	Silt and clay	silt 60%,clay 40%	L/b	Both	Y	N
1.195Km	Culvert 0n munnar colony thodu(near sangeetha resturant)	10.08659	77.065805	3	earth	Y	Private	Earth	1	1	earth	govt	Y	Culvert	In use	Yes	yes	0.3	Silt and clay	silt 60%,clay 40%	L/b	Both	Y	N
1.210km	Culvert 0n munnar colony thodu(near gurubhavan hotel	10.087291	77.068005	5	Earth	Y	Govt	Earth	4	4	earth	Govt	Y	Culvert	In use	No	No	0.3	Silt and clay	silt 60%,clay 40%	L/b	Both	Y	N
1.235km	Foot Brodge near Govt Hostel	10.088230,	77.063379	0.7	Earth	N	Govt	Earth	2	2	earth	Govt	N	Concrete foot bridge	Abutment failure	yes	yes	No	No	No	R/B	Both	Y	Yes, vegetation noted Right bank(2x10x1.0)
1.290km	Excess of household waste and toilet waste	10.087809,	77.062577	7	Earth	N	Private	Earth	1	1	earth	Govt	N	NA	NA	No	NA	No	No	NA	L/B	Both	Y	Yes noted right bank
1..650km	Behind Eastend hotel(deposition of solid waste)	10.087812,	77.06232	5	Earth	N	Private	Earth	3	5	Silt	Govt	N	NA	NA	no	NA	No	No	NA	both	Both	Y	Yes,vegetation noted both bank(2x15x1.5)
1.740km	Culvert (PIPE CULVERT)	10.08784	77.06145	10	Earth	N	Govt	Earth	5	5	Earth	private	N	Temperory pipe culvert	During construction	no	NA	No	No	No	both	Both	Y	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.750km	Confluence to muthirapuzha	10.061562	77.061562	10.0m	earth	N	Govt	Earth	7	3.5	Silt	Govt	N	NA	NA	NO	NO	No	No	No	Both	Both	Y	Yes,vegetation noted both bank(2x30x1.5)
kundala river Tributary of Muthirapuzha																								
0.00Km	Chittuvarai thodu	10.152415,	77.217196	3	Earth	n	Private	Earth	1	1	Earth	Private	n	NO	NA	nil	NA	N	N	N	N	N	N	Yes .noted in the left bank
0.618	culvert near kundala club road	10.148072,	77.216216	4	Earth	n	Private	Earth	2	1.3	Earth	Private	No	Culvert	in use	nil	NA	NA	N	N	N	N	N	N
0.065KM	Confluence to kundala reservoir	10.14712	77.214245	4	Earth	N	Govt	Earth	1.5	1.5	Earth	Govt	N	NA	NA	nil	NA	NA	N	N	N	N	N	N
2.896km	Kundala Dam	10.1435604	77.198631	3	Earth	N	Govt	Earth	15	18	Earth	Govt	N	Dam	in use	nil	No	NA	N	N	N	No	No	Both banks are part of forest
5.506	Culvert near (Aruvikkadu estate Road)	10.141596,	77.178463	4	Earth	N	Govt	Earth	1.5	1.7	Earth	Govt	N	Culvert	in use	nil	No	NA	NA	NA	NA	NA	NO	Both banks are part of forest
9.47	Confluence to Mattupatty reservoir	10.138713,	77.171323	5	Earth	Y	Govt	Earth	2	2.5	Earth	Govt	N	Culvert	NA	nil	No	NA	NA	NA	NA	NA	N	Both banks are part of forest
16.806	Mattupetty Dam	10.106351,	77.123867	180.m	Earth	N	Govt	Earth	20	22	Earth	Govt	N	Dam	in use	nil	No	NA	NA	NA	N	NO	N	Both banks are part of forest
20.305	Culvert near Carmel giri	10.091590,	77.106679	10	Earth	N	Private	Earth	2	1.5	Earth	Private	N	Culvert	in use	nil	No	NA	NA	NA	N	NO	N	Both banks are part of Tea Plantation
24.255	Culvert near Grahamsland New division	10.083719,	77.082784	5	Earth	N	Private	Earth	2.5	3	Earth	Private	N	Culvert	in use	nil	No	NA	NA	NA	N	NO	N	Both banks are part of Tea Plantation
25.206	Earth Dumping near KTDC	10.0844927	77.0702181	35	Earth	N	Govt	Earth	1.5	1.5	Silt	Govt	N	Culvert	NA	nil	No	1	earth	NA	NO	NO	N	Noted in right bank (25x1.5)
25.716	KWA pump house near KTDC	10.084358,	77.070092	35	Earth	N	Govt	Earth	2.5	3	Earth	Govt	N	KWA pump house	in use	nil	No	1	earth	NA	NO	NO	N	Noted in right bank (50x1.5)
26.516	Culvert on munnar devikulam road (near police station)	10.084755,	77.062825	20m	Earth	Y	Govt	Earth	2	2	Soil	Govt	Y	Culvert	in use	nil	No	No	NA	No	N	N	N	N
26.656	Confluence to Muthirapuzha reservoir	10.084962,	77.061604	23	Earth	N	Govt	Earth	3	3.5	Soil	Govt	Y	NA	NA	No	NA	NA	NA	NA	N	N	N	Yes .noted in the left bank(20x2)
Chocknad thodu Tributary of Muthirapuzha																								
0.00km	Chocknad	10.066891,	77.078359	4.5	Silt	N	private	Soil	1.5	1.5	silt	private	N	NA	NA	NO	NA	NO	NO	NO	No	No	No	No
0.595km	Chocknad(near Labour quarters)	10.068634,	77.073837	8.0m	Silt	N	private	Soil	1.5	1.5	silt	private	N	Culvert	In Use	No	No	0.6	30%silt	clay	R/B	Liquid	Y	No
0.930km	Chocknad(near tea factory)	10.069543,	77.071065	15	Silt	N	private	Soil	1.5	1.5	silt	private	N	Culvert	In Use	yes	No	0.9	20%silt	clay	L/B	Liquid	Y	Vegetation onted both bank
1.5km	Confluence of chocknad thodu in head work dam	10.069896,	77.069509	20	Silt	N	private	Soil	2	2		private	N		NA	NO	No	1	10%silt	clay	Both	Liquid	Y	Vegetation onted Left bank

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Uppar thodu Tributary of Muthirapuzha																								
0.00Km	originating from muttukadu hills region	10.015226,	77.179388	3	Earth	N	Private	Earth	1	1	Earth	Private	No	NO	NA	NA	NA	NA	NA	NA	N	N	N	Vegation noted both bank
2.53km	culvert on muttukadu bysonvalley road(arampillil)	10.008849,	77.161776	3	Earth	N	Private	Earth	2	1.3	Earth	Private	No	Culvert	in use	NO	NA	NA	NA	NA	N	N	N	NO
4.440km	culvert near muttukadu padashakaram	10.05813611	77.022711	3.5	Earth	Y	Private	Earth	1.5	1.5	Earth	Private	Y	Culvert	in use	NO	NA	NA	NA	NA	N	N	N	NO
4.5	culvert in muttukadu padashekaram	10.011706,	77.145316	2.75	Earth	Y	Private	Earth	1.5	1.3	Earth	Private	Y	Culvert	in use	NO	No	NA	NA	NA	N	No	No	NO
4.645	culvert tractor passage	10.011866,	77.143992	2.75	Earth	Y	Private	Earth	1.5	1.7	Earth	Private	Y	Culvert	in use	No	No	NA	NA	NA	NA	NA	NO	NO
4.791	Iron foot bridge	10.011868,	77.142635	2.5	Earth	Y	Private	Earth	2	2	Earth	Private	Y	iron bridge	in use	NO	No	NA	NA	NA	NA	NA	NA	NO
5.31	Foot bridge	10.012076	77.14546	3,0	Earth	N	govt	Earth	1.5	2	Earth	Private	N	Foot bridge	in use	No	No	NA	NA	NA	N	No	N	NO
6.185	Culvert on periyacanal muttukadu road	10.008864,	77.131359	3	Earth	N	govt	Earth	1.5	1.5	Earth	Private	N	Culvert	in use	No	No	NA	NA	NA	No	No	No	vegetation noted both bank
6.405	Culvert on periyanickal muttukadu road	10.008283	77.129457	3	Earth	Y	Private	Earth	1.5	1.5	Earth	Private	Y	Culvert	in use	No	No	NA	NA	NA	No	No	No	vegetation noted both bank
7.5	Culvert on periyacanal muttukadu road	10.007435,	77.124011	4	Earth	N	Govt	Earth	2.5	2.5	Earth	Govt	Y	Culvert	in use	No	NA	NA	NA	NA	No	No	No	NO
8	culvert near Sree Balasubhramanya Swami Temple	10.005956,	77.118998	5	Earth	Y	Govt	Earth	2	2	Earth	Govt	Y	Culvert	in use	No	NA	0.5	Silt and clay	sand 60%Silt 30%,clay 10%,	No	No	No	NO
8.46	Foot bridge near servic centre	10.088812,	77.059731,	10	Earth	N	Private	Earth	1.75	2	Earth	Private	N	Footbridge	inuse	YES	YES	0.75	Silt and clay	sand 60%Silt 30%,clay 10%,	NO	NO	NO	NO
8.8	Culvert near bysonvalley junction	10.004289,	77.111681	7	Earth	N	govt	Earth	1.7	1.5	Earth	Private	N	Culvert	inuse	Nil	No	0.5	Silt and clay	sand 60%Silt 30%,clay 10%,	No	No	NO	Vegetation noted both bank
9.124	Foot bridge near jalanidhi pump house	10.00608	77.114538	10	Earth	N	Private	Earth	1.5	1.7	Earth	Private	N	Foot bridge	inuse	No	YES	N	NA	N	No	No	NO	N
9.134	jalanidhi pump house(tea company)	10.006023,	77.114215	10	Earth	N	Private	Earth	1.5	1.5	Earth	Private	N	Pump house	inuse	NA	No	N	NA	N	No	No	NO	No
9.14	jalanidhi pump house	10.006023,	77.114215	10	Earth	N	Private	Earth	1.5	1.5	Earth	Private	N	Pump house	inuse	NA	No	N	NA	N	No	No	NO	No
11.134	jalanidhi pump house(pallithazham)	10.001065	77.096441	15	Earth	N	Private	Earth	2	2	Earth	Govt	N	Pump house	inuse	NA	No	N	NA	N	No	No	NO	No
11.535	Culvert on pottancadu khajinappara road	10.003855	77.09356	15	Earth	N	Private	Earth	2	2	Earth	Govt	N	Culvert under construction	Not in use	No	No	N	NA	N	No	No	NO	vegetation noted both bank
13.504	Culvert on ellackal pottancadu road	10.003487	77.081055	10	Earth	N	Private	Earth	1.75	1.6	Earth	Private	N	Culvert	In use	No	No	N	NA	N	No	No	NO	vegetation noted both bank
15.34	Confluence to muthirapuzha	10.004649,	77.067634	12	Earth	N	Private	Earth	1.5	1.8	Earth	Private	N	confluence point	NA	NA	NA	N	NA	N	No	No	NO	vegetation noted both bank

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Panniyar Tributary of Muthirapuzha																								
0.00	Anayirankal Dam (Kumily -Munnar road)	$10^0$0'33"N	$77^0$12'22"E	261.69	silty Soil	N	Govt.	hard soil	34.1	34.1	hard soil	Govt.	N	Dam	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
4.80	Pooppara New Bridge	$9^0$58'42"N	$77^0$12'31"E	35	Rock	N	Pvt.	hard soil	8	8	hard soil	Govt.	N	bridge	good	YES	NO	NO	NO	NO	YES	YES	YES	YES
4.90	Pooppara Old Bridge	$9^0$58'43"N	$77^0$12'28"E	33	Rock	N	Pvt.	hard soil	6	6	hard soil	Govt.	N	bridge	good	YES	NO	NO	NO	NO	YES	YES	YES	YES
7.20	Arattukadavu Bridge (Thottikkanam - Pooppara road)	$9^0$58'4"N	$77^0$11'59"E	15	Rock	N	Pvt.	hard soil	7	7	hard soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
7.70	Vakkodan city Bridge (Thottikkanam - Murikkumthotti road)	$9^0$57'57"N	$77^0$11'47"E	20	silty Soil	N	Pvt.	Soft soil	5	5	Soft soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
10.70	Senapathi Bridge (Senapathi - Rajakumari road)	$9^0$57'11"N	$77^0$11'5"E	15	silty Soil	N	Pvt.	Soft soil	4	4	Soft soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
15.80	Rajakumari avanakkumchal Bridge (Senapathi - Rajakumari road)	$9^0$57'45"N	$77^0$8'52"E	25	Rock	Y	Pvt.	hard soil	5	5	hard soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
24.30	Kuthunkal dam (Senapathi - Rajakkaduroad)	$9^0$56'19"N	$77^0$6'21"E		Rock	N	Pvt.	hard soil	NA	NA	hard soil	Private	N	Falls	N.A	NO	NO	NO	NO	NO	R.B	Solid	NO	YES
24.30	Kuthunkal Bridge (Senapathi - Rajakkaduroad)	$9^0$56'17"N	$77^0$6'21"E	20	Rock	Y	Pvt.	hard soil	5	5	hard soil	Private	Y	Dam	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
32.00	Ponmudi Dam	$9^0$57'37"N	$77^0$3'19"E	294	Rock	Y	Govt.	hard soil	59	59	hard soil	Govt.	N	Dam	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
32.40	Ponmudi Suspension Bridge	$9^0$57'51"N	$77^0$3'26"E	30	Rock	N	Govt.	hard soil	25	25	hard soil	Govt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
33.00	Chappath wholesale Bridge(Ponmudi - Rajakkadu cut road)	$9^0$58'12"N	$77^0$3'29"E	30	Rock	Y	Private	hard soil	3	3	hard soil	Private	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
33.70	Panniyarkutty Bridge(Ponmudi - Vellathooval road)	$9^0$58'32"N	$77^0$3'29"E	45	silty Soil	N	Private	hard soil	10	10	hard soil	Private	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	N.A	Nil
Sub tributory of Panniyar Rajakkadu Kallimali thodu																								
1/000	culvert, (Adimali - Rajakkadu road)	$9^0$57'32"N	$77^0$5'39"E	3	Soft soil	Y	Pvt.	Soft soil	4.0	4.0	Soft soil	Pvt.	Y	culvert	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
1 / 040	Rajakkadu VCB	$9^0$57'32"N	$77^0$5'40"E	5	Soft soil	Y	Pvt.	Soft soil	2.5	2.5	Soft soil	Pvt.	Y	VCB	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
1 / 450	Pazhayaviduthi bridge (cherupuram city - Mammattykkanam)	$9^0$57'21"N	$77^0$5'46"E	5	Soft soil	Y	Pvt.	Soft soil	3	3	Soft soil	Pvt.	Y	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
1 / 700	Kallimali VCB	$9^0$57'13"N	$77^0$5'39"E	5	Soft soil	Y	Pvt.	Soft soil	2.5	2.5	Soft soil	Pvt.	Y	VCB	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
2 / 000	Diamond bridge (Kuthunkal - Kallimali road)	$9^0$56'50"N	$77^0$5'27"E	5	Soft soil	Y	Pvt.	Soft soil	3	3	Soft soil	Pvt.	Y	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
Sub tributory of Panniyar Kulatharakuzhy - Panniyarkutty thodu																								
1 / 200	Culvert - 1	$9^0$57'36"N	$77^0$4'26"E	3	Rock	N	Pvt.	Rock	1.5	1.5	Rock	Pvt.	Y	culvert	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	No
2 / 200	Culvert - 2 (Adimali - Rajakkadu road)	$9^0$57'55"N	$77^0$3'56"E	4	Rock	N	Pvt.	Rock	1.5	1.5	Rock	Pvt.	N	culvert	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3 / 300	Chappath bridge (Adimali - Rajakkadu road)	$9^0$58'14"N	$77^0$3'30"E	3	Hard soil	Y	Pvt.	Rock	4	4	Hard soil	Pvt.	N	bridge	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
Sub tributory of Panniyar Undamala - Panniyarkutty thodu																								
0 / 800	Culvert	$9^0$58'19"N	$77^0$3'33"E	3	Rock	N	Pvt.	Rock	1.5	1.5	Rock	Pvt.	N	culvert	good	NO	NO	NO	NO	NO	Nil	Nil	Nil	YES
Sub tributory of Panniyar Ambalamkunnu																								
1 / 500	Culvert	$9^0$58'33"N	$77^0$3'42"E	3	Rock	N	Pvt.	Rock	1.5	1.5	Rock	Pvt.	N	culvert	good	yes	NO	NO	NO	NO	Nil	Nil	Nil	YES
3 / 350	Bridge (Panniyarkutty - Pothupara road)	$9^0$58'33"N	$77^0$3'32"E	5	soft soil	Y	Pvt.	Rock	4.5	4.5	Rock	Pvt.	Y	bridge	good	NO	NO	NO	NO	NO	YES	YES	YES	YES
Sub tributory of Panniyar Santhanpara river																								
6 / 100	. Chennakkadavubridge (near santhanpara town)	9^o58'07"N	77^o13'05"E	30	Rock	Y	Pvt.	Rock	5	5	Rock	Pvt.	y	bridge	good	NO	NO	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Sub tributory of Panniyar Cheriyar river																								
0 / 360	Bridge (Menaka - Estate road)	9.948282^0N	77.193184^0E	15	soft soil	N	Pvt.	Rock	2.5	2.5	Rock	Pvt.	N	bridge	good	NO	NO	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1 / 050	Bridge (Manithukkammed - Temple road)	9.953091^0N	77.195075^0E	15	soft soil	N	Pvt.	Rock	2.5	2.5	Rock	Pvt.	N	bridge	good	NO	NO	Nil	Nil	Nil	Nil	Nil	Nil	Nil
1 / 830	Pinakkacity Bridge (near thottikkanam)	9^o57'23"N	77^o11'30"E	15	soft soil	Y	Pvt.	Rock	2.5	2.5	Rock	Pvt.	Y	bridge	good	NO	NO	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Ambhazhachal river Tributary of Muthirapuzha																								
0.00	KSEB Tunnel from Viripara	10°04'19.7"N	76°57'35.4"E	2.5m	Rock	NA	NA	Rock	…	…	Rock	NA	NA	…	….	No	No	NA	NA	NA	Nil	Nil	N.A	Nil
0.23	KSEB Power house bridge	10°04'13.6"N	76°57'32.6"E	6m	Boulders	N	Private	hard soil	1.5	1.5	hard soil	Private	Y	bridge	Good	No	No	NA	NA	NA	Nil	Nil	N.A	Nil
1.12	Foot bridge downstream of power plant	10°03'49.5"N	76°57'32.1"E	6m	Gravel muck	N	Private	Clayey soil	1	1	Clayey soil	Private	N	Wooden Foot bridge	Good	No	No	NA	NA	NA	Nil	Nil	N.A	Nil
1.27	Kallar mankulam road bridge d/s of power house	10°03'45.2"N	76°57'30.0"E	8m	Silt	N	Private	Clayey soil	1	1	Clayey soil	Private	N	Bridge	Good	No	No	0.5m	Vegetation obstruction	NA	Nil	Nil	N.A	Yes
1.50	Check dam by jalanidhi	10°03'39.9"N	76°57'26.2"E	8m	Sand	Y	Govt	hard soil	2	2	hard soil	Private	Y	Check dam	Good	Yes	No	2	Sand & Silt	70% sand, 30% Silt	Nil	Nil	N.A	Nil
2.04	Private Foot bridge	10°03'29.3"N	76°57'19.6"E	4m	Rock	N	Private	Clayey soil	1	1	Clayey soil	Private	N	Foot bridge	Good	No	No	NA	NA	NA	Nil	Nil	N.A	Nil
2.39	Confluence Point of kaithodu 1	10°03'20.8"N	76°57'12.7"E	6m	Silt	N	Private	Clayey soil	1.5	1.5	Clayey soil	Private	N	NA	NA	NA	NA	0.6m	Silt	100% Silt	Nil	Nil	N.A	Nil
3.36	Peechad bridge	10°03'01.0"N	76°57'11.0"E	7m	Silt & muck	N	Private	Clayey soil	1.5	1.5	Clayey soil	Private	N	Bridge	Good	NA	NA	1m	Silt, muck & Vegetation	50% Silt, 30% muck & 20% Vegetation	Nil	Nil	N.A	Yes
3.86	Confluence Point of kaithodu 2	10°02'47.0"N	76°57'05.4"E	7m	Silt & sand	N	Private	Clayey soil	2	2	Clayey soil	Private	N	NA	NA	NA	NA	0.6m	Silt & Sand	50% Silt & 50% Sand	Nil	Nil	N.A	Nil
4.25	Private bridge near Wild Spice Trails Resort	10°02'43.4"N	76°57'16.4"E	8m	Silt & sand	N	Private	Clayey soil	1.5	1.5	Clayey soil	Private	N	Bridge	Good	NA	NA	0.5m	Silt & Sand	50% Silt & 50% Sand	Nil	Nil	N.A	Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4.60	Samsung Estate - Vengayapara Bridge	10°02'40.9"N	76°57'26.8"E	10m	Silt & sand	Y	Govt	hard soil	2	2	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
5.26	Private bridge to Swiss nest	10°02'34.4"N	76°57'44.5"E	20m	Silt	N	Govt	hard soil	3	3	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
5.31	Private bridge to private land near Swiss nest	10°02'34.3"N	76°57'46.0"E	20m	Silt	N	Govt	hard soil	3	3	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
5.37	Private bridge to Flower valley	10°02'34.2"N	76°57'48.0"E	25m	Silt	N	Govt	hard soil	3	3	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
5.68	Private bridge to Home	10°02'33.4"N	76°57'57.2"E	9m	Silt	Y	Govt	hard soil	3	3	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
6.04	Kurishupara Bridge	10°02'29.6"N	76°58'06.8"E	8m	Silt	Y	Private	hard soil	2	2	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
6.20	Bridge to Pallivasal grama panchayat samskarika nilayam kurisupara	10°02'31.4"N	76°58'11.4"E	12m	Silt	Y	Road	hard soil	2	2	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
6.64	bridge near bubbly falls	10°02'29.6"N	76°58'24.4"E	12m	Rock	Y	Road	hard soil	4	4	hard soil	Private	N	Bridge	Good	NA	NA	0.6m	Silt & Vegetation	80% silt, 20% Vegetation	Nil	Nil	N.A	Yes
7.00	ridge near kallar valley anganvadi	10°02'27.4"N	76°58'36.1"E	8m	Silt	Y	Private	hard soil	2	2	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
7.31	bridge near kallrvalley waiting shed	10°02'27.4"N	76°58'45.4"E	8m	Silt	N	Private	hard soil	2.5	2.5	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Yes
7.93	Confluence Point of Kaithodu 3	10°02'19.5"N	76°58'56.6"E	15m	Boulders	N	Private	hard soil	2	2	hard soil	Private	N	NA	NA	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
8.76	kallar bridge	10°02'03.6"N	76°59'11.7"E	20m	Boulders	u/s -Y d/s - N	Private	hard soil	5	5	hard soil	Private	u/s -Y d/s - N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
10.62	Confluence Point of Kaithodu 4	10°01'36.5"N	76°59'51.9"E	12m	Boulders	N	Private	hard soil	2	2	hard soil	Private	N	NA	NA	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
11.43	kambiline - chundakkadu bridge	10°01'25.0"N	77°00'12.4"E	15m	Rock	N	Private	hard soil	1.5	1.5	hard soil	Private	N	Bridge	Good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
11.58	kambiline check dam	10°01'25.2"N	77°00'16.7"E	30m	Rock	Y	Private	hard soil	2	2	hard soil	Private	Y	Check dam	Damaged	NA	yes	NA	NA	NA	Nil	Nil	N.A	Nil
12.69	Island formation	10°01'14.3"N	77°00'47.3"E	20m	silt	N	Private	soft soil	5	2.5	soft soil	Private	N	NA	NA	NA	NA	1.5	Silt, muck & Vegetation	50% Silt, 30% muck & 20% Vegetation	Nil	Nil	N.A	Yes
12.94	Confluence Point of Kaithodu 5	10°01'08.3"N	77°00'52.2"E	15m	Silt &muck	N	Private	hard soil	2.5	2.5	hard soil	Private	N	NA	NA	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
13.02	ambazhachal bridge	10°01'06.1"N	77°00'52.7"E	15m	Silt	Y	Private	lateritic	6	6	lateritic	Private	Y	bridge	good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
13.45	iruttukanam small hydel power project check dam	10°00'53.9"N	77°00'45.9"E	17m	Rock	Y	Private	lateritic	7	20	lateritic	Private	N	Check dam	good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
14.29	iruttukanam small hydel power house	10°00'31.4"N	77°00'30.5"E	17m	Rock	N	Private	lateritic	10	10	lateritic	Private	N	Power house	good	NA	NA	0.6m	Boulders & sand	50% Boulders & 50% sand	Nil	Nil	N.A	Nil
16.32	mankadavu bridge	9°59'38.7"N	77°00'31.9"E	55m	Rock	N	Private	lateritic	10	7	lateritic	Private	N	bridge	good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
18.57	adimali - rajakkadu road bridge (kallarkutty bridge)	9°58'57.9"N	77°00'00.7"E	50m	silt	N	Private	hard soil	20	20	hard soil	Private	N	bridge	good	NA	NA	NA	NA	NA	Nil	Nil	N.A	Nil
Kallar Thodu Tributary of Ambhazhachal river																								
0.00	Peechadu Thaliyam Check dam	10°03'27.5"N	76°57'40.5"E	40m	silt	N	Private	hard soil	2	2	hard soil	Private	N	Check dam	good	NA	NA	1m	Silt	100 % silt	Nil	Nil	N.A	yes
0.11	Private bridge	10°03'26.8"N	76°57'37.9"E	4m	Silt	N	Private	soft soil	2	2	soft soil	Private	N	bridge	good	NA	NA	1m	Silt & Vegetation	70 % silt & 30% Vegetation	Nil	Nil	N.A	yes
0.92	Pipe culvert –Kallar Mankulam road	10°03'21.5"N	76°57'17.5"E	4m	Silt	N	Private	hard soil	3	2	soft soil	Private	N	Pipe culvert	good	yes	yes	1m	Silt & Vegetation	70 % silt & 30% Vegetation	Nil	Nil	N.A	yes
1.07	Confluence Point of thodu to kallar.	10°03'20.8"N	76°57'12.7"E	5m	Silt	N	Private	Clayey soil	1.5	1.5	Clayey soil	Private	N	NA	NA	NA	NA	0.6m	Silt	100% Silt	Nil	Nil	N.A	Nil
Thokkupara - Ambazhachal thodu Tributary of Ambhazhachal river																								
0.00	Thokkupara tunnel near by bridge	10°01'57.1"N	77°01'33.3"E	3m	laterite	N	Private	hard soil	1.5	1.5	hard soil	Private	N	bridge	good	NA	NA	1m	Boulders & muck	70 % Boulders & 30% muck	Nil	Nil	N.A	Nil
0.95	Thokkupara ananthavilasam karadipara road near check dam	10°01'32.1"N	77°01'21.3"E	8m	Boulders	N	Private	hard soil	1.5	1.5	hard soil	Private	N	Check dam	Good	NA	NA	1.5m	Boulders & muck	70 % Boulders & 30% muck	Nil	Nil	N.A	Nil
1.04	Thokkupara - ananthavilasam road bridge	10°01'29.9"N	77°01'19.4"E	6m	Rock	Y	Private	hard soil	4	4	hard soil	Road	Y	bridge	Good	Yes	yes	0.5m	Boulders & muck	70 % Boulders & 30% muck	Nil	Nil	N.A	Nil
1.67	19 Palam	10°01'19.0"N	77°01'04.0"E	8m	gravel	N	Private	hard soil	2	2	hard soil	Private	N	bridge	Good	NA	NA	0.6m	muck	100% Muck	Nil	Nil	N.A	Nil
2.14	Ambazhachal-kandiyampara road bridge	10°01'09.2"N	77°00'53.8"E	8m	muck, gravelly	Y	Private	lateritic	2.5	2.5	lateritic	Private	N	bridge	Good	Yes	yes	0.5m	Boulders & muck	70 % Boulders & 30% muck	Nil	Nil	N.A	Nil
2.19	Confluence Point of thodu to kallar.	10°01'08.3"N	77°00'52.2"E	8m	Silt &muck	Y	Private	hard soil	2	2	hard soil	Private	Y	NA	NA	NA	NA	0.5m	Boulders & muck	70 % Boulders & 30% muck	Nil	Nil	N.A	Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
REACH II																								
DETAILS OF LEFT BANK																								
	Karithiriyar from pettimudi																							
0.000	Starting point	10°09´59.52"	77°01´14.68"	4.00	silty with boulders	N	private	Partially rock with hard soil	1.50	1.50	Partially rock with hard soil	private	N	Nil				0.20	silty rock	10% sand, 40%silt, 50% rock boulders	Nil		Nil	
1.080	Bridge	10°09´44.65"	77°00´50.80"	5.00	do	N	private	Partially rock with hard soil	1.50	1.50	Partially rock with hard soil	private	N	concrete	Old but in good condition	No obstruction		0.20	silty rock	10% sand, 40%silt, 50% rock boulders	Nil		Nil	
1.620	Pettimudy Stream	10°09´42.1"	77°00´40.0"	5.00	do	N	private	Partially rock with hard soil	3.00	3.00	Partially rock with hard soil	private	N	Nil				Nil	silty rock	10% sand, 40%silt, 50% rock boulders	Nil		Nil	
4.210	Bridge	10°09´4.27"	76°59´58.31"	24.00	do	N	private	Partially rock with hard soil	2.50	2.50	Partially rock with hard soil	private	N	concrete	Old but in good condition	No obstruction	no	0.20	silty rock	10% sand, 40%silt, 50% rock boulders	Nil		Nil	
10.520	a tributary joins to Karinthiriyar	10°07´43.71"	76°58´24.91"	25.00	do	N	Forest	Partially rock with hard soil	3.00	3.00	Partially rock with hard soil	Forest	N	Nil					silty rock	10% sand, 40%silt, 50% rock boulders	Nil		Nil	
10.730	Conflunce of Kadalar	10°07´38.33"	76°58´20.87"	20.00	do	N	Forest	Partially rock with hard soil	3	3	Partially rock with hard soil	Forest	N	Nil				0.20	silty rock	10% sand, 40%silt, 50% rock boulders	Nil		Nil	
15.040	Karimunda city foot bridge	10°07´58.7"	76°56´24.1"	40.00	do	N	do	Partially rock with hard soil	2.50	4.00	Partially rock with hard soil	do	N	do				0.20		do	Nil			
15.560	Tributary from right(Parekudy thodu)	10°08´08.29"	76°56´15.8"	50.00	do	N	do	Partially rock with hard soil	3.50	5.00	Partially rock with hard soil	do	N					0.20		do	Nil			
16.050	Georgiar hanging bridge	10°08´08.1"	76°56´00.1"	70.00	do	N	do	Partially rock with hard soil	3.20	4.50	Partially rock with hard soil	do	N	do				0.20		do	Nil			

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
16.950	Kuwait city Bridge	10°08´14.71"	76°55´53.57"	60.00	do	N	Private	Partially rock with hard soil	3.20	3.80	Partially rock with hard soil	Private	N	concrete	Good condition	nil	no	1.00		Boulders 60% silt 40%				Due to land slides about 900 m u/s of this place is deposited with silt and rock boulders. Appx Qty is 27000 m3
18.630	Mankulam Joints Left side	10°08´25.87"	76°54´49.14"	60.00	do	N	Forest	Partially rock with hard soil	5.00	8.00	Partially rock with hard soil	Forest	N	Nil				0.15		sand 20% silt 40% clay 40%	Nil		Nil	
20.110	Ettacholayar joints from Right	10°08´56.3"	76°54´14.38"	50.00	do	N	Forest	Partially rock with hard soil	4.00	5.00	Partially rock with hard soil	Forest	N	Nil				0.10		sand 10% silt 40% clay 50%	Nil		Nil	
21.930	Vathikudy Tributary joints from Left	10°07´24.54"	76°50´47.07"	50.00	do	N	Forest	Partially rock with hard soil	3.50	4.00	Partially rock with hard soil	Forest	N	Nil				0.15		sand 20% silt 20% clay 60%	Nil		Nil	
31.030	KunjiyarTributary joints from Left	10°07´31.76"	76°49´09.22"	48.00	do	N	Forest	Partially rock with hard soil	4.00	4.20	Partially rock with hard soil	Forest	N	Nil				0.10		sand 20% silt 40% clay 40%	Nil		Nil	
34.630	Conflunce of Mamalathodu	10°09´47"	76°47´12.08"	60.00	do	N	Forest	Partially rock with hard soil	3.00	3.60	Partially rock with hard soil	Forest	N	Nil				0.10		sand 10% silt 30% clay 60%	Nil		Nil	
40.530	Pooyamkutty Manikandanchal bridge	10°09´34.37"	76°47´12.66"	90.00	do	N	Forest	Partially rock with hard soil	2.00	2.00	Partially rock with hard soil	Forest	N	concrete	Good condition	Y,Insufficient height and insufficient vent way	N,Both sides forest	0.20		sand 10% silt 40% clay 50%	Nil		Nil	
41.430	Conflunce of Pooyamkuty yar	10°09´9.52"	76°44´13.00"	60	do	N	Forest	Partially rock with hard soil	5.00	10.00	Partially rock with hard soil	Forest	N	Nil				0.2		sand 10% silt 30% clay 60%	Nil		Nil	
	Mankulam ar																							
0.000	Parvathy mala starting point	10°05´18.44"	77°01´42.24"	3.00	silt with rock boulders	N	private	hard soil with rock strata	3.00	3.00	hard soil with rock strata	Forest	N	nil		nil	nil	0.20	Silt, clay, boulders	Silt 10%, clay 30%, boulders 60%	Nil			Nil
0.740	Culvert road cross	10°05´26.08"	77°01´26.44"	5.00	do	do	private	do	3.00	3.00	do	do	do	Concrete	Old but good condition	Nil	No	0.20	Silt, clay, boulders	Silt 10%, clay 30%, boulders 60%	Nil			Nil
2.320	Tributory joining from right side of length 0 .9 km(Kallar estate)	10°05´35.23"	77°00´41.31"	4.00	do	do	Forest	do	2.50	2.50	do	Forest	do	Nil				0.20	do	do	Nil			Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
2.500	Road crossing culvert,Mankulam near at road D/s of kallar Estate	10°05´33.93”	77°00´36.83”	4.00	do	do	do	do	2.50	2.50	do	do	do	Concrete	Old but good condition	slightly obstructed	No	0.20	do	do	Nil			Nil
3.230	Road crossing culvert	10°05´18.96”	77°00´19.33”	4.00	do	do	private	do	2.50	do	do	do	do	Concrete	do	do	No	0.20	do	do	Nil			Nil
4.320	Culvert at crossing road	10°05´9.67”	76°59´51.42”	4.00	do	do	private	do	3.00	3.00	do	do	do	Concrete	do	do	No	0.20	do	do	Nil			Nil
5.460	Culvert at crossing road	10°05´07.66”	76°59´27.00”	4.00	do	do	do	do	3.00	3.00	do	do	do	Concrete	do	do	No	0.20	do	do	Nil			Nil
5.570	Tributory joining right side of length 1.50 km	10°05´10.64”	76°59´25.75”	4.00	do	do	Forest	do	2.50	2.50	do	do	do	Nil	do	do	No		do		Nil			Nil
10.080	Road Bridge U/s of Viripara checkdam bridge	10°04´43.17”	76°57´44.01”	5.00	do	do	private	do	3.00	3.00	do	do	do	Concrete	do	do	No		do		Nil			Nil
10.190	Viripara KSEB diversion weir in Tata tea estate	10°04´41.12”	76°57´41.15”	29.00	do	do	do	do	2.50	2.50	do	do	do	Diversion weir	Old but good condition	Water is diverted by a tunnal to menachery River and then to Kallarkuttty reservoir of Neriamangalam hydroelectric project.	Re construction required	0.40	Silty	70% silty, 25% clay,5 %sand.	Nil			Nil
10.910	Bridge road crossing (Viripara bridge Mankulam road)	10°05´01.08”	76°57´4.84”	28.00	do	do	Forest	do	3.00	3.00	do	Forest	do	Concrete	do	Flow is obstructed, since the vent way is very less	vent way is to be increased	0.40	silty	70% silty, 25% clay,5 %sand.	Nil			Nil
14.120	Nakshathrakuthu water falls	10°05´01.35”	76°57´03.09”	14.00	do	do	Forest	do	4.00	4.00	do	do	do	Nil		Water is diverted by constructing a small weir upstream of water fall for Mankulam micro hydroelectric project owned by Panchayath			do	70% silty, 25% clay,5 %sand.	Nil			Nil
15.140	Pambumkayam bridge	10°05´45.2”	76°55´56.57”	23.00	do	do	private	do	4.00	5.60	do	do	do	Concrete	Old but good condition	Nil	No	0.30	do	70% silty, 25% clay,5 %sand.	Nil			Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
16.690	Cause way Mankulam ar	10°06´22.12"	76°55´50.71"	30.00	do	do	private	do	3.50	3.50	do	do	do	Concrete	Vent vay is very less	The causeway have no sufficient vertical clearance and vent way. There became an obstruction to the flow especially during flood	No	0.60	delta formation u/s	30% sand ,50%silt,20 % clay	Nil			Nil
17.290	Tributary of length 500 m							do																Nil
17.730	Thalumkandam bridge,Mankulam ar	10°06´49.01"	76°55´41.29"	30.00	do	do	do	do	4.00	5.00	do	do	do	Concrete	Old but good condition	do	No	20.00	do	20% sand ,60%silt,20 % clay	Nil			Nil
18.390	Bridge	10°07´6.75"	76°55´32.78"	30.00	do	Yes 50 m	do	do	3.50	3.70	do	do	Yes 20 m	Concrete	Old but good condition	do	No	15.00	do	30% sand ,50%silt,20 % clay	Nil			Nil
19.580	Bridge Mankulam Thodu	10°07´33.89"	76°55´07.77"	25.00	do	do	do	do	3.00	3.00	do	do	do	Concrete	Old but good condition	do	No	0.20	do	10% sand ,70%silt,20 % clay	Nil			Nil
22.220	Perumbankuthu waterfalls	10°08´15.5"	76°54´55.2"	42.00	do	do	do	do	4.00	5.00	do	do	do				No	0.20			Nil			Nil
22.380	Bridge u/s of Perumbankuthu waterfalls	10°08´17.53"	76°54´51.62"	42.00	do	do	do	do	4.00	4.00	do	do	do	Concrete	Old but good condition	do	No	0.30	silty	30% sand, 50%silt,20 % clay	Nil			Nil
22.820	Confluence at ch 18.63 km of Karinthiriyar	10°08´25.87"	76°54´49.14"	42.00	do	do	do	do	6.00	6.00	do	do	do	Nil			No	0.30	do	30% sand, 50%silt,20 % clay	Nil			Nil
	Anakulam Tributary Thodu (Anakulam ambalathodu)																							
0.000	Starting point	10°09´32.28"	76°54´56.04"	3.00	silt with rock boulders	N	Forest	hard soil with rock strata	1.20	1.50	hard soil with rock strata	Forest	N	Nil				0.2	silt	silt 50% clay 30 % Boulders 20%	Nil		nil	
0.170	Culvert	10°09´36.37"	76°54´51.0"	4.00	do	Y d/s	Forest	do	2.00	2.00	do	Forest	S d/s	Concrete	Good	No	Nil	0.2	silt	silt 50% clay 30 % Boulders 20%	Nil		nil	
0.300	Incomplete VCB	10°09´36.37"	76°54´48.1"	5.00	do	N	Forest	do	2.00	2.00	do	Forest	N	do	incomplete	No	To be completed	0.3	silt	silt 40% clay 20 % Boulders 40%	Nil		nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
0.440	Anakulam road Culvert	10°09´39.72"	76°54´45.31"	7.00	do	N	private	do	2.50	2.50	do	Forest	N	do	do	No	Nil	0.3	silt	silt 40% clay 20 % Boulders 40%	Nil		nil	
0.500	Conflunece at ch 3.05 km of Ettacholayar	10°09´41.21"	76°54´44.41"	8.00	do	N	Forest	do	1.50	1.50	do	Forest	N	Nil				0.3	silt	silt 40% clay 20 % Boulders 40%	Nil		nil	
	Karithiriyar from Rajamala portion																							
0.000	Starting point	10°08´35.98"	77°03´10.56"	3.00	silty soil with boulders	N	Forest	rock and hard soil			rock and hard soil	Forest	N	Nil		No	No				Nil		nil	
0.090	culvert	10°08´34.00"	77°03´7.00"	6.00	do	N	do	do	3.40	4.00	do	do	N	concrete	Good condition	No	No	0.20		Boulders 50% silt 40% clay 10 %	Nil		nil	
1.580	culvert	10°08´3.1"	77°02´44.93"	4.00	do	N	Private	do	4.00	5.00	do	do	N	do	do	No	No	0.30		Boulders 30% silt 60% clay 10 %	Nil			
2.540	culvert	10°07´58.61"	77°02´18.43"	3.00	do	N	do	do	4.50	4.00	do	Private	N	do	do	No	No	0.20		do	Nil			
2.750	culvert	10°07´59.04"	77°02´13.14"	3.00	do	N	do	do	3.00	6.00	do	do	N	do	do	No	No	0.20		do	Nil			
5.670	culvert	10°07´53.21"	76°00´57.08"	12.00	do	N	do	do	3.50	4.00	do	do	N	do	do	No	No	0.20		do	Nil			
12.160	Confluence of Karinthiriyar @ ch 10.73 km	10°07´38.41"	76°58´20.84"	15.00	do	N	Forest	do	3.00	5.50	do	Forest	N	do				0.20		do	Nil			
	Kozhyalakudyar																							
0.000	Starting point from Mangaparekudy	10°09´54.35"	76°57´34.75"	3.00	silt with rock boulders	N	Forest	Partially rock and hard soil	2.00	1.50	Partially rock and hard soil	Forest	N	Nil				0.20		Silt 45% clay 35% sand 20%	Nil		nil	
5.040	Check dam of length 17.000 m	10°09´58.97"	76°55´19.85"	17.00	do	N	Forest	do	1.50	2.50	do	Forest	N	concrete	Good	No	No	0.20		Silt 45% clay 35% sand 20%	Nil		nil	
5.160	Bridge	10°09´59.35"	76°55´19.84"	17.00	do	N	Forest	do	2.50	2.50	do	Forest	N	concrete	Good	No	No	0.20		Silt 45% clay 35% sand 20%	Nil		nil	
5.670	Conflunce at ch 1.80 km of Ettacholayar	10°10´5.4"	76°55´6.7"	16.00	do	N	Forest	do	2.00	2.00	do	Forest	N	Nil				0.20		Silt 45% clay 35% sand 20%	Nil		nil	
	Tributary 1																							
0.000	Starting point	10°09´1.46"	77°01´43.61"	3.00	silt with rock boulders	N	private	Silty soil over rock with vegitation	2.00	2.00	Silty soil over rock with vegitation	private	N	Nil				0.20	silt and rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
1.250	Culvert	10°09´3.48"	77°01´13.57"	5.00	do	N	private	do	2.00	2.00	do	private	N	concrete	Old but in good condition	Slightly obstructed	No	0.20	silt and rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
3.570	Conflunce to at 2.63 km of Karinthiyar	10°09´14.48"	77°01´26.59"	5.00	do	N	private	do	3.00	3.00	do	private	N	Nil				0.15	silty rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
	Vathikudy tributary																							
0.000	Starting point	10°06´35.5"	76°06´45.2"	3.00	silt with rock	N	forest	hard soil over rock with vegitation	2.00	2.00	hard soil over rock with vegitation	forest	N	Nil				0.20	silt and rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
1.260	Culvert	10°07´13.6"	76°53´8.19"	6.00	do	N	forest	do	2.00	2.00	do	forest	N	concrete	Old but in good condition	Slightly obstructed	No	0.20	silt and rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
3.070	Culvert	10°07´46.9"	76°53´29.46"	8.50	do	N	forest	do	2.00	2.00	do	forest	N	concrete	Old but in good condition	nil	No	0.20	silt and rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
3.910	Conflunce to at 21.93 km of Karinthiyar	10°08´10.55"	76°53´37.02"	8.00	do	N	forest	do	3.00	3.00	do	forest	N	Nil				0.15	silty rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
	Kunjiar																							
0.000	Starting point	10°03´6.48"	76°55´58.43"	3.00	silty with rock boulders	N	forest	Silt soil over rock with vegitation	2.00	2.00	Silt soil over rock with vegitation	forest	N	Nil				0.20	silt and rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
15.000	Confluence to at ch 31.03 km of Karinthiyar	10°07´24.45"	76°50´47.01"	20.00	do	N	forest	Partioaly rock	3.00	3.00	Silt soil over rock with vegitation	forest	N	Nil				0.15	silty rock	sand 10% clay 20% rock boulders 70 %	Nil		nil	
	Irupakalkudy																							
0.000	Origin	10.195589	76.920358	3.00	Rock																			
3.530	Confluence point with Muthirapuzha @ 2.57 km	10.191369	76.896967	10.00	Rock	N	Forest																	
	Mamala Thodu																							
0.00	Forest (Neryamangalam Forest Range,not accessable)	10.076229	76.823466																					
0.97	Tributary from forest	10.074249	76.816410	25.00	Rock	N	Forest	Rock	2.00	2.00	Rock	Forest	N	NIL				NIL			NIL			NIL
1.39	Tributary from forest	10.077322	76.815686	25.00	Rock	N	Forest	Rock	2.00	2.00	Rock	Forest	N	NIL				NIL			NIL			NIL
2.55	Mamala chappathu	10.084368	76.818826	20.00	Rock	N	Forest	Rock			Rock	Forest	D/S, Y	Concrete	Good condition	N	N	NIL			NIL			NIL
2.91	Foot bridge	10.088613	76.820794	17.00	Rock	Y	Private	Hard soil strata	3.00	3.00	Hard soil strata	Private	Y	Concrete	Good condition	N	N	NIL			NIL			NIL
3.34	Elamblassery bridge with CD	10.088980	76.820659	17.00	Rock	N	Private	Hard soil strata	3.50	3.00	Hard soil strata	Private	N	Concrete	Good condition	N	N	NIL			NIL			NIL
3.66	Confluence pt of Elamblassery thodu -Near GHS Mamalakandam	10.091381	76.820844	18.00	Rock	N	Private	Hard soil strata	2.00	2.00	Hard soil strata	Private	N	NIL				NIL			NIL			NIL
4.61	Confluence pt of Cheriya thodu-Ayurveda pady	10.094948	76.812988	17.00	Rock	Y	Private	Hard soil strata	2.00	2.00	Hard soil strata	Private	Y	NIL				NIL			NIL			NIL

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
4.72	Urulakuzhy CD	10.095780	76.812988	17.00	Rock	Y	Private	Hard soil strata	1.80	1.80	Hard soil strata	Private	Y	Concrete	Panchayath authorities reduced the height of checkdam to avoid flooding during heavy rainfall	N	N	NIL			NIL			NIL
7.10	Near chamappara water falls	10.110392	76.813348	30.00	Rock	N	Forest	Rock	10.00	20.00	Rock	Forest	N	NIL				NIL			NIL			NIL
7.40	Chamappara water falls	10.112997	76.814230	30.00	Rock	N	Forest	Rock	10.00	20.00	Rock	Forest	N	NIL				NIL			NIL			NIL
9.50	Confluence pt of Mamala thodu with Karinthiriyar(not accessable)	10.125300	76.819200																					
	Cheriya thodu																							
0.000	Origin SM LP school	10.09891200	76.80228100	2.00	Silt and Rock	Y	Private	hard soil strata	1.5	1.5	hard soil strata	Private	Y	NIL				NIL			NIL			NIL
0.162	Culvert at ayurveda pady	10.09520818	76.81154030	6.00	silt and Rock	Y	Private	hard soil strata	2	2	hard soil strata	Private	Y	concrete	good condition	N	N	NIL			NIL			NIL
1.320	Confluence point wth Mamala thodu	10.09494800	76.81298800	6.00	Rock	N	Private	hard soil strata	1.8	1.8	hard soil strata	Private	N	NIL				NIL			NIL			NIL
	Kai thodu																							
0	Origin (not accessable)	10.088200	76.835100	3.00	Rock	N	Private	Hard soil strata	1.5	1.5	Hard soil strata	Private	N	NIL				NIL			NIL			NIL
0.103	Venunarayanan pady bridge	10.088157	76.835063	7.50	Rock	Y	Private	Hard soil strata	1.5	1.5	Hard soil strata	Private	Y	concrete	good condition	N	N	D=0.60m, L=20m (U/S & D/S of structure)	silt and clay	silt 60% clay 40%	NIL			NIL
0.178	Foot bridge near Kerala state Bamboo corporation,Sub dippo Elamblassery	10.087525	76.835277	7.50	Rock	N	Private	Hard soil strata	2	2	Hard soil strata	Govmnt	N	concrete	good condition	N	N	D=0.50m, L=20m (D/S of structure)	silt and clay	silt 60% clay 40%	NIL			NIL
0.267	Meeting point wth Elamblassery thodu	10.086831	76.835357	6.00	Rock	N	Private	Hard soil strata	1.5	1.5	Hard soil strata	Private	N	NIL				NIL			NIL			NIL
	DETAILS OF RIGHT BANK																							
	Ettacholayar																							
0.000	Starting point from Maangaparekudy(Parekudy Thodu)	10°10´42.11"	76°55´43.03"	7.00	silt with rock boulders	N	Forest	Hard soil strata with rock bottom	2.00	1.50	Hard soil strata with rock bottom	Forest	N	Nil				0.20	silty soil	sand 10% Clay 40% silt 50%	Nil		nil	
1.800	Kozhiyalakudy Branch joints	10°10´5.4"	76°55´6.7"	20.00	do	N	Forest	do	1.50	2.00	do	Forest	N	Nil				0.30	silty soil	Rock Boulders	Nil		nil	
4.830	Conflunece of 20.11 km of Karithiriyar	10°08´56.3"	76°54´14.38"	70.00	do	N	Forest	do	2.50	1.50	do	Forest	N	Nil				0.30	silty soil	Rock Boulders	Nil		nil	
	Tributary 2																							

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
0.000	Starting point	10°08´26.83"	76°57´57.2"	3.00	silt with rocky boulders	N	Forest	silty soil with rock	1.50	1.50	silty soil with rock	Forest	N	Nil				Nil	silt and sand	Sand 10% silt 30% Rocky boulders 60%	Nil		nil	
1.650	Joints Pettimudy Branch joints 10.52 km of karithiry ar	10°07´43.71"	76°58´24.91"	5.00	silt with rocky boulders	N	Forest	do	1.50	1.50	do	Forest	N	Nil				Nil	silt and sand	Sand 10% silt 30% Rocky boulders 60%	Nil		nil	
	Parekudy thodu																							
0.000	Starting point	10°08´36.29"	76°56´52.58"	3.00	silty with rock boulders	N	forest	Partially rock	1.50	1.50	Partially rock	forest	N	Nil				0.10	silty clay	Silt 40 %clay 50% sand 10%	Nil		nil	
1.440	Culvert	10°08´9.31"	76°56´16.81"	4.00	do	N	forest	do	2.00	2.00	do	forest	N	concrete	Old but in good condition	Slightly obstructed		0.20	silty clay	Silt 40 %clay 50% sand 10%	Nil		nil	
1.470	Conflunce to Karinthiyar of ch 15.56 km	10°08´8.29"	76°56´15.81"	4.00	do	N	forest	do	3.00	3.00	do	forest	N	Nil				0.25	silty clay	Silt 40 %clay 50% sand 10%	Nil		nil	
	Elamblassery thodu																							
0.000	Origin-Elamblassery(meeting point of kaithodu to Elamblassery thodu)	10.08683100	76.83535700	2.50	Rock	N	Forest	Hard soil strata	1.5	1.5	Hard soil strata	Forest	N	NIL				NIL			NIL			NIL
0.220	Damaged CD U/S of Thangappan padi Bridge	10.08627000	76.83436800	8.00	Rock	Y	Private	Hard soil strata	1.5	1.5	Hard soil strata	Private	Y	concrete	completely damaged	Y	not required	NIL			NIL			NIL
0.226	Thangappan padi Bridge	10.08651433	76.83435600	8.00	Rock	Y	Private	Hard soil strata	1.5	1.5	Hard soil strata	Private	Y	concrete	good condition	N		D=0.60m, L=100m (D/S of structure)	ilty and clay	Clay 40% ,silt60%	NIL			NIL
0.507	Foot bridge near Angan vaadi	10.08628804	76.83259885	8.50	Rock	N	Private	Hard soil strata	1.5	1.5	Hard soil strata	Private	N	concrete	Old and good condition	N		D=0.80m, L=100m (D/S and U/S of structure)	ilty and clay	Clay 40% ,silt60%	NIL			NIL
1.182	Sadhanandhan padi Paalam	10.08844647	76.82833326	6.00	Rock	Y	Private	Hard soil strata	2	2	Hard soil strata	Private	Y	concrete	good condition	N		D=0.5m,L =70m	silty and clay	Clay 40% ,silt60%	NIL			NIL
1.500	Foot bridge	10.08952900	76.82583100	6.00	Rock	N	Private	Hard soil strata	2	2	Hard soil strata	Private	N	NIL		N		NIL			NIL			NIL
2.190	Confluence point with Mamala thodu-Near GHS Mamalakandam	10.09138100	76.82084400	6.00	Rock	N	Private	Hard soil strata	2	2	Hard soil strata	Private	N	NIL		N		D=0.5m,L =100m	silty and clay	Clay 40% ,silt60%	NIL			NIL
	Vellamakuthu thodu																							
0.000	Vellaramkuthu origin	10.153222	76.813008	3.00	Rock Boulders	N	Forest	Rock	5.00	5.00	Rock	Forest	N	NIL				NIL			NIL			NIL
0.035	Culvert no.1 (near Vellaramkuthu)	10.153216	76.812976	5.00	Rock Boulders	D/S,Y	Private	Hard soil strata	2.50	2.50	Hard soil strata	Private	D/S,Y	Concrete	Good condition	N	N	NIL			NIL			NIL

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
0.095	VCB d/s of culvert 1	10.153163	76.812980	6.30	Rock Boulders	Y	Private	Hard soil strata	1.20	1.20	Hard soil strata	Private	y	Concrete	Good condition	N	N	D=0.30m, L=10m (U/S of structure)	Boulder and silt	silt 30%	NIL			NIL
0.102	Culvert no.2	10.153090	76.812149	5.80	Rock	D/S,Y	Private	Hard soil strata	2.60	2.60	Hard soil strata	Private	U/S,Y	Concrete	Good condition	N	N	D=0.30m, L=10m (U/S of structure)	Clay and silt	Clay 40% ,silt60%	NIL			NIL
0.212	Culvert 3	10.153142	76.811118	5.70	Rock	N	Private	Hard soil strata	3.00	3.00	Hard soil strata	Private	N	Concrete	Good condition	N	N	NIL			NIL			NIL
0.338	Culvert 4	10.153358	76.810100	5.70	Rock	N	Private	Hard soil strata	2.10	2.10	Hard soil strata	Private	D/S,Y	Concrete	Good condition	N	N	D=0.30m, L=30m (U/S of structure)	Clay and silt	Clay 40% ,silt60%	NIL			NIL
0.364	VCB	10.153460	76.809731	5.00	Rock	Y	Private	Hard soil strata	1.60	1.60	Hard soil strata	Private	Y	Concrete	Good condition	N	N	NIL			NIL			NIL
0.380	culvert 5	10.153370	76.809842	6.00	Rock	U/S,Y	Private	Hard soil strata	2.30	2.30	Hard soil strata	Private	U/S,Y	Concrete	Good condition	N	N	NIL			NIL			NIL
0.452	Culvert 6	10.153652	76.809139	5.60	Rock	N	Private	Hard soil strata	2.80	2.80	Hard soil strata	Private	D/S,Y	Concrete	Good condition	N	N	NIL			NIL			NIL
0.552	Culvert 7	10.154159	76.808401	5.50	Rock	N	Private	Hard soil strata	2.70	2.70	Hard soil strata	Private	U/S,Y	Concrete	Good condition	N	N	NIL			NIL			NIL
0.788	Stream joining at Vellaramkuthu jn	10.154469	76.806321	10.40	Rock	N	Private	Hard soil strata	2.50	2.50	Hard soil strata	Private	N	NIL				NIL			NIL			NIL
0.796	VCB at Vellaramkuthu jn	10.154365	76.806282	10.40	Rock	Y	Private	Hard soil strata	1.50	1.50	Hard soil strata	Private	Y	Concrete	Good condition	N		NIL			NIL			NIL
0.968	Parameswaranpadi foot bridge	10.155253	76.804974	12.20	Rock	D/S,Y	Private	Hard soil strata	3.60	3.60	Hard soil strata	Private	D/S,Y	Concrete	A new bridge is constructred near to this.Not in use	N	N	NIL			NIL			u/s and d/s
0.972	Parameswaranpadi bridge	10.155284	76.804897	12.20	Rock	U/S,Y	Private	Hard soil strata	3.60	3.60	Hard soil strata	Private	U/S,Y	Concrete	Good condition	N	N	NIL			NIL			u/s and d/s
2.112	VCB at u/s of footbridge at Manikandanchal	10.159570	76.795854	9.80	Rock	Y	Private	Hard soil strata	1.50	1.50	Hard soil strata	Forest	y	Concrete	Old but in good condition	Trees and other wastes material got blocked in piller due to insufficient vent way	Y,construted by forest department,Right bank in forest	D=0.40m, L=40m (U/S of structure)	Clay and silt	Clay 40% ,silt60%	NIL			NIL
2.119	Bridge and footbridge at Manikandanchal	10.159603	76.795918	9.80	Rock	Y	Forest	Hard soil strata	4.00	4.00	Hard soil strata	Forest	U/S,Y	Concrete	Left side abutment of bridge is constructed encroaching the thodu. foot bridge is not in use	Y	Y,D/S side is in forest	NIL			NIL			NIL

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
2.765	Bridge near Anakulam forest office	10.161278	76.790272	9.00	Rock	N	Forest	Hard soil strata	4.50	4.50	Hard soil strata	Forest	N	Concrete	Old.good condition	N	N	NIL			NIL			NIL
3.011	Confluence pt of Vellaramkuthu thodu with Karinthiriyar	10.162126	76.788801	12.00	Rock	N	Forest	Hard soil strata	2.50	2.50	Hard soil strata	Forest	N	NIL				D=0.40m, L=50m (In forest,)	Clay and silt	Clay 40% ,silt60%	NIL			NIL
	Muthirapuzha AR																							
0.000	Origin	10.213711	76.887300				Forest					Forest	N											
2.570	Irupukalkudy branch joins	10.191369	76.896967				Forest					Forest	N											
12.330	Kunjippara tributary joins (5.41 Km)	10.211050	76.833392				Forest																	
17.940	U/S of confluence point	10.167909	76.791711	40.00	Rock	N	Private	Hard soil strata	5	7	Hard soil strata	Forest	N	NIL				NIL			NIL			NIL
18.700	Confluence pt of Muthirapuzha AR with PooyamkuttyAr	10.163075	76.786838	60.00	Rock	N	Forest	Hard soil strata	10	7	Hard soil strata	Forest	N	NIL				NIL			NIL			NIL
Pooyamkuttiyar (40/530 km to Aanakkayam)																								
40/530	Pooyamkutty chappath	10.058597	76.776976		Rock	N	Private	Clayey	3	4	clayey	Forest	N	Arch Bridge	Good	No	No	-	-	-	-	-	-	-
41/060 (Rt. side)	Muthirapuzhayar	10.024359	76.836883		Rock	N	Private	clayey	2	2	-	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
41/515 (Lt. Side)	Parankamaly Thodu mouth	10.164562	76.782560		silt,clay	No	Govt	silt,clay	3.00 m	3.00 m	silt,clay	Govt	No											yes
41/946 (Lt. Side)	Madathinalpady Thodu mouth	10.166127	76.778997		silt,clay	No	Govt	silt,clay	3.00 m	3.00 m	silt,clay	Govt	No											
42/130 (Lt. Side)	Pallippady Thodu mouth	10.166578	76.777251		Silt, laterite, clay	No	Govt	Rock,silt, laterite	3.00 m	3.00 m	Rock,silt, laterite	Govt	No	Tributary	-	-	-	-		-	-	-	-	
44/220(Lt. side)	Korangatty Thodu mouth	10.168504	76.759546		Silt,clay	No	Govt	Rock,laterite	3.00 m	3.00 m	Rock,laterite	Govt	No				-	-		-	-	-	-	
44/932 (Lt. Side)	Thannikkunnelpady Thodu mouth	10.168426	76.753228		Silt,clay	No	Govt	silt,laterite	3.00 m	3.00 m	silt,laterite	Govt								-	-	-	-	
45/262 (Lt. Side)	Edattu Chelakkattupady Thodu mouth	10.167545	76.750376		Silt,clay	No	Govt	Silt,laterite	2.50 m	2.50 m	Silt,laterite	Govt	No											
45/270 (Lt. Side)	Anikkanalpady Thodu mouth	10.167428	76.750447		silt,clay	No	Govt	silt,clay	3.00 m	3.00 m	silt,clay	Govt	No											
47/542(Lt. side)	Kuttiyamchal Kurukku Thodu mouth	10.159324	76.743933		Silt,clay	No	Govt	Silt, laterite	2.50 m	2.50 m	Silt, laterite	Govt	No											
45/270	Aanakkayam	10.146142	76.723010	3 m	Silt,clay	No	Govt	Silt, laterite	2.50 m	2.50 m	Silt, laterite	Govt	No											
Periyar River (163/200 km to 179/550 km)																								
163/200	NERIAMANGALAM BRIDGE	10.058376	76.776024	4.9										Bridge	Good	No	No	-	-	-	-	-	-	-
164/200	Neriamangalam - krishi bhavan thodu tail end towrds to river	10.06086	76.76606	4	Rock, stones	N	Govt	clay,sand	2	2	clay,sand	Govt	N					60 cm	silt clay	silt ,clay	No	No	No	YES
164/800	Charupara kadavu- opp thodu	10.061189	76.767375	4 m	Sand, clay	N	Govt	sand,clay	3 m	3 m	sand,clay	govt	N				45cm	silt, clay	silt,clay	no	no	no	yes	
165/950	Manimaruthan chal thodu tail end tail end towads periyar river	10.06963	76.75528		sand,rock	N	Govt	clay,sand	2	2	clay,sand	Govt	N					50 cm	clay silt	silt, clay	NO	NO	NO	YES
166/600	Pothupara 2 thodutail end	10.08761	76.73293	4.5m	silt, clay		govt	Sand, silt	1 m	1 m	Sand, silt	govt	N	Bridge	good	No	No	50 cm	silt clay	silt clay	No	No	No	Yes
166/700	Pothupara thodu 1 tail end	10.08761	76.73293	4.5m	silt, clay		govt	Sand, silt	1 m	1 m	Sand, silt	govt	N	Bridge	good	No	No	50 cm	silt clay	silt clay	No	No	No	Yes
166/700	Avolichal opposite thodu tail end towards river	10.07072	76.7565	5 m	silt, clay	No	govt	laterite, silt	0.8m	0.8m	laterite, silt	govt	No					45cm	silt clay	silt clay	No	No	No	yes
167/500	Incha thotty post office thodu - opp side tail end towards river	10.06279	76.76683	5	silt, clay	No	govt	silt, clay	1.5m	1.5m	silt, clay	govt	no						silt clay	silt clay	NO	NO	NO	YES

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
167/600	Avolichal thodu tail end towards river	10.07351	76.7511		silt, clay	No	govt	laterite, silt	0.8m	0.8m	laterite, silt	govt	No					45cm	silt clay	silt clay	No	No	No	yes
168/600	Charupara Valiya thoduTail end	10.08872	76.73103	8.6 m	rock,sand	N	Govt	Clay Sand	1	1	Clay sand	govt	No					60cm	silt clay	silt clay	No	No	No	yes
167/500	Inchathotty thodu tail end	10.095351	76.722533	5.6	silt	N	Forest	silt	1.5m	1.5 m	silt	Forest	N	Bridge	Good	No	No	50 cm	silt clay	silt clay	N	N	No	Yes
169/500	Charupara kadavu thoduTail end	10.09317	76.72459	4.6 m	silt clay	No	govt	silt clay	2m	2m	silt clay	govt	No					60cm	silt, clay	silt, clay	no	no	no	yes
170/660	Inchathotty hanging bridge	10.095167	76.722322	1.2	Silt, clay																			
170/700	Inchathotty thodu tail end	10.095351	76.722533	5.6	silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No	yes
171/500	cheekod thodu - 3 tail end	10.101038	76.717783	4.8	silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No	yes
172/200	Cheekod thodu 1&2 tail end	10.104523	76.71334	5m	silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No	yes
173/500	Palamattom thodu tail end	10.112562	76.704071	5m	silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No	yes
174/200	Quarry thodu	10.11531	76.69917	5m	silt ,clay	N	forest	rock, silt, clay	3	3	rock, sand	forest	N					45cm	silt clay	silt clay	No	No	No	yes
175/200	Nadukani thodu - Odappanal thodu (kurukulam)	10.12171	76.6922	5m	silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No	yes
176/130	Thattekkad bridge	10.127901	76.685765	11 m	Rock	Y	Govt	Private	Silt	5	5	-	Forest	N	Tributary	-	-	-	-	-	-	-	-	-
178/330	Koottikkal	10.130151	76.672333	275 m	Silt, clay		Govt					Govt												
179/550	Bhoothathankettu Barrage	10.136778	76.66221	210.92	Silt, clay		Govt					Govt												
Periyar River (163/200 km to 179/550 km)																								
163/200	NERIAMANGALAM BRIDGE	10.024984	76.841032	110	Rock	N	Private	clayey	3	4	clayey	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
164/200	Neriamangalam - krishi bhavan thodu tail end towrds to river	10.06086	76.76606	4	Rock, stones	N	Govt	clay,sand	2	2	clay,sand	Govt	N					60 cm	silt clay	silt ,clay	No	No	No	YES
164/800	Charupara kadavu- opp thodu	10.061189	76.767375	4 m		Sand, clay	N	Govt	sand,clay	3 m	3 m	sand,clay	govt	N				45cm	silt, clay	silt,clay	no	no	no	yes
165/950	Manimaruthan chal thodu tail end tail end towads periyar river	10.06963	76.75528			sand,rock	N	Govt	clay,sand	2	2	clay,sand	Govt	N					50 cm	clay silt	silt, clay	NO	NO	NO
166/600	Pothupara thodutail end	10.08761	76.73293	4.5m		silt, clay		govt	Sand, silt	1 m	1 m	Sand, silt	govt	N	Bridge	good	No	No	50 cm	silt clay	silt clay	No	No	No
166/700	avolichal thodu tail end towards river	10.07072	76.7565	5 m		silt, clay	No	govt	laterite, silt	0.8m	0.8m	laterite, silt	govt	No					45cm	silt clay	silt clay	No	No	No
155/400 (Lt. side)	Thattekkad bridge	10.02563	76.832058	100	Rock	N	Private	Silt	5	5	-	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
	Koottikkal																							
156/420	Bhoothathankettu barrage	10.030871	76.823958	130	Silt	N	Private	Silt	5	5	Silt	Private	N	Suspension Bridge	Good	No	No	-	-	-	-	-	-	-
170/700	Inchathotty thodu tail end	10.095351	76.722533	5.6	silt	N	Forest	silt	1.5m	1.5 m	silt	Forest	N					50 cm	silt clay	silt clay	N	N	No	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
171/500	cheekod thodu - 3 tail end	10.101038	76.717783	4.8		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No
170/700	Pothupara thodutail end	10.08761	76.73293	4.5m		silt, clay		govt	Sand, silt	1 m	1 m	Sand, silt	govt	N	Bridge	good	No	No	50 cm	silt clay	silt clay	No	No	No
167/700	avolichal thodu tail end towards river	10.07072	76.7565	5 m		silt, clay	No	govt	laterite, silt	0.8m	0.8m	laterite, silt	govt	No					45cm	silt clay	silt clay	No	No	No
174/200	Quarry thodu (kalathodu)	10.11226	76.69519	4m		silt	N	forest	rock, silt	3	3	rock, sand	forest	N					45cm	silt clay	silt clay	No	No	No
173/500	Palamattom thodu tail end	10.112562	76.704071	5m		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No
165/950	Manimaruthan chal thodu tail end tail end towads periyar river	10.06963	76.75528			sand,rock	N	Govt	clay,sand	2	2	clay,sand	Govt	N					50 cm	clay silt	silt, clay	NO	NO	NO
170/708	Tail end	10.0061189	76.767375	4 m		Sand, clay	N	Govt	sand,clay	3 m	3 m	sand,clay	govt	N					45cm	silt, clay	silt,clay	no	no	no
170/709	tail end towards to river	10.08761	76.73293	4m		rock ,silt	No	govt.	laterite,stone	1.5m	1.5m	laterite,stone	govt.	No					50cm	silt , clay	silt , clay	No	No	No
167/600	avolichal thodu tail end towards river	10.07072	76.7565	5 m		silt, clay	No	govt	laterite, silt	0.8m	0.8m	laterite, silt	govt	No					45cm	silt clay	silt clay	No	No	No
170/711	Pothupara thodutail end	10.08761	76.73293	4.5m		silt, clay		govt	Sand, silt	1 m	1 m	Sand, silt	govt	N	Bridge	good	No	No	50 cm	silt clay	silt clay	No	No	No
167/600	avolichal thodu tail end towards river	10.07072	76.7565	5 m		silt, clay	No	govt	laterite, silt	0.8m	0.8m	laterite, silt	govt	No					45cm	silt clay	silt clay	No	No	No
170/713	Incha thotty post office thodu - opp side tail end towards river	10.06279	76.76683	5		silt, clay	No	govt	silt, clay	1.5m	1.5m	silt, clay	govt	no						silt clay	silt clay	NO	NO	NO
170/714	Tail end	10.08872	76.73103	8.6 m		rock,sand	N	Govt	Clay Sand	1	1	Clay sand	govt	No					60cm	silt clay	silt clay	No	No	No
170/715	Tail end towads to river	10.09317	76.72459	4.6 m		silt clay	No	govt	silt clay	2m	2m	silt clay	govt	No					60cm	silt, clay	silt, clay	no	no	no
170/716	Incha thotty post office thodu - opp side tail end towards river	10.06279	76.76683	5		silt, clay	No	govt	silt, clay	1.5m	1.5m	silt, clay	govt	no						silt clay	silt clay	NO	NO	NO
170/717	charupara VALIYA THODU	10.08872	76.73103	8.6 m		rock,sand	N	Govt	Clay Sand	1	1	Clay sand	govt	No					60cm	silt clay	silt clay	No	No	No
170/718	charupara thodu 1	10.09317	76.72459	4.6 m		silt clay	No	govt	silt clay	2m	2m	silt clay	govt	No					60cm	silt, clay	silt, clay	no	no	no
170/700	inchathotty thodu	10.104146	76.713304	5.6		silt clay	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N	bridge	Good	N	N	50 cm	silt clay	silt clay	No	No	No
170/720	cheekod thodu - 3 tail end	10.101038	76.717783	4.8		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No
170/721	Cheekod thodu 1&2 tail end	10.104523	76.71334	5m		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No
170/722	Kondimattom thodu tail end	10.11531	76.69917	6m		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No
170/723	Palamattom thodu tail end	10.112562	76.704071	5m		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No
170/724	Quarry thodu (kalathodu)	10.11226	76.69519	4m		silt	N	forest	rock, silt	3	3	rock, sand	forest	N					45cm	silt clay	silt clay	No	No	No
170/725	Odappanal thodu (kurukulam) tail end river	10.12171	76.6922	5m		silt	N	Govt	silt clay	1.5 m	1.5 m	silt clay	Govt	N					50 cm	silt clay	silt clay	No	No	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
Idamalayar River (0 km to 39.946 km)																								
0/000	Origin in Anamudi Hills in Kerala	10.169684	77.064007	15	Rock	N	Forest	Rock			Rock	Forest	N		Good	No	No	-	-	-	-	-	-	-
14/400	Enters Tamilnadu	10.22235	76.988837	150	Rock			Rock			Rock	Forest	N		Good	No	No							
20/500	Confluence point of Nirar	10.237195	76.947259	100	Rock	N	Forest	Rock			-	Forest	N	Dam	-	-	-	-	-	-	-	-	-	-
27/930	Re-enters Kerala	10.244613	76.890304	60 m	Rock	No	Forest	Rock	3.00 m	3.00 m	Rock	Forest	No					55 cm	silt,clay, sand	silt,clay, sand	NA	NA	NA	yes
52/680	Idamalayar Dam	10.222091	76.706391	352 m	Rock,silt	No	Forest	Rock	3.00 m	3.00 m	Rock	Forest	No					60 cm	silt,clay, sand	silt,clay, sand	NA	NA	NA	yes
54/780	Idamalayar Power House bridge	10.205275	76.713492	100 m	Silt,clay																			
56/110	Thodu 1	10.190723	76.724819	10 m	Rock	No	Forest	Rock	3.00 m	3.00 m	Rock	Forest	No					55 cm	silt,clay, sand	silt,clay, sand	NA	NA	NA	yes
56/910	Thodu 2	10.195251	76.719580	22 m	Rock	No	Forest	Rock	3.00 m	3.00 m	Rock	Forest	No					60 cm	silt,clay, sand	silt,clay, sand	NA	NA	NA	yes
60/070 (Lt. Side)	Pooyamkuttiyar joins	10.164586	76.736738	80m	clay,silt, rock	N	Forest	Rock			Rock	Forest	N	Main Tributary	-	-	-	-		-	-	-	-	-
61/39 (Lt. Side)	Kuttampuzha river mouth	10.15307	76.73958		clay, silt																			
61/801(Lt. side)	Koottampara Thodu mouth	10.14035	76.737290	5 m	clay,silt, sand	No	Govt	clay,silt, sand	2.00 m	2.00 m	clay,silt, sand	Govt	No							-	-	-	-	Yes
63/661(Lt. side)	Arambankudy Thodu	10.144176	76.720577	5 m	clay,silt, sand	No	Govt	clay,silt, sand	2.00 m	2.00 m	clay,silt, sand	Govt	No							-	-	-	-	Yes
65/027 (Lt. Side)	Vengassery Thodu	10.14644	76.71360	5 m	Rock, laterite, silt	No	Govt	Laterite	2.50 m	2.50 m	Laterite	Govt	No		-	-	-	-	-	-	-	-	-	-
66/527 (Lt. Side)	Aliyarpadi Thodu	10.140571	76.698893	3 m	laterite, silt	No	Govt	laterite, silt	2.00 m	2.00 m	laterite, silt	Govt	No			No	Yes	-	-	-	-	-	-	-
68/990 (Lt. side)	Joins Periyar at Koottikkal	10.141485	76.673146	200	Rock, laterite, silt	No	Govt	clayey	2.00 m	2.00 m	Sandy	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
Idamalayar thodu 1																								
0	Idamalayar forest	10.189927	76.733372	4 m	Rock, stones	No	Forest	Rock,silt	2.50 m	2.50 m	Rock,silt	Forest	No											yes
165	D/s - towards Idamalayar river	10.189114	76.732183	4 m	silt,clay	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes
464	D/s - towards Idamalayar river	10.18932	76.729904	5 m	sand, silt,clay	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes
835	D/s - towards Idamalayar river	10.190454	76.726890	7 m	sand, silt,clay	No	Forest	laterite, silt	3.00 m	3.00 m	laterite, silt	Forest	No											yes
1090	tail end - towards Idamalayar river	10.190723	76.724819	10 m	sand, silt,clay	No	Forest	Silt, clay	3.00 m	3.00 m	Silt, clay	Forest	No					55 cm	silt,clay, sand	silt,clay, sand	No	No	No	yes
Idamalayar thodu 2																								
0	Idamalayar forest	10.197602	76.726819	12 m	Rock, stones	No	Forest	Rock,silt	2.50 m	2.50 m	Rock,silt	Forest	No											yes
234	D/s - towards Idamalayar river	10.197834	76.725320	12 m	silt,clay, sand	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes
523	D/s - towards Idamalayar river	10.196477	76.723538	15 m	silt,clay, sand	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes
726	D/s - towards Idamalayar river	10.196626	76.721834	15 m	silt,clay, sand	No	Forest	Rock,sand	3.00 m	3.00 m	Rock,sand	Forest	No											yes
931	D/s - towards Idamalayar river	10.196539	76.720117	15 m	sand, silt,clay	No	Forest	Rock,sand	3.00 m	3.00 m	Rock,sand	Forest	No											yes
1090	tail end - towards Idamalayar river	10.195251	76.719580	22 m	sand, silt,clay	No	Forest	Silt, clay	3.00 m	3.00 m	Silt, clay	Forest	No					60 cm	silt,clay, sand	silt,clay, sand	No	No	No	yes
Madathinaalppady Thodu																								
0	Pooyamkutty	10.161873	76.777071	5 m	Rock, stones	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
485	Culvert u/s - Pooyamkutty - manikandanchal road.	10.165728	76.779051	4 m	silt,clay	No	Private	laterite, silt	3.00 m	3.00 m	laterite, silt	Private	No	Road culvert	Good	No	No	55 cm	silt,clay, stones	silt,clay	No	No	No	yes
552	d/s - Tail end towards Pooyamkutty river	10.166127	76.778997	4 m	silt,clay	No	Govt	silt,clay	3.00 m	3.00 m	silt,clay	Govt	No					60 cm	silt,clay, stones	silt,clay	No	No	No	yes
Paarankamaly Thodu																								
0	Pooyamkutty	10.160120	76.780235	6 m	Rock, stones	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes
343	Culvert u/s - Pooyamkutty - manikandanchal road.	10.162821	76.781430	5 m	silt,clay	No	Private	laterite, silt	3.00 m	3.00 m	laterite, silt	Private	No	Road culvert	Good	No	No	55 cm	silt,clay, stones	silt,clay	No	No	No	yes
513	d/s - Culvert Pooyamkutty - manikandanchal road.	10.163954	76.781805	5 m	silt,clay	No	Private	laterite, silt	3.00 m	3.00 m	laterite, silt	Private	No											yes
672	Tail end towards Pooyamkutty river	10.164562	76.782560	4 m	silt,clay	No	Govt	silt,clay	3.00 m	3.00 m	silt,clay	Govt	No					55 cm	silt,clay, stones	silt,clay	No	No	No	yes
Kuttyanchal Kurukku Thodu																								
0	Kuttampuzha	10.156824	76.746741	6 m	Rock, stones	No	Forest	Rock	2.50 m	2.50 m	Rock	Forest	No											Yes
379	d/s near St.Marys church, Kuttampuzha	10.154787	76.744710	6 m	Silt, laterite	No	Private	Rock,laterite	2.50 m	2.50 m	Rock,laterite	Private	No											Yes
759	d/s - kuttampuzha - pooyamkutty road	10.157691	76.743954	6 m	Silt, laterite	No	Private	Rock,laterite	2.50 m	2.50 m	Rock,laterite	Private	No											Yes
919	Culvert u/s -kuttampuzha - pooyamkutty road	10.158852	76.744388	5 m	Silt, laterite	No	Private	Silt, laterite	2.50 m	2.50 m	Silt, laterite	Private	No	Road culvert	Good	No	No	40 cm	Silt,clay	silt,clay	No	No	No	Yes
1000	d/s point of culvert	10.159324	76.739330	4 m	Silt, laterite	No	Private	Silt, laterite	2.50 m	2.50 m	Silt, laterite	Private	No											Yes
1708	Tail end towards Edamalayar river	10.159324	76.743933	3 m	Silt,clay	No	Govt	Silt, laterite	2.50 m	2.50 m	Silt, laterite	Govt	No					40 cm	Silt,clay	silt,clay	No	No	No	Yes
Aanykanalpady Thodu																								
0	Kuttyaamchal	10.163523	76.752985	6 m	Rock, stones	No	Forest	Rock,silt	3.00 m	3.00 m	Rock,silt	Forest	No											yes
238	Kambipalam -road culvert	10.164718	76.752390	5 m	silt,clay	No	Private	laterite, silt	3.00 m	3.00 m	laterite, silt	Private	No	Road culvert	Good	No	No	55 cm	silt,clay, stones	silt,clay	No	No	No	yes
373	Tail end towards pooyamkutty river	10.165840	76.752347	5 m	silt,clay	No	Private	laterite, silt	3.00 m	3.00 m	laterite, silt	Private	No											yes
719	Tail end towards pooyamkutty river	10.167428	76.750447	4 m	silt,clay	No	Govt	silt,clay	3.00 m	3.00 m	silt,clay	Govt	No					55 cm	silt,clay, stones	silt,clay	No	No	No	yes
Edattu -Chelakkattupady Thodu																								
0	Near Pooyamkutty - Kuttanpuzha road - culvert -Kuttyaanchal	10.163713	76.750786	5 m	Rock, silt	No	Forest	Rock,silt	2.50 m	2.50 m	Rock,silt	Forest	No	Road culvert	Good	No	No	45 cm	Silt,clay, stones	silt,clay	No	No	No	yes
286	Kuttampuzha	10.165857	76.751099	3 m	Silt,laterite	No	Private	Silt,laterite	2.50 m	2.50 m	Silt,laterite	Private	No											yes
501	Tail end towards pooyamkutty river	10.167545	76.750376	3 m	Silt,clay	No	Govt	Silt,laterite	2.50 m	2.50 m	Silt,laterite	Govt	No					45 cm	Silt,clay, stones	silt,clay	No	No	No	yes
Thannikunnelpady Thodu																								
0	Near Pooyamkutty - Kuttanpuzha road - culvert	10.164929	76.754521	5 m	Rock, stones	No	Forest	Rock, stones	3.00 m	3.00 m	Rock, stones	Forest	No	Road culvert	good	No	No	50 cm	silt,clay	silt,clay	No	No	No	Yes
319	Kambipalam	10.167044	76.754870	3 m	Silt,laterite	No	Private	silt,laterite	3.00 m	3.00 m	silt,laterite	Private												Yes
599	Tail end towards pooyamkutty river	10.168426	76.753228	3 m	Silt,clay	No	Govt	silt,laterite	3.00 m	3.00 m	silt,laterite	Govt						50 cm	silt,clay	silt,clay	No	No	No	Yes
Korangatty Thodu																								
0	Koovappara	10.16487	76.761452	5 m	Rock, silt	No	Forest	Rock, silt	3.00 m	3.00 m	Rock, silt	Forest	No											Yes
266	Koovappara	10.166674	76.761018	5m	Rock, silt	No	Private	Rock,laterite	3.00 m	3.00 m	Rock,laterite	Private	No											Yes
318	Koovappara	10.167099	76.760884	4 m	Rock, silt	No	Private	Rock,laterite	3.00 m	3.00 m	Rock,laterite	Private	No											Yes
337	Near Pooyamkutty - Kuttanpuzha road - culvert d/s	10.167211	76.760756	3 m	Rock, silt, laterite	No	Private	Rock,laterite	3.00 m	3.00 m	Rock,laterite	Private	No	Road culvert	Good	No	No	50 cm	silt,clay	Clay,silt	No	No	No	Yes
624	Tail end towards pooyamkutty river	10.168504	76.759546	3 m	Silt,clay	No	Govt	Rock,laterite	3.00 m	3.00 m	Rock,laterite	Govt	No					50 cm	silt,clay	Clay,silt	No	No	No	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
Pallypady Thodu																								
0	Pooyamkutty	10.161885	76.775085	5 m	Rock, silt	No	Forest	Rock, silt	3.00 m	3.00 m	Rock, silt	Forest	No											Yes
148	Pooyamkutty	10.163053	76.774968	4 m	Rock, silt	No	Private	Rock, silt	3.00 m	3.00 m	Rock, silt	Private	No											Yes
337	Pooyamkutty	10.164172	76.775735	3 m	Rock, silt	No	Private	Rock, silt	3.00 m	3.00 m	Rock, silt	Private	No											Yes
455	Pooyamkutty	10.164727	76.776254	3 m	Rock, silt	No	Private	Rock, silt	3.00 m	3.00 m	Rock, silt	Private	No											Yes
564	Pooyamkutty	10.165535	76.776610	3 m	Rock, silt, laterite	No	Private	Rock,silt, laterite	3.00 m	3.00 m	Rock,silt, laterite	Private	No											Yes
633	Near Pooyamkutty - manikandanchal road - culvert	10.166002	76.776951	3 m	Rock, silt, laterite	No	Private	Rock,silt, laterite	3.00 m	3.00 m	Rock,silt, laterite	Private	No	Cross culvert	good	No	No	60 cm	Rock,silt, laterite	Silt	No	No	No	Yes
769	Near Pooyamkutty - manikandanchal road - culvert tail end to river	10.166578	76.777251	3 m	Silt, laterite, clay	No	Govt	Rock,silt, laterite	3.00 m	3.00 m	Rock,silt, laterite	Govt	No					60 cm	Rock,silt, laterite	Silt	No	No	No	Yes
Aaliyarpady Thodu																								
0	Njayappilly	10.135704	76.700341	5 m	Rock,silt	No	Forest	Rock,stones	1.50 m	1.50 m	Rock, stones	Forest	No											Yes
280	Near thattekadu - kuttampuzha road - road culvert	10.137919	76.700196	3 m	Rock, laterite, silt	No	Govt	Rock, laterite, silt	2.00 m	2.00 m	Rock, laterite, silt	Govt	No	Road culvert	Good	No	No	50 cm	Rock,silt	Silt, gravel	NA	NA	NA	Yes
306	Near thattekadu - kuttampuzha road - culvert d/s	10.138124	76.700099	3 m	Rock, laterite, silt	No	Govt	Rock, laterite, silt	2.00 m	2.00 m	Rock, laterite, silt	Govt	No											Yes
362	d/s	10.138495	76.69983	3 m	Rock, laterite, silt	No	Private	Rock, laterite, silt	2.00 m	2.00 m	Rock, laterite, silt	Private	No											Yes
633	d/s	10.13984	76.69848	3 m	Rock, laterite, silt	No	Private	Rock, laterite, silt	2.00 m	2.00 m	Rock, laterite, silt	Private	No											Yes
762	Tail end towards river	10.140571	76.698893	3 m	laterite, silt	No	Govt	laterite, silt	2.00 m	2.00 m	laterite, silt	Govt	No											Yes
Vengassery Perum Thodu																								
0	Njayappilly	10.142404	76.714720	5 m	Rock, silt	No	Forest	Rock, stones	1.50 m	1.50 m	Rock, stones	Forest	No											Yes
216	Near thattekadu - kuttampuzha road - road culvert	10.14324	76.721080	5 m	Rock, laterite, silt	No	Govt	Laterite	2.00 m	2.00 m	Laterite	Govt	No	Road culvert	Good	No	No	60 cm	Silt,clay	Clay,silt	NA	NA	NA	Yes
362	d/s portion	10.14494	76.713570	5 m	Rock, laterite, silt	No	Govt	Laterite	2.00 m	2.00 m	Laterite	Govt	No											Yes
599	tail end towards river	10.14644	76.71360	5 m	Rock, laterite, silt	No	Govt	Laterite	2.50 m	2.50 m	Laterite	Govt	No											Yes
Arambankudy Thosu																								
0	Njayappilly	10.14079	76.721770	5 m	Rock, silt	No	Forest	Rock, stones, silt	2.00 m	2.00 m	Rock, stones, silt	Forest	No											Yes
342	Near road culvert - thattekadu - kuttampuzha road - tail end	10.14324	76.721080	5 m	clay,silt, sand	No	Govt	clay,silt, sand	2.00 m	2.00 m	clay,silt, sand	Govt	No	Culvert	Good	No	No	50 cm	Clay,silt	Clayey sand and silt	NA	NA	NA	Yes
482	Near thattekadu - kuttampuzha road - tail end towards Edamalayar	10.144176	76.720577	5 m	clay,silt, sand	No	Govt	clay,silt, sand	2.00 m	2.00 m	clay,silt, sand	Govt	No											Yes
Urulanthanni Thodu																								
0	Pinavurkudy start	10.09565	76.78342	5 m	Rock, stones	No	Forest	Rock, stones	2.00 m	2.00 m	Rock, stones	Forest	No											yes
5170	Knachery	10.12428	76.7617	8 m	Silt,clay	No	Forest	Rock, stones	2.00 m	2.00 m	Rock, stones	Forest	No							Clay and silt deposit				yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
6344	Urulanthanni VCB	10.13212	76.75650	12 m	Slit,sand	No	Private	Rock, stones	2.00 m	2.00 m	Rock, stones	Private	No	VCB	Water is not flowing properly through the VCB	Bed level high								yes
9734	Kuttampuzha town bridge	10.15307	76.74089	15 m	Rock, stones, silt	No	Private	Rock, stones	3.00 m	3.00 m	Rock, stones	Private	No	Small bridge	good	No	NA		Rock, stones, silt	clay, silt	NA	NA	NA	yes
10000	Tail end to river	10.15307	76.73958	15 m	Rock, sand	No	Private	Rock, stones	3.00 m	3.00 m	Rock, stones	Private	No						Rock, stones, silt,					
Kootampara Thodu																								
0	Koottambara	10.14035	76.73729	8 m	Rock, stones	No	Forest	Rock, stones	1.00 m	1.00 m	Rock, stones	Forest	No											yes
535	u/s pt 1	10.14478	76.73541	9 m	Rock, stones	No	Forest	Rock, stones	1.00 m	1.00 m	Rock, stones	Forest	No											yes
677	u/s pt 2	10.14584	76.73470	10 m	Rock, stones	No	Forest	Rock, stones	1.50 m	1.50 m	Rock, stones	Forest	No											yes
799	u/s pt 3	10.14649	76.73559	10 m	Rock, stones	No	Forest	Rock, stones	2.00 m	2.00 m	Rock, stones	Forest	No											yes
826	u/s pt 4 delta	10.14673	76.73563	10 m	Rock, stones	No	Forest	Rock, stones	2.00 m	2.00 m	Rock, stones	Forest	No											yes
979	u/s pt 5	10.148106	76.735621	10 m	Rock,stones,sand	No	Forest	Rock, stones	2.00 m	2.00 m	Rock, stones	Private	No											yes
1047	Near koottambara Anganavady	10.14834	76.736190	10 m	Rock, sand	No	Govt	Rock, stones	2.50 m	2.50 m	Rock, stones	Private	No	Culvert	Good	No	No	50 cm	clay, sand	clay, sand	NA	NA	NA	yes
1090	point 3 d/s koottambara thodu	10.14848	76.736550	10 m	Stones, silt	No	Private	Rock, stones	2.50 m	2.50 m	Rock, stones	Private	No											yes
1213	point 2d/s	10.14947	76.73605	10 m	Stones, silt	No	Private	Rock, stones	2.50 m	2.50 m	Rock, stones	Private	No											yes
1323	point 1 d/s	10.150270	76.735462	10 m	Stones, silt	No	Private	Rock, stones	2.50 m	2.50 m	Rock, stones	Private	No											yes
1378	point 0 d/s	10.150670	76.735160	10 m	Stones, silt	No	Private	Rock, stones	2.00 m	2.00 m	Rock, stones	Private	No											yes
1405	periyar- kuttambara thodu kuttampuzha bridge u/s	10.150865	76.735023	10 m	Silt, sand	No	Private	Silt, sand	2.50 m	2.50 m	Silt, sand	Private	No	Small bridge	Good	No	No	40 cm	Silt, sand	Silt, sand	NA	NA	NA	
1508	tail end towards river	10.15178	76.73507	10 m	Silt, sand	No	Private	Silt, sand	2.50 m	2.50 m	Silt, sand	Private	No					40 cm	Silt, sand	Silt, sand	NA	NA	NA	
Periyar River (154/400 km to 163/200 km)																								
154/400	Karimanal bridge	10.024984	76.841032	110	Rock	N	Private	clayey	3	4	clayey	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
154/730 (Lt. side)	RSP Kunnu thodu mouth	10.024359	76.836883	100	Rock	N	Private	clayey	2	2	-	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
155/400 (Lt. side)	Neendapara Vayanasalapadi Thodu mouth	10.02563	76.832058	100	Rock	N	Private	Silt	5	5	-	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
156/420	Neendapara Thookkupalam	10.030871	76.823958	130	Silt	N	Private	Silt	5	5	Silt	Private	N	Suspension Bridge	Good	No	No	-	-	-	-	-	-	-
156/800 (Rt. Side)	Inchapathal Thookku palam thodu mouth	10.033097	76.822502	100	Rock	N	Private	clayey	3	3	clayey	Private	N	Tributary	-	-	-	-		-	-	-	-	-
157/310 (Rt. Side)	Inchapathal Thodu mouth	10.035549	76.819388	120	Silt	N	Private	Sandy	3	3	Sandy	Private	N	Tributary	-	-	-	-	-	-	-	-	-	Yes
158/300 (Lt. side)	Chembankuzhy Thodu mouth	10.035266	76.81008	150	Silt	N	Private	Sandy	5	5	-	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	Yes
159/500 (Lt. side)	Maniyanpara Thodu mouth	10.040688	76.801286	80	Silt	N	Private	Sandy	8	3	Sandy	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
159/800	Maniyanpara	10.040836	76.80073	100	Silt	N	Private	Sandy	3	3	Sandy	Private	N	Old suspension Bridge	Damaged	No	Yes	-	-	-	-	-	-	-

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
159/900 (Rt. Side)	Thottiyar mouth	10.043684	76.799738	115	Rock	N	Private	Silt	3	4	silt	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
161/200 (Lt. side)	Neriyamangalam colony thodu mouth	10.048345	76.78738	105	Silt	N	Devaswom	clayey	7	7	Sandy	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
162/900 (Rt. Side)	Kambiline thodu mouth	10.060298	76.777722	120	Rock	N	Private	sandy	3	5	sandy	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
163/000 (Lt. side)	Neriyamangalam	10.059085	76.778687	100	Sand	N	Private	Sandy	4	4	Sandy	Forest	N	Deposit	-	-	-	2	Sand	90% sand 10% Clay	-	-	-	-
163/200	Neriyamangalam bridge	10.058597	76.776976	176	Rock	N	Private	Clayey	3	4	clayey	Forest	N	Arch Bridge	Good	No	No	-	-	-	-	-	-	-
RSP Kunnu thodu @ Ch: 154/730 km																								
0/200	Bridge	10.022037	76.83745	4	Rock	Y	Private	Sandy	4	5	Sandy	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
0/516	Mouth	10.024359	76.836883	5	silt	N	Private	clayey	2	2	clayey	Private	N	-	-	-	-	-	-	-	-	-	-	-
Neendapara Vayanasalapady thodu @ Ch: 155/400 km																								
0/033	Bridge	10.023635	76.82971	3	Rock	y	Private	laterite	6	1.5	laterite	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/309	Tributary mouth	10.024488	76.832132	3	Silt	N	Private	laterite	3	2	laterite	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
0/450	Mouth	10.02563	76.832058	5	Silt	N	Private	Silt	5	1.5	Silt	Irrign	N	-	-	-	-	-	-	-	-	-	-	-
Tributary @Ch: 0/309 km																								
0/150	Bridge	10.022281	76.831479	3	Rock	N	Private	laterite	2	2	laterite	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
0/309	Mouth	10.024488	76.832132	4	Silt	N	Private	laterite	3	3	laterite	Private	-	-	-	-	-	-	-	-	-	-	-	-
Inchapathal thookku palam thodu @ Ch: 156/800 km																								
0/019	Bridge	10.033964	76.824519	5.5	Rock	N	Private	Rock	3	3	Rock	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/103	Tributary	10.033313	76.824182	4	Rock	N	Private	clayey	4	5	clayey	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
0/320	Mouth	10.033097	76.822502	6	Rock	N	Private	clayey	3 m	3 m	clayey	Private	N	-	-	-	-	-	-	-	-	-	-	-
Tributary @ Ch: 0/103 km																								
0/050	Bridge	10.033517	76.82487	3	Rock	N	Private	Rock	3	3	Rock	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/103	Mouth	10.033313	76.824182	4	Rock	N	Private	clayey	2	2	clayey	Private	N	-	-	-	-	-	-	-	-	-	-	-
Inchapathal thodu @ Ch: 157/310 km																								
0/030	Bridge	10.036509	76.819989	4.9	Rock	N	Private	Rock	4	4	Silt	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/190	Mouth	10.035549	76.819388	4	Silt	N	Private	Sandy	3	3	Sandy	Private	N	-	-	-	-	-	-	-	-	-	-	-
Chembankuzhy thodu @ Ch: 158/300 km																								
0/054	Bridge	10.031409	76.814344	6	laterite	N	Forest	laterite	6	6	laterite	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/340	Tributary	10.03328	76.812686	6	Sand	N	Private	Sandy	1.5	1.5	Sandy	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
0/820	Mouth	10.035266	76.81008	8	Silt	N	Private	Sandy	2	2	Sandy	Private	N	-	-	-	-	-	-	-	-	-	-	-
Tributary @ Ch: 0/340 km of Chembankuzhy thodu																								
0/300	Bridge	10.032367	76.815371	5	Rock	Y	Private	laterite	2	3	laterite	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
0/500	Mouth	10.03328	76.812686	6	Sand	N	Private	Sandy	1.5	1.5	Sandy	Private	N	-	-	-	-	-	-	-	-	-	-	-
Maniyanpara thodu @ Ch: 159/800 km																								
0/020	Bridge	10.039552	76.801202	4	Rock	N	Private	laterite	1.5	1.5	laterite	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/180	Mouth	10.040688	76.801286	5	Silt	N	Private	clayey	5	5	clayey	Private	N	-	-	-	-	-	-	-	-	-	-	-
Thottiyar @ Ch: 159/900 km																								
0/580	Adimaly town	10.014464	76.954742	6.5	Rock	Y	Road	Road	3	3	Road	Road	y	Bridge	Good	No	No	-	-	-	-	-	-	-
1/372	Camco Jn	10.010776	76.951389	6.5	Rock	N	Private	laterite	2	2	laterite	Private	N	Bridge	Good	No	No							
1/600 (Rt. Side)	Camco Jn	10.00965	76.949898	14.5	Silt	Y	Private	Latrite	2	2	laterite	Private	N	Tributary	-	-	-	-	-	-	-	-	-	-
1/626	Camco Jn	10.00955	76.94981	14.5	Silt	Y	Private	Latrite	2	2	laterite	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
1/861	Ambalampady	10.011667	76.944571	12.5	Silt	N	Private	Latrite	3	3	laterite	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
2/552	Near KNP Garrage	10.013377	76.939273	6.2	silt	Y	Private	sandy	4	4.2	sandy	private	Y	Bridge (Private)	Good	No	No	-	-	-	-	-	-	-
2/962	Eastern Company	10.014682	76.937103	12.2	Rock	Y	Private	sandy	3	3	sandy	private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
3/253	Chattupara	10.014886	76.932675	15	silt	y	private	sandy	3.5	3.5	sandy	private	N	VCB cum Bridge	Good	No	No	-	-	-	-	-	-	-
3/572	Chattupara	10.016024	76.929589	8	Rock	Y	Private	Sandy	2	2	Sandy	Road	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
4/640 (Rt. Side)	Triutary mouth	10.017364	76.927044	12	rock	y	private	sandy	2	2	sandy	Road	Y	Tributary	-	-	-	-	-	-	-	-	-	-
4/657	Near Eastern School	10.017314	76.926929	12.5	rock	y	Private	sandy	3	2	sandy	private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
4/596	Eastern School	10.01746	76.926725	13.2	Rock	y	private	sandy	2	2	sandy	private	Y	Bridge (Private)	Good	No	No	-	-	-	-	-	-	-
6/033	Machiplavu	10.017549	76.920208	15	silty	y	Private	Sandy	2	2	sandy	private	y	VCB	Damaged	No	Yes	-	-	-	-	-	-	-
6/082	Machiplavu	10.017313	76.919813	15	silty	Y	Private	sandy	2	2	sandy	private	y	Bridge	Good	No	No	-	-	-	-	-	-	-
6/131	Machiplavu	10.017575	76.919679	15	silty	N	Private	sandy	2.5	2.5	sandy	private	N	Check dam	Good	No	No	-	-	-	-	-	-	-
7/591	Machiplavu	10.020665	76.911353	18.2	silty	Y	Private	clayey	2	2	sandy	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
8/215	Mazhumattathilpady	10.026392	76.902437	10	sandy	y	Private	clayey	2.5	2.5	sandy	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
8/874	14th mile	10.02538	76.898412	13.8	silty	y	Private	clayey	2	2	clayey	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
9/945	12th mile	10.025436	76.884572	28	silty	N	Private	clayey	2	2	clayey	Private	N	Foot bridge	Damaged	No	Yes	-	-	-	-	-	-	-
10/525	Cherai	10.028061	76.880577	27.4	rock	y	Private	clayey	3	3.3	clayey	NH	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
11/050 (Rt. Side)	Irumbupalam	10.029604	76.878242	10	Rock	N	Private	Sandy	2	2	Sandy	Private	N	Padikkappu thodu mouth	-	-	-	-	-	-	-	-	-	-
11/300	Irumbupalam	10.028383	76.876657	27.5	Rock	Y	Private	Latrite	2	2	Latrite	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
11/733	Kandamalippadi	10.030832	76.875519	16	Rock	Y	Road	Latrite	4	4	Latrite	Private	y	Bridge	Good	No	No	-	-	-	-	-	-	-
12/566	10th mile	10.0314278	76.866347	14	Rock	N	Private	Latrite	2	3	Latrite	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
13/068	Deviyar Devi Temlpe	10.032784	76.8665121	20	Rock	Y	Private	Sandy	2	2	Sandy	Private	Y	Chappathu	Damaged	No	Yes	-	-	-	-	-	-	-
13/542	10th mile	10.034046	76.863302	23	Rock	N	Private	Sandy	3	3	Sandy	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
14/562	Colony Palam	10.036523	76.85534	37	Rock	Y	Road	Sandy	3	4	Sandy	Road	y	Bridge	Good	No	No	-	-	-	-	-	-	-
15/827	Thottiyar Project Palam	10.038198	76.848851	120	Rock	N	KSEB	Sandy	2	4.5	Sandy	KSEB	N	Bridge	Good	No	No	-	-	-	-	-	-	-
16/150	Thottiyar HEP	10.036774	76.846689	100	Rock	N	KSEB	Sandy	6	3	Sandy	KSEB	N	Check dam	Under construction			-	-	-	-	-	-	-
17/600	Valara	10.04368	76.83905	56	Rock	N	Forest	Rocky	3	4	Rocky	Private	N	Bridge Check dam Foot bridge	Good	No	No	-	-	-	-	-	-	-
18/000	Valara kuthu	10.046464	76.839297		Rock	N	Forest	Rocky			Rocky	Forest	N	Water falls	-	-	-	-	-	-		-	-	-
18/100 (Rt. Side)	Valara kuthu	10.04617	76.840163		Rock	N	Forest	Rock			Rock	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
18/300 (Rt. Side)	Valara kuthu	10.047527	76.840238		Rock	N	Forest	Rock			Rock	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
19/400 (Rt. Side)	Chiyappara	10.0525	76.828261		Rock	N	Forest	Rock			Rock	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
24/560	Kanjiraveli	10.045845	76.798822	30	Rock	Y	Private	Sandy	3	3.5	Sandy	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
24/962	Kanjiraveli	10.042414	76.798914	35	Rock	N	Private	Sandy	3.5	4	Sandy	Private	N	Mouth to Periyar	-	-	-	-	-	-	-	-	-	-
Polinjapalam thodu @ Ch: 1/600km of Thottiyar																								
0/050	Polinjapalam	10.003097	76.967982	3	Clayey	N	Private	Clayey	2	2	clayey	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
0/100 (Rt. Side)	Polinjapalam	10.003026	76.967536	3	Clayey	N	Private	Clayey	2	2	clayey	Private	Y	Tributary	-	-	-	-	-	-	-	-	-	-
0/860	Mar Basalious Collage	10.003698	76.961149	6.6	Rock	y	Private	Sandy	2.5	2.5	Sandy	Private	y	Bridge	Good	No	No	-	-	-	-	-	-	-
2/100	Mannamkala Road	10.006337	76.954979	5.5	laterite	Y	Private	sandy	3	3	Sandy	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
2/850	Camco Jn	10.00965	76.949898	6	silt	N	Private	Sandy	2	2	Sandy	Private	N	Mouth to Thottiyar		-	-	-	-	-	-	-	-	-

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
Tributory @ Ch: 0/100 of Polinjapalam																								
0/100	Polinjapalam	10.003358	76.967927	3	Clayey	N	Private	clayey	2	2	clayey	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/150	Polinjapalam	10.003026	76.967536	3	Clayey	N	Private	clayey	1	1	clayey	Private	N	Mouth to Polinjapalam				-	-	-	-	-	-	-
Tributary @ Ch: 4/640 km of Thottiyar																								
0/010 km	NH crossing	10.019735	76.92885	3	Rock	N	Forest	Rocky	2	2	Rocky	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/400	Mouth	10.017364	76.927044	4	silt	N	Private	silt	2	2	silt	Private	N	Mouth	-	-	-	-	-	-	-	-	-	-
Padikappu thodu @ Ch: 11/000 km of Thottiyar																								
0/500	Chillithodu	10.046307	76.881586	6.5	Rock	N	Private	Rocky	3	3	Rocky	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
1/400	Padikappu	10.048681	76.87429	8	Rock	N	Private	laterite	2	2	laterite	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
1/720	Padikappu	10.046793	76.874428	6	laterite	Y	Private	laterite	2	2	laterite	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
2/980	Chillithodu	10.039349	76.87805	13.5	Rock	Y	Road	Rocky	3	3	Rocky	Private	Y	Bridge cum check dam	Good	No	No	-	-	-	-	-	-	-
3/150	Chillithodu	10.038449	76.87803	8.8	Rock	Y	Private	Rocky	3.3	3.3	Rocky	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
3/330 (Lt side)	Tributory water falls	10.037648	76.879255		Rock		Forest	Rocky			Rocky	Forest		Water falls	-	-	-	-	-	-	-	-	-	-
3/710	Chillithodu	10.034482	76.880192	10	Rock	y	Private	laterite	3	3	laterite	Road	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
3/900	Juma Masjid	10.032859	76.880157	10.5	Rock	Y	Masjid	laterite	2	2	laterite	Road	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
3/930	Juma Masjid	10.032607	76.880114	15	Rock	N	Private	laterite	2	2	laterite	Road	Y	VCB	Good	No	No	-	-	-	-	-	-	-
4/150	Chillithodu	10.03201	76.88003	17.5	Rock	y	Private	laterite	2	2	Rocky	Private	Y	Foot bridge bridge	Good	No	No	-	-	-	-	-	-	-
4/280	Irumbupalam	10.031028	76.880068	15	Rock	y	Private	laterite	2	2	laterite	Road	y	Bridge	Good	No	No	-	-	-	-	-	-	-
4/420	Irumbupalam	10.029535	76.877321	18	Rock	N	Private	Rock	2	2	Rock	Road	Y	Check dam	Good	No	No	-	-	-	-	-	-	-
4/840	Irumbupalam	10.030174	76.878876	14.5	Rock	N	Private	Rock	3	3	Rock	Road	N	Old Iron bridge	Good	No	No	-	-	-	-	-	-	-
4/850	Irumbupalam	10.03017	76.87887	15.5	Rock	y	Road	Rock	5	5	Rock	Road	y	Bridge	Good	No	No	-	-	-	-	-	-	-
4/960	Irumbupalam	10.029604	76.878242	26	Rock	N	Private	Rock	1.5	1.5	Rock	Private	N	Mouth	-	-	-	-	-	-	-	-	-	-
Tributary @ Ch: 18/100 km of Thottiyar																								
0/000	Valara kuthu	10.045998	76.84007	13	Rock	Y	Private	Rock	2	2	Rock	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
0/100	Valara kuthu	10.04617	76.840163		Rock		Forest	Rock			Rock	Forest		Mouth to Thottiyar		-	-	-	-	-	-	-	-	-
Tributary @ Ch: 18/300 km of Thottiyar																								
0/000	Valara kuthu	10.047517	76.840234	13	rock	N	Private	Rock	2	2	Rock	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/100	Valara kuthu	10.047527	76.840238		Rock	N	Forest	Rock			Rock	Forest	N	Mouth to Thottiyar		-	-	-	-	-	-	-	-	-
Tributary @ Ch: 19/400 km of Thottiyar																								
0/000	Chiyappara	10.053785	76.829107	13	Rock	N	Forest	Rock			Rock	Forest	N	Bridge & Water falls	Good	No	No	-	-	-	-	-	-	-
0/170	Chiyappara	10.0525	76.828261		Rock	N	Forest	Rock			Rock	Forest	N	Mouth to Thottiyar		-	-	-	-	-	-	-	-	-
Neriyamangalam colony thodu @ Ch: 161/200 km of Periyar																								
0/000	Neriyamangalam	10.040972	76.790432	4	Rock	N	Forest	Rocky	2	3	Rocky	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/150 (Lt. side)	Tributory	10.043702	76.786962	4	rock	N	Private	Rock	2	2	Rock	Private	N	Tributry	-	-	-	-	-	-	-	-	-	-
0/192	Neryamangalam	10.045976	76.787058	5	rock	N	Private	Latrite	4	5	Rock	Private	Y	Bridge	Good	No	No	-	-	-	-	-	-	-
0/398	Sastha Temple	10.048345	76.78738	15	silt	N	Devaswom	clayey	7	7	Sandy	Private	N	Mouth to Periyar		-	-	-	-	-	-	-	-	-
Tributary @ Ch: 0/150 km ofNeriyamangalam colony thodu																								
0/000	Neriyamangalam	10.04105	76.788222	3	rock	N	Forest	Rock	2.5	2.5	Rock	forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/500	Neriyamangalam	10.043702	76.786962	4	rock	N	Forest	Rock	2	2	Rock	forest	N	Mouth	-	-	-	-	-	-	-	-	-	-
Kambiline Thodu @ Ch: 162/900km of Periyar																								

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
0/150	NH crossing	10.065362	76.806652	3	Rock	N	Forest	Rock	12	12	Rock	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
0/160 (Rt. Side)	NH crossing	10.065276	76.80607	4	Rock	N	Forest	Rock	12	12	Rock	Forest	N	Tributary	-	-	-	-	-	-	-	-	-	-
1/302	Near Forest station	10.064064	76.797557	16	Rock	N	Forest	Rock	2	2	clayey	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
3/754	Kambiline	10.064399	76.777364	12	Rock	N	Private	sandy	3	3	Rock	Private	N	Bridge	Good	No	No	-	-	-	-	-	-	-
4/237	Kanjiraveli	10.061819	76.776612	12.5	Rock	N	Forest	Sandy	3	5	Sandy	Forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
4/510	Kanjiraveli	10.060298	76.777722	12	Rock	N	Forest	sandy	3	2	sandy	Forest	N	Mouth	-	-	-	-	-	-	-	-	-	-
	Tributary 1 @ Ch: 0/160 km of Kambiline Todu																							
0/000	Bridge	10.065276	76.80607	3	rock	N	Forest	Rock	3	3	Rock	forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
Tributary 2																								
0/000	Bridge	10.066431	76.776321	3	rock	N	Forest	Rock	4	4	Rock	forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
Tributary 3																								
0/000	Bridge	10.064412	76.777378	11.7	rock	N	Forest	Rock	4	2	Rock	forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-
Tributary 4																								
0/000	Bridge	10.061822	76.77663	12.5	rock	N	Forest	Rock	3	3	Rock	forest	N	Bridge	Good	No	No	-	-	-	-	-	-	-

REACH III

PERIYAR RIVER BASIN STUDY- RIGHT BANK

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
NAME OF THODU:ILLI THODU																								
0	Forest	10.22638889	76.56138889	3	Rock	N	Forest land	Soft Rock	1.4	N	Forest land	Soft Rock	1.8											
2765	Moolam Kuzhi Aqueduct	10.20305556	76.56111111	17	Rock	Y	Private	Soft Rock	3.1	Y	Private	Soft Rock	3.2	Aqueduct	Good	No	No							
3100	Mahagony Thottam	10.20000000	76.56111111	21	Rock	Y	Private	Soft Rock	2.9	Y	Private	Soft Rock	3.1	Bridge	Good	No	No							
3560	Meeting with Periyar river	10.19611111	76.56083333	16	Sand with Clay	N	Revenue	Soft Rock	2.4	N	Revenue	Soft Rock	2.5											
NAME OF THODU: THUNDAM THODU																								
0	Forest	10.21527778	76.63972222	3	Rock	N	Forest land	Soft Rock	1.9	N	Forest land	Soft Rock	2.2											
12620	Forest	10.16000000	76.64611111	35	Rock	Y	Forest land	Soft Rock	2.1	Y	Forest land	Soft Rock	2.1	IIP Canal Aqueduct	Good	No	No							
12668	Forest	10.15972222	76.64583333	20	Rock	Y	Forest land	Red Soil	3.1	Y	Forest land	Soft Rock	2.2	Culvert forest road	Good	yes	No							
12800	Meeting with Periyar River	10.15888889	76.64500000	25	Clay	N	Forest land	Red Soil	4.5	N	Forest land	Red Soil	2.4											
NAME OF THODU: PALLUPETTA THODU																								
0	Malayattoor	10.20805556	76.48555556	3	Clay	N	Private	Red Soil	1.8	N	Private	Red Soil	2.0											Y
2660	Neeleeswaram Ottu company area	10.19250000	76.48111111	4	clay	N	Private	Red Soil	1.3	N	Private	Red Soil	1.5	Culvert	damaged	no	yes							Y
2993	Neeleeswaram	10.18497222	76.48111111	5	clay	N	Private	Red Soil	2.3	N	Private	Red Soil	2.5											Y
3493	Pallupetta Bridge	10.18750000	76.48027778	4.5	Rock	Y	Private	Red soil	2.9	Y	Private	Red Soil	3.0	Bridge	Good	No	No							Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3835	Meeting with Periyar River	10.18444444	76.47888889	7	Clay	Y	Private	Red soil	2.3	Y	Private	Red Soil	2.1											Y
NAME OF THODU: MUKKADAI THODU																								
1st order (Left Branch)																								
0	Manickamangalam	10.21638889	76.46472222	3	Clay	Y	Private	Soft Rock	1.40	Y	Private	Soft Rock	1.30											
17	Manickamangalam	10.21638889	76.46472222	3.5	Rock	Y	Private	Soft Rock	1.50	Y	Private	Soft Rock	1.60	Foot Bridge	Good	No	No							
253	Manickamangalam	10.21527778	76.46361111	4	Rock	Y	Private	Soft Rock	1.70	Y	Private	Soft Rock	1.55	Foot Bridge	Good	No	No							
415	Manickamangalam	10.21416667	76.46250000	4.3	Clay	Y	Private	Soft Rock	2.00	Y	Private	Soft Rock	2.10											
NAME OF THODU: MUKKADAI THODU																								
2nd order																								
0	Ayyampuzha	10.25166667	76.50111111	3	Soft Rock	N	PCK LTD	Soft Rock	1.30	N	PCK LTD	Soft Rock	1.20											Y
1023	Ayyampuzha	10.25833333	76.44222222	10.5	Rock	Y	Private	Soft Rock	2.8	Y	Private	Soft Rock	2.8	Bridge	Good	No	No							Y
1650	Ayyampuzha	10.258804	76.462861	8	Soft Rock	N	Private	Soft Rock	2.50	Y	Private	Soft Rock	2.50					1.25	silt					Y
2958	Ayyampuzha	10.244044	76.444744	20	Rock	Y	Private	Soft Rock	3.00	Y	Private	Soft Rock	2.90	Bridge	Good	No	No	1.10	silt					Y
4380	Ayyampuzha	10.233512	76.44953	18	Rock	Y	Private	Soft Rock	1.95	Y	Private	Soft Rock	2.15	VCB	Good	No	No	1.30	silt					Y
4518	Ayyampuzha	10.23333333	76.44944444	13	Rock	Y	Private	Soft Rock	2.8	Y	Private	Soft Rock	2.6	Bridge	Good	No	No							Y
4745	Marygiri Road	10.229143	76.450913	14	Rock	Y	Private	Red Soil	3.50	Y	Private	Red Soil	3.50	Bridge	Good	No	No	1.05	silt					Y
4758	Marygiri Road	10.229143	76.450913	10	Rock	Y	Private	Red Soil	2.50	Y	Private	Red Soil	2.50	Bridge	Good	No	No							Y
5201	IIP Aqueduct	10.227801	76.45306	10	Rock	Y	Private	Red Soil	2.65	N	Private	Red Soil	2.80	Aqueduct	Good	No	No							Y
5215	Marygiri	10.227801	76.45306	6	Soft Rock	Y	Private	Red Soil	2.25	Y	Private	Red Soil	2.30	Bridge	Good	No	No							Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
5276	Marygiri	10.22694444	76.45333333	7	Rock	Y	Private	Red Soil	2.70	Y	Private	Red Soil	2.60	Culvert	Good	No	No							Y
6034	Marygiri	10.22250000	76.45611111	15	Rock	Y	Private	Red Soil	3.00	Y	Private	Red Soil	3.10	Bridge	Good	No	No							Y
7090	Marygiri	10.207784	76.459949	13	clay	Y	Private	Red Soil	1.70	Y	Private	Red Soil	1.60	VCB	Good	No	No							Y
7100	Manjapra-Ayyampuzha Plantation Road	10.21555556	76.44138889	10	Rock	Y	Private	Red Soil	2.80	Y	Private	Red Soil	3.00	Bridge	Good	No	No							Y
7741	Meeting of small branch into main thodu	10.21416667	76.46250000	15	Clay	N	Private	Red Soil	1.50	N	Private	Red Soil	1.65											Y
8700	Manjapra	10.208423	76.460983	9	Red Soil	N	Private	Red Soil	1.65	N	Private	Red Soil	1.75											Y
8804	Mini Dam Manjapra	10.207523	76.460076	8	Red Soil	Y	Private	Red Soil	3.00	Y	Private	Red Soil	3.10	Mini-Dam	Good	No	No							Y
9798	Manjapra	10.20388889	76.46222222	23	soft rock	Y	Private	Red Soil	2.00	Y	Private	Red Soil	1.95	VCB	Good	No	No							y
9814	Naduvattom-Chandrapura Bridge	10.204044	76.462502	10	clay	Y	Private	Red Soil	3.80	Y	Private	Red Soil	3.80	Bridge	Good	No	No							y
9858	Meeting of left branch into main thodu	10.18743	76.455954	6.3	clay	Y	Private	Red Soil	1.85	Y	Private	Red Soil	1.85	Bridge	Good	No	No							y
10398	Manjapra	10.19972222	76.46277778	6	Clay	Y	Private	Red Soil	1.40	Y	Private	Red Soil	1.50	Foot Bridge	Good	No	No							y
10843	Manjapra	10.19611111	76.46250000	10	Clay	Y	Private	Red Soil	2.75	Y	Private	Red Soil	2.80	Culvert	Good	No	No							y
12318	Manjapra	10.19027778	76.45694444	14	Clay	Y	Private	Red Soil	1.85	Y	Private	Red Soil	1.70	Foot Bridge	Good	No	No							y
12928	Mukkadai Bridge	10.192815	76.449798	27	Rock	Y	Private	Red Soil	3.75	Y	Private	Red Soil	3.75	Bridge	Good	Y	Y							Y
14385	Kottamam Bridge	10.177873	76.45732	17	Rock	Y	Private	Red Soil	4.00	Y	Private	Red Soil	4.00	Bridge	Good	No	No							Y
15108	Meeting with Periyar River	10.171763	76.457742	23.5	Clay	N	Private	Red Soil	3.30	N	Private	Red Soil	3.10											Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
PERIYAR RIVER BASIN STUDY- LEFT BANK																								
NAME OF THODU: KRARIYELI THODU																								
1st order(Left branch)																								
0	Meykappala	10.11361111	76.57305556	3	Soft Rock	Y	Private	Red Soil	1.0	Y	Private	Red Soil	1.0	Nil				Nil			Nil			Yes
26	Panichayam-Sincere jn.-Moonamthodu Road	10.11388889	76.57277778	5	Soft Rock	Y	Private	Red Soil	2.0	Y	Private	Red Soil	2.0	Culvert	Good	No	No	Nil			Nil			Yes
824	Kottappady-Payyal link Road	10.11888889	76.57138889	7	Rock	N	Private	Red Soil	1.5	N	Private	Red Soil	1.5	Culvert	Good	No	Side protection required	Nil			Nil			Yes
1428	Meykappala: Kuthukuzhy-Kadakana Thodu	10.12277778	76.57166667	7	Rock	N	Private	Red Soil	1.0	N	Private	Red Soil	1.0	Bridge	Good	No	No	Nil			Nil			Yes
2280	Meykappala	10.12833333	76.57416667	6	Soft rock	N	Private	Red Soil	1.0	N	Private	Red Soil	1.0	Bridge	Good	No	No	Nil			Nil			Yes
2744	Meeting with 2nd order	10.13083333	76.57666667	5	Soft rock	N	Private	Red soil	1.0	N	Private	Red soil	1.0	Nil				Nil			Nil			
NAME OF THODU: KRARIYELI THODU																								
1st order(Right branch)																								
0	Kanichattupara	10.12361111	76.58916667	3	Soft Rock	N	Private	Red Soil	1.0	N	Private	Red Soil	1.0	Nil				Nil			Nil			yes
612	Kanichattupara	10.12638889	76.58916667	7	Soft Rock	N	Private	Red Soil	1.0	N	Private	Red Soil	2.0	Nil				Nil			Nil			yes
1495	Kanichattupara	10.12666667	76.58416667	5	Soft Rock	N	Private	Red Soil	1.0	N	Private	Red Soil	3.0	Culvert	Good	No	No	Nil			Nil			yes
1715	Kuttykuzhy-Plamudy Road-Asamanoor Panchayat	10.12888889	76.57666667	5	Soft Rock	Y	Private	Red Soil	2.0	Y	Private	Red Soil	2.0	Culvert	Good	No	No	Nil			Nil			yes
1933	Meeting with 2nd order	10.13083333	76.57666667	5	Soft rock	N	Private	Red soil	1.0	N	Private	Red soil	1.0	Nil				Nil			Nil			yes
NAME OF THODU: KRARIYELI THODU																								

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2nd order																								
0	Joining of left and right branches into Main Thodu	10.13083333	76.57666667	11	Soft rock	N	Private	Red soil	1.0	N	Private	Red soil	1.0	Nil										Yes
145	Kuttykuzhy-Plamudy Road	10.13194444	76.57611111	8	Soft rock	N	Private	Red soil	2.0	N	Private	Red soil	2.0	Culvert	Good	No	No	Nil			Nil			Yes
735	Punjakkara-Moonamthodu-Meykappala canal road	10.13583333	76.57472222	7	Soft rock	Y	Private	Soft Rock	1.0	Y	Private	Soft Rock	1.0	Foot Bridge	Good	No	No	Nil			Nil			Yes
761.5	Punjakkara-Moonamthodu-Meykappala canal road	10.13583333	76.57444444	8	Soft rock	Y	Private	Soft Rock	1.5	Y	Private	Soft Rock	1.5	Bridge	Good	No	No	0.5	Silt	100%	Nil			Yes
1914	Bifurcating point	10.14194444	76.57166667	8	Red soil	N	Private	Red soil	1.0	Y	Private	Red soil	2.0	Nil				Nil			Nil			Yes
After bifurcation-Left branch-At 65 m from Ch:1914 m	Meykappala Chooramudi road	10.14222222	76.57138889	4	Rock	Y	Private	Red soil	2.0	Y	Private	Red soil	2.0	Culvert	Good	No	No	Nil						Yes
After bifurcation-Right branch-At 76 m from Ch:1914 m		10.14194444	76.5725	8	Rock	Y	Private	Red soil	1.0	Y	Private	Red soil	2.0	Culvert	Good	No	No	Nil			Nil			Yes
2677	Canal Aqueduct	10.14722222	76.57111111	10	Soft rock	N	Private	Red soil	0.5	N	Private	Red soil	0.5	Canal Aqueduct	Good	No	No							Yes
3096	Nedungapra-Krariyeli Road-Kanichattupara Bridge	10.15055556	76.57083333	8	Soft rock	N	Private	Rock	0.6	Y	Private	Rock	3.0	Bridge	Good	No	No	Nil			Nil			Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4468	Paniely	10.16222222	76.57194444	10	Soft rock	N	Private	Red soil	1.0	N	Private	Red soil	1.0	Cross bar	Damaged	Yes	Yes	Nil			Nil			No
4981	Perumbavoor Paniely Road	10.16638889	76.5725	15	Rock	N	Private	Red soil	1.5	N	Private	Red soil	1.0	Bridge	Good	No	No	0.6	Silt+ Clay	50%+50 %	R/B	Liquid	Yes	Yes
6673	Krariyeli Kochupurakkanadavu Road	10.17527778	76.57166667	15	Rock	N	Private	Red soil	1.0	y	Private	Red soil	1.0	Bridge & Cross bar	Good	No	No	0.4	Silt	100%	Nil			Yes
7290	Confluence Point -Vengoor Panchayat	10.18083333	76.57166667	12	Rock	N	Private	Red soil	1.0	N	Private	Red soil	3.0	Nil				Nil			Nil			Yes
NAME OF THODU: THOTTUVA THODU																								
0	Nedungapra	10.1280556	76.5372222	3	Clay	Y	Private	red earth	1.5	Y	Private	red earth	1.8	culvert	good	No	no	0.3	silt	silt	both	Solid	yes	yes
200	Keezhillam-Kurichilakode Road	10.1400000	76.5091667	12	soft Rock	Y	Private	red earth	3.1	Y	Private	red earth	3.0	Bridge&cross bar	Good	No	No	0.3	silt	silt	both	Solid	yes	yes
1480	Pappanpady-Akanad-Vengoor Road	10.1477778	76.5038889	8	red earth	Y	Private	red earth	2.8	Y	Private	red earth	3.1	Bridge	Good	yes	No	0.45	silt	silt	both	Solid	yes	yes
4180	Kurichilakode	10.16250000	76.4969444	1o	red earth	N	Private	red earth	3.0	Y	Private	red earth	2.9	Bridge	Good	No	No	0.45	silt	silt	both	Solid	yes	yes
5460	Kurichilakode	10.1719444	76.4938889	3	Clay	Y	Private	red earth	1.8	Y	Private	red earth	1.9	Wooden bridge	damaged	No	No	0.6	silt	silt	both	Solid	yes	yes
5475	Vallom-Kodanad Road	10.1719444	76.4936111	8	clay	N	Private	red earth	2.7	Y	Private	red earth	3.0	Bridge	Good	No	No	0.6	silt	silt	both	both	yes	yes
7688	Kodanad	10.1800000	76.5002778	15	clay	Y	Private	Soft Rock	3.0	Y	Private	Soft Rock	3.2	foot Bridge	Good	No	No	0.6	silt	silt	both	both	yes	yes
7775	Meeting with Periyar river	10.1808333	76.5005556	20	Clay&sand	Y	Private	Red soil	2.4	Y	Private	Red soil	2.0			no		0.2	silt	silt	both	Solid	yes	yes
REACH IV																								
DETAILS OF RIGHT BANK OF PERIYAR																								
Name of Thodu/Tributary - CHENGAL THODU FROM COAST GUARD TO PERIYAR																								
0.000	Coast guard	10.15487	76.40461	15	Clay	4	Private	Clay	Y	4	Clay	Private	Y	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	No	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.300	Coast guard	10.15511	76.40624	30	Clay	10	Private	Clay	Y	10	Clay	Private	Y	New bridge coast guard	Good	No	No	NIL	N/A	N/A	N/A	N/A	No	Yes
0.940	Nedumbassery	10.15713	76.40793	30	Clay	10	Private	Clay	N	10	Clay	Private	N	New bridge	Good	No	No	NIL	N/A	N/A	N/A	N/A	No	No
2.270	Piravoor - Thuravunkara	10.15652	76.41537	30	Clay	4	Private	Clay	N	4	Clay	Private	N	Chappaath	Not Good	Yes	Yes	NIL	N/A	N/A	N/A	N/A	No	No
3.700	Chengal bhagavathi Temple	10.15700	76.42690	30	clay	12	Private	Clay	Y	12	Clay	Private	Y	New bridge	Good	No	No	1.0	clay	100%clay	NIL	NIL	No	Yes
4.690	Kanjoor	10.15095	76.42604	30	clay	10	Private	Clay	N	10	Clay	Private	N	Bridge	Good	No	No	1.0	clay	100%clay	NIL	NIL	No	Yes
5.020	Periyar	10.14762	76.42962	30	clay	4	Private	Clay	N	4	Clay	Private	N	N/A	N/A	N/A	N/A	1.5	clay	100%clay	NIL	NIL	Yes	Yes
Name of Thodu/Tributary - KANJOOR THODU																								
0.000	Periyar	10.144880	76.432830	15	Clay	7	Private	Clay	Y	2	Clay	Private	N	N/A	NIL	NIL	NIL	NIL	N/A	N/A	N/A	N/A	No	Yes
0.360	Vadakkumbhagam(Thalipara bridge)	10.142743	76.427840	9.3	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	Good	N	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
0.450	Thattampady road Bridge-1	10.142398	76.426842	9	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	New	Y	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
0.940	Thattampady road Bridge-2	10.140697	76.423398	9	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	New	N	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
1.15 to 1.25	Thodu Blocked with Cultivated land and Narrow spring	10.141844	76.421235	1	Clay	1	Private	Clay	N	1	Clay	Private	N	NIL	N/A	Y	Yes	Full	N/A	N/A	N/A	N/A	No	Yes
1.40 to 1.50	Thodu Blocked with Auditorium and Narrow spring	10.140862	76.420417	1	Clay	1	Private	Clay	N	1	Clay	Private	N	NIL	N/A	Y	Yes	Full	N/A	N/A	N/A	N/A	No	Yes
2.050	Venmany Road Culvert	10.154284	76.423146	7.5	Clay	7	Private	Clay	N	7	Clay	Private	N	Bridge	Good	N	No	1	Clay	100% Clay	N/A	N/A	No	Yes
2.375	Thekkumbhagam (Thattampady)	10.135150	76.419800	6	Clay	6.5	Private	Clay	N	6.5	Clay	Private	N	Culvert	Good	N	No	1	Clay	100% Clay	N/A	N/A	No	Yes
2.830	Thiruvanikkualm	10.135150	76.419800	5	Clay	5	Private	Clay	N	5	Clay	Private	N	Culvert	Good	N	No	1	Clay	100% Clay	N/A	N/A	No	Yes
3.060	Thiruvanikkualm Road	10.129104	76.416161	2	Clay	1.5	Private	DR	Y	1.5	DR	Private	Y	Culvert	Good	N	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
3.480	Thiruvanikkualm Road	10.126128	76.415027	2	Clay	1.5	Private	DR	Y	1.5	DR	Private	Y	Culvert	Good	N	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4.600	Periyar	10.119560	76.407230	3	Clay	4	Private	Clay	N	4	Clay	Private	N	N/A	N/A	NIL	NIL	0.5	Clay	100% Clay	N/A	N/A	No	Yes
Name of Thodu/Tributary - THONDIKADAVU THODU																								
0	Edanad-Sreemoolanagaram	10.390070	76.402408	3	Clay	2	Private	DR	Y	2	Clay	Private	N	N/A	N/A	No	No	NIL	N/A	N/A	NIL	N/A	No	Yes
0.04	Edanad-Sreemoolanagaram	10.138922	76.402105	3	Clay	2	Private	Clay	N	2	DR	Private	Y	Culvert	Good	No	No	0.5	Clay	100% Clay	NIL	N/A	No	No
0.55	Edanad-Edakkandam Road	10.137285	76.397700	3	Clay	2	Private	Clay	N	2	Clay	Private	N	Culvert	Good	No	No	0.5	Clay	100% Clay	NIL	N/A	No	No
1.125	Edanad-Thettali Cross Road	10.133433	76.395557	3	Clay	2	Private	Clay	N	2	Clay	Private	N	Culvert	Good	No	No	0.5	Clay	100% Clay	NIL	N/A	No	No
1.57	Tettali	10.130760	76.393700	3.5	Clay	2.5	Private	Clay	Y	2.5	DR	Private	Y	Culvert	Good	No	No	0.5	Clay	100% Clay	NIL	N/A	No	Yes
2.08	Edanad-Sreemoolanagaram	10.127237`	76.391572	4	Clay	3.5	Private	Clay	N	3.5	Clay	Private	N	Culvert	Good	No	No	0.5	Clay	100% Clay	NIL	N/A	No	Yes
2.25	Periyar	10.125859	76.391488	4	Clay	3.5	Private	Clay	N	3.5	Clay	Private	N	N/A	N/A	No	No	1.0	Clay	100% Clay	N/A	N/A	No	Yes
Name of Thodu/Tributary - THUMBA THODU																								
0.00	Periyar	10.120040	76.379120	50	Clay	8	Private	Clay	N	8	Clay	Private	N	NIL	N/A	NIL	N/A	1.00	Clay	100% Clay	N/A	N/A	No	No
0.50	Chowara Thuruth	10.124193	76.376370	50	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	Good	No	No	0.50	Clay	100% Clay	N/A	N/A	No	Yes
1.90	Purayar Thuruth road	10.127215	76.369470	50	Clay	8	Private	Clay	N	8	Clay	Private	N	Steel Narrow Bridge	Good	No	No	0.50	Clay	100% Clay	N/A	N/A	No	Yes
3.68	Purayar Thuruth road	10.118475	76.362738	50	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	Good	No	No	0.50	Clay	100% Clay	N/A	N/A	No	Yes
3.70	Purayar Thuruth road	10.118233	76.362588	50	Clay	8	Private	Clay	N	8	Clay	Private	N	Railway bridge	Good	No	No	0.50	Clay	100% Clay	N/A	N/A	No	Yes
4.50	Periyar	10.119250	76.355410	50	Clay	8	Private	Clay	N	8	Clay	Private	N	NIL	N/A	NIL	N/A	1.00	Clay	100% Clay	N/A	N/A	No	No
Name of Thodu/Tributary - CHENGAL DIVERSION THODU AND CHENGAL THODU																								
0.00	Airport Runway West End	10.150133	76.419579	20	Clay	10	Public	Hard Soil	N	10	Hard Soil	Public	N	New bridge	Good	Yes	No	0.50	Clay	100% Clay	NIL	NIL	No	No
3.92	Naduvannoor	10.144882	76.377575	30	Clay	10	Private	clay	N	10	Clay	Private	N	New bridge	Good	No	No	0.50	Clay	100% Clay	NIL	NIL	No	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
6.18	Naduvannoor Bridge	10.144889	76.377580	30	Clay	10	Private	clay	N	10	Clay	Private	N	Bridge	Good	No	No	0.50	Clay	100% Clay	NIL	NIL	No	Yes
8.32	Kaprassery-Moozhiyal road	10.145113	76.368622	30	Clay	10	Private	clay	N	10	Clay	Private	N	Railway bridge	Good	No	No	1.00	Clay	100% Clay	NIL	NIL	No	Yes
9.20	Kaprassery	10.138520	76.356348	30	Clay	10	Private	clay	N	10	Clay	Private	N	Aanippaara Bridge	Good	No	No	1.00	Clay	100% Clay	NIL	NIL	No	Yes
11.28	Desom	10.132741	76.354240	30	Clay	20	Private	clay	N	20	Clay	Private	N	NH Bridge	Good	No	No	1.50	Clay	100% Clay	NIL	NIL	No	Yes
14.38	Desom	10.131450	76.353320	30	Clay	10	Private	clay	N	10	Clay	Private	N	Bridge	Good	No	No	1.00	Clay	100% Clay	NIL	NIL	No	Yes
14.50	Periyar	10.131330	76.353240	30	Clay	10	Private	clay	N	10	Clay	Private	N	N/A	N/A	No	No	1.50	Clay	100% Clay	NIL	NIL	No	Yes
Name of Thodu/Tributary - KUZHIPPALLAM THODU																								
0.00	Chengal Thodu	10.143579	76.386973	10	Clay	4	Private	Clay	N	4	Clay	Private	N	NIL	N/A	yes	N/A	1	Clay	100% Clay	N/A	N/A	No	Yes
0.12	Edanad Road	10.141505	76.385957	15	Clay	4	Private	Clay	N	4	Clay	Private	N	Bridge	Good	No	Y	1	Clay	100% Clay	N/A	N/A	No	Yes
0.95	Neduvannoor-Airport road	10.145900	76.379086	5	Clay	2	Private	DR	Y	2	DR	Private	Y	Culvert	Good	yes	N	0	N/A	N/A	N/A	N/A	No	No
0.97	Neduvannoor-Airport road	10.144386	76.378996	30	Clay	15	Private	Clay	N	15	Clay	Private	N	Rail bridge	Good	No	Y	0.5	Clay	100% Clay	N/A	N/A	No	Yes
1.10	Neduvannoor	10.144941	76.377594	30	Clay	5	Private	Clay	N	5	Clay	Private	N	Chappaath	Not Good	yes	Y	0.5	Clay	100% Clay	N/A	N/A	No	No
2.20	Neduvannoor	10.144934	76.377579	30	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	Good	No	Y	0.5	Clay	100% Clay	N/A	N/A	No	No
2.70	Kaprassery	10.143663	76.364218	30	Clay	7	Private	Clay	N	7	Clay	Private	N	Partially Demolished Bridge	Not Good	No	Y	0.5	Clay	100% Clay	N/A	N/A	No	No
3.20	Neduvannoor	10.144882	76.377575	30	Clay	8	Private	Clay	Y	8	Clay	Private	Y	VCB Damaged	Not Good	No	Y	0.5	Clay	100% Clay	N/A	N/A	No	No
3.57	Pallappadam road	10.142312	76.360363	15	Clay	8	Private	Clay	N	8	Clay	Private	N	Bridge	Good	No	Y	0.5	Clay	100% Clay	N/A	N/A	No	No
3.88	VIP Road	10.138550	76.356311	5	Clay	5	Private	Clay	N	5	Clay	Private	N	Culvert	Good	Yes	Y	0.5	Clay	100% Clay	N/A	N/A	No	No
4.50	Chengal Thodu	10.133103	76.356149	5	Clay	5	Private	Clay	N	5	Clay	Private	N	NIL	N/A	No	Y	1	Clay	100% Clay	N/A	N/A	No	Yes
Name of Thodu/Tributary - UDUMBUZHA THODU																								
0.00	Manikkya Mangalam Chira	10.154871	76.404607	3	Clay	2	Private	DR	Y	2	DR	Private	Y	Culvert	Good	No	No	NIL	NIL	NIL	N/A	N/A	No	No
1.40	Matoor Road Culvert	10.179055	76.442426	3	Clay	3	Private	Clay	Y	3	Clay	Private	N	Road culvert	Good	No	No	0.5	Clay	100% Clay	N/A	N/A	No	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.05	MC Road Culvert	10.179207	76.440796	15	Clay	4	Private	Clay	N	4	Clay	Private	N	Culvert	Good	No	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
2.70	Railway Culvert	10.163259	76.427269	15	Clay	6	Private	Clay	N	6	Clay	Private	N	Railway culvert	Good	No	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
3.00	Vadakkumbhagam Kalady	10.168253	76.434533	20	Clay	6	Private	Clay	N	6	Clay	Private	N	Culvert	Good	No	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
3.75	Chengal Thodu	10.160172	76.421601	20	Clay	6	Private	Clay	N	6	Clay	Private	N	Culvert	Good	No	No	0.5	Clay	100% Clay	N/A	N/A	No	Yes
DETAILS OF LEFT BANK OF PERIYAR																								
Name of Thodu/Tributary - Ovunkal Thodu																								
330	Chelamattom Temple Road	10.140292	76.4623033	4	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	Y	Culvert	Good	No	No	1.2	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
903	Chelamattom	10.136856	76.46163306	4.5	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	Y	Culvert	Good	No	No	1.2	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
1330	Chelamattom Temple vallom Kadavu Road	10.133435	76.45988446	5	Sand, silt and clay	N	Private	Sand and clay	4	4	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
Name of Thodu/Tributary - Vallam Thodu																								
0	Koduvelichira	10.158038	76.464567	50	soil & clay	Y	Private	soil & clay	4	2	soil & clay	Private	Y	Chira	water flowing	No	No	0.8	soil & clay	50%	N	N	N	N
2.28	Thodu joining	10.106944	76.446389	3	Clay	N	Private	clay	2	2	clay	Private	N	Thodu	water flowing	No	No	0.5	clay	100%	N	N	N	N
0	Poopani padasekaram	10.096480	76.463457	3	soil & clay	Y	Private	soil & clay	2	2	soil & clay	Private	Y	Thodu	water flowing	No	No	0.45	soil & clay	50%	N	N	N	N
0.700	Thodu joining from poopani & kovelichira	10.106944	76.446389	3	Clay	N	Private	clay	2	2	clay	Private	N	Thodu	water flowing	No	No	0.5	clay	100%	N	N	N	N
3.2	Thodu joining towards Vallam thodu	10.121742	76.462834	12	soil & clay	Y	Private	soil & clay	2	2	soil & clay	Private	Y	Thodu	water flowing	No	No	0.5	soil & clay	50%	N	N	Y	Y
0	Rayamangalam padasekaram	10.104972	76.499899	1.5	soil & clay	Y	Private	soil & clay	1	1	soil & clay	Private	Y	Thodu	water flowing	No	No	0.2	soil & clay	50%	N	N	N	N

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.98	Thodu joining	10.121742	76.462834	3	soil & clay	N	Private	sand,soil & clay	1.5	1.5	soil & clay	Private	N	Thodu	water flowing	Y	No	0.5	soil & clay	50%	N	N	N	Y
0	Thuruthiply padasekaram	10.121742	76.462834	12	soil & clay	Y	Private	soil & clay	2	2	soil & clay	Private	Y	Thodu	water flowing	No	No	0.5	soil & clay	50%	N	N	Y	Y
2.98	Thodu joining from Rayamangalam & Thuruthyply	10.109176	76.475522	3	soil & clay	N	Private	sand,soil & clay	1.5	1.5	soil & clay	Private	N	Thodu	water flowing	Y	No	0.5	soil & clay	50%	N	N	N	Y
0	Kandanthara padasekaram	10.112659	76.466675	3	soil & clay	Y	Private	soil & clay	1.5	1.5	soil & clay	Private	Y	Thodu	water flowing	No	No	0.2	soil & clay	50%	N	N	N	N
0.645	Thodu joining from Kandanthara padasekaram	10.109176	76.475522	8	soil & clay	Y	Private	soil & clay	2	2	soil & clay	Private	Y	Thodu	water flowing	No	No	0.5	soil & clay	50%	N	N	Y	N
Ownership of land: Govt & Private																								
Name of Thodu/Tributary - Kunnuvazhi Thodu																								
0	Mudikkal	10.113799	76.441246	5	soil &	Y	Private	soil &	2	2	soil &	Private	Y	Thodu	water	No	No	0.5	soil &	50%	N	N	N	Y
0.98	Thodu joining towards Kunnuvazhi thodu	10.106944	76.446389	3	Clay	N	Private	clay	2	2	clay	Private	N	Thodu	water flowing	No	No	0.5	clay	100%	N	N	N	N
0	Orna padasekaram	10.096480	76.463457	3	soil & clay	Y	Private	soil & clay	2	2	soil & clay	Private	Y	Thodu	water flowing	No	No	0.45	soil & clay	50%	N	N	Y	Y
1.86	Thodu joining towards Kunnuvazhi thodu	10.106944	76.446389	3	Clay	N	Private	clay	2	2	clay	Private	N	Thodu	water flowing	No	No	0.5	clay	100%	N	N	N	N
0	Thodu joining towards Kunnuvazhi thodu	10.096480	76.463457	3	soil & clay	Y	Private	soil & clay	2	2	soil & clay	Private	Y	Thodu	water flowing	No	No	0.45	soil & clay	50%	N	N	Y	Y
1.05	Cheruvelikkunnu tura - Kunnuvazhi thodu	10.107032	76.439180	50	soil & clay	Y	Panchayath	soil & clay	3	3	soil & clay	Panchayath	Y	Thura	water flowing	No	No	0.6	soil & clay	50%	Y	Y	Y	Y
3	Kunnuvazhi thodu-Periyar end	10.110139	76.428499	8	sand,soil & clay	N	Private	sand,soil & clay	3.5	3.5	sand,soil & clay	Private	N	Thodu	water flowing	Y	No	2	sand,soil & clay	50%	N	N	N	Y
Ownership of land: Govt & Private																								
Name of Thodu/Tributary - Marampilly Thodu																								
0	Mullankunnu padasekaram	10.099006	76.418494	2.5	soil & clay	N	Private	soil & clay	1	1	soil & clay	Private	N	Thodu	water flowing	No	No	0.5	soil & clay	50%	N	N	N	Y

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	Thodu joining towards Marampilli thodu	10.099006	76.418494	3.5	sand, soil & clay	Y	Private	sand, soil & clay	1.5	1.5	sand, soil & clay	Private	Y	Thodu	water flowing	No	No	0.3	sand, soil & clay	50%	N	Y	Y	N
0	Padasekaram near AVT group	10.106681	76.419152	3.5	Clay	N	Private	clay						Thadayana		No	No							
2	Thodu joining towards Maampilli thodu	10.099006	76.418494	3.5	sand, soil & clay	N	Private	sand, soil & clay	1.5	1.5	sand, soil & clay	Private	Y	Thodu	water flowing	No	No	0.3	sand, soil & clay	50%	N	Y	Y	N
0.5	Marampilli thodu/periyar end	10.112496	76.4220	3	sand, soil & clay	N		sand, soil & clay	2	2	sand, soil & clay	Private	N	Thodu	water flowing	No	No	0.6	sand, soil & clay	50%	N	N	N	Y
Ownership of land: Govt & Private																								
Name of Thodu/Tributary -Chalackal Thodu																								
0	Mosko Road	10.10878	76.40079	3	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	0.8	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
1180	Pongam Veli Bridge	10.11673	76.40067	5	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	0.8	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
1960	Aluva Munnar Road	10.12094	76.39805	6	Sand, silt and clay	N	Private	Sand and clay	4	4	Sand, silt and clay	Private	N	Culvert	Good	No	No	1.2	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
Name of Thodu/Tributary -Monnukaiyyani Thuruthi Thodu																								
0	Moonnukaiyyani Chira	10.092928	76.371302	7	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	1.2	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1300	Keezhmad Road Culvert (Kalunk)	10.101828	76.375092	5	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
309.12	Keezhmad Road Culvert	10.101587	76.37677	5	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
788.73	Kuttamassery Road	10.105099	76.386368	4	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
1650	Keeramkunnu	10.107615	76.379879	4	Sand, silt and clay	N	Private	Sand and clay	4	4	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
426.19	Therad Bridge	10.098757	76.364078	5	Sand, silt and clay	N	Private	Sand and clay	3	3	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
1050	Edayapuram	10.102804	76.366804	4	Sand, silt and clay	Y	Private	Sand and clay	3	3	Sand, silt and clay	Private	Y	Culvert	Good	No	No	0.8	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	No
210	Green Ln	10.108310	76.376516	6	Sand, silt and clay	N	Private	Sand and clay	5	5	Sand, silt and clay	Private	N	Culvert	Good	No	No	1.2	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1010	Edayapuram Road	10.107615	76.371527	7	Sand, silt and clay	N	Private	Sand and clay	4	4	Sand, silt and clay	Private	N	Culvert	Good	No	No	1.2	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
280	Thottumugham Bridge	10.108512	76.37082378	12	Sand, silt and clay	N	Private	Sand and clay	6	6	Sand, silt and clay	Private	N	Culvert	Good	No	No	1	Sand, silt and clay	30% sand, 40% silt and 30% clay	N/A	N/A	No	Yes
REACH V																								
VARATTAR STRETCH																								
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Name of thode		**Vembala thodu**																						
0		10.095397	76.326832	2.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
2		10.095302	76.326822	2.00	Silt	y	Private	Silt	2.00	2.00	Silt	Private	y		Good	Nil	NO	NO	-	-	NO		NO	Nil
5		10.095367	76.326797	2.00	Silt	y	Private	Silt	2.00	2.00	Silt	Private	y	Culvert	Good	Nil	NO	NO	-	-	NO		NO	Nil
200		10.09364	76.32654	2.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
489.54		10.09114	76.32615	2.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
756.15		10.08871	76.32661	2.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
977.23		10.08638	76.32653	2.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1319.71		10.083833	76.326285	2.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1326.13		10.083788	76.3263	3.00	Silt	y	Private	Silt	2.50	2.50	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1343.66		10.083642	76.326212	3.00	Silt	y	Private	Silt	2.50	2.50	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1349.23		10.083597	76.326197	3.00	Silt	y	Private	Silt	2.50	2.50	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1368		10.083422	76.32617	3.00	Silt	y	Private	Silt	2.50	2.50	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1368.22		10.083507	76.32618	5.00	Silt	y	Private	Silt	2.50	2.50	Silt	Private	N	Culvert	Good	Nil	NO	NO	-	-	NO		NO	Nil
1374.87		10.08338	76.326133	5.00	Silt	y	Private	Silt	2.50	2.50	Silt	Private	N	Culvert	Good	Nil	NO	NO	-	-	NO		NO	Nil
1389.86		10.083288	76.326072	5.00	Silt	N	Private	Silt	2.50	2.50	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1433.12		10.082908	76.326087	7.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1460		10.07671	76.28436	2.00	Silt	y	Private	Silt	2.00	2.00	Silt	Private	y		Good	Nil	NO	NO	-	-	NO		NO	Nil
Panachi thodu																								
0	Thodu Starting	10.082033	76.286637	3.00	Silt	y	Private	Silt	2.00	2.00	Silt	Private	y			Nil	NO	NO	-	-	NO		NO	Nil
2	Panachi thode culvert	10.087015	76.290882	7.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Culvert	Good	Nil	NO	0.60	Silt	Silt	NO		NO	Nil
340		10.087015	76.290882	7.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N			Nil	NO	0.60	Silt	Silt	NO		NO	Nil
728.41		10.080822	76.289852	7.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Culvert	Good	Nil	NO	0.60	Silt	Silt	NO		NO	Nil
764.57		10.080803	76.289845	6.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Culvert	Good	Nil	NO	0.60	Silt	Silt	NO		NO	Nil
1050.10	Koipanatte Culvert	10.078477	76.288758	5.00	Silt	N	Private	Silt	2.00	2.00	Silt	Private	N			Nil	NO	0.60	Silt	Silt	NO		NO	Yes
1071.33	Pallipuram chal-Lakshamveedu culvert	10.078393	76.288727	7.00	Clay &Silt	N	Private	Silt	1.20	1.20	Silt	Private	N	Culvert	Good	Nil	NO		Clay &Silt	Clay &Silt	NO		NO	Nil
1217.16		10.07758	76.28779	7.00	Clay &Silt	N	Private	Silt	1.20	1.20	Silt	Private	N			Nil	NO		Clay &Silt	Clay &Silt	NO		NO	Nil
1333.25	Y-Junction	10.076738	76.287092	3.00	Clay &Silt	N	Private	Silt	1.20	1.20	Silt	Private	N			Nil	NO	NO	Clay &Silt	Clay &Silt	Yes		NO	Yes
1411.09		10.076355	76.286527	3.00	Silt	N	Private	Silt	1.20	1.20	Silt	Private	y			Nil	NO	NO	-	-	NO		NO	Nil
1541.82	Periyar Road	10.076658	76.28444	3.00	Clay &Silt	y	Private	Silt	1.50	1.50	Clay &Silt	Private	N	Culvert	Good	Nil	NO	NO	-	-	NO		NO	Nil
1642.5	Palliyathu mutu to Periyar	10.076658	76.28444	3.00	Clay &Silt	y	Private	Silt	1.50	1.50	Clay &Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
1650	Palliyathu mutu to Periyar	10.07672	76.284375	3.00	Clay &Silt	y	Private	Silt	1.50	1.50	Clay &Silt	Private	N			Nil	NO	NO	-	-	NO		NO	Nil
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Kolavelipadam thodu																								
	Thodu Starting																							
0	**Kolavelipadam**	10.102048	76.33736	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	NO	-	-	NO		NO	Yes
63.7		10.10241	76.33754	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	NO						
94.56		10.10265	76.33762	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	NO						
120.7		10.10289	76.33773	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	NO	-	-	NO		NO	Yes
132.5		10.10300	76.33778	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	NO	-	-	NO		NO	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
141.65		10.10307	76.33779	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	NO						
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Varapuzha thodu																								
0.00		10.080627	76.272592	20.00	Silt &Clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N	Bridge	good	Nil	NO	0.8	Silt &Clay	Silt &Clay	NO		NO	Yes
25.95		10.080588	76.277236	10	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	Yes
78.22		10.08112	76.27326	12	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N	Bridge		Nil	NO	1.50	Silt &Clay	Silt &Clay	NO		NO	Yes
137.54		10.08137	76.27371	12	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	2.50	Silt &Clay	Silt &Clay	NO		NO	Yes
233.74		10.08181	76.2744	13	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	3.50	Silt &Clay	Silt &Clay	NO		NO	Yes
336.92		10.08227	76.27529	13	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	4.50	Silt &Clay	Silt &Clay	NO		NO	Yes
419.26		10.08259	76.27596	14	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	5.50	Silt &Clay	Silt &Clay	NO		NO	Yes
530.77		10.08304	76.27689	15	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	5.50	Silt &Clay	Silt &Clay	NO		NO	Yes
632.50		10.083403	76.277295	12	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	Yes
853.61		10.08567	76.27816	12	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	1.50	Silt &Clay	Silt &Clay	NO		NO	Yes
960.29		10.08626	76.27892	12	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N	Bridge		Nil	NO	2.50	Silt &Clay	Silt &Clay	NO		NO	Yes
1050.21		10.08657	76.27965	12	silt & clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N			Nil	NO	3.50	Silt &Clay	Silt &Clay	NO		NO	Yes
1125.55		10.086675	76.280828	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1142.40		10.086658	76.280707	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1152.25		10.086642	76.280483	3.00	silt & clay	N	Private	Silt &Clay	1.60	1.60	Silt &Clay	Private	N			Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	Yes
1157.70		10.08663	76.280403	3.00	silt & clay	N	Private	Silt &Clay	1.60	1.60	Silt &Clay	Private	N			Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	Yes
1168.05		10.086655	76.280572	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	Yes
1192.95		10.086374	76.279953	4.00	silt & clay	Y	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	Y	Culvert	good	Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	NO
1202.10		10.086548	76.280042	3.00	silt & clay	N	Private	Silt &Clay	1.00	1.00	Silt &Clay	Private	N			Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	Yes
1211.40		10.086593	76.28018	3.00	silt & clay	N	Private	Silt &Clay	1.00	1.00	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1226.45		10.08653	76.27996	3.00	silt & clay	N	Private	Silt &Clay	1.00	1.00	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1238.65		10.086573	76.280088	4.00	silt & clay	Y	Private	Silt &Clay	1.3	1.3	Silt &Clay	Private	Y	Culvert	good	Nil	NO	0.50	Silt &Clay	Silt &Clay	NO		NO	NO
1239.91		10.086728	76.280882	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1247.10		10.086742	76.281023	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1252.30		10.08673	76.280925	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1263.00		10.086747	76.281097	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1271.00		10.086753	76.281217	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
1285.00		10.08754	76.28273	3.00	silt & clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.30	Silt &Clay	Silt &Clay	NO		NO	Yes
		10.080833	76.272698	20.00	Silt &Clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N	Bridge	good	Nil	NO	0.8	Silt &Clay	Silt &Clay	NO		NO	Yes
		10.08077	76.272557	20.00	Silt &Clay	N	Private	Silt &Clay	2.00	2.00	Silt &Clay	Private	N	Bridge	good	Nil	NO	0.8	Silt &Clay	Silt &Clay	NO		NO	Yes
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Kachappilly thodu																								
283.35	Kachappilly thodu	10.08893	76.32408	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N	Culvert	good	Nil	NO	0.8	Silt &Clay	Silt &Clay	NO		NO	Yes
292.00		10.088755	76.324518	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N	Culvert	good	Nil	NO	0.8	Silt &Clay	Silt &Clay	NO		NO	Yes
297.90		10.08878	76.32458	3.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Culvert	good	Nil	NO		-	-	NO		NO	Yes
346.18		10.088743	76.324465	3.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N	Culvert	good	Nil	NO		-	-	NO		NO	Yes
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Punathil thodu																								
0	Punathil thodu(varapuzha branch thodu)	10.086263	76.28096	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N	Nil	Nil	Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
14.45		10.086238	76.280908	2.50	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N	Nil	Nil	Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
46.15		10.086253	76.280675	2.00	Silt &Clay	N	Private	Silt &Clay	1.40	1.40	Silt &Clay	Private	N	Nil	Nil	Nil	NO	0.5	Silt &Clay	Silt &Clay	NO		NO	Yes
57		10.08624	76.280468	2.00	Silt &Clay	N	Private	Silt	1.30	1.30	Silt &Clay	Private	N	Nil	Nil	Nil	NO	0.3	Silt &Clay	Silt &Clay	NO		NO	Yes
104.45		10.08624	76.280547	2.00	Silt &Clay	N	Private	Silt	1.30	1.30	Silt &Clay	Private	N	Nil	Nil	Nil	NO	0.3	Silt &Clay	Silt &Clay	NO		NO	Yes
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Muttinakham thodu(varapuzha branch thodu)																								
0.00		10.08177	76.27477	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
1013.50		10.079237	76.282072	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
1015.25		10.079358	76.282207	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
1035.00		10.079373	76.28226	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
1041.50		10.079235	76.282057	3.00	Silt	N	Private	Silt	1.50	1.50	Silt	Private	N			Nil	NO	0.6	-	-	NO		NO	Yes
1275.60		10.07981	76.28423	3.00	Silt &Clay	N	Private	Silt &Clay	1.50	1.50	Silt &Clay	Private	N			Nil	NO	0.6	Silt &Clay	Silt &Clay	NO		NO	Yes
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Karuka thodu																								
0	Poonthuruth	10.097551	76.295168	5	Ordinary soil	N	private	Ordinary soil	1	1	Ordinary soil	Private	N	thode		Nil	NO	2	silt					Thick vegetation
40	Poonthuruth	10.097935	76.29538	6	Ordinary soil	N	private	Ordinary soil	1	1	Ordinary soil	Private	N	thode		Nil	NO	2	silt					Thick vegetation
65	Karukapadam	10.097904	76.295571	6	Ordinary soil	N	private	Ordinary soil	1	1	Ordinary soil	Private	N	thode		Nil	NO	2	silt					Thick vegetation
155	Karukapadam	10.098302	76.29582	6	Ordinary soil	N	private	Ordinary soil	1	1	Ordinary soil	Private	N	thode		Nil	NO	2	silt					Thick vegetation
360	Near SC colony	10.099896	76.296824	5	Ordinary soil	N	private	Ordinary soil	1	1	Ordinary soil	Private	N	thode		Nil	NO	2	silt					Thick vegetation
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Kakkunni Methanam Thode)																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0		10.098518	76.303553	8	Ordinary soil	N	Private	Ordinary soil	1.5	1.5	Ordinary soil	Private	N	thode		Nil	No	2	silt			nil	yes	Both side vegetation
123		10.09887	76.302431	22	Ordinary soil	Y	Public	Ordinary soil	2	2	Ordinary soil	Public	Y	Bridge	Good but Too insufficient	Abutments are in the thode	Yes	2	Silt				yes	
793	Near SC Colony64	10.100917	76.298243	8	Ordinary soil	N	Private	Ordinary soil	2.5	2.5	Ordinary soil	Private	N	Foot slab	Too insufficient		Yes	2	Silt				yes	Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1038	Karukapadam	10.099896	76.296824	10	Ordinary soil	N	Private	Ordinary soil	2.5	2.5	Ordinary soil	Private	N	thode		Nil	No	2	Silt				yes	Thick vegetation
1835	Chirayam Methanam Bridge	10.099545	76.290342	40	Ordinary soil	N	Private	Ordinary soil	2.5	2.5	Ordinary soil	Private	N	Bridge			No	2	Silt				yes	Thick vegetation
2305	Pallikadavu	10.097548	76.288299	10	Ordinary soil	N	Private	Ordinary soil	2.5	2.5	Ordinary soil	Private	N	thode		Nil	No	2	Silt				yes	vegetation
		10.096491	76.287495	15	Ordinary soil	N	Private	Ordinary soil	1.5	1.5	Ordinary soil	Private	N	thode		Nil	No	2	Silt				yes	vegetation
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Periyar to Periyar																								
0 M	Angadikadavu	10.122286	76.294775	20 M	Hard Soil	Y	Private	Hard Soil	2.50	2.5	Hard soil	Private	Y	culvert	Good, But not sufficient	Reduced ventwayof bridge obstruct flow of water as both the abutments are inside of Thodu	Yes	1.50	Silt		Nil	Nil	Polluted	Yes, Weeds
300 M	Koduvazhanga	10.120956	76.292633	12	Ordinary soil	N	Private	Hard soil	2.0	2.0	Hard soil	Private	N	thode		heavy silt accumulation, water hyacinth, filled with debris		2.5	Silt		Nil	Nil	yes	Thick vegetation
1100 M	Mecheri palam	10.125001	76.287957	20	Ordinary soil	N	Private	Hard soil	1.0	1.2	Hard soil	Private	N	bridge	under construction	heavy silt accumulation, water hyacinth, filled with debris	No	2.5	Silt		Nil	Nil	yes	Thick vegetation
2110 M	Kulithodu	10.118409	76.288824	10	Ordinary soil	N	Private	Hard soil	2.5	2.5	Hard soil	Private	N	bridge	Not good,	Abutments extended to thode, obstruct flow of water	Yes	2.5	Silt		yes	solid	yes	Thick vegetation & water hyacinth

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3680	Varattupady colony	10.111006	76.283061	16.5	Ordinary soil	N	Private	Hard soil	1.5	1.5	Hard soil	Private	N	pipe culvert - 5nos, 90cm dia pipe laid as ventway & filled entire cross section with earth	Not fuctioning & fully blocked the system of stream	filled up earth, silt accumulation for long run, heavy water hyacinth & huge quantity of water is stagnated	Yes	3.0	Silt		Nil	Nil	yes	Thick vegetation& water hyacinth
3880	neerkodu new bridge private	10.109712	76.281928	30	Ordinary soil	Y	Private	Hard soil	3	3	Hard soil	Private	Y	New Bridge	Good	filled up earth, silt accumulation for long run, heavy water hyacinth & huge quantity of water is stagnated	No	2.5	Silt		Nil	Nil	yes	Thick vegetation
4000	parappalam	10.108621	76.282325	38	Ordinary soil	Y	Private	Hard soil	3	1.5	Hard soil	Private	N	continuous VCB	Good but no shutter arrangements	filled up earth, silt accumulation for long run, heavy water hyacinth & huge quantity of water is stagnated	No	2.5	Silt		Nil	Nil	yes	Thick vegetation
4570M	plackattumpilly	10.104852	76.282885	30	Ordinary soil	N	Private	Hard soil	1.5	2.0	Hard soil	private	N	Bridge	Good	heavy silt deposit, water hyacinth	No	2.0	Silt		Nil	Nil	Yes	Thick vegetation
4620	allothu bridge	10.104359	76.283062	10	Ordinary soil	N	Private	Hard soil	1.5	2.0	Hard soil	private	N	Bridge	Good	heavy silt deposit, water hyacinth	No	2.5	Silt		Nil	Nil	yes	Thick vegetation
5080	Kongoorppilly	10.101294	76.284311		Ordinary soil	N	Private	Hard soil			Hard soil	private		Bridge				2.5	Silt		Nil	Nil	yes	Thick vegetation
5390	Adakkattukuzhi	10.099274	76.282363	15	Ordinary soil	N	Private	Hard soil			Hard soil	private		Foot bridge				2.5	Silt		Nil	Nil	yes	Thick vegetation
5730	Chingathara	10.097398	76.279943	5	Ordinary soil	N	Private	Hard soil	1.5	1.5	Hard soil	private	N	Footslab				2.5	Silt		Nil	Nil	yes	Thick vegetation
5890	Pallathunadu petta palam	10.096282	76.279429		Ordinary soil	N	Private	Hard soil			Hard soil	private		culvert				2.5	Silt	`	Nil	Nil	yes	Thick vegetation
6190	Pallathunadu palam	10.093605	76.279866		Ordinary soil	N	Private	Hard soil			Hard soil	private		culvert				2.5	Silt		Nil	Nil	yes	Thick vegetation
6550	PP thodu meets with Periyar South	10.092548	76.282458		Ordinary soil	N	Private	Hard soil			Hard soil	private		Thode				2.5	Silt		Nil	Nil	yes	Thick vegetation
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Plackattumpilly Chirayam thode																								
0 M	Plackattampilly	10.104852	76.282885	30	Ordinary soil	N	Private	Hard soil	1.5	2.0	Hard soil	private	Y	Bridge	Good	heavy silt deposit, water hyacinth	No	2.0	Silt		Nil	Nil	Yes	Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
150 M	Kureethazham	10.101485	76.294415		Ordinary soil		Private	Hard soil			Hard soil	private	Y			heavy silt deposit, water hyacinth		2.0	Silt		Nil			Thick vegetation
150 M	Kureethazham	10.104784	76.28423	7	Ordinary soil	N	Private	Hard soil	1.5	2.0	Hard soil	private	Y	Tripple span VCB		heavy silt deposit, water hyacinth		2.0	Silt		Nil			Thick vegetation
340 M	Mankuzhy	10.103903	76.285764		Ordinary soil	Y	Private	Hard soil	1.5	2.0	Hard soil	private	Y	Doublespan culvert 2X2.5m		heavy silt deposit, water hyacinth		2.0	Silt		Nil			Thick vegetation
1280 M	Meets with Kakkunni Methanam thode at ch 2005 M	10.099149	76.288724		Ordinary soil			Hard soil			Hard soil	private	N					2.0	Silt					Thick vegetation
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
0	Methanam	10.097216	76.287521	15	Ordinary soil	N	Private	Ordinary soil	1.50	1.5	Ordinary soil	Private	N	thode		Nil	No	2.00	silt	silt				Vegetation
195	Manavala	10.097121	76.28588	8.9	Ordinary soil	Y	Private	Ordinary soil	2.50	2.5	Ordinary soil	Private	Y	VCB	Good but shutter not functioning	intermediate pillars make obstruction	Yes	2.00	silt	silt				Vegetation
310	Manavala	10.096692	76.28575	15	sand	N	Private	Ordinary soil	2.50	2.5	Ordinary soil	Private	N	Thode mouth		Nil	No	2.00	Heavy silt deposit	silt				Vegetation
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar branch)																								
0	Pazhamthode	10.111075	76.289624	4.7	Ordinary soil	Y	Private	Ordinary soil	2.0	2.0	Ordinary soil	Private	Y	Double span VCB-Pazhamthode project - large waterbody	No shutter arrangements & not functioning	Downstream of the thodu is fully silt accumulated and hence no flow	No	1.0	Silt		Nil	Nil	Yes	No vegetation
40	Pazhamthode	10.110594	76.290468	8	Ordinary soil	Y	Private	Ordinary soil	2.0	2.0	Ordinary soil	Private	Y	thode	Alignment is seen as deviated & reduced width	Downstream of the thodu is fully silt accumulated and hence no flow	NO	1.0	Silt		Nil	Nil	Yes	No vegetation
80	Pazhamthode	10.110203	76.290369	5M reduced to 1.5 m & increased to 7 M	Ordinary soil	N	Public	Ordinary soil	1.5	3.0	Ordinary soil	Public	N	Culvert	Not sufficient & insufficient ventway & freeboard	Downstream of the thodu is fully silt accumulated and hence no flow	Yes	1.0	Silt		Nil	Nil	Yes	No vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
185	Kottappillikunnu	10.109311	76.290224	4	Ordinary soil	N	Public	Ordinary soil	1.5	1.5	Ordinary soil	Private	Y	Foot slab	Not good, to be reconstructed	Downstream of the thodu is fully silt accumulated and hence no flow	Yes	1.0	Silt		Nil	Nil	Yes	No vegetation
530	Kochirikka Mundone Road	10.107089	76.289179	6	Ordinary soil	N	Private	Ordinary soil	1.5	1.5	Ordinary soil	Private	N	culvert	Not good, to be reconstructed as a new bridge having more ventway	silt accumulated, no flow	Yes	1.0	Silt		Nil	Nil	Yes	No vegetation
820	Mundon Kochirikka Road	10.106802	76.286899	6	Ordinary soil	N	Private	Ordinary soil	1.5	1.5	Ordinary soil	Private	N	Culvert	Insufficient, to be reconstructed, alignment is seen as deviated	silt accumulated, no flow	Yes	1.0	Silt		Nil	Nil	Yes	No vegetation
1035	Koduvazhanga-Kochirikka	10.106052	76.285247	Thode width reduced to 4.3 from 15M	Ordinary soil	N	Private	Ordinary soil	1.5	1.5	Ordinary soil	Private	N	Culvert	Insufficient, to be reconstructed, alignment is seen as deviated	silt accumulated, no flow	Yes	1.0	Silt		Nil	Nil	Yes	No vegetation
1130	Plackattampilly	10.105926	76.284452	5	Ordinary soil	N	Private	Ordinary soil	1.5	1.5	Ordinary soil	Private	N	Tripple span VCB	No shutter arrangements & not functioning	silt accumulated, no flow	Yes	1.0	Silt		Nil	Nil	Yes	weeds, Heavy water hyacinth
1370	Plackattampilly	10.105971	76.284459	30	Ordinay soil	N	Private	Ordinay soil	1.50	1.50	Ordinay soil	Private	N	Bridge	Good but bed level raised by concrete, to be removed	silt, water hyacinth & solid waste of cement concrete deposited in the bed of bridge, obstruct water flow	Yes	1.0	Silt		Nil	Nil	Yes	weeds, Heavy water hyacinth
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar ranch)																								
Ongi thode																								
0	Eloorkkara	10.095241	76.334599	5	Hard soil	Yes	Private	Hard soil	3	3	Hard soil	Private	Yes	nil		Bed raised using concrete	No	2.5	silt	silt	nil	yes	yes	yes
80	Eloorkkara(original thode meets with)	10.095477	76.3337888	10	Hard soil	Yes	Private	Hard soil	3	3	Hard soil	Private	Yes	nil		Bed raised using concrete	No	2.5	silt	silt	nil	yes	yes	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
160	Elenjichuvadu bus stop Eloorkkara	10.09578	76.333248	14.55(13.4m inner)	Ordinary soil	Yes	Private	Hard soil	2	2	Hard soil	Private	Yes	Double box culvert	structure is is in good condition but not suficientgood	Bed raised using concrete	yes	2.5	silt	silt	nil	yes	yes	yes
650	Eloorkkara	10.101587	76.312976	20	Ordinary soil	No	Private	Ordinary soil	2	2	Ordinary soil	Private	No	nil	thode			2.5	silt	silt	nil		yes	yes
812	Keerampilly Bridge	10.094858	76.327365	11.3	Ordinary soil	No	Private	Ordinary soil	2	2	Ordinary soil	Private	No	Bridge	structure is is in good condition but not suficientgood	Bed raised using concrete	No	2.5	silt	silt	nil	yes	yes	Yes
2360	Kadungalloor Rd(Moopathadam)	10.101304	76.318667	40	Ordinary soil	No	private	Ordinary soil	2	2	Ordinary soil	Private	No	Bridge	good	Bed raised using concrete	No	2.5	silt	silt	nil	yes	yes	Yes
2370	Kadungalloor Rd(Moopathadam)	10.101304	76.318667	67	Ordinary soil	No	Public	Ordinary soil	2	2.5	Ordinary soil	public	No	Bridge	good	Bed raised using concrete	No	2.5	silt	silt	nil	yes	yes	Yes
3020	perekadu	10.101587	76.312976	50	Ordinary soil	No	Public	Ordinary soil	2	2	Ordinary soil	public	No	thode		Nil	No	2.5	silt	silt	nil		yes	Yes
3300	Karipuzha	10.102855	76.310834	6	Ordinary soil	No	private	Ordinary soil			Hard soil	public	No	Bridge	structure is is in good condition but not suficientgood	Bed raised using concrete,no flow	No	2.5	silt	silt		yes	yes	Yes
4400	Near PANAYIKULAM Juma Masjith(Kakkunnipalam)	10.099757	76.304504	8	Ordinary soil	N	public	Hard soil	2	2	Ordinary soil	public	No	Bridge	no good	Bed raised using concrete,no flow	yes	2.5	silt	silt		yes	yes	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4700	Kakkunni branch thode starts	10.09847	76.303577	8	Ordinary soil	N	public	Ordinary soil	2.5	2.5	Ordinary soil	public	No	thode				2.5	silt	silt			yes	
4870	near Panayikulam Lodge stop	10.096828	76.302894	8	Ordinary soil	N	Private	Ordinary soil	2	2	Ordinary soil	Private	No	Foot slab	no good	Too insufficient structure	Yes	2.5	silt	silt			yes	yes
5000	Panayikulam Lodge stop	10.096329	76.301948	7(double span 2X3.50)	Ordinary soil	N	public	Ordinary soil	2	2	Ordinary soil	Panchayath road	Yes	culvert	no good	Middle pillar inside the thode obstruct flow.Too insufficient structure	Yes	2.5	silt	silt		yes	yes	
5100	Near lodge stop	10.095442	76.301756	2.5	Ordinary soil	N	public	Ordinary soil	2	2	Ordinary soil		Yes	thode	no good		Yes	2.5	silt	silt			yes	
5150	Panayikulam Binanipuram road	10.095005	76.301667	2.5	Ordinary soil	Y	public	Ordinary soil	1.5	1.5	Ordinary soil	public	Yes	culvert	structure is is in good condition but not sufficientgood		Yes	2.5	silt	silt		yes	yes	Yes
5620	Paddy field	10.09391	76.29816	2.5	Ordinary soil	Y	private	Ordinary soil	2	2	Ordinary soil	public	Yes	culvert	structure is is in good condition but not sufficientgood	silt accumulation	Yes	2.5	silt	silt		yes	yes	Yes
5800	Meenkuzhikandam	10.095458	76.297749	0.9	ordinary soil	N	private	ordinary soil	1	2	ordinary soil	private	yes	Pipe culvert 90cm dia pipe,road width 4m	no good	Too insufficient structure	Yes	2.5	silt	silt		yes	yes	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
5880	Paddy field turn left	10.095799	76.297325	4	ordinary soil	N	private	ordinary soil	1	1.5	ordinary soil	private	yes	thode	No	silt accumulation	Yes	2.5	silt	silt			yes	yes
6020	Paddy field	10.096289	76.296229	2.5	ordinary soil	N	public	ordinary soil	1	1	ordinary soil	private	No	Culvert	structure is is in good condition but not sufficientgood	Too insufficient structure	Yes	2.5	silt	silt		yes	yes	thick weeds growth
6220	PoonthuruthuStarting point of Kanuka thode	10.097551	76.295168	6	ordinary soil	N	private	ordinary soil	2	2	ordinary soil	private	No	thode	nil	No		2.5	silt	silt			yes	thick weeds growth
6260	Poonthuruth	10.097418	76.294904	2.5	ordinary soil	yes	private	hardSoil	2	2	hardSoil	private	yes	Foot bridge	damaged	Too insufficient structure	Yes	2.5	silt	silt		yes	yes	Yes
6360	Poonthuruth	10.097614	76.294246	7	ordinary soil	yes	private	hardSoil	2	2	hardSoil	private	yes	thode				2.5	silt	silt			yes	Yes
6370	Poonthuruth	10.097636	76.294203	6	ordinary soil	yes	private	hardSoil	2	2	hardSoil	private	yes	Culvert	structure is is in good condition but not sufficientgood	Bed raised using concrete	Yes	2.5	silt	silt		yes	yes	nil
6550	Methanam(mouth to Periyar)	10.096278	76.293752	7	ordinary soil	N	private	hardSoil	2	2	hardSoil	private	N	thode ends to Periyar				2.5	silt	silt			yes	Both side thick vegetation
River/Tributary/Sub-tributary :																								
Periyar Marthanada Varma bridge to Varappuzha Bridge(Varattar branch)																								
Karippuzha Angadikadavu thode																								
0	Angadikadav , Alangad panchayathBoundary	10.122286	76.294775	20 M	Hard Soil	Y	Private	Hard Soil	2.50	Hard Soil	2.50	Private	Y	culvert	Good, But not sufficient	Reduced ventwayof bridge obstruct flow of water as both the abutments are inside of Thodu	Yes	1.50	Silt				Polluted	Yes, Weeds

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
337	kduvazhanga	10.120956	76.292633	12	Ordinary Soil	N	Private	Ordinary soil	2.00	Ordinary soil	2.00	Private	N	Thode										Yes, Weeds
560	Kallupalam busstop, KottappuramKoonam mavu pWD Road(Sreechithra Road)	10.119926	76.296122	6 M	Hard Soil	N	Public (Panchayath Road)	Hard Soil	3.00	Hard Soil	3.00	Private	N	Culvert 2.50x3 ventway	Good, But not sufficient	Reduced ventwayof bridge obstruct flow of water as both the abutments are inside of Thodu	Yes	1.50	Silt				Polluted	Thick vegetation
1400	Kallupalam padam	10.117973	76.296548	7 M	Hard Soil	N	Private	Hard Soil	2.00	Hard Soil	2.00	Private	N	Fs 4 X 2.50M	Good, But not sufficient	Reduced ventwayof FS obstruct flow of water as both the abutments are inside of Thodu	Yes	1.50	Silt				Polluted	Thick vegetation
1500	Kunnelppilli	10.102905	76.307461	5 M	Hard Soil	N	Private	Hard Soil	1.50	Hard Soil	1.50	Private	N	PVIP canal	Good, But not sufficient	Silt Deposit	Yes	1.50	Silt				Polluted	Thick vegetation
1870	Kunnelppalli Valunkal (Kavathiyad)	10.111474	76.29914	4 M	Clay	Y	Private	Ordinary Soil	2.00	Ordinary Soil	2.00	Private	Y	Culvert 3.0MX2M	Damaged	Silt Deposit	Yes	1.50	Silt				Polluted	Thick vegetation
2500	Ezhuvichira	10.112366	76.304928	10 M	Clay	N	Private	Ordinary Soil	2.50	Ordinary Soil	2.50	Private	N	Culvert 4.0MX3M	Good, But not sufficient	Silt Deposit	Yes	2.50	Silt				Polluted	Thick vegetation
3743	Karippuzha	10.104358	76.311207	upstream 20	Clay	N	Private	Ordinary Soil	2.50	Ordinary Soil	2.50	Private	N	Bridge span 9M, Depth- 5 M	Good, But not sufficient	Silt Deposit	No	1.20	Silt				Polluted	Thick vegetation
3920	Kakkunnipalam	10.09887	76.302431	8 M	Ordinary Soil	N	Public	Hard Soil	2.00	Ordinary Soil	2.00	Public	N	Culvert 8 m span	Good, But not sufficient	Bedlevel raised by concrete	Yes	2.50	Silt				Polluted	Thick vegetation

EDAMULA/ MUTTAR STRETCH

River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**

Name of River/Tributary/Sub-tributary : **Vaduvathodu**

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0km	starting near Periyar river	10.110187	76.346493	4	clay	partialy protected	Private	clay	0.5	0.5	clay	private	Partially protected	Nil	Nil	Nil	Nil	0.3	clay	_	Nil	NA	Fully Polluted	Yes
0.09	near kunjunnikara smarakam	10.109569,	76.345317	8	clay		Private	clay	0.5	0.5	clay	private		Bridge	Nil	flow completely obstructed	Yes	0.3	clay		Nil	NA		Yes
0.12	near aqueduct	10.109194,	76.345247	16	clay		Private	clay	0.5	0.5	clay	private		aqueduct	Nil	Nil	Nil	0.3	clay		Nil	NA		Yes
0.21	Near Dream Land Interior and Exterior	10.108392,	76.345092	12	clay		Private	clay	0.5	0.5	clay	private		Nil	Nil	Nil	Nil	0.3	clay	_	Nil	NA		Yes
0.42	Near Rahims Complex	10.106764,	76.344767	8	clay		Private	clay	0.3	0.3	clay	private		nil	Nil	Nil	Nil	0.75	clay	_	Nil	NA		Thick vegetation
0.59	Near Thoppil Apartments	10.106586,	76.343833	8	clay		Private	clay	0.3	0.3	clay	private		Nil	Nil	NIL	No	0.75	clay	_	Nil	NA		Thick vegetation
0.63	vettuvelikannan kadavu	10.106764,	76.344733		clay		Private	clay	0.3	0.3	clay	private		culvert	Nil	flow completely obstructed	Yes	0.75	clay		Nil	NA		Thick vegetation
0.94	Last Point Anganavadi,Kunjunnikkara	10.1063	76.340331	6.5m	clay		Private	clay	0.3	0.3	clay	private		NIL	Nil	NIL	No	0.75	clay	_	Nil	NA		Thick vegetation
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**																								
Name of River/Tributary/Sub-tributary : Idamula Thodu																								
0.00km	starting from Periyar	10.082208	76.33365	20m	clay	N	private	clay	NA	NA	clay	private	N	N	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.34Km	Edamula bridge	10.08176	76.33481	22m	clay	N	private	clay	NA	NA	clay	private	N	bridge	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**																								
Name of River/Tributary/Sub-tributary : Thumbungal thodu																								
0	Near SCMS Colleage	10.06692	76.32607	15m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
0.2km	NH 66 Bridge Crossing	10.066119	76.327854	19m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	bridge	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
0.71	Near Kendriya Vidyalay ,Nad	10.065543	76.331829	16m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
1km	Meeting Point Of Branch thodu	10.066287	76.334246	15m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
1.1km	Eastern Brach thodu crossing Pipe line road	10.061408	76.338722	15m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	NO	Nil	Nil	_	Nil	Nil	Nil	
2.9km	Western Branch thodu Behind metroyard muttam	10.074526	76.338846	11m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
3.8km	Location Near Thumbi Parambu	10.073215	76.342169	9m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
4.05	Crossing at Pipeline Rd, Kunnathery Thikavu, Aluva	10.073167	76.344202	7m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	culvert	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
5.6km	Point near Spring Valley Retirement Home	10.069051	76.355303	4m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
6.1km	Stream crossing NAD Rd, Edathala, Aluva,	10.065915	76.358209	4m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
6.29km	Starting point of west br. Thodu	10.064094	76.359397	4m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	culvert	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**																								
Name of River/Tributary/Sub-tributary : **Kattukandathil thodu**																								
0.00km	starting of periyar	10.0689,	76.28921	8 m	clay	N	private	clay	NA	NA	clay	private	N	NA	N	N	N	Nil	clay	_	NA	NA	NA	
0.359Km	Godown Road	10.065778	76.289539	12m	clay	N	private	clay	NA	NA	clay	private	N	NA	N	N	N	Nil	clay	_	NA	NA	NA	Thick waterweeds
0.692Km	DTDC cochin	10.062885,	76.290708	11m	clay	N	private	clay	NA	NA	clay	private	N	NA	N	N	N	Nil	clay	_	NA	NA	NA	
0.782Km	Go Mechanic car workshop	10.063015,	76.291311	7m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	Nil	Nil	Nil	clay	_	NA	NA	NA	
1.11 Km	ends in Periyar	10.064040,	76.294081	6m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**																								
Name of River/Tributary/Sub-tributary : **Kattukandathil thodu**																								
0.0Km	starting of periyar	10.0689	76.28921	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.180Km	blue bazar shopping village	10.065992,	76.288506	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	Thick waterweeds
0.36	vytilla steel private road	10.065992,	76.288506	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.45	Godown Road	10.065369,	76.288881	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.625Km	near Lshape turn	10.063772,	76.289422	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**																								
Name of River/Tributary/Sub-tributary : **Edapally thodu**																								
0km	starting near Periyar river	10.04.3533	76.303215	13	clay	partialy protected	Private	clay	0.5	0.5	clay	private	Partially protected	Nil	Nil	Nil	Nil	0.3	clay	_	Nil	NA	Fully Polluted	Yes
36	Muttar kadavu bridge culvert	10.04.3342	76.303307	9.00	clay		Private	clay	0.5	0.5	clay	private		culvert	Nil	no sufficient vertical clearence	Yes	0.3	clay		Nil	NA		Yes
140	slight turn	10.042741	76.302788	9.00	clay		Private	clay	0.5	0.5	clay	private		nil	Nil	Nil	Nil	0.3	clay		Nil	NA		Yes
256	slight turn	10.042368	76.302147	9.00	clay		Private	clay	0.5	0.5	clay	private		Nil	Nil	Nil	Nil	0.3	clay	_	Nil	NA		Yes
640	Indira bridge	10.039538	76.30235	13.80	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	Nil	Nil	0.75	clay	_	Nil	NA		Thick vegetation
1000	Railway bridge	10.036072	76.303722	14.30	clay		Private	clay	0.3	0.3	clay	private		railway lane	Nil	NIL	No	0.75	clay	_	Nil	NA		Thick vegetation
1600	slight turn	10.034273	76.3042373		clay		Private	clay	0.3	0.3	clay	private		nil	Nil	nil	Yes	0.75	clay		Nil	NA		Thick vegetation
1500	Chambokadavu bridge	10.032957	76.30477	14.2	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	No	0.75	clay	_	Nil	NA		Thick vegetation
2360	Lulu Private Bridge	10.026367	76.307418	15	clay	partialy protected	Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	Nil							
2400	Lulu metro Bridge	10.02566	76.30802	16	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	Nil	0.3	clay	_	Nil	NA	Fully Polluted	Yes
2500	NH bridge Edapally	10.025223	76.308795	18	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	Yes	0.3	clay		Nil	NA		Yes
2850	Marotty chodu palam	10.023087	76.310547		clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	Nil	0.3	clay		Nil	NA		Yes
3230	Timber Bridge	10.020017	76.311333	10.5	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	Nil	0.3	clay	_	Nil	NA		Yes
3500	vadathodu joining to Edapally thodu-	10.017432	76.3111898	5	clay		Private	clay	0.3	0.3	clay	private		nil	Nil	NIL	Nil	0.75	clay	_	Nil	NA		Thick vegetation
3600	Puravankara Bridge	10.016893	76.312353	15	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	No	0.75	clay	_	Nil	NA		Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4150	Pipe line road	10.01482	76.315993	11.5	clay		Private	clay	0.3	0.3	clay	private		pipe line	Nil	NIL	No	0.75	clay		Nil	NA		Thick vegetation
4200	Pipe line road(2,3 pipe)	10.014763	76.315998	11.5	clay		Private	clay	0.3	0.3	clay	private		nil	Nil	NIL	No	0.75	clay	_	Nil	NA		Thick vegetation
4300	St Theresas convent	10.013758	76.316095	12.2	clay		Private	clay	0.3	0.3	clay	private		nil	Nil	NIL	No	0.75	clay	_	Nil	NA		
5100	Chembumukku Bridge	10.010415	76.319725	16	clay	partially protected	Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	No	0.75	clay	_	Nil	NA	Fully Polluted	Thick vegetation
6560	Kallikuzhy Paramada	10.004523	76.326743	56	clay		Private	clay	0.3	0.3	clay	private		nil	Nil	NIL	No	0.75	clay	_	Nil	NA		Yes
7200	Palachuvad bridge	9.999582	76.330573	31	clay		Private	clay	0.3	0.3	clay	private		bridge	Nil	NIL	No	0.75	clay	_	Nil	NA		yes
9450	slight turn	9.9865444	76.3375952		clay		Private	clay	0.3	0.3	clay	private		nil	Nil	NIL	No	0.75	clay	_	Nil	NA		yes
10200	Edapally thodu outlet point	9.980897	76.337167	55	clay		Private	clay	0.3	0.3	clay	private		steel bridge	Nil	NIL	No	0.75	clay	_	Nil	NA		yes
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Varappuzha (Muttar branch)**																								
Name of River/Tributary/Sub-tributary : **Unthithodu**																								
0.0Km	starting of periyar	10.07088,	76.2853	8	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.119Km	Ferry bay road	10.07164	76.28609	10	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.297	Eloor ferry road	10.07296	76.28693	11	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
0.583	Palliyattu road	10.07543	76.28693	13	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
0.698	Ferry road near SNDP hall	10.07643	76.28728	16	clay	partially protected	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	Thick waterweeds
0.99	Periyar road	10.07832	76.28868	16	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
1.28	Kuzhikkandam Eloor.N	10.08071	76.28981	13	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
1.64	Ambedhkar road	10.08381	76.29104	12	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
1.99	Depot road	10.08695	76.29093	7	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
2.38	End point	10.09027	76.29063	5	clay		private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	yes	
VADUTHALA STRETCH																								
River/Tributary/Sub-tributary : **Periyar River - Varappuzha to Vaduthala**																								
Name of River/Tributary/Sub-tributary : **Pizhala Thodu Tributary.**																								
0.00km	Startiing near Pizhala Hospital.	10.05131	76.26413	55m	clay		Private	clay	0.5	0.5	clay	Private		NIL	NA	NIL	No	0	clay	_	nil	NA	NA	NIL
0.30km	Near South side of Pizhala jetty	10.051783	76.262938	25m	clay	Partially protected	Private	clay	0.6	0.6	clay	Private	Partially protected	Nil	NA	NIL	No	0	clay	_	nil	NA	NA	NIL
0.55km	Near Pizhala Church	10.051197	76.265167	52m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	0	clay	_	nil	NA	NA	NIL
River/Tributary/Sub-tributary : **Periyar River - Varappuzha to Vaduthala**																								
Name of River/Tributary/Sub-tributary : **Kolarickal Thodu Tributary.**																								
0.00km	Startiing near Edayakkunnam	10.034757	760285990	15m	clay		Private	clay	0.7	0.7	clay	Private		NIL	NA	NIL	No	0.75m	clay	_	nil	NA	NA	NIL
0.60km	At Chittoor - Edayakkunnam road	10.038898	76.277602	8m	clay	Partially protected	Private	clay	0.6	0.6	clay	Private	Partially protected	Nil	NA	NIL	No	0.75m	clay	_	nil	NA	NA	NIL
1.00km	At Chittoor - Kothad Road near Aster Medicity	10.040277	76.274815	8.50m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	0.75m	clay	_	nil	NA	NA	vegitation
1.80km	Ends near North side of Chittoor Boat jetty.	10.039625	76.268703	26.00 m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	0.75m	clay	_	nil	NA	NA	Nil
River/Tributary/Sub-tributary : **Periyar River - Varappuzha to Vaduthala**																								

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Name of River/Tributary/Sub-tributary : **Kandanadu Thodu sub Tributary.**																								
0.00km	Startiing near Kandanadu jetty	10.059028	76.275048	12m	clay	Partially protected	Private	clay	0.5	0.5	clay	Private	Partially protected	NIL	NA	NIL	No	1.00m	clay	_	nil	NA	NA	NIL
0.03km	South side of Kandanadu jetty	10.05859	76.2753	8m	clay		Private	clay	0.6	0.6	clay	Private		Nil	NA	NIL	No	1.00m	clay	_	nil	NA	NA	NIL
0.22km	Korambadam road crossing	10.056488	76.276937	6m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	1.00m	clay	_	nil	NA	NA	vegitation
0.50km	Ends near Korambadam ferry	10.056393	76.278333	10.00 m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	1.00m	clay	_	nil	NA	NA	vegitation
River/Tributary/Sub-tributary : **Periyar River - Varappuzha to Vaduthala**																								
Name of River/Tributary/Sub-tributary : **Kothadu Thodu sub Tributary.**																								
0.00km	Startiing near South side of Korambadam Changadam ferry	10.054006	76.278092	15m	clay	Partially protected	Private	clay	0.7	0.7	clay	Private	Partially protected	NIL	NA	NIL	No	0.75m	clay	_	nil	NA	NA	NIL
0.40km	Bridge near Kothadu School	10.055507	76.273893	12m	clay		Private	clay	0.6	0.6	clay	Private		Nil	NA	NIL	No	0.75m	clay	_	nil	NA	NA	NIL
0.8km	At Kothadu-Kandanadu Bridge	10.05718	76.272593	12m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	0.75m	clay	_	nil	NA	NA	NIL
0.95km	Near kothadu - Chennoor ferry	10.058328	76.272055	15.00 m	clay		Private	clay	0.5	0.5	clay	Private		NIL	NA	NIL	No	0.75m	clay	_	nil	NA	NA	NIL
River/Tributary/Sub-tributary : **Periyar River - Varappuzha to Vaduthala**																								
Name of River/Tributary/Sub-tributary : **Puthussery Thodu sub Tributary.**																								
0.00km	Near Cheriyanthuruthu jetty / landing	10.06402	76.266728	50m	clay	Partially protected	Private	clay	0.7	0.7	clay	Private	Partially protected	NIL	NA	NIL	No	0	clay	_	nil	NA	NA	NIL
0.55km	West side of Cheriyanthuruthu jetty/Landing	10.063473	76.26107	45m	clay	Not protected	Private	clay	0.6	0.6	clay	Private		Nil	NA	NIL	No	0	clay	_	nil	NA	NA	NIL
0.75km	West side of Cheriyanthuruthu jetty/Landing	10.062628	76.259802	50m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	0	clay	_	nil	NA	NA	vegitation
0.98km	West side of Cheriyanthuruthu jetty/Landing	10.06352	76.25883	35.00 m	clay	Partially protected	Private	clay	0.8	0.8	clay	Private	Partially protected	NIL	NA	NIL	No	0	clay	_	nil	NA	NA	vegitation
1.15km	Near Puthussery Bridge	10.064707	76.259185	55.00 m	clay	Partially protected	Private	clay	0.8	0.8	clay	Private	Partially protected	NIL	NA	NIL	No	0	clay	_	nil	NA	NA	vegitation
2.00km	Puthussery Bridge	10.065132	76.259325	65.00 m	clay	Partially protected	Private	clay	1.00	1.00	clay	Private	Partially protected	NIL	NA	NIL	No	0	clay	_	nil	NA	NA	Paddy
2.50km	North of Puthussery Bridge	10.069401	76.257409	75.00 m	clay	Partially protected	Private	clay	0.60	0.60	clay	Private	Partially protected	NIL	NA	NIL	No	0	clay	_	nil	NA	NA	Paddy
3.60km	Ends at Chathanadu Puzha	10.071503	76.243952	50.00 m	clay	Partially protected	Private	clay	0.60	0.60	clay	Private	Partially protected	NIL	NA	NIL	No	0	clay	_	nil	NA	NA	Paddy
# REACH VI																								
## DETAILS OF RIGHT BANK TRIBUTARIES																								
River/Tributary/Sub-tributary : Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar/ Thoomba thodu																								
0.0km	Thoomba thodu starting point near eastern end of Aluva	10.123337	76.381853	25m	clay		Govt.	clay	2	2.5	mixture of clay, silt and sand	private	yes	NA	NA	Mouth width less. silt deposit on	NA	1m	sand	_	NA	NA	NA	Thick vegetation on both sides

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.095km	Noble pack carton company	10.123216	76.38104	25m	clay	Partially protected	Govt.	clay	2	2.5	clay	Govt	No	NA	NA	obstruction due to water weed growth	NA	0.8	sand	_	NA	NA	NA	Thick vegetation on both sides
0.283km	Chowara thoomba kadavu	10.123858	76.379454	40m	clay		Govt.	clay	2.5	3	clay	Govt	No	NA	NA	silt deposit & light jungle on side	NA	1	sand	_	NA	NA	NA	massive silt deposit on banks,which obstruct the flow
0.476km	Chowara bridge	10.124178	76.377716	45m	clay		Govt.	clay	4	4	clay	Govt	yes	bridge	width of thodu reduced due to side obstruction	slight obstruction on banks	no	1.2	sand	_	NA	NA	NA	massive silt deposit and thick vegetation on banks.
1.5km	sharp turning point	10.125269	76.372224	40m	clay		Govt.	clay	2.5	3.5	clay	Govt	No	NA	NA	silt deposit & Vegetation on side	no	0.8	sand	_	NA	NA	NA	silt deposit and vegetation on banks.
2km	Near Shiva temple purayar	10.126759	76.368792	45m	clay		Govt.	clay	2	2	clay	Govt	No	foot bridge	safe	silt deposit & Vegetation on side	no	0.6	sand	_	NA	NA	NA	silt deposit and vegetation on banks.
2.864km	Near rockwall compound	10.120885	76.369369	45m	clay		Govt.	clay	2.5	3	clay	Govt	yes	NA	NA	silt deposit & Vegetation on side	no	0.6	sand	_	NA	NA	NA	silt deposit and vegetation on banks.
3.7km	Thoomba thodu bridge	10.118152	76.362609	70m	clay		Govt.	clay	4.5	3	clay	Govt	No	bridge	safe	silt deposit of about 15 m width on both sides obstruct the flow	no	1.2	sand	_	NA	NA	NA	Thick vegetation on both sides
3.8km	under railway bridge	10.118286	76.361974	40m	clay		Govt.	clay	4.5	3	clay	Govt	No	Railway bridge	safe	silt deposit and vegetation on both sides	no	1.2	sand	_	NA	NA	NA	Thick vegetation on both sides
4.1km	opposite to seed farm	10.118414	76.358706	40m	clay		Govt.	clay	4	4.5	clay	Govt	No	NA	NA	silt deposit of about 10 m width on both sides	no	0.8	sand	_	NA	NA	NA	massive silt deposit and thick vegetation on banks
4.4km	opposite to manappuram(near apartment)	10.119683	76.356443	40m	clay		Govt.	clay	3	1.5	clay	Govt	No	NA	NA	silt deposit of about 30 m length on mouth reduced the width	no	0.8	sand	_	NA	NA	NA	massive silt deposit on mouth and thick vegetation on banks
River/Tributary/Sub-tributary : Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar (Right bank)/ KARINTHIRI AAR																								
0km	Karinthiri Aar starting point	10.151802	76.329418	52	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	
0.24Km	Karinthiriyar	10.152613	76.331517	26	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	
0.36Km	Karinthiriyar at Kandanthuruth at Panchayath kadavu	10.152597	76.332588	35	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	Slight Vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.520km	Karinthiriyar at Kandanthuruth	10.151923	76.333748	40	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	
0.68Km	Karinthiriyar near Kandanthuruth bridge	10.151352	76.335175	46	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Bridge	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	Vegetation observed
0.685Km	Near Chengamanad pump house	10.151485	76.33541	45	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	No	0.6	silt and clay	_	Nil	Nil	No	
1.1 Km	Chengal thodu joining to Karinthiriyar	10.148347	76.33733	40	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	
1.54Km	Karinthiriyar joining to Periyar	10.144654	76.337795	30	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	No	
River/Tributary/Sub-tributary : Sub-tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar/Karinthiriyar/Chengal thodu																								
0km	Chengal thodu near SFS Airport Royale apartments	10.134234	76.355233	18m	Clay	Partially protected	Private	Clay	1.2m	1.2m	Clay	Private	Partially protected	Nil	NA	Silt depositon	NA	1m	clay	_	NA	NA	NA	Yes
0.4km	Chengal thodu near Salem-Highway	10.132455	76.353273	18m	Clay	Partially protected	Private	Clay	1.2m	1.2m	Clay	Private	Partially protected	Bridge	NA	Silt depositon	NA	1m	clay	_	NA	NA	NA	Yes
400m	Chengal thodu near Salem-Highway	10.132707	76.353428	18m	Clay	Partially protected	Private	Clay	1.1m	1.1m	Clay	Private	Partially protected	Bridge	NA	Siltdeposition	NA	1.10m	clay	_	NA	NA	NA	Yes
2.40km	Near opp bank of Harisree playground	10.141363	76.34156	17m	Clay	No	Private	Clay	1.20m	1.20m	Clay	Private	No	nil	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes
2.50km	Near end of byelane of Elamanapallam sri parvathy temple road	10.141632	76.34097	15m	Clay	No	Private	Clay	1.40m	1.60m	Clay	Private	No	nil	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes
3.13km	near Puthen kadavu LIS	10.145373	76.342003	18m	Clay	No	Private	Clay	3m	3m	Clay	Private	Partially protected	nil	NA	nil	NA	1.10m	clay	_	NA	NA	NA	Yes
3.15km	Intermediate location to the south of puthen kadavu LIS	10.144265	76.340031	18m	Clay	No	Private	Clay	1.2m	1.2m	Clay	Private	Partially protected	nil	NA	nil	NA	1.10m	clay	_	NA	NA	NA	Yes
3.35km	Near Chengamanad Puthuvassery road	10.145927	76.340528	18m	Clay	No	Private	Clay	1m	1m	Clay	Private	No	nil	NA	nil	NA	80cm	clay	_	NA	NA	NA	Yes
3.50km	Near Chengamanad Puthuvassery road	10.146723	76.340312	15m	Clay	No	Private	Clay	1.00m	1.00m	Clay	Private	No	nil	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes
3.60km	Near Chengamanad Puthuvassery road	10.147165	76.341245	15m	Clay	No	Private	Clay	1.00m	1.00m	Clay	Private	No	nil	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes
3.78km	near Panayikadavu bridge	10.148328	76.340257	18m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	Partially protected	bridge	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes
3.95km	near Thalakolli bridge	10.147778	76.338738	25m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	Partially protected	bridge	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
4.35km	Chengal thodu joining to Karinthiriyar	10.148484	76.337743	45m	Clay	No	Private	Clay	1.4m	1.4m	Clay	Private	No	nil	NA	nil	NA	90cm	clay	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary : Sub-tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary :Periyar(Right bank)- Karinthiriyar/ Chengal thodu/Puthen thodu																								
0Km	Puthen thodu starts at paddy field	10.157497	76.345642	6m	silt and clay	Partialy proteted	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	silt 50%,clay - 50%	Nil	Nil	Nil	Thick vegetation
0Km	Puthen thodu starts at paddy field	10.157553	76.346097	6m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.171Km	North side of bye lane of Athani-Paravoor road	10.156875	76.347157	6m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Bridge	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.361Km	North side of bye lane of Athani-Paravoor road	10.155248	76.347683	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.542km	Near Athani - Paravoor road	10.153623	76.347835	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Bridge	NA	Nil	NO	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.571km	Near Pumphouse	10.153373	76.347908	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.625Km	Near bye lane of Athani- Paravoor road	10.152952	76.347772	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.754Km	Near bye lane of Athani- Paravoor road	10.151853	76.347332	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.784Km	Near bye lane of Athani- Paravoor road	10.151545	76.347243	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	NA	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.847Km	Near bye lane of Athani- Paravoor road	10.15115	76.34686	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	No	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.870Km	Near bye lane of Athani- Paravoor road	10.15107	76.346702	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	Thick vegetation
0.895Km	Near bye lane of Athani- Paravoor road	10.150942	76.346507	4.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	fully waterweeds
1.04Km	Near bye lane of Athani- Paravoor road	10.150293	76.345322	6.5m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	0.6	silt and clay	_	Nil	Nil	Nil	
1.68Km	Puthenthodu joins Chengal thodu Near Panayikadavu bridge	10.148338	76.340313	8m	silt and clay	Partialy protected	Private	silt and clay	0.2	0.2	silt and clay	Private	Partialy proteted	Bridge	NA	Nil	No	0.6	silt and clay	_	Nil	Nil	Nil	
River/Tributary/Sub-tributary : Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar (Right Bank)/ Cheriyathekkanam thodu																								
Name of officer : Smt .Yasoda devi N, Executive Engineer, MI division, Ernakulam																								

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0 km	Cheriyathekkanam thodu starting point from Manjalythodu	10.153724	76.28096	40m	mixture of clay & silt	No	Private	mixture of clay & silt	90cm	90cm	mixture of clay & silt	Private	No	nil	NA	Nil	NA	60 cm	mixture of clay & silt	_	Nil	Nil	NA	**Yes**
0.7 km	Near Karakkathuruth bridge	10.14827	76.283861	24m	mixture of clay & silt	Yes	Private	mixture of clay & silt	9ocm	9ocm	mixture of clay & silt	Private	Yes	bridge	NA	Nil	NA	60 cm	mixture of clay & silt	_	Nil	Nil	NA	**Yes**
1.05km	Near mouth at Periyar	10.146549	76.283789	24m	mixture of clay & silt	Yes	Private	mixture of clay & silt	1m	1m	mixture of clay & silt	Private	Yes	Nil	NA	Nil	NA	60 cm	mixture of clay & silt	_	Nil	Nil	NA	**Yes**
River/Tributary/Sub-tributary : Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary: Periyar (Right Bank)/Manjaly thodu																								
0 Km	Puthenpalam bridge on Karukutty-Mookkannoor road	10.225215,	76.39557	10m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
0 Km	Manjalythodu at puthenpalam towards west side,Mookkannoor	10.225254,	76.39555	10m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
0 Km	Manjalythodu under puthenpalam ,Mookkannoor	10.225168	76.395553	10m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.63km	Manjalythodu at Bharaniparambu bridge near LI scheme ,Mookkannoor	10.212442	76.395952	50m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.70km	Manjalythodu at Bharaniparambu bridge towards north side ,Mookkannoor	10.212587	76.395754	50m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.70km	Manjalythodu at Bharaniparambu bridge towards south side ,Mookkannoor	10.212465	76.395693	50m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
3.48Km	Manjalythodu at Kothakulangara bridge towards west side ,Angamaly	10.208478	76.381915	70m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
3.48Km	Manjalythodu under Kothakulangara bridge ,Angamaly	10.208563	76.382069	70m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
3.48Km	Manjalythodu under Kothakulangara bridge ,Angamaly	10.208516	76.382031	70m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3.48Km	Manjalythodu at Kothakulangara bridge towards east side ,Angamaly	10.208073	76.382157	70m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
3.90 km	Manjalythodu near Eshwari kalakshetra,Angamaly	10.205845	76.380911	108m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
4.16 km	Manjalythodu nearAngamaly walkway,Angamaly	10.203897	76.378718	195m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
4.16 km	Manjalythodu nearAngamaly walkway,Angamaly	10.203905	76.37869	195m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
4.16 km	Manjalythodu nearAngamaly walkway,Angamaly	10.203624	76.377764	195m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
4.96km	Manjalythodu near Angadikadavu bridge,Angamaly	10.197343	76.379018	200m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
5.42km	Manjalythodu near railway bridge ,Angamaly	10.19566	76.374663	200m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
5.42km	Manjalythodu near railway bridge ,Angamaly	10.195798	76.37476	200m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Railwaybridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
8.90km	Manjalythodu near Madhurapuram-mallussery bridge towards north side,Nedumbassery .	10.180177	76.348816	20m	Clay	No	Private	Clay	20cm	20cm	Clay	Private	No	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
9.1km	Manjalythodu near Madhurapuram-mallussery bridge towards north side,Nedumbassery .	10.180183	76.348603	20m	Clay	No	Private	Clay	20cm	20cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
9.1 km	Manjalythodu near Madhurapuram-mallussery bridge towards south side,Nedumbassery .	10.179973	76.348623	20m	Clay	No	Private	Clay	20cm	20cm	Clay	Private	No	Nil		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
9.63 km	Manjalythodu near Alungalkadavu bridge towards north side,Nedumbassery .	10.175647	76.346172	20m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
9.63 km	Manjalythodu near Alungalkadavu bridge towards south side,Nedumbassery .	10.175537	76.346223	20m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
9.63 km	Manjalythodu near Alungalkadavu bridge towards north side,Nedumbassery .	10.175498	76.346273	20m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Bridge		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
12.06km	Manjalythodu near chundamthuruth bridge towards north side,Nedumbassery .	10.168055	76.330455	31m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
12.06km	Manjalythodu under chundamthuruth bridge , Nedumbassery .	10.168043	76.330507	31m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
12.06km	Manjalythodu near chundamthuruth bridge towards south side, Nedumbassery .	10.168105	76.330362	31m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Bridge		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
15.12km	Manjalythodu near oozhamkadavu bridge towards north side, Kunnukara .	10.170885	76.309877	22m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
15.12km	Manjalythodu under oozhamkadavu bridge , Kunnukara .	10.171227	76.259643	22m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
15.12km	Manjalythodu near oozhamkadavu bridge towards south side, Kunnukara .	10.17089	76.309962	22m	Clay	No	Private	Clay	30cm	30cm	Clay	Private	No	bridge		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
17.50km	Manjalythodu near Kalathikadavu road towards east side, Kunnukara .	10.164475	76.296335	17m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
17.50km	Manjalythodu near Kalathikadavu road , Kunnukara .	10.164508	76.296498	17m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
18.25km	Manjalythodu near Manayi- Pallikadavu road , Kunnukara .	10.160992,	76.292663	21m	Clay	No	Private	Clay	nill	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
18.25km	Manjalythodu near Jama -ath masjith, Kunnukara .	10.161552	76.29016	16m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
18.58km	Manjalythodu near Jama ath masjith, Kunnukara .	10.161014	76.290335	12m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
19.28km	Manjalythodu near Kunnukara LI scheme, near Masjid kandamthuruth road	10.156675	76.288547	16m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
19.70km	Manjalythodu near Chalakka Korekadavu bridge, Kunnukara	10.154899	76.286685	22m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Bridge		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
19.78 km	Manjalythodu near Ryan school, Kunnukara	10.1548	76.28684	20m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Bridge	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
20.72km	Manjalythodu near Cheriyathekkinam bridge cum sluice , Kunnukara	10.15379	76.279932	30m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Bridge		nil	NA	70cm	Clay	_	NA	NA	NA	No
21.30km	Manjalythodu near Cheriyathekkinamthodu ghat , Kunnukara	10.153197	76.27475	37m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
21.60km	Manjalythodu joining periyar-starting point of manjaly thodu, Kunnukara	10.151696	76.272489	40m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
River/Tributary/Sub-tributary : Sub Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar(Right Bank)/Manjaly thodu/Puthen thodu connecting to Chalakudy river																								
0m	Puthenthodu link staring point -joining Chalakudiyar Kunnukara	10.179842	76.317006	15m	Clay	No	Private	Clay	1.00m	1.00m	Clay	Private	No	Nil	NA	nil	NA	90cm	Clay	_	NA	NA	NA	Yes
20m	Puthenthodu link near joining Chalakudiyar , Kunnukara	10.17969	76.316753	16m	Clay	No	Private	Clay	1.00m	1.00m	Clay	Private	No	Nil	NA	nil	NA	90cm	Clay	_	NA	NA	NA	Yes
180m	Puthenthodu link near ayirur puthenthodu bridge (near rock portion) Kunnukara	10.178298	76.316522	14m	Clay	No	Private	Clay	1.00m	1.00m	Clay	Private	No	Nil		nil	NA	1.20m	Clay	_	NA	NA	NA	Yes
220m	Puthenthodu link near ayirur puthenthodu bridge , Kunnukara	10.177967	76.316438	15m	Clay	Partially protected	Private	Clay	1.50m	1.50m	Clay	Private	Partially protected	Bridge		nil	NA	90cm	Clay	_	NA	NA	NA	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
785m	Puthenthodu link end atManjalypuzha - , Kunnukara	10.173973	76.313368	20m	Clay	Partially protected	Private	Clay	1.00m	1.00m	Clay	Private	Partially protected	Nil	NA	nil	NA	80cm	Clay	_	NA	NA	NA	No
River/Tributary/Sub-tributary : Sub Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary :Periyar(Right Bank)- Manjali thodu- Kannakka thodu																								
0m	Kannakka thodu starting point	10.165039	76.283847	5m	Clay & Silt	No	Private	Clay	70cm	70cm	Clay	Private	No	nil	NA	nil	NA	90cm	Clay & Silt	_	NA	NA	NA	Yes
5m	Kannakka thodu intermediate	10.165021	76.283854	5m	Clay & Silt	No	Private	Clay	70cm	70cm	Clay	Private	No		NA	nil	NA	90cm	Clay & Silt	_	NA	NA	NA	Yes
1.00km	Kannakka thodu intermediate to west near chalakka-kuthia thodu road	10.165967	76.291428	15m	Clay & Silt	No	Private	Clay	50cm	50cm	Clay	Private	No	Bridge	NA	nil	NA	1.10m	Clay & Silt	_	NA	NA	NA	Yes
1.40km	Kannakka thodu intermediate to east near chalakka-kuthia thodu road	10.165863	76.291502	15m	Clay & Silt	No	Private	Clay	50cm	50cm	Clay	Private	No	nil	NA	nil	NA	1.10m	Clay & Silt	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary																								
Name of River/Tributary/Sub-tributary			: Periyar(Right Bank)/ Chalakudypuzha/ **Chettikad thodu**																					
0m	Chetiikadu thod starting point near Chalakka-kuthiathodu road	10.165967	76.291428	24m	Clay	Partially protected	Private	Clay	90cm	90cm	Clay	Private	Partially protected		NA	nil	NA	80cm	Clay & silt	_	NA	NA	NA	Yes
2.34km	Chetiikadu thodu near Cherukadappuram sluice bridge,Kunnukara	10.161221	76.278824	24m	Clay	Partially protected	Private	Clay	90cm	90cm	Clay	Private	Partially protected	Sluice cum bridge	NA	nil	NA	80cm	Clay & silt	_	NA	NA	NA	Yes
2.341km	Chettikkadu thodu - bund location	10.161141	76.27885	24m	Clay	Partially protected	Private	Clay	90cm	90cm	Clay	Private	Partially protected		NA	nil	NA	80cm	Clay & silt	_	NA	NA	NA	Yes
2.629km	Chettikkatdu thdodu -near thrikkai Maha Vishnutemple	10.160039	76.276875	21m	Clay	No	Private	Clay	80cm	80cm	Clay	Private	No	Nil	NA	nil	NA	70cm	Clay & silt	_	NA	NA	NA	Yes
2.80km	Chettikadu thodu near cultivation area	10.163056	76.271483	30m	Clay	No	Private	Clay	90cm	90cm	Clay	Private	No	Nil	NA	nil	NA	70cm	Clay & silt	_	NA	NA	NA	Yes
2.90km	Chetiikadu thodu near plantain cultivation	10.163453	76.271284	30m	Clay	Partially protected	Private	Clay	90cm	90cm	Clay	Private	Partially protected		NA	nil	NA	80cm	Clay & silt	_	NA	NA	NA	Yes
3.00km	Chettikkaduthodu joining link thodu of Chalakudypuzha	10.163511	76.271247	48m	Clay	No	Private	Clay	1.40m	1.40m	Clay	Private			NA	nil	NA	90cm	Clay & silt	_	NA	NA	NA	Yes
3.40km	Chettikkaduthodu joining link thodu of Chalakudypuzha	10.1635	76.271228	48m	Clay	No	Private	Clay	1.40m	1.40m	Clay	Private			NA	nil	NA	90cm	Clay & silt	_	NA	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
River/Tributary/Sub-tributary : Sub-tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar (Right Bank) / Pandipadam thodu																								
0m	Pandipadamthodu starting near thanthonichira, Puthenvelikkara	10.169771	76.266602	6m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Culvert	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
104m	Pandipadamthodu near thanthonichira, Puthenvelikkara	10.169785	76.2656	6m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
705m	Pandipadamthodu near pandipadam-choukkakadavu road - north side	10.170698	76.262801	3m	Clay	Partially protected	Private	Clay	20cm	20cm	Clay	Private	Partially protected	Culvert	NA	nil	NA	70cm	Clay	_	NA	NA	NA	No
710m	Pandipadamthodu near pandipadam-choukkakadavu road - south side	10.170708	76.262796	5m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.14km	Near culvert on byelane of chouka kadavu road	10.167875	76.260364	5m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Culvert	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.19km	Near byelane of choukakadavu road - sub thodu connecting to pandipadam thodu	10.167232	76.259935	5m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.20km	Pandipadamthodu near exit to periyar	10.167364	76.259898	5m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.30km	Pandipadam thodu joining to periyar	10.166837	76.259408	5m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary : Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
River/Tributary/Sub-tributary : Periyar/**Kuttikkatupallam thodu**																								
0m	Kutiikkattu pallam thodu- starting point near kochukadavil temple	10.175632	76.250147	5m	Clay	No	Private	Clay	70cm	70cm	Clay	Private	No	_	NA	Nil	No	50cm	Clay	_	NA	NA	NA	Yes
160m	Kutiikkattupallam thodu-near Station kadavu-Malavana road	10.174686	76.250793	5m	Clay	No	Private	Clay	70cm	70cm	Clay	Private	No	Culvert	NA	Nil	No	50cm	Clay	_	NA	NA	NA	Yes
220m	Kutiikkattu pallam thodu- joining to periyar	10.174183	76.250419	5m	Clay	No	Private	Clay	70cm	70cm	Clay	Private	No	_	NA	Nil	No	50cm	Clay	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary : Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary : Periyar/ Payikkattupallam thodu																								
0m (Starting fromChainage 240m of Thondal thodu)	Payikkattupallam thodu east side of Stationkadavu-Malavana road	10.177099	76.24927	4m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	nil	NA	nil	NA	70cm	Clay	_	NA	NA		Yes
340m	Payikkattupallam thodu east side of Stationkadavu-Malavana road	10.176836	76.249009	4m	Clay	No	Private	Clay	70cm	70cm	Clay	Private	No	nil	NA	nil	NA	60cm	Clay	_	NA	NA		Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
350m	Payikkattupallam thodu near Stationkadavu-Malavana road view towards east - obstructing the vegetation and silt deposition in thodu	10.176669	76.248619	4m	Clay	No	Private	Clay	90cm	90cm	Clay	Private	No	nil	NA	nil	NA	60cm	Clay	_	NA	NA		Yes
390m	Payikkattupallam thodu near Stationkadavu-Malavana road view towards west (exit to periyar) - obstructing the vegetation and silt deposition in thodu	10.176662	76.248593	4m	Clay	No	Private	Clay	70cm	70cm	Clay	Private	No	Culvert	NA	nil	NA	70cm	Clay	_	NA	NA		Yes
450m	Payikkattupallam thodu joining to periyar	10.176282	76.248179	4m	Clay	No	Private		90cm	90cm	Clay	Private	No	nil	NA	nil	NA	70cm	Clay	_	NA	NA		Yes
River/Tributary/Sub-tributary :Tributary (Periyar river -Aluva Manappuram to Puthenvelikkara reach)																								
Name of River/Tributary/Sub-tributary:Periyar / Thondalthodu, Puthenvelikkara																								
0m	Keezhurpadam area in Puthenvelikkara panchayath	10.185672	76.272843	6m	Clay & Silt	Yes	Private	Clay	90cm	90cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
1.80Km	Thondalthodu near thazhanchirapadam	10.179169	76.259631	6m	Clay & Silt	Yes	Private	Clay	90cm	90cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
1.81km	Thondalthodu-turnining point near thazhanchirapadam	10.179252	76.259335	6m	Clay & Silt	Yes		Clay	90cm	90cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
1.83km	Thondalthodu sluice near thazhanchirapadam	10.179170	76.259224	6m	Clay & Silt	Yes	Private	Clay	1m	1m	Clay	Private	Yes	sluice	NA	nil	NA	80cm	Clay & Silt	_	Nil	NA	NA	Yes
1.84km	Near thazhanchirapadam road culvert	10.179062	76.259299	6m	Clay & Silt	Yes	Private	Clay	90cm	90cm	Clay	Private	Yes	culvert	NA	nil	NA	80cm	Clay & Silt	_	Nil	NA	NA	Yes
2.84km	Intermediatecrossing - near western boundary of thazhanchirapadam	10.180951	76.252104	6m	Clay & Silt	Yes	Private	Clay	80cm	80cm	Clay	Private	Yes	culvert	NA	nil	NA	75cm	Clay & Silt	_	Nil	NA	NA	Yes
3.07km	Thondal thodu near thondal bridge	10.180589	76.250325	13m	Clay & Silt	Yes	Private	Clay	1.2m	1.2m	Clay	Private	Yes	Bridge	NA	nil	NA	80cm	Clay & Silt	_	Nil	NA	NA	Yes
3.34km	Thondal thodu-intermediate reach - south side of thondal bridge-heavy sillt deposition	10.180365	76.249862	12m	Clay & Silt	Yes	Private	Clay	90cm	90cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3.64Km	Thondal thodu near Kurunnilakkal temple road- silted reach intermediate slab crossing	10.180222	76.246005	9m	Clay & Silt	Yes	Private	Clay	80cm	80cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
3.65km	Thondal thodu - intermediate near Kurunnilakkal temple road	10.180048	76.247052	9m	Clay & Silt	Yes	Private	Clay	80cm	80cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
3.72km	Thondal thodu - sluice obstruct water way near kurunnilakkal temple road	10.180195	76.24551	8m	Clay & Silt	Yes	Private	Clay	75cm	75cm	Clay	Private	Yes	sluice	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
3.87km	Thondal thodu near stationkadavu - Malavana road	10.179719	76.244574	7m	Clay & Silt	Yes	Private	Clay	90cm	90cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
3.95km	Thondal thodu exit to periyar south side of stationkadavu bridge right bank of periyar	10.179109	76.244386	6m	Clay & Silt	Yes	Private	Clay	80cm	80cm	Clay	Private	Yes	Nil	NA	nil	NA	50cm	Clay & Silt	_	Nil	NA	NA	Yes
DETAILS OF LEFT BANK TRIBUTARIES																								
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Periyar to Periyar Tributary**																								
0.00km	Periyar to periyar thodu ,Chirayam,Alangad Panchayath.	10.09249	76.281797	6m	clay		Private	clay	0.5	0.5	clay	Private		NIL	NA	NIL	No	75cm	clay	_	nil	NA	NA	NIL
0.35km	Periyar to periyar end over ,chirayam	10.104502	76.283268	6.5m	clay		Private	clay	0.5	0.5	clay	Private		culvert		NIL	No	75cm	clay	_	nil	NA	NA	NIL
0.85km	Exit point to periyar at Chirayam	10.096172	76.284047	6.5m	clay		Private	clay	0.8	0.8	clay	Private		NIL	NA	NIL	No	75cm	clay	_	nil	NA	NA	NIL
1.35km	Periyar to periyar at Chirayam	10.104502	76.283268	6.5m	clay		Private	clay	0.8	0.8	clay	Private		NIL	NA	NIL	No	75cm	clay	_	nil	NA	NA	NIL
2.05km	Periyar to periyar thodu joining to main stream under Plackattambilly bridge	10.104808	76.283017	6.5m	clay		Private	clay	0.8	0.8	clay	Private		NIL	NA	NIL	No	75cm	clay	_	nil	NA	NA	NIL
2.05km	Periyar to periyar thodu ,east side of Plackattambilly bridge	10.104808	76.283017	6.5	clay		Private	clay	0.8	0.8	clay	Private		NIL	NA	NIL	No	75cm	clay	_	nil	NA	NA	NIL
2.05km	Periyar to periyar thodu west side of Plackattambilly bridge	10.104818	76.28293	6.5	clay		Private	clay	0.8	0.8	clay	Private		bridge		NIL	No	75cm	clay	_	nil	NA	NA	NIL
2.45km	Periyar to periyar thodu near Palm village apartments	10.119442	76.28821	10m	clay		Private	clay	.8 m	.8 m	clay	Private		NIL	NA	NIL	No	75cm	clay	_	nil	NA	NA	Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.45km	Periyar to periyar thodu near Palm village apartments	10.119442	76.28821	10m	clay	Partially protected	Private	clay	.8 m	.8 m	clay	Private	Partially protected	NIL	NA	NIL	No	65cm	clay	_	nil	NA	NA	Thick vegetation
2.85km	Periyar to periyar thodu near Palm village apartments	10.11999	76.287728	10m	clay		Private	clay	.8 m	.8 m	clay	Private		NIL	NA	NIL	No	65cm	clay	_	nil	NA	NA	Thick vegetation
2.85km	Periyar to periyar thodu near colonypady road Alangad Panchayath north	10.110975	76.283225	10m	clay		Private	clay	0.6	0.6	clay	Private		NIL	NA	NIL	No	65cm	clay	_	nil	NA	NA	NIL
2.85km	Periyar to periyar thodu near colonypady road Alangad Panchayath south	10.110975	76.283225	10m	clay		Private	clay	0.6	0.6	clay	Private		pipe culvert		5 nos pipes placed	yes	65cm	clay	_	nil	NA	NA	NIL
3.95km	Periyar to periyar thodu near culvert at Alangad	10.111005	76.283247	10m	clay		Private	clay	.8 m	.8 m	clay	Private		NIL	NA	NIL	No	65cm	clay	_	nil	NA	NA	Thick vegetation
4.05km	Periyar to periyar thodu at south side	10.118473	76.288825	12m	clay		Private	clay	.8 m	.8 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
4.15km	Periyar to periyar thodu near Puthiya road bus stop north side	10.118527	76.288828	12m	clay		Private	clay	.8 m	.8 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
5.65km	Periyar to periyar thodu extends towards north near Angadikadavu	10.122367	76.294702	12m	clay		Private	clay	1.5 m	1.5 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
5.65km	Periyar to periyar thodu extends towards north near Angadikadavu	10.122312	76.294895	12m	clay		Private	clay	1.5 m	1.5 m	clay	Private		culvert		NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
5.65km	Periyar to periyar thodu extends towards north near Angadikadavu	10.122373	76.294815	12m	clay		Private	clay	1.5 m	1.5 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.05km	Periyar to periyar thodu extends towards north near Priyadershini road	10.126513	76.292955	12m	clay		Private	clay	1.2 m	1.2 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.05km	Periyar to periyar thodu extends towards south near Priyadershini road	10.126125	76.293315	12m	clay		Private	clay	1.2 m	1.2 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.05km	Periyar to periyar thodu extends towards south near Priyadershini road	10.126525	76.292947	12m	clay		Private	clay	1.2 m	1.2 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.05km	Periyar to periyar thodu extends towards south near Priyadershini road	10.1261	76.293593	12m	clay		Private	clay	1.2 m	1.2 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
6.40km	periyar to periyar thodu near Kanjirakkattu bridge	10.129783	76.293732	12m	clay		Private	clay	1.2m	1.2m		Private		bridge	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.50km	periyar to periyar thodu towards west side	10.131853	76.298222	12m	clay		Private	clay	.5 m	.5 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.55km	periyar to periyar thodu intermediate	10.131732	76.297833	12m	clay		Private	clay	.50 m	.50 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	Thick vegetation
6.55km	periyar to periyar thodu towards east side	10.13178	76.298273	8m	clay		Private	clay	.5 m	.5 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	NIL
6.85km	Periyar to periyar thodu near Karumaloor LIS	10.131733	76.297357	8m	clay		Private	clay	.50 m	.50 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	NIL
7.85km	Periyar to periyar thodu mouth near S.River resort,Karumallur	10.135822	76.292112	8m	clay		Private	clay	.20 m	.20 m	clay	Private		NIL	NA	NIL	No	60cm	clay	_	nil	NA	NA	NIL
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Kallikuzhy thodu -Tributary**																								
0.00Km	Kallikuzhy thodu start near Muriyackal chapel	10.140765	76.274991	4.5m	clay	Y	Private	clay	0.60m	NA	clay	Private	N	Culvert	NA	NA	NA	**0.2**	clay	_	NA	NA	NA	
0.025Km	Kallikuzhy thodu near Muriyackal chapel	10.14072	76.27499	4.5m	clay	Y	Private	clay	0.60m	NA	clay	Private	N	NA	NA	NA	NA	**0.2**	clay	_	NA	NA	NA	
0.10km	Kallikuzhy thodu intermediate towards north	10.148625	76.270918	4m	clay	N	Private	clay	NA	NA	clay	Private	N	Culvert	NA	NA	NA	**0.2**	clay	_	NA	NA	NA	
0.115km	Kallikuzhy thodu intermediate towards south	10.148635	76.270905	4m	clay	N	Private	clay	NA	NA	clay	Private	N	NA	NA	NA	NA	**0.2**	clay	_	NA	NA	NA	
1.35km	Kallikuzhy thodu end at periyar in Karumallur pt.	10.149421	76.270772	5m	clay	N	Private	clay	NA	NA	clay	Private	N	NA	NA	NA	NA	**0.2**	clay	_	NA	NA	NA	
1.4Km	Kallikuzhy thodu end at periyar in Karumallur pt.	10.149434	76.270795	4m	clay	N	Private	clay	NA	NA	clay	Private	N	NA	NA	NA	NA	**0.2**	clay	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Naduvilathattu thodu**																								
0.00km	Naduvilathattu thodu starting at Anchamparuthy puzha	10.160788	76.254768	4.5m	clay	yes	Private	clay	nil	No	Private	clay	yes	Nil	NA	NA	NA	0.6	clay	_	NA	NA	NA	
0.00km	Naduvilathattu thodu starting at Anchamparuthy puzha	10.160817	76.2548	4.5m	clay	yes	Private	clay	nil	No	Private	clay	yes	Nil	NA	NA	NA	0.6	clay	_	NA	NA	NA	
0.15 Km	culvert near Mattummal road	10.160426	76.256087	4.5m	clay	yes	Private	clay	nil	No	Private	clay	yes	culvert	NA	NA	NA	1.6	clay	_	NA	NA	NA	
0.55Km	culvert near Aikya kerala road	10.158179	76.25847	4.5m	clay	yes	Private	clay	nil	No	Private	clay	yes	culvert	NA	NA	NA	2.6	clay	_	NA	NA	NA	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.70km	Naduvilathattu thodu towards east Mattummal road	10.160427	76.256106	4.5m	clay	yes	Private	clay	nil	No	Private	clay	yes	Nil	NA	NA	NA	0.6	clay	_	NA	NA	NA	
0.86Km	Cu;vert near Mattupuram	10.157861	76.260861	4.5m	clay	yes	Private	clay	nil	No	Private	clay	yes	culvert near Mattupuram	NA	NA	NA	1.6	clay	_	NA	NA	NA	
1.17Km	Naduvilathattu thodu at pipe culvert near Kambivelikakam road	10.156717	76.263125	3.0m	clay	No	Private	clay	nil	No	Private	clay	No	Pipe culvert	NA	NA	NA	2.6	clay	_	NA	NA	NA	
1.35km	Naduvilathattu thodu	10.158185	76.258477	3.0m	clay	yes	Private	clay	nil	No	Private	clay	yes	Nil	NA	NA	NA	0.6	clay	_	NA	NA	NA	
1.70km	Naduvilathattu thodu at Aikya kerala road ,North paravur	10.158179	76.25847	3.0m	clay	No	Private	clay	nil	No	Private	clay	No	Nil	NA	NA	NA	0.9	clay	_	NA	NA	NA	Slight vegetation
1.80km	Naduvilathattu thodu connecting to Periyar at Karumalloor	10.154525	76.267469	2.0m	clay	No	Private	clay	**nil**	No	Private	clay	No	Nil	NA	NA	NA	0.9	clay	_	NA	NA	NA	Thick vegetation and blocked at starting point
1.90km	Naduvilathattu thodu ending Periyar at Karumalloor	10.154547	76.267498	2.0m	clay	No	Private	clay	**nil**	No	Private	clay	No	Nil	NA	NA	NA	0.9	clay	_	NA	NA	NA	Thick vegetation and blocked at starting point
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Anachal thodu** (Tributary of Naduvilathattu thodu)																								
0km	Koomullam Parab at Koonamavu	10.121672	76.269701	12m	clay	partially protected	Private	clay	0.5	0.5	clay	private	Y	Nil	Nil	Nil	Nil	0.3	clay	_	Nil	NA	NA	
2.10km	Near Vazhikulangara Anachal road	10.140545	76.261042	12m	clay		Private	clay	0.5	0.5	clay	private	Y	Bridge	Nil	Nil	Nil	0.3	clay	_	Nil	NA	NA	
2.52km	Near Aluva Paravr road	10.144224	76.260906	12m	clay		Private	clay	0.3	0.3	clay	private	Y	Bridge	Nil	Nil	Nil	0.75	clay	_	Nil	NA	NA	
3.14km	Near Athani Paravur Road	10.149759	76.260568	6m	clay		Private	clay	0.3	0.3	clay	Private	Partially protected	Bridge	NA	NIL	No	0.75	clay	_	Nil	NA	NA	
3.15km	Near Athani Paravur Road	10.149876	76.260972	6.5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	
3.26km	North Paravur ,Mannam	10.150699	76.260985	6.5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	
3.26km	North Paravur ,Mannam	10.150789	76.261034	6.5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	Thick vegetation
3.26km	North Paravur ,Mannam	10.150733	76.260998	6.5	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	Thick vegetation
3.28km	North Paravur ,Mannam	10.150953	76.260997	6.5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	Thick vegetation
3.3km	North Paravur ,Mannam	10.150789	76.261034	6.5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	Thick vegetation
3.35km	North Paravur ,Mannam	10.151526	76.261127	3m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.9	clay	_	Nil	NA	NA	Thick vegetation
3.38km	North Paravur ,Mannam	10.151566	76.261129	3m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.9	clay	_	Nil	NA	NA	Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
3.48km	Near Manjaly juma masjid	10.152888	76.261187	3m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.9	clay	_	Nil	NA	NA	Thick vegetation
4.63Km	Pipe culvert	10.155708	76.262679	3m	clay		Private	clay	0.3	0.3	clay	Private		culvert	NA	NIL	No	1.9	clay	_	Nil	NA	NA	Thick vegetation
4.92km	Joining to Naduvilathattu thodu	10.156704	76.263091	3m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.9	clay	_	Nil	NA	NA	Thick vegetation
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Karukadamoopu thodu -Tributary of Periyar River**																								
0.00km	Karukadamooppu thodu starting to Paravur puzha	10.16149	76.25358	4m	clay	N	private	clay	NA	NA	clay	private	N	N	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.35Km	Culvert at Mattummel	10.16136	76.2562	4m	clay	N	private	clay	NA	NA	clay	private	N	culvert	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.600Km	Karukkadamoopputh odu east side ,Mattummal road	10.161382	76.256263	4m	clay	N	private	clay	NA	NA	clay	private	N	N	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.68Km	Culvert near Aikyakerala road	10.160548	76.259135	4m	clay	N	private	clay	NA	NA	clay	private	N	culvert	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.730Km	Karukkadamoopputh odu east side ,Mattummal road	10.16136	76.256264	4m	clay	N	private	clay	NA	NA	clay	private	N	N	N	N	N	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.730Km	Karukkadamoopputh odu east side ,Mattummal road	10.161366	76.256294	4.5m	clay	N	private	clay	NA	NA	clay	private	N	culvert	NA	Nil	Nil	0.30m	clay	_	NA	NA	NA	Thick vegetation
0.740Km	Karukkadamoopputh odu west side,Aikya kerala road	10.160549	76.259066	4.5m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	0.30m	clay	_	NA	NA	NA	Thick vegetation
1.0Km	Karukkadamoopputh odu east side of Aikya kerala road	10.160548	76.259135	4.5m	clay	N	private	clay	NA	NA	clay	private	N	culvert	NA	NA	NA	0.30m	clay	_	L/B	solid	YES	Thick vegetation
1.050Km	Karukkadamoopputh odu Aikya kerala road	10.160534	76.259088	4.5m	clay	N	private	clay	NA	NA	clay	private	N	N	NA	NA	NA	0.30m	clay	_	NA	NA	NA	thick water hyacinth
1.050Km	Karukadamooppu thodu west side at Karumaloor	10.15794	76.264634	4m	clay	N	private	clay	NA	NA	clay	private	N	N	NA	NA	NA	0.30m	clay	_	NA	NA	NA	
1.2Km	Culvert at Karumalloor	10.159168	76.261442	4m	clay	N	private	clay	NA	NA	clay	private	N	culvert	NA	NA	NA	0.30m	clay	_	NA	NA	NA	
1.35Km	Culvert at Karumalloor	10.158271	76.263434	4m	clay	N	private	clay	NA	NA	clay	private	N	culvert	NA	NA	NA	0.30m	clay	_	NA	NA	NA	
1.400Km	Karukadamooppu thodu at Karumalloor,end at Periyar	10.157905	76.264637	3m	clay	y	private	clay	0.75	0.75	clay	private	y	NA	NA	NA	NA	0.30m	clay	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar River (Aluva Manappuram to Puthenvelikkara)**																								
Name of River/Tributary/Sub-tributary : **Paravur puzha -Left bank of Periyar river**																								
0.0km	Paravur puzha near Cherai bridge	10.141648	76.201555	140m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
0.05km	Paravur puzha near National water way	10.141957	76.201745	140m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
0.70km	Paravur puzha near Kalluchira	10.145232	76.207062	57m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.45km	Paravur puzha near Mattummel bridge	10.14838	76.211983	35m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Mattummal bridge	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
1.9km	Paravur puzha near Paravur bridge	10.150903	76.214985	45m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Vadekekkara bridge	NA	Nil	NO	Nil	Nil	_	Nil	Nil	Nil	
2km	Paravur puzha near Paravur bridge ,Vadakkekara	10.150803	76.215153	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.1km	Paravur puzha near Paravur bridge ,Vadakkekara,upstream side	10.150827	76.215245	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.50km	Paravur puzha near Paravur Market	10.15294	76.220307	18m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.67km	Paravur puzha near Muzris	10.153482	76.2281	20m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.72km	Paravur puzha near Thattukadavu boat jetty	10.153452	76.22189	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.78km	Paravur puzha near Kannan kulangara temple	10.153888	76.222713	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.8km	Paravur puzha near Kannan kulangara temple,upstream	10.154015	76.222645	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Koottukadu bridge	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
2.9km	Anchamparuthy puzha bridge near Kooottukad road	10.15407	76.22255	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
3.50km	Near Kottichirappadam Bridge	10.153783	76.229028	22m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
3.53km	Near Kottichirappadam Bridge	10.153823	76.229088	22m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Thattukadavu bridge	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
3.62km	Paravur puzha near Kacherithodu	10.154025	76.229853	20m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
3.63km	Paravur puzha near Bhadrakali temple	10.154128	76.230125	20m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Bridge near Koottichirappadam road	NA	Nil	NO	Nil	Nil	_	Nil	Nil	Nil	
3.66km	Paravur puzha near Kacherithodu	10.154112	76.230177	20m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	NA	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
4.20km	Anchamparuthy puzha near Chendamangalam bridge	10.155132	76.234018	20m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Bridge at Chendamangalam	Nil	Nil	No	Nil	Nil	_	Nil	Nil	Nil	
5.96km	Anchamparuthy puzha towards east at Munduruthy bridge	10.156939	76.247519	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Munduthurut	Nil	Nil	No	Nil	Nil	_	Nil	Nil	Nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
5.96km	Anchamparuthy puzha towards west at Munduruthy bridge	10.156957	76.247485	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	hy bridge	Nil	Nil	No	Nil	Nil	_	Nil	Nil	Nil	
7.05km	Anchamparuthy thodu	10.160836	76.25469	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
7.25km	Anchamparuthy thodu ward 10 ,Aarankavu	10.161832	76.253013	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
7.7km	Anchamparuthy thodu view of small thodu on opp.side	10.16569	76.251314	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
7.75km	Anchamparuthy thodu	10.165691	76.25132	25m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
7.8km	Anchamparuthy thodu at Mattuparam kadavu	10.165857	76.251468	30m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
7.85km	Anchamparuthy puzha behind thuruth near Amb-k road	10.165859	76.251462	30m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
8.0Km	Anchamparuthy puzha joining to periyar	10.168546	76.251982	45m	silt and clay	Partialy proteted	Private	silt and clay	0.3	0.3	silt and clay	Private	Partialy proteted	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Puthen thodu -Tributary of Paravur puzha**																								
0.00km	Puthenthodu joining National waterway	10.092782	76.231408	22 m	clay	N	private	clay	NA	NA	clay	private	N	NA	N	N	N	Nil	clay	_	NA	NA	NA	
0.850Km	Puthenthodu near Pulinganad bridge	10.0983	76.228902	20m	clay	N	private	clay	NA	NA	clay	private	N	bridge	N	N	N	Nil	clay	_	NA	NA	NA	
0.850Km	Puthenthodu near Pulinganad bridge	10.098253	76.228872	20m	clay	N	private	clay	NA	NA	clay	private	N	bridge	N	N	N	Nil	clay	_	NA	NA	NA	
1.50 Km	Puthenthodu near Kadakkara bridge	10.103707	76.227385	18m	clay	N	private	clay	NA	NA	clay	private	N	bridge	NA	Nil	Nil	Nil	clay	_	NA	NA	NA	
1.50 Km	Puthenthodu near Kadakkara bridge,Edathuruth	10.103735	76.227383	18m	clay	N	private	clay	NA	NA	clay	private	N	bridge	NA	NA	NA	Nil	clay	_	NA	NA	NA	
1.50 Km	Puthenthodu near Kadakkara bridge,Edathuruth	10.103712	76.22739	18m	clay	N	private	clay	NA	NA	clay	private	N	bridge	NA	NA	NA	Nil	clay	_	L/B	solid	YES	
2.85 Km	Puthenthodu near Lanka Bridge	10.114403	76.224568	12 m	clay	N	private	clay	NA	NA	clay	private	N	bridge	NA	NA	NA	Nil	clay	_	NA	NA	NA	
2.85 Km	Puthenthodu near Lanka Bridge	10.114407	76.22457	12 m	clay	N	private	clay	NA	NA	clay	private	N	bridge	NA	NA	NA	Nil	clay	_	NA	NA	NA	
4.05 Km	Puthenthodu near Kayikkara thodu joining	10.124705	76.221633	30 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
4.05 Km	Puthenthodu near Kayikkara thodu joining	10.124705	76.221633	30 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
4.05 Km	Puthenthodu near Kayikkara thodu joining	10.124692	76.221622	30 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
5.35Km	Puthenthodu ,culvert near Thalakkattu road	10.13426	76.214992	10 m	clay	N	private	clay	NA	NA	clay	private	N	culvert	NA	NA	NA	Nil	clay	_	NA	NA	NA	
5.35 Km	Puthenthodu ,culvert near Thalakkattu road	10.13432	76.21497	10 m	clay	N	private	clay	NA	NA	clay	private	N	culvert	NA	NA	NA	Nil	clay	_	NA	NA	NA	
5.70 Km	Puthenthodu near Chakkathara Bridge	10.136967	76.214712	14 m	clay	N	private	clay	NA	NA	clay	private	N	Bridge	NA	NA	NA	Nil	clay	_	NA	NA	NA	
5.72 Km	Puthenthodu near Chakkathara Bridge	10.137052	76.214673	14 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
5.72 Km	Puthenthodu near Chakkathara Bridge	10.13701	76.214675	14 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.35 Km	Puthenthodu near Perumpadanna	10.142145	76.21344	13 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.45Km	Puthenthodu near Perumpadanna Bridge	10.143503	76.212977	16 m	clay	N	private	clay	NA	NA	clay	private	N	Bridge	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.48Km	Puthenthodu near Perumpadanna Bridge	10.143372	76.213065	16 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.40Km	Puthenthodu near Perumpadanna Bridge	10.143342	76.213065	16 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.75Km	Puthenthodu near Mahatma road	10.145602	76.210572	15 m	clay	y	private	clay	0.75	0.75	clay	private	y	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.80Km	Puthenthodu near Mahatma road	10.145643	76.210627	12 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.82Km	Puthenthodu near Mahatma road	10.145627	76.21019	12 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.85Km	Puthenthodu near Mahatma road	10.1456	76.210185	8 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.88Km	Puthenthodu near Mahatma road	10.14569	76.210098	16 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.88Km	Puthenthodu near Mahatma road	10.145517	76.210385	16 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
6.90Km	Puthenthodu joining to Paravur puzha	10.145958	76.209792	16 m	clay	N	private	clay	NA	NA	clay	private	N	NA	NA	NA	NA	Nil	clay	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **KUZHUVELI THODU -Tributary of Puthen thodu-**																								
0.0Km	Kuzhuveli thodu starts	10.093506	76.23408	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.145Km	Kuzhuveli thodu at Kottuvally	10.093177	76.232973	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	Thick waterweeds
0.250Km	Kuzhuveli thodu Kottuvally	10.092885	76.23194	5.0m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
0.290Km	Kuzhuveli thodu Kottuvally	10.092778	76.231615	10m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.380Km	Kuzhuveli thodu joining to Puthenthodu	10.09263	76.23078	10m	clay	Y	private	clay	0.6	0.6	clay	private	Y	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
River/Tributary/Sub-tributary : **Periyar River - Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Kayikkara thodu (Tributary of Puthenthodu thodu)**																								
0km	Kayikkara thodu	10.125105	76.22291	2m	clay	partialy protected	Private	clay	0.5	0.5	clay	private	Partially protected	NIL	Nil	Nil	Nil	0.75	clay	_	Nil	NA	NA	Thick vegetation
0 Km	Kayikkara thodu	10.125088	76.222912	2m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.75	clay	_	Nil	NA	NA	Thick vegetation
0.010Km	Kayikkara thodu	10.12508	76.222837	5m	clay		Private	clay	0.5	0.5	clay	private		NIL	Nil	Nil	Nil	0.3	clay	_	Nil	NA	NA	Thick vegetation
0.043Km	Kayikkara thodu near Culvert	10.124982	76.222538	5m	clay		Private	clay	0.3	0.3	clay	private		NIL	Nil	Nil	Nil	0.3	clay	_	Nil	NA	NA	Thick vegetation
0.100Km	Kayikkara thodu - Culvert	10.12472	76.222007	5m	clay		Private	clay	0.3	0.3	clay	Private		Culvert	NA	NIL	No	0.3	clay	_	Nil	NA	NA	
0.110Km	Kayikkara thodu near Culvert	10.124713	76.222008	5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.3	clay	_	Nil	NA	NA	
0.115Km	Kayikkara thodu near Culvert	10.124742	76.222027	5m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.3	clay	_	Nil	NA	NA	
0.125Km	Kayikkara thodu near Culvert	10.124708	76.221927	6m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.3	clay	_	Nil	NA	NA	
0.140Km	Kayikkara thodu joining to Puthenthodu	10.124712	76.221987	6m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.3	clay	_	Nil	NA	NA	
0.150Km	Kayikkara thodu joining to Puthenthodu	10.124598	76.22164	6m	clay		Private	clay	0.3	0.3	clay	Private		NIL	NA	NIL	No	0.3	clay	_	Nil	NA	NA	
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Kongini thodu - Tributary of of Puthenthodu**																								
0.0Km	Kongini thodu at Ezhikkara	10.13251	76.207365	7m	clay	Partial	private	clay	0.2	0.2	clay	private	Partial	Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.610Km	Kongini thodu at near paddy field ,Ezhikkara	10.134595	76.212692	7m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.620Km	Kongini thodu at near paddy field ,Ezhikkara	10.134583	76.212573	4m	clay		private	clay	0.2	0.2	clay	private		Culvert	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.620Km	Kongini thodu at near paddy field ,Ezhikkara	10.134582	76.212577	4m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	NA	NA	Nil	Nil	_	NA	NA	NA	
0.640Km	Kongini thodu at near paddy field ,Ezhikkara	10.134683	76.212975	4m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
.670Km	Kongini thodu at near paddy field ,Ezhikkara	10.13472	76.21306	4m	clay		private	private	0.2	0.2	clay	private		Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
0.70Km	Kongini thodu at near paddy field ,Ezhikkara	10.134843	76.213275	4m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	NA	Nil	Nil	_	NA	NA	NA	slight vegetation
0.70Km	Kongini thodu at near paddy field ,Ezhikkara	10.134818	76.213282	4m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.71Km	Kongini thodu at near paddy field ,Ezhikkara	10.134813	76.213278	4m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation
0.94Km	Kongini thodu joining to Puthenthodu	10.135825	76.215217	4m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Kundekavu thodu -Tributary of of Puthenthodu**																								
0.0Km	Kundekavu thodu Starting from Kannachira	10.120551	76.225673	11m	clay	Partial	private	private	private	private	private	private	Partial	Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.190Km	Near Chathanad Bridge	10.120551	76.225673	11m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.20Km	Near Chathanad Bridge	10.120545	76.22566	11m	clay		private	clay	0.2	0.2	clay	private		Chathanad Bridge	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.21Km	Near Chathanad Bridge	10.120579	76.225693	11m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
0.48Km	Kundekavu thodu joining to Puthenthodu	10.119529	76.223224	11m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **KACHERI THODU -Tributary of Paravur puzha**																								
0 Km	Kacherithodu starting ,North Paravur	10.152543	76.231058	5.5m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	NA	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0 Km	Kacherithodu ,North Paravur	10.152552	76.231173	5.5m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	NA	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.023Km	Kacherithodu, North Paravur	10.152637	76.231003	5.5m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	NA	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.047Km	Kacherithodu, North Paravur	10.15268	76.230947	5.5m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	NA	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.165Km	Kacherithodu, North Paravur	10.153663	76.230443	5.5m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	NA	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.187Km	Kacherithodu, North Paravur	10.153822	76.230345	6m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	Nil	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.205Km	Kacherithodu, North Paravur	10.153975	76.230268	6m	clay	Y	private	clay	0.4	0.4	clay	private	Y	Nil	NA	Nil	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.205Km	Kacherithodu, North Paravur	10.153975	76.230268	6m	clay	Y	private	clay	0.2	0.2	clay	private	Y	Nil	NA	Nil	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
0.208Km	Kacherithodu joining to Paravur puzha	10.153983	76.23023	7m	clay	Y	private	clay	0.2	0.2	clay	private	Y	Nil	NA	Nil	NA	0.3	clay	_	Nil	Nil	Nil	slight vegetation
River/Tributary/Sub-tributary : **Periyar river -Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Periyar/Paravur puzha/ Pooyampilly thodu**																								
0m	Start of Pooyampilly thodu from Paravur puzha , Vadakkekara	10.147837	76.209271	15m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
292m	Pooyampilly thodu Near Needoor colony road, Vadakkekara	10.148842	76.207588	6m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	culvert	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
386m	Pooyampilly thodu Near east side of Pooyappilly Gurumandhir, Vadakkekara	10.149383	76.206973	8m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Nil		nil	NA	60cm	Clay	_	NA	NA	NA	No
432m	Pooyampilly thodu Near Pooyappilly Gurumandhir, Vadakkekara	10.14979	76.206643	8m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
550m	Pooyampilly thodu at Pooyappilly culvert, Vadakkekara	10.150769	76.206402	8m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	culvert	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
603m	Kaipram thodu joining to Pooyampilly main thodu , Vadakkekara	10.151237	76.206265	13m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.72km	Pooyampilly thodu joining to National Water way , Vadakkekara	10.153093	76.198534	20m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary : **Periyar river -Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Periyar/ Pooyampilly thodu /Kaipram thodu**																								
0m	Start of Kaipram thodu from pattanam thodu , Vadakkekara	10.153585	76.209107	4m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
5m	Kaipram thodu at culvert across kalarikkal temple road, Vadakkekara	10.153585	76.209057	4m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	culvert	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
340m	Kaipram thodu Near Puyampilly main road , Vadakkekara	10.151847	76.207195	6m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
347m	Puyampilly link thodu Near Raja mill road , Vadakkekara	10.151847	76.207195	6m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	Yes
450m	Kaipram thodu joining to Puyampilly main thodu , Vadakkekara	10.151501	76.206376	14m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary : **Periyar river -Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary- **PARAYAKKAD -VELANKADAVU THODU - Tributary of Paravur puzha**																								
0 Km	Parayakkad - Velankadavu thodu	10.15316	76.2187	45m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	nil	nil	_	Nil	Nil	Nil	
0.87Km	Parayakkad - Velankadavu thodu	10.158142	76.221093	30m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	nil	nil	_	Nil	Nil	Nil	
0.88Km	Parayakkad - Velankadavu thodu	10.158088	76.221103	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	0.6	clay	_	Nil	Nil	Nil	

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.60Km	Parayakkad - Velankadavu thodu	10.162275	76.2222	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Cheriapallam thuruth Bridge at Kootukkadu road	NA	NA	NA	0.6	clay	_	Nil	Nil	Nil	
2.61Km	Parayakkad - Velankadavu thodu near kottukkadu bridge	10.162323	76.222237	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
3.55Km	Parayakkad - Velankadavu thodu near Velan kadavu bridge	10.158309	76.228015	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA		Nil	Nil	_	Nil	Nil	Nil	
3.59Km	Parayakkad - Velankadavu thodu	10.158057	76.227907	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
3.59Km	Parayakkad - Velankadavu thodu near Velan kadavu bridge	10.158316	76.228016	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
3.60Km	Parayakkad - Velankadavu thodu - Velan kadavu bridge	10.158085	76.227957	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Velan kadavu bridge	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
3.61Km	Parayakkad - Velankadavu thodu near Velan kadavu bridge	10.15778	76.228105	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
3.75Km	Parayakkad - Velankadavu thodu near Thooyithara road	10.157713	76.22947	17m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
4.59Km	Parayakkad - Velankadavu thodu	10.157327	76.233777	12m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
4.60Km	Parayakkad - Velankadavu thodu	10.157398	76.233777	12m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Thooyithara bridge	NA	NA	No	Nil	Nil	_	Nil	Nil	Nil	
4.60km	Parayakkad - Velankadavu thodu - Thooyithara bridge	10.157342	76.233922	12m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial		NA	NA	No	Nil	Nil	_	Nil	Nil	Nil	
4.605Km	Near Thooyithara bridge	10.157247	76.23386	12m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
4.90Km	Parayakkad - Velankadavu thodu	10.15523	76.23326	12m	clay	Partial	private	clay	0.4	0.4	clay	private	Partial	Nil	NA	NA	NA	Nil	Nil	_	Nil	Nil	Nil	
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Thachappilly puzha -Tributary of Parayakadu Velankadavu thodu**																								
0.0Km	Vadakkumpuram	10.165514	76.230392	7m	clay	Partial	private	private	0.2	0.2	clay	private	Partial	Nil	Nil	Nil	Nil	Nil	Nil	_	Nil	Nil	Nil	
0.43Km	Vadakkumpuram	10.169572	76.229355	12m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	NA	Nil	Nil	_	NA	NA	NA	slight vegetation
0.45Km	Vadakkumpuram	10.169283	76.229297	12m	clay		private	clay	0.2	0.2	clay	private		Bridge at Vadakumpuram	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation
0.680Km	Chendamangalam	10.1695	76.22719	12m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.685Km	Chendamangalam	10.169418	76.22709	12m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation
1.1Km	Parayakkad , Chendamangalam	10.166091	76.226113	12m	clay		private	clay	0.2	0.2	clay	private		Bridge near Parayakkad KAPPELA	NA	Nil	No	Nil	Nil	_	NA	NA	NA	slight vegetation
1.5Km	Chendamangalam	10.163149	76.224742	20m	clay		private	clay	0.2	0.2	clay	private		Nil	NA	NA	NA	Nil	Nil	_	NA	NA	NA	slight vegetation
River/Tributary/Sub-tributary : **Periyar river -Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Pashni thodu - Tributary of Paravur puzha**																								
0.0 km	Pashni thodu near cheriapilly bridge	10.125311	76.248533	13m	clay	No	private	clay	0.9	0.9	clay	private	yes	nil	NA	nil	NA	0.6	clay	_	NA	NA	NA	
1.1km	Pashni thodu	10.134342	76.245438	8m	clay	yes	private	clay	1.1	1.1	clay	private	yes	bridge	NA	nil	NA	2.3	clay	_	NA	NA	NA	Slight vegetation
1.70km	Pashni thodu	10.139399	76.244004	8m	clay	yes	private	clay	1.1	1.1	clay	private	yes	bridge	NA	nil	NA	1.3	clay	_	NA	NA	NA	Slight vegetation
2.31km	Pashni thodu	10.144636	76.241885	8m	clay	yes	private	clay	1.1	1.1	clay	private	yes	peruvaram east bridge	NA	nil	NA	0.3	clay	_	NA	NA	NA	Slight vegetation
3.09km	Pashni thodu north side	10.149492	76.237332	8m	clay	no	private	clay	0.9	0.9	clay	private	yes	nil	NA	nil	NA	0.6	clay	_	NA	NA	NA	Slight vegetation
3.1km	Pashni thodu south side	10.149405	76.237285	8m	clay	no	private	clay	0.9	0.9	clay	private	yes	Bridge at Pallithazham	NA	nil	NA	0.6	clay	_	NA	NA	NA	Slight vegetation
3.15km	Pashni thodu	10.149878	76.237363	8m	clay	no	private	clay	0.9	0.9	clay	private	yes	nil	NA	nil	NA	0.6	clay	_	NA	NA	NA	
3.3km	Pashni thodu	10.1515	76.237363	8m	clay	yes	private	clay	0.75	0.75	clay	private	yes	nil	NA	nil	NA	0.6	clay	_	NA	NA	NA	
3.4km	Pashni thodu	10.151748	76.237293	8m	clay	yes	private	clay	1.1	1.1	clay	private	yes	nil	NA	nil	NA	0.6	clay	_	NA	NA	NA	
3.59km	Pashni thodu near Poothayil bridge	10.153667	76.236565	8m	clay	yes	private	clay	0.75	0.75	clay	private	yes	bridge		nil	NA	0.4	clay	_	NA	NA	NA	Slight vegetation
3.59km	Pashni thodu near Poothayil bridge	10.15359	76.236575	8m	clay	yes	private	clay	0.5	0.5	clay	private	yes	bridge		nil	NA	0.4	clay	_	NA	NA	NA	Slight vegetation
3.76km	Pashni thodu	10.15513	76.236093	10m	clay	no	private	clay	0.7	0.7	clay	private	yes	nil	NA	nil	NA	0.4	clay	_	NA	NA	NA	Slight vegetation
3.76km	Pashni thodu	10.155133	76.236118	12m	clay	no	private	clay	1.1	1,1	clay	private	yes	nil	NA	nil	NA	0.2	clay	_	NA	NA	NA	
3.85km	Pashni thodu	10.155268	76.236068	12m	clay	Partially	private	clay	1.1	1.1	clay	private	Partially protected	nil	NA	nil	NA	0.2	clay	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar river -Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Alunkal kadavu thodu (Tributary of Paravur puzha)**																								
0m	Start of Alunkalkadavu thodu from Achamparuthy thodu, Chendamangalam	10.15701	76.247533	4m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
130m	Alunkalkadvu thodu near east side of Munduthuruthy road, Chendamangalam	10.158101	76.247777	4m	Clay	Partially protected	Private	Clay	40cm	40cm	Clay	Private	Partially protected	Nil	NA	nil	NA	60cm	Clay	_	NA	NA	NA	No
498m	Alunkalkadvu thodu near east side of Munduthuruthy culvert,Chendamangalam	10.161153	76.247359	4m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	Nil		nil	NA	70cm	Clay	_	NA	NA	NA	No

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										Vegetation if any
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
780m	Alunkalkadvu thodu at Munduthuruthy culvert,Chendamangalam	10.162295	76.245658	4m	Clay	Partially protected	Private	Clay	60cm	60cm	Clay	Private	Partially protected	culvet	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.12km	Alunkalkadvu thodu at Arankkavu culvrt,Chendamangalam	10.160432	76.244518	5m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	culvet		nil	NA	50cm	Clay	_	NA	NA	NA	Yes
1.79km	Alunkalkadvu thodu near Thekkumpuram kadavu,Chendamangalam	10.157812	76.243192	6m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
2.15km	Alunkalkadvu thodu at near to mouth of Anchamparuthy thodu /end of Vedimara kadavu road ,Chendamangalam	10.15617	76.244193	8m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
2.17km	Alunkalkadvu thodu joining to Anchamparuthy thodu ,Chendamangalam	10.155858	76.244123	8m	Clay	No	Private	Clay	60cm	60cm	Clay	Private	No	Nil	NA	nil	NA	50cm	Clay	_	NA	NA	NA	Yes
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Korakkara thodu -Tributary of Periyar River**																								
0.0Km	Korakkara thodu starts at Vadakumpuram	10.169324	76.232058	3m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	Nil	NA	0.3	clay	_	NA	NA	NA	Slight vegetation
0.25Km	Korakkara thodu west side	10.16959	76.232763	3m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Culvert across Kollamparambu-Panayathara road	NA	Nil	No	0.3	clay	_	NA	NA	NA	Thick vegetation
0.250km	Korakkara thodu east side	10.169558	76.232767	3m	clay	Partial	private	clay	NA	NA	clay	private	Partial		NA	Nil	No	0.3	clay	_	NA	NA	NA	Thick vegetation
0.40Km	bridge near paliyam road at Chendamangalam	10.169842	76.23416	2m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Culvert cross Paliyam road	NA	Nil	No	0.6	clay	_	NA	NA	NA	Thick vegetation
0.440Km	Korakkara thodu east side ,Chendamngalam	10.169928	76.23443	2m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	Nil	NA	0.6	clay	_	NA	NA	NA	Thick vegetation
1.70Km	Korakkara thodu ,Chendamangalam	10.170665	76.245578	2m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	NA	NA	0.6	clay	_	NA	NA	NA	Thick vegetation
2.08Km	Culvert at CHM Kovilakam road			2m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Culvert	NA	NA	NA	1.6	clay	_	NA	NA	NA	Thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.10Km	Korakkara thodu near culvert across Kovilakam road	10.170663	76.245605	2m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	NA	NA	0.6	clay	_	L/B	solid	YES	Thick vegetation
2.17Km	Korakkara thodu joins to Periyar	10.1714	76.24578	2m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	NA	NA	0.6	clay	_	NA	NA	NA	Thick vegetation
River/Tributary/Sub-tributary : Periyar River - **Aluva Manappuram to Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Paliyam thodu - Tributary of Periyar river**																								
0.0km	Paliyam thodu starting from Thachappilli puzha	10.169862	76.227245	4.5m	clay	No	private	clay	0.7	0.7	clay	private	No	Nil	NA	Nil	Nil	0.3	clay	_	Nil	nil	nil	
0.14km	Paliyam thodu near Little flower chapel ,Vadakumpuram	10.17164	76.227658	4.5m	clay	yes	private	clay	0.7	0.7	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.24km	Paliyam thodu intermediate towards west	10.171628	1.65	4.5m	clay	No	private	clay	0.7	0.7	clay	private	No	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.20km	Paliyam thodu near Little flower chapel ,Vadakumpuram	10.171645	76.227663	4.5m	clay	yes	private	clay	0.7	0.7	clay	private	yes	culvert	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.61km	Paliyamthodu intermediate towards south	10.170562	76.230778	4.0m	clay	No	private	clay	0.7	0.7	clay	private	No	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.61km	Paliyamthodu intermediate towards south	10.170512		4.0m	clay	yes	private	clay	0.7	0.7	clay	private	No	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.69km	Paliyamthodu intermediate at Chendamangalam	10.171107	76.231078	6.0m	clay	yes	private	clay	0.9	0.9	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.74km	Paliyamthodu intermediate at Chendamangalam	10.171495	76.231325	4.00m	clay	yes	private	clay	0.9	0.9	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.79km	Paliyamthodu intermediate at Chendamangalam	10.171785	76.231623	4.00m	clay	yes	private	clay	0.9	0.9	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	thick vegetation
0.89	Paliyamthodu near Ayyappa temple ,Chendamangalam	10.171918	76.232453	4.0m	clay	yes	private	clay	0.7	0.7	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.90km	Paliyamthodu at chalipuram culvert	10.170973	76.227747	4.0m	clay	no	private	clay	0.7	0.7	clay	private	No	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.90km	paliyam thodu near chalipuram culvert	10.170463	76.227587	4.0m	clay	no	private	clay	0.7	0.7	clay	private	No	culvert	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
0.95	Paliyamthodu intermediate near Govt school	10.172038	76.233557	6.0m	clay	yes	private	clay	0.9	0.9	clay	private	yes	culvert	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	thick vegetation
0.97km	Paliyamthodu intermediate near Govt school	10.172123	76.233408	6.0m	clay	yes	private	clay	0.9	0.9	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	
1.0Km	Paliyamthodu intermediate near Govt school	10.172033	76.233633	6.0m	clay	yes	private	clay	0.9	0.9	clay	private	yes	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	thick vegetation
1.13km	Paliyamthodu intermediate to south near kovilakam road	10.17265	76.235217	3.0m	clay	Partially protected	private	clay	0.7	0.9	clay	private	No	Nil	NA	Nil	Nil	0.3	clay	_	nil	nil	nil	thick vegetation

Chainage	Location Name	Lattitude	Longitude	Approx width	Type of soil on bed	Left Bank				Right Bank				Obstructions										
														Structure				Sedimentation			Waste Deposit			
						Protected (Y/N)	Ownership of land	Type of soil	Height	Height	Type of soil	Ownership of land	Protected (Y/N)	Type	Present Condition	Any Obstruction to Flow	Whether reconstruction required or not	Approximate Depth	Type	Composition approx (clay, silt, sand)	L/B or R/B	Solid/ Liquid	Whether it pollutes water	Vegetation if any
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.25km	Paliyamthodu intermediate near post office	10.172723	76.235335	3.0m	clay	yes	private	clay	0.9	0.9	clay	private	yes	Nil	NA	Nil	Nil	0.6	clay	_	nil	nil	nil	thick vegetation
1.29km	Paliyamthodu intermediate near kovilakam road	10.172815	76.236612	3.0m	clay	Partially protected	private	clay	0.5	0.5	clay	private	No	Nil	NA	Nil	Nil	0.6	clay	_	nil	nil	nil	
1.64km	Paliyamthodu intermediate near pazhampilly thuruth bridge	10.175373	76.237213	3.0m	clay	Partially protected	private	clay	0.5	0.5	clay	private	Partially protected	Nil	NA	Nil	Nil	0.9	clay	_	nil	nil	nil	slight vegetation
1.90km	Paliyam thodu joining to Periyar	10.175876	76.237433	3.0m	clay	Partially protected	private	clay	0.5	0.5	clay	private	Partially protected	Nil	NA	Nil	Nil	0.9	clay	_	nil	nil	nil	slight vegetation
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **VP THURUTH THODU -Tributary of Periyar River**																								
0.0Km	VP thuruth thodu starting from chira near Sacred heart church				clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	Nil	No	0.3	clay	_	NA	NA	NA	Thick vegetation
0.088km	VP Thuruth thodu ,Puthenvelikkara	10.180944	76.236705	3m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	Nil	No	0.3	clay	_	NA	NA	NA	Thick vegetation
0.090Km	VP Thuruth thodu ,Puthenvelikkara	10.180902	76.23676	6m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	Nil	No	0.3	clay	_	NA	NA	NA	Thick vegetation
0.145Km	VP Thuruth thodu ,Puthenvelikkara	10.181362	76.236912	6m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	Nil	NA	0.3	clay	_	NA	NA	NA	
0.220Km	VP Thuruth thodu joining to Periyar	10.181866	76.237164	6m	clay	Partial	private	clay	NA	NA	clay	private	Partial	Nil	NA	NA	NA	0.3	clay	_	NA	NA	NA	
River/Tributary/Sub-tributary : **Periyar River / Aluva Manappuram -Puthenvelikkara**																								
Name of River/Tributary/Sub-tributary : **Kaipetty puzha -Kesavathuruth Thodu**																								
0.00km	Kesava Thuruth Thodu,start	10.141443	76.252383	9 m	clay	Partial	private	clay	NA	NA	clay	private	Partial	N	N	N	N	50 cm	clay	_	NA	NA	NA	
0.400km	Kesava Thuruth Thodu,Vazhikulangara Anachal Road	10.137993	76.253472	9 m	clay		private	clay	NA	NA	clay	private		Culvert	N	N	N	50 cm	clay	_	NA	NA	NA	
0.410km	Kesava Thuruth Thodu,Vazhikulangara Anachal Road	10.137965	76.253482	9 m	clay		private	clay	NA	NA	clay	private		N	N	N	N	50 cm	clay	_	NA	NA	NA	
0.395 Km	Kesava Thuruth Thodu,Vazhikulangara Anachal Road	10.138049	76.253461	9 m	clay		private	clay	NA	NA	clay	private		N	N	N	N	50 cm	clay	_	NA	NA	NA	
0.400Km	Kesava Thuruth Thodu,Vazhikulangara Kariyil	10.138041	76.253461	9 m	clay		private	clay	NA	NA	clay	private		Bridge	N	N	N	50 cm	clay	_	NA	NA	NA	
1.50Km	Kesava Thuruth Thodu,Sluice cum Bridge	10.138041	76.253461	9 m	clay		private	clay	NA	NA	clay	private		N	NA	Nil	Nil	50 cm	clay	_	NA	NA	NA	
1.50Km	Kesava Thuruth Thodu,Vazhikulangara Anachal Road	10.129262	76.256977	9 m	clay		private	clay	NA	NA	clay	private		N	NA	NA	NA	50 cm	clay	_	NA	NA	NA	
1.82Km	Kesava Thuruth Thodu,Vazhikulangara Anachal Road	10.12643	76.25785	10 m	clay		private	clay	NA	NA	clay	private		N	NA	NA	NA	50 cm	clay	_	NA	NA	NA	

SILT DEPOSIT FOR RIVER PERIYAR

SILT DEPOSIT FOR RIVER PERIYAR														
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km														
Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
1	Periyar	kumily	kumily - vandiperiyar			60				3872				
2	Periyar	Vandiperiyar Grama Panchayath	Vandiperiyar	9.574722	77.088196	50 m	78	-	0.3	100	25%	70%	5%	Silt deposit isover the rock bed of the river
3	Periyar	Vandiperiyar Grama Panchayath	Meenakshikayam	9.60095	77.08789	76 m	78.06	-	0.3	750	25%	70%	5%	Silt deposit isover the rock bed of the river
4	Periyar	Vandiperiyar Grama Panchayath	Chandravanam	9.608821	77.082666	75 m	79.21	-	0.5	1200	25%	70%	5%	Silt deposit isover the rock bed of the river
5	Periyar	Vandiperiyar Grama Panchayath	Chandravanam bridge to santhipalam	9˚60'77"N	77˚07'39"E	70m	80.23	87	2	91175	0%	80%	20%	
6	Periyar	Vandiperiyar Grama Panchayath	Santhipalam	9.640533	77.043595	30m	87.20 km	-	2.5	24975	0%	80%	20%	
7	Periyar	Elappara and Ayyappankovil Grama Panchayath	Heliburia Vallakkadavu	9.647504	77.030801	67m	89.302 km	-	1.5	28125	0%	80%	20%	
8	Periyar	Elappara and Ayyappankovil Grama Panchayath	Heliburia Vallakkadavu Bridge	9.653653	77.019076	79m	92.627 km	-	1.5	19050	0%	80%	20%	
9	Periyar	Elappara and Ayyappankovil Grama Panchayath	Moonattumukku bhagam	9.658379	77.016685	45m	90.61 km	-	3	59000	0%	80%	20%	
10	Periyar	Elappara and Upputhara Grama Panchayath	Upstream side of Chappath bridge	9.65911	77.019293	76m	92 km	-	2.5	11750	0%	80%	20%	
11	Periyar	Elappara and Upputhara Grama Panchayath	Bridge at Chappath bhagam	9.666696	77.022044	100m	92.89 km	-	2	16820	0%	80%	20%	

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
12	Periyar	Ayyappankovil Grama Panchayath	Alady	9.672475	77.023412	78m	93.8 Km	-	0.5	61.242	10%	50%	40%	Silt deposit isover the rock bed of the river
13	Periyar	Vazhatoppu	Cheruthoni Dam	9°50'49.53"N	76°58'6.67"E	650m	119.9	121.65	0.3	6000		80	20	
14	Periyar	Vazhathoppu	Cheruthoni Submercible bridge	9°51'27.52" N	76°57'48.7" E	46.2m	121.65	125.63	0.5	24000		80	20	
15	Periyar	Vazhathoppu	Thadiyambadu Chappath	9°52'43.95" N	76°58'13.51" E	170m	125.63	128.8	0.6	86400		80	20	
16	Periyar	Vazhathoppu& Mariyapuram	Karimban Bridge	9°53'55.86" N	76°58'27.56" E	210m	128.9	130.44	0.6	72000		80	20	
17	Periyar	Vathikkudy	Periyar Valley	9.933023	76.971985	70 m	132.46	133.85	0.5	12500		80	20	
18	Periyar	Konnathady	Panamkutty	9.9524598	76.98092	110 m	133.85	136.4	0.5	18500		70	30	
19	Periyar	Kanjikuzhy & A	Tattekkanni	10.005447	76.87645	100 Meter	144/700	146/600				Silt Only		
20	Periyar	Kanjikuzhy GP on left side Vellathooval GP on right side		9.999851	76.883886				NA	NA	NA	NA	NA	
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km														
NIL														
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km														
21	Periyar	Pindimana	Pindimana	10.13842500	76.6565667	207.40	180.300	180.550	1.349	29914.150		100		
22	Periyar	Pindimana	Pindimana	10.14007500	76.65580000	253.60	180.550	180.800	0.399	11161.500		100		
23	Periyar	Pindimana	Pindimana	10.14265556	76.65421389	132.50	180.800	181.300	0.398	5095.200		100		
24	Periyar	Pindimana	Pindimana	10.14509444	76.6522417	129.10	181.300	181.800	1.258	15577.850		100		
25	Periyar	Pindimana	Pindimana	10.14808611	76.6495583	331.80	181.800	182.300	2.422	91356.500		100		
26	Periyar	Vengoor	Kombanad	10.17010556	76.6082611	190.40	182.300	188.800	0.489	9795.300		100		
27	Periyar	Vengoor	Kombanad	10.17025278	76.60586670	176.10	188.800	189.050	0.247	4513.400		100		
28	Periyar	Vengoor	Kombanad	10.17053056	76.6034667	544.50	189.050	189.300	0.130	8384.500		100		
29	Periyar	Vengoor	Kombanad	10.17171944	76.6021472	537.00	189.300	189.550	1.605	101698.000		100		
30	Periyar	Vengoor	Kombanad	10.17211111	76.6006528	283.70	189.550	189.800	0.778	24733.050		100		
31	Periyar	Vengoor	Kombanad	10.17236667	76.5986057	274.30	189.800	190.050	0.425	12982.000		100		
32	Periyar	Vengoor	Kombanad	10.17259444	76.5966639	199.00	190.050	190.300	2.374	50141.000		100		
33	Periyar	Vengoor	Kombanad	10.17259444	76.5946222	194.30	190.300	190.550	0.184	3772.540		100		
34	Periyar	Vengoor	Kombanad	10.17298889	76.5922778	136.30	190.550	190.800	0.366	4869.280		100		
35	Periyar	Vengoor	Kombanad	10.17527778	76.5883333	140.70	190.800	191.050	0.400	5547.000		100		

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							From	To			Sand	Silt	Clay	
36	Periyar	Vengoor	Kombanad	10.17666667	76.5872222	194.10	191.050	191.300	0.502	10297.650		100		
37	Periyar	Vengoor	Kombanad	10.17916667	76.5852778	310.00	191.300	191.550	0.901	31545.000		100		
38	Periyar	Vengoor	Kombanad	10.18055556	76.5833333	386.70	191.550	191.800	1.978	88203.000		100		
39	Periyar	Vengoor	Kombanad	10.18166667	76.5827778	347.30	191.800	192.050	1.428	56631.000		100		
40	Periyar	Vengoor	Kombanad	10.18194444	76.5813889	182.50	192.050	192.300	1.263	24076.650		100		
41	Periyar	Vengoor	Kombanad	10.18222222	76.5788889	265.20	192.300	192.550	0.115	3374.680		100		
42	Periyar	Vengoor	Kombanad	10.18082778	76.5747611	214.60	192.550	193.050	1.299	29983.300		100		
43	Periyar	Vengoor	Kombanad	10.18027778	76.5719444	293.00	193.050	193.300	0.499	16394.350		100		
44	Periyar	Vengoor	Kombanad	10.18082778	76.5747611	365.60	193.300	193.550	0.656	27519.350		100		
45	Periyar	Vengoor	Kombanad	10.18361111	76.5658333	303.20	193.550	193.800	0.749	25573.000		100		
46	Periyar	Vengoor	Kombanad	10.18341111	76.5660778	274.40	193.800	194.050	1.009	30841.950		100		
47	Periyar	Vengoor	Kombanad	10.18666666	76.5652778	272.40	194.050	194.300	1.120	33936.500		100		
48	Periyar	Vengoor	Kombanad	10.18777778	76.5636111	156.30	194.300	194.550	0.597	9427.500		100		
49	Periyar	Vengoor	Kombanad	10.19000000	76.56250000	193.50	194.550	194.800	1.141	23314.700		100		
50	Periyar	Vengoor	Kombanad	10.19194444	76.5613889	194.20	194.800	195.050	2.706	55533.500		100		
51	Periyar	Vengoor	Kombanad	10.18166667	76.5772222	200.50	195.050	195.300	1.258	26820.650		100		
52	Periyar	Vengoor	Kombanad	10.19500000	76.5555556	272.40	195.300	195.550	0.143	4333.970		100		
53	Periyar	Vengoor	Kombanad	10.19444444	76.5561111	156.30	195.550	195.800	0.675	10657.600		100		
54	Periyar	Vengoor	Kombanad	10.19555556	76.5522222	193.50	195.800	196.050	1.280	26164.800		100		
55	Periyar	Vengoor	Kombanad	10.19527778	76.5505556	194.20	196.050	196.300	2.101	43125.200		100		
56	Periyar	Koovappady	Kodanad	10.19497500	76.5488722	200.50	196.300	196.550	0.926	19741.500		100		
57	Periyar	Koovappady	Kodanad	10.19486667	76.54677500	165.20	196.550	196.800	0.596	10068.350		100		
58	Periyar	Koovappady	Kodanad	10.19529722	76.54507780	167.50	196.800	197.050	0.225	3860.785		100		
59	Periyar	Koovappady	Kodanad	10.19557500	76.5427139	166.70	197.050	197.300	0,489	8371.050		100		
60	Periyar	Koovappady	Kodanad	10.19547778	76.5405722	151.70	197.300	197.550	0.322	4902.650		100		
61	Periyar	Koovappady	Kodanad	10.19527778	76.5288889	152.40	197.550	198.800	0.272	4157.705		100		
62	Periyar	Koovappady	Kodanad	10.19555556	76.5222222	155.70	198.800	199.550	0.192	3020.205		100		
63	Periyar	Koovappady	Kodanad	10.19527778	76.4768194	160.10	199.550	199.800	0.148	2410.635		100		
64	Periyar	Koovappady	Kodanad	10.19527777	76.5177778	200.40	199.800	200.050	0.076	1622.800		100		
65	Periyar	Koovappady	Kodanad	10.19416667	76.5136111	390.50	200.050	200.300	1.657	74670.500		100		
66	Periyar	Koovappady	Kodanad	10.18805556	76.5105556	238.70	200.300	200.800	0.819	21353.600		100		
67	Periyar	Koovappady	Kodanad	10.18694444	76.5122222	233.00	200.800	201.050	0.921	23374.650		100		
68	Periyar	Koovappady	Kodanad	10.18305556	76.5002778	192.60	201.050	203.050	0.516	10489.350		100		
69	Periyar	Koovappady	Kodanad	10.18388889	76.4983333	192.30	203.050	203.300	0.347	7035.800		100		
70	Periyar	Koovappady	Kodanad	10.18444444	76.4966667	200.10	203.300	203.550	0.749	15916.650		100		
71	Periyar	Koovappady	Kodanad	10.18527778	76.49500000	223.80	203.550	203.800	1.724	41770.750		100		
72	Periyar	Koovappady	Kodanad	10.18555556	76.4936111	261.70	203.800	204.050	0.986	28571.100		100		
73	Periyar	Koovappady	Kodanad	10.18555556	76.4913889	287.80	204.050	204.300	0.981	31603.750		100		
74	Periyar	Koovappady	Kodanad	10.18500000	76.4891667	242.30	204.300	204.550	0.179	4756.875		100		
75	Periyar	Koovappady	Kodanad	10.18416667	76.4869444	224.20	204.550	204.800	0.030	721.705		100		
76	Periyar	Koovappady	Kodanad	10.18277778	76.4830556	225.00	204.800	205.050	0.101	2463.055		100		

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							From	To			Sand	Silt	Clay	
77	Periyar	Koovappady	Kodanad	10.18250000	76.4805556	287.50	205.050	205.300	0.566	18220.150		100		
78	Periyar	Koovappady	Kodanad	10.18277778	76.4783333	266.80	205.300	205.550	0.564	16702.300		100		
79	Periyar	Koovappady	Koovappady	10.18194444	76.4752778	278.00	205.550	205.800	0.204	6313.700		100		
80	Periyar	Koovappady	Koovappady	10.18361111	76.47250000	294.00	205.800	206.050	0.567	18716.650		100		
81	Periyar	Koovappady	Koovappady	10.18305556	76.4702778	264.60	206.050	206.300	0.560	16426.950		100		
82	Periyar	Koovappady	Koovappady	10.18000000	76.47000000	285.80	206.300	206.550	0.810	25902.950		100		
83	Periyar	Koovappady	Koovappady	10.17833333	76.46750000	266.80	206.550	206.800	0.459	16278.800		100		
84	Periyar	Koovappady	Koovappady	10.17666667	76.4658333	253.90	206.800	207.050	0.415	11624.200		100		
85	Periyar	Okkal	Chelamattom	10.17361111	76.4638889	299.40	207.050	207.300	0.338	11378.150		100		
86	Periyar	Okkal	Chelamattom	10.17305556	76.4605556	242.10	207.300	207.550	0.234	6196.500		100		
87	Periyar	Okkal	Chelamattom	10.17055556	76.4602778	237.80	207.550	207.800	0.163	4251.105		100		
88	Periyar	Okkal	Chelamattom	10.16861111	76.45750000	282.60	207.800	208.050	1.358	42883.650		100		
89	Periyar	Okkal	Chelamattom	10.16777778	76.4547222	269.70	208.050	208.300	0.102	3056.390		100		
90	Periyar	Okkal	Chelamattom	10.16933333	76.4526667	250.00	208.300	208.550	0.078	2149.510		100		
91	Periyar	Okkal	Chelamattom	10.16805556	76.4497222	286.20	208.550	208.800	0.310	9932.200		100		
92	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19500000	76.5555556	272.40	208.800	195.550	0.143	4333.970		100		
93	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19444444	76.5561111	156.30	195.550	195.800	0.675	10657.600		100		
94	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19555556	76.5522222	193.50	195.800	196.050	1.280	26164.800		100		
95	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19527778	76.5505556	194.20	196.050	196.300	2.101	43125.200		100		
96	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19497500	76.5488722	200.50	196.300	196.550	0.926	19741.500		100		
97	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19486667	76.54677500	165.20	196.550	196.800	0.596	10068.350		100		
98	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19529722	76.5450778	167.50	196.800	197.050	0.225	3860.785		100		
99	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19557500	76.5427139	166.70	197.050	197.300	0.490	8371.050		100		
100	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19547778	76.5405722	151.70	197.300	197.550	0.322	4902.650		100		
101	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19527778	76.5288889	152.40	197.550	198.800	0.272	4157.705		100		
102	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19555556	76.5222222	155.70	198.800	199.550	0.192	3020.205		100		
103	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19527778	76.4768194	160.10	199.550	199.800	0.148	2410.635		100		
104	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19527777	76.5177778	200.40	199.800	200.050	0.076	1622.800		100		

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							From	To			Sand	Silt	Clay	
105	Periyar	Malayattoor Neeleswaram	Malayattoor	10.19416667	76.5136111	390.50	200.050	200.300	1.657	74670.500		100		
106	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18805556	76.5105556	238.70	200.300	200.800	0.819	21353.600		100		
107	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18694444	76.5122222	233.00	200.800	201.050	0.921	23374.650		100		
108	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18305556	76.5002778	192.60	201.050	203.050	0.516	10489.350		100		
109	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18388889	76.4983333	192.30	203.050	203.300	0.347	7035.800		100		
110	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18444444	76.4966667	200.10	203.300	203.550	0.749	15916.650		100		
111	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18527778	76.49500000	223.80	203.550	203.800	1.724	41770.750		100		
112	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18555556	76.4936111	261.70	203.800	204.050	0.986	28571.100		100		
113	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18555556	76.4913889	287.80	204.050	204.300	0.981	31603.750		100		
114	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18500000	76.4891667	242.30	204.300	204.550	0.179	4756.875		100		
115	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18416667	76.4869444	224.20	204.550	204.800	0.030	721.705		100		
116	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18277778	76.4830556	225.00	204.800	205.050	0.101	2463.055		100		
117	Periyar	Malayattoor Neeleswaram	Malayattoor	10.18250000	76.4805556	287.50	205.050	205.300	0.566	18220.150		100		
118	Periyar	Malayattoor Neeleswaram	Mattoor	10.18277778	76.4783333	266.80	205.300	205.550	0.564	16702.300		100		
119	Periyar	Malayattoor Neeleswaram	Mattoor	10.18194444	76.4752778	278.00	205.550	205.800	0.204	6313.700		100		
120	Periyar	Malayattoor Neeleswaram	Mattoor	10.18361111	76.47250000	294.00	205.800	206.050	0.567	18716.650		100		
121	Periyar	Malayattoor Neeleswaram	Mattoor	10.18305556	76.4702778	264.60	206.050	206.300	0.560	16426.950		100		
122	Periyar	Malayattoor Neeleswaram	Mattoor	10.18000000	76.47000000	285.80	206.300	206.550	0.810	25902.950		100		
123	Periyar	Malayattoor Neeleswaram	Mattoor	10.17833333	76.46750000	266.80	206.550	206.800	0.550	16278.800		100		
124	Periyar	Malayattoor Neeleswaram	Mattoor	10.17666667	76.4658333	253.90	206.800	207.050	0.415	11624.200		100		

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							From	To			Sand	Silt	Clay	
125	Periyar	Malayattoor Neeleswaram	Mattoor	10.17361111	76.4638889	299.40	207.050	207.300	0.338	11378.150		100		
126	Periyar	Malayattoor Neeleswaram	Mattoor	10.17305556	76.4605556	242.10	207.300	207.550	0.234	6196.500		100		
127	Periyar	Malayattoor Neeleswaram	Mattoor	10.17055556	76.4602778	237.80	207.550	207.800	0.164	4251.105		100		
128	Periyar	Kalady	Mattoor	10.16861111	76.45750000	282.60	207.800	208.050	1.358	42883.650		100		
129	Periyar	Kalady	Mattoor	10.16777778	76.4547222	269.70	208.050	208.300	0.102	3056.390		100		
130	Periyar	Kalady	Mattoor	10.16933333	76.4526667	250.00	208.300	208.550	0.078	2149.510		100		
131	Periyar	Kalady	Mattoor	10.16805556	76.4497222	286.20	208.550	208.800	0.310	9932.200		100		
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km														
132	Periyar	Kalady	Kalady	10.161848	76.440137	330	209.7	210.22	2.5	116162	0	50	50	
133	Periyar	Kalady	Kalady	10.158456	76.436632	330	210.07	210.22	2	14732	0	50	50	
134	Periyar	Kanjoor	Kanjoor	10.158458	76.435942	367	210.29	210.8	2.5	57315	0	50	50	
135	Periyar	Okkal	Okkal	10.15445	76.432576	389	210.905	211.527	2	81808	0	50	50	
136	Periyar	Okkal	Okkal	10.155592	76.435098	401	209.78	210.4	1.5	86725	0	50	50	
137	Periyar	Okkal	Okkal	10.152588	76.430783	356.31	210.31	210.53	2	15540	0	50	50	
138	Periyar	Okkal	Okkal	10.154248	76.433411	353.57	212.6	212.9	2.5	144542	0	50	50	
139	Periyar	Okkal	Okkal	10.145655	76.431815	265.5	212.07	212.15	2	3070	0	50	50	
140	Periyar	Okkal	Okkal	10.145989	76.442571	295	212.262	213.404	2	5.204	0	50	50	
141	Periyar	Vazhakkulam	Vazhakkulam	10.114488	76.420356	318	220.955	221.38	2.1	44106.3	0	50	50	
142	Periyar	Keezhmad	Keezhmad	10.121731	76.386064	292.9	225.68	225.595	2	2152	0	50	50	
143	Periyar	Aluva	Aluva	10.116217	76.372624	591	227.747	226.8	2.5	415660	0	50	50	
144	Periyar	Aluva	Aluva	10.116909	76.370952	591	227.278	227.338	2	2630	0	50	50	
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA														
145	Periyar	Kadungalloor	Uliyannoor	10.112537	76.339362	57.93	231.13	231.14	2.5	1448.25				
146	Periyar	Kadungalloor	Uliyannoor	10.11251	76.339155	64	231.14	231.16	1.65	2112				
147	Periyar	Kadungalloor	Uliyannoor	10.112515	76.33908	64.43	231.16	231.18	1.8	2319.48				
148	Periyar	Kadungalloor	Uliyannoor	10.111752	76.337185	59.7	231.18	231.42	1.96	28082.88				
149	Periyar	Kadungalloor	Uliyannoor	10.111593	76.337098	57.16	231.42	231.44	1.65	1886.28				
150	Periyar	Kadungalloor	Uliyannoor	10.107518	76.33499	56.73	231.69	231.73	1.85	4198.02				
151	Periyar	Kadungalloor	Uliyannoor	10.103085	76.33517	43.69	232.06	232.42	1.9	29883.96				
152	Periyar	Kadungalloor	Uliyannoor	10.101372	76.337298	73.92	232.42	232.47	2	7392				
153	Periyar	Kadungalloor	Uliyannoor	10.102733	76.33548	55.35	232.47	232.52	2.1	5811.75				
154	Periyar	Kadungalloor	Uliyannoor	10.102622	76.335623	53.88	232.52	232.54	1.96	2112.096				
155	Periyar	Kadungalloor	Uliyannoor	10.101868	76.336818	37.43	232.54	232.83	1.85	20081.195				
156	Periyar	Kadungalloor	Uliyannoor	10.094577	76.334537	62.05	233.56	233.62	1.63	6068.49				
157	Periyar	Kadungalloor	Uliyannoor	10.094195	76.334455	58.86	233.62	233.67	1.57	4620.51				
158	Periyar	Kadungalloor	Uliyannoor	10.093862	76.334398	63	233.67	233.84	1.58	16921.8				
159	Periyar	Kadungalloor	Uliyannoor	10.09067	76.334032	44.71	233.84	234.14	1.65	22131.45				
160	Periyar	Kadungalloor	Uliyannoor	10.089668	76.333962	48.21	234.14	234.18	1.86	3586.824				

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
161	Periyar	Kadungalloor	Uliyannoor	10.088158	76.333738	97.22	234.18	234.35	1.67	27600.758				
162	Periyar	Kadungalloor	Uliyannoor	10.087863	76.333642	82.3	234.35	234.38	1.89	4666.41				
163	Periyar	Kadungalloor	Uliyannoor	10.086927	76.333358	89.71	234.38	234.49	1.87	18453.347				
164	Periyar	Kadungalloor	Uliyannoor	10.086665	76.333287	88.12	234.49	234.54	2	8812				
165	Periyar	Eloor	Edamula	10.08241	76.33109	113.7	235.04	235.1	2	13644				
166	Periyar	Eloor	Edamula	10.082018	76.32847	84.21	235.22	235.41	2.1	33599.79				
167	Periyar	Kadungalloor	Kayantikkara	10.081978	76.327295	95.67	235.41	235.53	1.98	22731.192				
168	Periyar	Kadungalloor	Kayantikkara	10.082245	76.326925	83.23	235.53	235.58	1.7	7074.55				
169	Periyar	Kadungalloor	Kayantikkara	10.082473	73.325748	96.17	235.58	235.71	1.6	20003.36				
170	Periyar	Eloor	Pathalam	10.082618	76.324775	98.69	235.71	235.82	1.3	14112.67				
171	Periyar	Eloor	Pathalam	10.082888	76.322493	97.02	235.82	236.07	1.47	35654.85				
172	Periyar	Kadungalloor	CMRL	10.083005	76.320073	126.25	236.07	236.09	1.68	4242				
173	Periyar	Eloor	Pathalam	10.076932	76.312147	136.92	237.28	237.33	1.94	13281.24				
174	Periyar	Eloor	Pathalam	10.076702	76.31066	131.92	237.53	237.63	1.82	24009.44				
175	Periyar	Eloor	Pathalam	10.076697	76.310142	108.35	237.63	237.73	1.67	18094.45				
176	Periyar	Kadungalloor	Edayar	10.076842	76.30552	142.41	238	238.13	1.64	30361.812				
177	Periyar	Eloor	Vettukadavu	10.084585	76.298778	107.8	239.5	239.92	1.8	81496.8				
178	Periyar	Eloor	Vettukadavu	10.088263	76.29803	140.81	239.92	240.07	1.89	39919.635				
179	Periyar	Eloor	Vettukadavu	10.089535	76.297287	110.31	240.07	240.45	1.67	70002.726				
180	Periyar	Eloor	Vettukadavu	10.092735	76.295742	112.29	240.45	240.89	1.89	93380.364				
181	Periyar	Eloor	North	10.095218	76.292883	147.08	240.89	241.3	1.82	109751.096				
182	Periyar	Eloor	North	10.095803	76.28951	108.95	241.3	241.41	1.96	23489.62				
183	Periyar	Eloor	North	10.095785	76.288673	120.91	241.41	241.42	1.93	2333.563				
184	Periyar	Eloor	North	10.095777	76.288488	123.42	241.42	241.85	1.94	102956.964				
185	Periyar	Eloor	METHANAM	10.09484	76.284825	160.24	241.85	241.99	2	44867.2				
186	Periyar	Eloor	METHANAM	10.094148	76.28407	204.28	241.99	242.82	2.1	356060.04				
187	Periyar	Eloor	METHANAM	10.086863	76.283582	147.43	242.82	242.95	1.83	35073.597				
188	Periyar	Varappuzha	Muttinakam	10.085735	76.283968	185.9	242.95	243.34	1.49	108026.49				
189	Periyar	Eloor	Depot	10.082448	76.284668	225.1	243.34	243.79	1.58	160046.1				
190	Periyar	Eloor	Depot	10.078575	76.284288	131.28	243.79	243.92	1.63	27818.232				
191	Periyar	Eloor	Depot	10.077547	76.28384	116.11	243.92	244.06	1.87	30397.598				
192	Periyar	Eloor	Muttinakam	10.076398	76.283312	112.07	244.06	244.19	1.67	24330.397				
193	Periyar	Aluva	Marthandavarma Bridge	10.1122	76.3474	108	0	250	0.5	13500		25	75	soil to be tested for determine the qnty of composition
194	Periyar	Kadungalloor	near vaduva thodu	10.11076	76.34587	75	250	3900	0.8	219000	60	40		
195	Periyar	Kadungalloor	near Periyar hermitage	10.0883	76.33442	45	3900	4250	0.8	12600	60	40		delta

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							From	To			Sand	Silt	Clay	
196	Periyar	choornnikkara/kadungalloor	near choornnikkara	10.07319	76.33013	40	4250	6330	1	83200	60	40		delta
197	Periyar	choornnikkara/kadungalloor	muttom	10.07251	76.32892	30	6330	7190	0.7	18060	60	40		desilting
198	Periyar	kalamassery/elo or	varappuzha	10.07295	76.2822	45	7190	17290	0.8	363600	60	40		desilting
199	Periyar	Cochin corporati	Vaduthala container Terminal	10.015303	76.272153	780	0	1400	2 m	2515670.151				
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH														
201	Periyar	Aluva Muncipality	Near Aluva Manappuram	10.116667	76.356889	140m	0	0.28	1.4	6300	_	_	_	Silt deposition near start of Mangalappuzha branch of Periyar near Manappuram for an approx length of 150m , width 30m and depth 1.4m
202	Periyar	Chengamanad	Periyar near Mouth of Thoomba thodu (RB)	10.119403	76.356125	165m	0.28	0.42	1.8	9000	_	_	_	Silt deposition near right bank of Periyar near mouth of Thoomba thodu for an approx length of 200m , width 25m and depth 1.8m
203	Periyar	Aluva Muncipality	Near Govt Ayurveda Hospital (LB)	10.124476	76.346373	163m	0.42	1.7	0.9	2250	_	_	_	A bay portion of Periyar along left bank near Govt hospital is heavily silted for an area of 100m X 25m
204	Periyar	Chengamanadu	Near Chunkam kadavu (RB)	10.152455	76.328358	168m	1.7	5.7	1.5	6000	_	_	_	Silt deposition near right bank of Periyar near mouth of Karinthiri Aar and Chunkam kadavu for an approx length of 200m , width 20m and depth 1.5m
205	Periyar	Karumallur Panchayath	Near Pallath road (LB)	10.147846	76.314343	260m	5.7	7.3	1.5	3000	_	_	_	Silt deposition near left bank of Periyar near Pallath road for an approx dimensions of 100m , width 20m and depth 1.5m

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
206	Periyar	Karumallur Panchayath	Near Laksham veedu ground , Karumallur (LB)	10.1399	76.3032	220m	7.3	8.9	1.7	3750	_	_	_	Silt deposition near left bank of Periyar near Laksham veedu ground road for an approx dimensions of 100m , width 25m and depth 1.5m
207	Periyar	Karumallur Panchayath	Mambra kadavu road (LB)	10.13673	76.298665	283m	8.9	9.4	1.5	15000	_	_	_	Silt deposition near left bank of Periyar near Mambrakadavu road for an approx dimensions of 100m , width 25m and depth 1.5m
208	Periyar	Karumallur Panchayath	Periyar to Periyar mouth near S River Resorts (LB)	10.135822	76.292112	313m	9.4	10.05	1.5	18000	_	_	_	Silt deposition near left bank of Periyar near S River Resorts for an approx dimensions of 250m , width 20m and depth 1.5m
209	Periyar	Kunnukara Panchayat	Thazhathuveettilkadavu (RB)	10.139514	76.291144	177m	10.05	10.37	1.5	9375	_	_	_	Near to this location,there is a turning bend in the river course and hence Silt deposition is observed near left bank of Periyar near Thazhathuveettilkadavu for an approx dimensions of 250m , width 25m and depth 1.5m
210	Periyar	Kunnukara Panchayat	Manakkapallam(RB)	10.14108	76.289909	245m	10.37	10.7	2.3	9775	_	_	_	Delta formation of approx size 50 X 25 x 2.3m and 100 X 30X 2.3m observed due to silt deposition along the right bank at this location
211	Periyar	Kunnukara Panchayat	Ammanthuruthpallam (RB)	10.144179	76.286088	310m	10.7	11.35	1.2	3000	_	_	_	Silt deposition near left bank of Periyar near Ammanthuruthpallam kadavu for an approx dimensions of 100m , width 25m and depth 1.2m

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
212	Periyar	Kunnukara Panchayat	South side of Manjaly bridge	10.15236	76.27196	237m	11.35	13	2	1750	_	_	_	Silt deposition near south side of Manjali bridge for approx 35m X 25m X 2m
213	Periyar	Puthenvelikkara Panchayat	Near mouth of Payikkattupalam thodu,Puthenvelikkara (RB)	10.176644	76.248540	245m	13	17.5	0.9	144	_	_	_	Periyar near mouth of Payikkatupallam thodu to be desilted for 20X 8X 0.9m
214	Periyar	Puthenvelikkara GP, Chendamangalam GP, Vadakkekkara GP, Pallippuram GP Kodungalloor Municipality, Eriyad GP		10.178552 to 10.177008	76.243235 to 76.162964	450m	17.500	27.470	0.80	3500000	20	20	60	Silt deposit found for entire stretch

LOCATION OF SILT DEPOSIT / DELTA IN VARIOUS REACHES														
Periyar Left bank - Tributaries of Veeranpuzha (National water way)														
Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu	Chainage		Approx Depth of Siltation	Approx Quantity(m3)	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
1	**Vastheri thodu**	Pallippuram Panchayath	Pallippuram	10.137496	76.194826	7m	0 Km	1.7Km	0.3	3570				
2	**Main Karithala thodu**	Pallippuram Panchayath	Pallippuram	10.143912	76.186805	7m	0 Km	1.75Km	0.3	3675				
3	**Main Convent thodu**	Pallippuram Panchayath	Pallippuram	10.161163	76.177725	7m	0 Km	1.2km	0.6	5040				
4	**TL Antony thodu**	Pallippuram Panchayath	Pallippuram	10.165703	76.183143	3m	0 Km	0.2km	0.3	180				
5	**Thrikkadakkappilly thodu**	Pallippuram Panchayath	Pallippuram	10.149033	76.196537	3m	0km	0.4km	0.3	360				
6	**Chankaradithara thodu**	Pallippuram Panchayath	Pallippuram	10.132153	76.191158	3m	0 Km	1km	0.3	900				
7	**Seethilane road**	Pallippuram Panchayath	Pallippuram	10.14325	76.188288	3m	0km	0.20km	0.3	180				
8	**link thodu b/e Karithala and convent thodu**	Pallippuram Panchayath	Pallippuram	10.166018	76.177539	3m	0km	2km	0.3	1800				
9	**Punna thodu**	Pallippuram Panchayath	Pallippuram	10.165649	76.180194	3	0km	0.80km	0.3	720				
10	**Kuzhuppilly thodu**	Kuzhuppilly Panchayath	Kuzhuppilly	10.117145	76.200526	10m	0 Km	2.1km	0.3	6300				
11	**Ramavarma canal**	Kuzhuppilly Panchayath	Kuzhuppilly	10.126027	76.194479	8m	0 Km	2Km	0,6	9600				
12	**Vemplayi canal**	Kuzhuppilly Panchayath	Kuzhuppilly	10.115986	76.19678	10m	0 Km	1.5km	nil	NIL				
13	**Vemplayi thodu**	Kuzhuppilly Panchayath	Kuzhuppilly	10.125931	76.194552	3m	0 Km	1.0km	0.3	900				
14	**Nalukandam thodu**	Kuzhuppilly Panchayath	Kuzhuppilly	10.112535	76.19851	3m	0 Km	0.40km	0.3	360				
15	**Paruthy thodu**	Kuzhuppilly Panchayath	Kuzhuppilly	10.113728	76.195597	3m	0 Km	0.50km	0.3	450				
16	**Nadathodu**	Kuzhuppilly Panchayath	Kuzhuppilly	10.125916	76.205274	3m	0 Km	0.60km	0.3	540				
17	**Bundar canal**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.02959	76.218478	8m	0 Km	4km	nil	NIL				
18	**Mookanchira vadakku thodu**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.017582	76.225138	3m	0 Km	0.420km	0.3	378				
19	**Anjattu thodu**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.020195	76.214628	3m	0 Km	0.20km	0.3	180				
20	**Fish farm bundar canal link**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.020195	76.214628	3m	0 Km	0.500km	0.3	450				
21	**Companipeedika thodu**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.000496	76.236927	3m	0 Km	1km	0.3	900				
22	**canal link thodu**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.028213	76.215497	3m	0 Km	0.380km	0.3	342				

23	**Pallithodu**	Elamkunnapuzha Panchayath	Elamkunnapuzha	10.021553	76.233988	3m	0 Km	0.40km	0.3	360				
24	**Appangad thodu**	Njarakkal Panchayath	Njarakkal	10.037829	76.224338	12m	0 Km	2km	nil	NIL				
25	**Cheriya Puthenthodu**	Njarakkal Panchayath	Njarakkal	10.043904	76.210671	3m	0 Km	0.300km	0.3	270				
26	**Mampilli thodu**	Njarakkal Panchayath	Njarakkal	10.051005	76.222217	3m	0 Km	0.10km	0.3	90				
27	**Oliparambil thodu**	Njarakkal Panchayath	Njarakkal	10.050444	76.221752	3m	0 Km	0.150km	0.3	135				
28	**Kurathiyattu thodu**	Njarakkal Panchayath	Njarakkal	10.045941	76.230539	3m	0 Km	0.20km	0.3	180				
29	**Canal thodu**	Njarakkal Panchayath	Njarakkal	10.047075	76.205946	4m	0 Km	0.500km	0.3	600				
30	**Puthuval thodu near 4cent colony**	Njarakkal Panchayath	Njarakkal	10.040078	76.214731	3m	0 Km	0.20km	0.3	180				
31	**Thodu near pPozhiyil road**	Njarakkal Panchayath	Njarakkal	10.033817	76.210352	3m	0 Km	0.30km	0.3	270				
32	**Bundar canal Kaivazhi thodu**	Njarakkal Panchayath	Njarakkal	10.04228	76.219193	3m	0 Km	0.250km	0.3	225				
33	**Near Kottarathil Sreedharan road**	Njarakkal Panchayath	Njarakkal	10.038783	76.215328	3m	0 Km	0.40km	0.3	360				
34	**Thodu near Pridarsini road**	Njarakkal Panchayath	Njarakkal	10.045544	76.225164	3m	0 Km	0.2km	0.3	180				
35	**Vallakkadavu bhagam thadu**	Njarakkal Panchayath	Njarakkal	10.048488	76.224251	3m	0 Km	0.43km	0.3	387				
36	**Aruvelli thodu**	Njarakkal Panchayath	Njarakkal	10.036702	76.229427	3m	0 Km	0.50km	0.3	450				
37	**Puthuval panchayath thodu**	Njarakkal Panchayath	Njarakkal	10.030667	76.21667	3m	0 Km	0.20km	0.3	180				
38	**Kallumadam thodu**	Njarakkal Panchayath	Njarakkal	10.045545	76.225027	3m	0 Km	0.30km	0.3	270				
39	**Thodu near Francis road**	Njarakkal Panchayath	Njarakkal	10.042502	76.22751	3m	0 Km	0.25	0.3	225				
40	**Punchayil thodu**	Nayarambalam Panchayath	Nayarambalam	10.06815	76.217165	6m	0 Km	2km	0.75	9000				
41	**Njarakkal thodu**	Nayarambalam Panchayath	Nayarambalam	10.048219	76.217061	10m	0 Km	1.45km	nil	NIL				
42	**Iyyathu thodu**	Nayarambalam Panchayath	Nayarambalam	10.054981	76.215587	10m	0km	2.18km	nil	NIL				
43	**Priyadarsini Anganavady thodu**	Nayarambalam Panchayath	Nayarambalam	10.057591	76.202177	3m	0 Km	0.10km	0.3	90				
44	**Valiya Banerjee link thodu**	Nayarambalam Panchayath	Nayarambalam	10.0529	76.204197	4m	0 Km	0.80km	0.3	960				
45	**Nedungad puzha link thodu**	Nayarambalam Panchayath	Nayarambalam	10.070837	76.217979	3m	0km	0.10km	0.3	90				
46	**Laksham veedu colony thodu**	Nayarambalam Panchayath	Nayarambalam	10.067088	76.218473	3m	0 Km	0.20km	0,3	180				
47	**Vattathara koottathara thodu**	Nayarambalam Panchayath	Nayarambalam	10.065001	76.219038	3m	0 Km	0.20km	0.3	180				
48	**Nambrattithara thodu**	Nayarambalam Panchayath	Nayarambalam	10.064017	76.218725	3m	0 Km	1.2km	0.3	180				

49	**Tributory of Banerjee thodu**	Nayarambalam Panchayath	Nayarambalam	10.06799	76.19871	3m	0 Km	0.50km	0.3	450				
50	**Thodu near Padinjare beach road**	Nayarambalam Panchayath	Nayarambalam	10.058129	76.201131	3m	0 Km	0.40km	0.3	360				
51	**Thodu near Edayathu Temple road**	Nayarambalam Panchayath	Nayarambalam	10.058238	76.202289	3m	0 Km	0.20km	0.3	180				
52	**Valiya Banerjee link thodu at Chathanthara**	Nayarambalam Panchayath	Nayarambalam	10.058329	76.202529	3m	0 Km	0.20km	0.3	180				
53	**Mangalathu thodu**	Nayarambalam Panchayath	Nayarambalam	10.055888	76.203138	3m	0 Km	0.20km	1.3	180				
54	**Thodu near Veliyathparambu beach road**	Nayarambalam Panchayath	Nayarambalam	10.058307	76.201088	3m	0 Km	0.20km	0.3	180				
55	**Cheriya Banerjee thodu**	Nayarambalam Panchayath	Nayarambalam	10.052786	76.204026	3m	0 Km	1.40km	0.3	1260				
56	**Panakkal thodu**	Nayarambalam Panchayath	Nayarambalam	10.057719	76.202651	3m	0 Km	0.10km	0.3	90				
57	**Pallath thodu**	Nayarambalam Panchayath	Nayarambalam	10.071107	76.216198	3m	0 Km	0.30km	0.3	270				
58	**Kochambalm East thodu**	Nayarambalam Panchayath	Nayarambalam	10.06683	76.213836	3m	0 Km	0.50km	0.3	450				
59	**Punchayil west**	Nayarambalam Panchayath	Nayarambalam	10.069411	76.216765	3m	0 Km	0.250km	0.3	225				
60	**Panchayath thodu**	Nayarambalam Panchayath	Nayarambalam	10.071108	76.206095	3m	0 Km	0.40km	0.3	360				
61	**Ammangattu thodu**	Nayarambalam Panchayath	Nayarambalam	10.060912	76.219357	3m	0 Km	0.20km	0.3	180				
62	**Vadayil south thodu**	Nayarambalam Panchayath	Nayarambalam	10.062942	76.216759	3m	0 Km	0.20km	0.3	180				
63	**Kommankattil thodu**	Nayarambalam Panchayath	Nayarambalam	10.058748	76.219553	3m	0 Km	0.50km	0.3	450				
64	**Peruva thodu**	Nayarambalam Panchayath	Nayarambalam	10.062123	76.227586	3m	0km	1.2km	0.3	1080				
65	**Ambalathodu**	Nayarambalam Panchayath	Nayarambalam	10.071481	76.207699	5m	0km	1km	0.5	2500				
66	**Aniyil thodu**	Edavanakkad Panchayath	Edavanakkad	10.080686	76.210158	20m	0 Km	3.10km	NIL	NIL				
67	**Chathangad thodu**	Edavanakkad Panchayath	Edavanakkad	10.103731	76.204173	12m	0 Km	2.75km	NIL	NIL				
68	**Jaya thodu**	Edavanakkad Panchayath	Edavanakkad	10.100228	76.203597	3m	0 Km	0.20km	0.3	180				
69	**Thodu near Iqbal road**	Edavanakkad Panchayath	Edavanakkad	10.077989	76.206701	3m	0 Km	0.60km	0.3	540				
70	**Aniyil temple thodu**	Edavanakkad Panchayath	Edavanakkad	10.080166	76.215154	3m	0 Km	0.250km	0.3	225				
71	**Colony Koottinkal Adappu thodu**	Edavanakkad Panchayath	Edavanakkad	10.086819	76.211573	3m	0Km	0.20km	0.3	180				
72	**Pazhanganad south HSS thodu**	Edavanakkad Panchayath	Edavanakkad	10.089464	76.209132	3m	0 Km	0.30km	0.3	270		`		
73	**Vachakkal thodu**	Edavanakkad Panchayath	Edavanakkad	10.09298	76.201077	3m	0 Km	0.30km	0.3	270				
74	**Thodu near Tzunami flat**	Edavanakkad Panchayath	Edavanakkad	10.091207	76.203909	2,5m	0Km	0.150km	0.3	112.5				

75	**Thodu near Illathupady road**	Edavanakkad Panchayath	Edavanakkad	10.096157	76.210227	3m	0 Km	0.80km	0.3	720				
76	**Thodu near bhavana Anganavady**	Edavanakkad Panchayath	Edavanakkad	10.087086	76.205129	3m	0 Km	0.20km	0.3	180				
77	**Ola thodu**	Edavanakkad Panchayath	Edavanakkad	10.083938	76.207375	3m	0 Km	0.50km	0.3	450				
78	**Chathangad link thodu**	Edavanakkad Panchayath	Edavanakkad	10.104044	76.207834	3m	0 Km	0.350km	0.3	315				
79	**west colony thodu**	Edavanakkad Panchayath	Edavanakkad	10.093827	76.202992	3m	0 Km	0.50km	0.3	450				

TOTAL QUANTITY OF SILT DEPOST IN RIVER	12241246.86 m3

SILT DEPOSIT FOR TRIBUTARIES

SILT DEPOSIT FOR TRIBUTARIES														
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km														
Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
1	Gavi Thodu	kumily - vandiperiyar	Gavi Thodu			3.5	0	4.35						
2	Vallakkadavu poabs Estate Thodu	kumily - vandiperiyar	Vallakkadavu poabs Estate Thodu			3.3	0	1.955		150	60	20	20	
3	Kocokkad Thodu	kumily - vandiperiyar	Kocokkad Thodu			3	0	0.104		100	60	20	20	
4	Hpc Thodu	kumily - vandiperiyar	Hpc Thodu			3.2	0	3.067		200	60	20	20	
5	Injakkadu Thodu	kumily - vandiperiyar	Injakkadu Thodu			3	0	0.689		150	60	20	20	
6	Aranakkal Estate Thodu	kumily - vandiperiyar	Aranakkal Estate Thodu			3.8	0	3.867		180	60	20	20	
7	Vandiperiyar Sthram Thodu	kumily - vandiperiyar	Vandiperiyar Sthram Thodu			4.8	0	3.852		100	60	20	20	
8	Kumily Thodu	kumily - vandiperiyar	Kumily Thodu			3	0	3.8		150	60	20	20	
9	Keerikkara thodu	Vandiperiyar Grama Panchayath	Full length	9°61’25”N,	77°06’43”E.	5	0	4.7km	0.5 m	2500	-	75	25	
10	Ladrum thodu	Vandiperiyar Grama Panchayath	Full length	9°59’95” N,	77°03’67” E	12	0	5.6km	0.5 m	1000	-	75	25	
11	majumala thodu	Vandiperiyar Grama Panchayath	Full length	9°62’04” N	77°04’33” E	7	0	3.47km	0.5 m	2500	-	80	20	
12	Vellaramkunnu thodu	Vandiperiyar Grama Panchayath	Full length	9°63’35” N,	77°07’23” E.	6	0	8.52km	0.5 m	1000	-	80	20	
13	Sasthanada Moogalar thodu	Vandiperiyar Grama Panchayath	Full length	9°66’73”N,	77°08’87”E	8	0	13.5km	0.5 m	3500	-	80	20	
14	Chinnar thodu	Elappara and Upputhara panchayath	Full length	9.662987	77.004291	18	0	15.546 km	1.50 m	36150	-	80	20	
15	Elappara thodu	Elappara panchayath	Full length	9.631965	76.977305	12	0	8.43 km	1 m	15150	-	80	20	
16	Arappukadu thodu	Elappara and Upputhara panchayath	Full length	9.667718	76.956572	8	0	8 km	1.50 m	2760	-	80	20	
17	Vellilamkandom	Kanchiyar	Labbakkada	9.7288	77.058714	3	0/250	1/890	0.4	1200		80	20	
18	Mattapilly	Kanchiyar	Swaraj	9.735266	77.04892	3.5	0/810	0/920	0.6	900		90	10	
19	Murikkattukudy	Kanchiyar	Murikattukudy	9.735179	77.041232	4	2/350	2/856	0.45	700		85	15	
20	Kozhimala	Kanchiyar	Rajapuram	9.738257	77.023768	3	0/680	1/100	0.5	950		80	20	
21	Palakada	Kanchiyar	Labbakkada to Pezhumkandam	9.736389	77.065024	4	2/310	4/807	0.6	1500		90	10	
22	Kattappanayar	Kattappana&Kanchiyar	Kannamundapady to Johnykada chapathu	9.726078	77.108527	10	3/286	10/667	0.5	5000		85	15	
23	Mannakudy	Pampadumpara	Kollamkunnelpady to Tail end	9.792412	77.130809	3	0/850	1/350	0.6	1200		80	20	
24	Thankamany	Kamakshy& Erattayar	Schoolpady to Kumarakam- Cumbum Rd	9.835811	77.044514	5	0/880	4/460	0.45	3000		90	10	

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
25	Nellippara	Kamakshy& Erattayar	8th mile- Thankamany Rd to mathaipady-Pallinirappu Rd	9.810807	77.048033	4	1/060	2/455	0.5	2300		85	15	
26	Idinjamala	Kamakshy& Erattayar	Theesalangattupady	9.815201	77.090332	5.5	3/050	3/950	0.6	1000		80	20	
27	Narakakanam	Idukki	Narakakanam Jn to Vazhakkulampady	9.838204	76.998025	2.5	1/510	1/800	0.5	900		85	15	
28	Kattappana thodu	Kattappana	Parakkadavu to St.John's Hospital	9.753326	77.127127	4	1/130	3/600	0.6	2000		90	10	
29	Valiyakandam thodu	Kattappana	Vellayamkudy to Pentacost Church Valiyakandam	9.767867	77.097997	3.5	0/116	2/969	0.5	2500		85	15	
30	Erattayar river	Erattayar	Mannakudy tunnel to Erattayar Tunnel Point	9.798859	77.106932	11	4/204	4/650	0.5	2000	0.3	0.7		
31	.Uppukandam Thodu	Erattayar	Kanakkalpady &Mariyan industries	9.776557	77.124841	3	1.16	2.745	0.5	2500		1		
32	Vimalagiri	Mariyapuram	Vimalagiri	9°49'37.68" N	77°11'6.21" E	9	2.85	3.15	0.8	4310	0.15	0.4	0.45	
33	Churuli Thodu	Vazhathoppu	Periyar Valley	9.911153	76.967915	6	3/600	4/300	0.5	1500	0.3	0.5	0.2	
34	Perinjamkutty Aar	Erattayar	Erattayar North	9.81293	77.105127	10	0/340	1/200	0.75	6450		0.6	0.4	
35	Perinjamkutty Aar	Nedumkandam	Karunakaranpadi	9.836741	77.101192	6.5	1/840	3/450	0.5	1950		0.7	0.3	
36	Perinjamkutty Aar	Nedumkandam	Ettakkanam	9.867043	77.089586	16	3/450	3/740	1	4640	0.2	0.5	0.3	
37	Perinjamkutty Aar	Erattayar	Ettithoppu	9.848864	77.099389	10	4/900	5/790	0.5	4450		0.6	0.4	
38	Perinjamkutty Aar	Vathikkudi	Melechinnar	9.869379	77.091422	10	7/000	7/500	0.25	875	0.2	0.6	0.2	
39	Perinjamkutty Aar	Vathikkudi	Bethel	9.875908	77.088475	12	9/850	10/650	0.66	4752	0.2	0.6	0.2	
40	Perinjamkutty Aar	Konnathady	Chembakappara to Chinnar	9.90671	77.061397	16	14/400	20/000	0.75	20000		0.8	0.2	
41	Kallar thodu(Sub tributary of Perinjamkutty Aar)	Nedumkandam	Kurishupara	9.835731	77.130761	12	00/00	3/150	1	6000	0.2	0.6	0.2	
42	Kallar thodu(Sub tributary of Perinjamkutty Aar)	Nedumkandam	Thooval	9.844868	77.111835	8	4/200	5/560	0.5	2000	0.2	0.6	0.2	
43	COMPAYAR THODU	NEDUMKANDAM	COMPAYAR	9°49'37.68" N	77°11'6.21" E	10	5.52	6.22	0.6	6000	0.15	0.4	0.45	
44	COMPAYAR THODU	NEDUMKANDAM	COMPAYAR CHECK DAM PADY	9°49'41.97" N	77°10'48.59" E	10	6.75	7.15	0.9	2400	0.1	0.55	0.35	
45	PUSHPAKANDAM THODU	NEDUMKANDAM	PUSHPAKANDAM	9.4904°N	77.1145°E	7	9.1	9.21	0.4	7100	0.2	0.5	0.3	
46	Alliyar	KARUNAPURAM		9°44'45.70"	77°09'29.21" E	11.8	3.64	7.3	0.3	4200		1		

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							From	To			Sand	Silt	Clay	
47	Balagram - Puliyanmala THodu	Vandanmedu GP and Pampadumpara GP	Saniyasiyoda & Balagram	9.7963 °N	77.18282 °E	4	5.13	5.67	0.55	2640		1		
48	Kallar	KARUNAPURAM	KOOTTAR	9°46'14.05" N	77°12'27.48" E	16	19.6	19.8	0.4	7200	0.12	0.48	0.4	
49	Kallar	KARUNAPURAM	KOCHARA	9°43'42.66" N	77°11'48.14" E	16	12.96	13.18	0.6	4200	0.18	0.38	0.44	
50	Kallar	KARUNAPURAM	KOCHARA	9°41'55.29" N	77°11'47.17" E	16	8.51	9	0.5	6000	0.16	0.54	0.3	
51	Cheruthoni- jilla Asupathri thodu	Vazhathoppu	Jilla asupathri Culvert	9°50'54.08" N	76°57'36.33" E		0.73	1.78	0.3	840		0.6	0.3	
52	Mariyapuram Thodu	MARIYAPURAM	PHC Padi	9°51'19.08" N	76°59'18.13" E	4	5	6.6	0.4	2550		1		
53	Peppara Thodu	Vazhathoppu	Check Dam	9°52'59" N	76°56'36.95" E	7	4.65	5.05	0.6	4200		0.6	0.4	
54	Vazhathoppe Pallithazham thodu	Vazhathoppu	Vazhathoppu	9°52'30.14" N	76°57'36.89" E	3	0.9	2.14	0.3	900		1		
55	Palkulamedu- Asoka jn, thodu	Idukki- Kanjikuzhy Panchayath	Palkulamedu	9°54'8.19" N	76°57'2.29" E	6	2.82	5.55	.0.3	3840		0.9	0.1	
56	Muthirapuzha river	Munnar G.P	Periyavarai	10.109174	77.058047	32.00	6.185	6.685km	1.75	27000.00	80	10	10	
57	Muthirapuzha river		nallathanny junction	10.091094	77.060388	20.00	8.855km	9.055	1.5	5400.00	60	20	20	
58	Muthirapuzha river		near main junction bridge	10.085986,	77.060912	32.00	9.22	9.425	1.00	6500.00	70	20	10	
59	Muthirapuzha river		Confluence of Periyavarai river & kundala river	10.084707	77.061906	28.00	9.435	9.575	1.5	675.00	50	30	20	
60	Muthirapuzha river		U/S of bypass bridge	10.082118,	76.062274	32.00	9.885	9.985	2.00	1600.00				Rock boulders obstructing flow
61	Muthirapuzha river		D/S of bypass bridge	10.082118,	77.062274	50.00	9.985	13.325	1.75	175000.00	40	30	30	
62	Muthirapuzha river		U/S of Ellackal bridge	9.997457,	77.065701	30.00	22.81	22.32	0.50	4410.00	70	10	20	
63	Muthirapuzha river	Vellathuval G P	Panniyarkutty confluence	9.977719,	77.057752	30.00	26.22	26.32	1.00	2200.00				Rock boulders obstructing flow
64	Kundala river	Munnar	near KTDC	10.0844927	77.0702181	35.0	25.206	25.716	1.00	13388	40	30	30	
65	Nallathanni river	Munnar	Nallathanni river confluence to near tea museum	10.094063,	77.050189	5.00	2.625	4.00	0.80	4288.00		60	40	
66	Colony Thodu	Munnar	Culvert on munnar colony road (near SA cottage)	10.087476,	77.072612	4.00	0.421	1.21	0.70	1728.00		60	40	
67	Chockanadu thodu	Munnar	near labour quarters	10.066928,	77.078306	12.00	0.595	1.5	0.90	6270.40		50	50	
68	Uppar thodu	Bysonvalley	Near bysonvalley Muttukadu Road	10.004366	77.111628	10	8.00	8.80	0.70	5600	80	10	10	

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
69	Muthirapuzhayar	Vellathooval, Rajakkad and Konnathady G.P	Panniyarkutty	9° 58’ 40”	77° 03’ 31”	35	26.3	26.4	1.50	2200	35	30	35	
70	Panniyar	Rajakkad and Senapathy G.P	U/S of Vakkacity - Mukkudil Bridge	9° 57’ 2.9”	77° 6’ 53.7”	70	21.42	21.6	1.20	3800	30	30	40	
71	Panniyar	Rajakkad and Senapathy G.P	D/S of Kuthungal Bridge	9° 57’ 2.9”	77° 6’ 53.7”	30	24.35	24.45	1.00	2200	25	25	50	
72	Ambazhachal/ Muthirapuzhayar	Pallivasal G.P	300 m U/S of Ambazhachal Bridge	10° 1’ 14.1”	77° 0’ 47.5”	20	12.716	12.746	0.60	4300	30	30	40	
73	Pazhayarikandam-Thattekkanni Thodu	Kanjikuzhy							Nil	Nil	Nil	Nil	Nil	No Silt Deposit
74	Vanchikkal-Thattekkanni Thodu	Kanjikuzhy							Nil	Nil	Nil	Nil	Nil	No Silt Deposit
75	Pambla thodu	Kanjikuzhy	Punnayar waterfalls	9.961724	76.938982				1.3 m	2340		Silt only		Desiltation required
76			Pazhzyirikandam town	9.966753	76.911299				1 m	1200		Silt only		Desiltation required
77			Mylapuzha	9.960416	76.902075				1.5 m	3375		Silt only		Desiltation required

SILT DEPOSIT FOR TRIBUTARIES

REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km														
78	Karinthiriyar from Pettimudi	Munnar GP	Starting point	10°09´59.52"	77°01´14.68"	4.00	0.000	0.015	0.20	12	10	40		Boulders 50%
		Munnar GP	Bridge	10°09´44.65"	77°00´50.80"	5.00	1.075	1.085	0.20	15	10	40		Boulders 50%
		Munnar GP	Bridge	10°09´4.27"	76°59´58.31"	24.00	4.150	4.260	0.20	330	10	40		Boulders 50%
		Munnar GP	Conflunce of Kadalar	10°07´38.33"	76°58´20.87"	20.00	10.730	10.830	0.20	360	10	40		Boulders 50%
		Munnar /Mankulam GP	Karimunda city foot bridge	10°07´58.7"	76°56´24.1"	40.00	14.990	15.090	0.20	600	10	40		Boulders 50%
		Munnar /Mankulam GP	Tributary from right(Parekudy thodu)	10°08´08.29"	76°56´15.8"	50.00	15.560	15.800	0.20	195	10	40		Boulders 50%
		Munnar /Mankulam GP	Georgiar hanging bridge	10°08´08.1"	76°56´00.1"	70.00	16.020	16.065	0.20	630	10	40		Boulders 50%
		Munnar /Mankulam GP	Kuwait city Bridge	10°08´14.71"	76°55´53.57"	60.00	16.550	17.000	1.00	27000		40		Boulders 60%
		Munnar /Mankulam GP	Mankulam Joints Left side	10°08´25.87"	76°54´49.14"	60.00	18.615	18.640	0.15	225	20	40	40	
		Munnar /Mankulam GP	Ettacholayar joints from Right	10°08´56.3"	76°54´14.38"	50.00	20.100	20.140	0.10	200	10	40	50	
		Munnar /Mankulam GP	Vathikudy Tributary joints from Left	10°07´24.54"	76°50´47.07"	50.00	21.920	21.950	0.15	225	20	20	60	
		Kuttampuzha GP	KunjiyarTributary joints from Left	10°07´31.76"	76°49´09.22"	48.00	31.030	31.075	0.10	216	20	40	40	
		Kuttampuzha GP	Conflunce of Mamalathodu	10°09´47"	76°47´12.08"	60.00	34.630	34.670	0.10	240	10	30	60	
		Kuttampuzha GP	Pooyamkutty Manikandanchal bridge	10°09´34.37"	76°47´12.66"	90.00	40.500	40.580	0.20	800	10	40	50	
		Kuttampuzha GP	Conflunce of Pooyamkuty yar	10°09´9.52"	76°44´13.00"	60	41.390	41.430	0.20	320	10	30	60	
79	Mankulam Ar	Munnar GP	Parvathy mala starting point	10°05´18.44”	77°01´42.24”	3.00	0.000	0.010	0.20	6		10	30	Boulders 60%
		Munnar GP	Culvert road cross	10°05´26.08”	77°01´26.44”	5.00	0.735	0.745	0.20	10		10	30	Boulders 60%
		Munnar GP	Tributory joining from right side of length 0 .9 km(Kallar estate)	10°05´35.23”	77°00´41.31”	4.00	2.316	2.324	0.20	8		10	30	Boulders 60%
		Munnar GP	Road crossing culvert,Mankulam near at road D/s of kallar Estate	10°05´33.93”	77°00´36.83”	4.00	2.500	2.509	0.20	8		10	30	Boulders 60%
		Munnar GP	Road crossing culvert	10°05´18.96”	77°00´19.33”	4.00	3.230	3.250	0.20	16		10	30	Boulders 60%
		Munnar GP	Culvert at crossing road	10°05´9.67”	76°59´51.42”	4.00	4.315	4.327	0.20	10		10	30	Boulders 60%

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							From	To			Sand	Silt	Clay	
		Munnar GP	Culvert at crossing road	10°05´07.66”	76°59´27.00”	4.00	5.445	5.478	0.20	28		10	30	Boulders 60%
		Munnar GP	Viripara KSEB diversion weir in Tata tea estate	10°04´41.12”	76°57´41.15”	29.00	10.160	10.210	0.40	300	5	70	25	
		Munnar GP	Bridge road crossing (Viripara bridge Mankulam road)	10°05´01.08”	76°57´4.84”	28.00	10.880	10.930	0.40	240	5	70	25	
		Munnar GP	Pambumkayam bridge	10°05´45.2”	76°55´56.57”	23.00	15.100	15.170	0.30	252	5	70	25	
		Munnar GP	Cause way Mankulam ar	10°06´22.12”	76°55´50.71”	30.00	16.680	16.710	0.60	306	30	50	20	
		Mankulam GP	Thalumkandam bridge,Mankulam ar	10°06´49.01”	76°55´41.29”	30.00	17.270	17.320	0.20	200	20	60	20	
		Mankulam GP	Bridge	10°07´6.75”	76°55´32.78”	30.00	17.710	17.760	0.15	150	30	50	20	
		Mankulam GP	Bridge Mankulam Thodu	10°07´33.89”	76°55´07.77”	25.00	18.370	18.420	0.20	200	10	70	20	
		Mankulam GP	Perumbankuthu waterfalls	10°08´15.5”	76°54´55.2”	42.00	19.560	19.610	0.20	200	10	70	20	
		Mankulam GP	Bridge u/s of Perumbankuthu waterfalls	10°08´17.53”	76°54´51.62”	42.00	22.200	22.240	0.30	240	30	50	20	
		Mankulam GP	Confluence at ch 18.63 km of Karinthiriyar	10°08´25.87”	76°54´49.14”	42.00	22.355	22.395	0.30	240	30	50	20	
80	Anakulam Tributary Thodu	Mankulam GP	Starting point	10°09´32.28"	76°54´56.04"	3.00	0.000	0.020	0.20	12		50	30	Boulders 20%
		Mankulam GP	Culvert	10°09´36.37"	76°54´51.0"	4.00	0.170	0.180	0.20	8		50	30	Boulders 20%
		Mankulam GP	Incomplete VCB	10°09´36.37"	76°54´48.1"	5.00	0.280	0.310	0.30	45		40	20	Boulders 40%
		Mankulam GP	Anakulam road Culvert	10°09´39.72"	76°54´45.31"	7.00	0.430	0.455	0.30	52.5		40	20	Boulders 40%
		Mankulam GP	Conflunece at ch 3.05 km of Ettacholayar	10°09´41.21"	76°54´44.41"	8.00	0.480	0.520	0.30	96		40	20	Boulders 40%
81	Ettacholayar	Forest	Starting point from Maangaparekudy(Parekudy Thodu)	10°10´42.11"	76°55´43.03"	7.00	0.000	0.020	0.20	28	10	50	40	
		Forest	Kozhiyalakudy Branch joints	10°10´5.4"	76°55´6.7"	20.00	1.800	1.850	0.30	225				Rock Boulders
		Forest	Conflunece of 20.11 km of Karithiriyar	10°08´56.3"	76°54´14.38"	70.00	4.800	4.830	0.30	270				Rock Boulders
82	Kadalar	Munnar GP	culvert	10°08´34.00"	77°03´7.00"	6.00	0.085	0.098	0.20	20		40	10	Boulders 50%
		Munnar GP	culvert	10°08´3.1"	77°02´44.93"	4.00	1.570	1.585	0.30	18		60	10	Boulders 30%
		Munnar GP	culvert	10°07´58.61"	77°02´18.43"	3.00	2.540	2.570	0.20	18		60	10	Boulders 30%
		Munnar GP	culvert	10°07´59.04"	77°02´13.14"	3.00	2.720	2.780	0.20	36		60	10	Boulders 30%
		Mankulam GP	culvert	10°07´53.21"	76°00´57.08"	12.00	5.670	5.690	0.20	48		60	10	Boulders 30%

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		Mankulam GP	Confluence of Karinthiriyar @ ch 10.73 km	10°07´38.41"	76°58´20.84"	15.00	12.140	12.160	0.20	60		60	10	Boulders 30%
83	Kozhyalakudyar	Mankulam GP	Starting point from Mangaparekudy	10°09´54.35"	76°57´34.75"	3.00	0.000	0.010	0.20	6	45	20	35	
		Mankulam GP	Check dam of length 17.000 m	10°09´58.97"	76°55´19.85"	17.00	5.025	5.050	0.20	85	45	20	35	
		Mankulam GP	Bridge	10°09´59.35"	76°55´19.84"	17.00	5.160	5.185	0.20	75	45	20	35	
		Mankulam GP	Conflunce at ch 1.80 km of Ettacholayar	10°10´5.4"	76°55´6.7"	16.00	5.645	5.670	0.20	80	45	20	35	
84	Parekudy thodu	Mankulam GP	Starting point	10°08´36.29"	76°56´52.58"	3.00	0.000	0.008	0.10	3	10	40	50	
		Mankulam GP	Culvert	10°08´9.31"	76°56´16.81"	4.00	1.440	1.455	0.20	12	10	40	50	
		Mankulam GP	Conflunce to Karinthiyar of ch 15.56 km	10°08´8.29"	76°56´15.81"	4.00	1.460	1.470	0.25	10	10	40	50	
85	tributary 1	Mankulam GP	Starting point	10°09´1.46"	77°01´43.61"	3.00	0.000	0.005	0.20	3	10		20	rock boulders 70 %
		Mankulam GP	Culvert	10°09´3.48"	77°01´13.57"	5.00	1.245	1.258	0.20	13	10		20	rock boulders 70 %
		Mankulam GP	Conflunce to at 2.63 km of Karinthiyar	10°09´14.48"	77°01´26.59"	5.00	3.555	3.570	0.15	12	10		20	rock boulders 70 %
86	Vathikudy tributary	Vathykudy GP	Starting point	10°06´35.5"	76°06´45.2"	3.00	0.000	0.010	0.20	6	10		20	rock boulders 70 %
		Vathykudy GP	Culvert	10°07´13.6"	76°53´8.19"	6.00	1.240	1.270	0.20	36	10		20	rock boulders 70 %
		Vathykudy GP	Culvert	10°07´46.9"	76°53´29.46"	8.50	3.050	3.068	0.20	30.6	10		20	rock boulders 70 %
		Vathykudy GP	Conflunce to at 21.93 km of Karinthiyar	10°08´10.55"	76°53´37.02"	8.00	3.880	3.910	0.15	36	10		20	rock boulders 70 %
87	Kunjiar	Kuttampuzha GP	Starting point	10°03´6.48"	76°55´58.43"	3.00	0.000	0.020	0.20	12	10		20	rock boulders 70 %
		Kuttampuzha GP	Confluence to at ch 31.03 km of Karinthiyar	10°07´24.45"	76°50´47.01"	20.00	14.960	15.000	0.15	120	10		20	rock boulders 70 %
88	Elamblassery thodu	Kuttampuzha GP	Thangappan padi Bridge	10.08651433	76.83435600	8.00	0.226	0.326	0.60	360		60	40	
		Kuttampuzha GP	Foot bridge near Angan vaadi	10.08628804	76.83259885	8.50	0.507	0.600	0.80	480		60	40	
		Kuttampuzha GP	Sadhanandhan padi Paalam	10.08844647	76.82833326	6.00	1.182	1.270	0.50	175		60	40	
		Kuttampuzha GP	Confluence point with Mamala thodu-Near GHS Mamalakandam	10.09138100	76.82084400	6.00	2.100	2.190	0.50	240		60	40	
89	Kai thodu to Elamblassery thodu	Kuttampuzha GP	Venunarayanan pady bri	10.088157	76.835063	7.50	0.103	0.123	0.60	72		60	40	
		Kuttampuzha GP	Foot bridge near Kerala state Bamboo corporation,Sub dippo Elamblassery	10.087525	76.835277	7.50	0.178	0.198	0.50	70		60	40	
89	Vellamakuthu thodu	Kuttampuzha GP	VCB d/s of culvert 1	10.153163	76.812980	6.30	0.090	0.100	0.30	15		30		Boulder 70%
		Kuttampuzha GP	Culvert no.2	10.153090	76.812149	5.80	0.102	0.112	0.30	15		60	40	
		Kuttampuzha GP	Culvert 4	10.153358	76.810100	5.70	0.328	0.358	0.30	45		60	40	

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		Kuttampuzha GP	VCB at u/s of footbridge	10.159570	76.795854	9.80	20.920	2.132	0.40	128		60	40	
		Forest	Confluence pt of Vellaramkuthu thodu with Karinthiriyar	10.162126	76.788801	12.00	2.961	3.011	0.40	200		60	40	
1	Paarankamaaly thodu	Kuttampuzha	Pooyamkutty	10.162821	76.781430	5	200	400	0.30	300	20	60	20	
	Paarankamaaly thodu	Kuttampuzha	Pooyamkutty	10.164562	76.782560	4	530	672	0.30	170.4	20	60	20	
2	Madathinaalpady thodu	Kuttampuzha	Pooyamkutty	10.165728	76.779051	4	250	485	0.4	376	15	55	35	
3	Idamalayar - thodu -1	Kuttampuzha	Idamalayar	10.190723	76.724819	7	900	1090	0.3	399	15	60	25	
4	Idamalayar - thodu - 2	Kuttampuzha	Idamalayar	10.195251	76.719580	15	950	1090	0.2	420	15	60	25	
5	Kuttyanchal- kurukku thodu	Kuttampuzha	Pooyamkutty	10.158852	76.744388	5	775	900	0.2	125	15	55	30	
6	Aanikanalpady thodu	Kuttampuzha	Pooyamkutty	10.164718	76.752390	5	228	300	0.2	72	15	65	20	
	Aanikanalpady thodu	Kuttampuzha	Pooyamkutty	10.167428	76.750447	4	600	719	0.25	119	15	75	10	
7	Edattu- chelakkattupady thodu	Kuttampuzha	Pooyamkutty	10.163713	76.750786	3	175	286	0.3	99.9	20	60	20	
	Edattu- chelakkattupady thodu	Kuttampuzha	Pooyamkutty	10.167545	76.750376	3	400	501	0.3	90.9	15	65	20	
8	Thannikunnelpady thodu	Kuttampuzha	Pooyamkutty	10.164929	76.754521	3	0	150	0.3	135	15	65	20	
				10.168426	76.753228	3	500	599	0.25	74.25	20	50	30	
9	korangatty thodu	Kuttampuzha	Pooyamkutty	10.167211	76.760756	3	275	337	0.30	55.8	20	55	25	
	korangatty thodu	Kuttampuzha	Pooyamkutty	10.168504	76.759546	3	500	624	0.25	93	15	80	5	
10	pallipady thodu	Kuttampuzha	Pooyamkutty	10.166578	76.777251	3	600	769	0.3	152.1	20	70	10	
11	Aliyarpady thodu	Kuttampuzha	Pooyamkutty	10.137919	76.700196	3	200	280	0.25	60	15	80	5	
12	Vengassery perum thodu	Kuttampuzha	Pooyamkutty	10.137919	76.700196	5	170	270	0.2	100	20	70	10	
13	Arambankudy thodu	Kuttampuzha	Pooyamkutty	10.14324	76.721080	5	300	400	0.2	100	15	65	20	
14	Urulanthanni thodu	Kuttampuzha	Kuttampuzha	10.15307	76.73958	15	9500	10000	0.1	750	10	60	10	Rock boulders 20%
15	Koottambara thodu	Kuttampuzha	Kuttampuzha	10.15178	76.73507	10	1380	1508	0.2	256	15	65	20	
16	Nariyamangalam - krishibhavan	Kavalangad	Inchathotty - Neriamangalam	10.06086	76.76606	3	150	213	0.2	37.8	15	60	25	
17	Manimaruthamchal	Kavalangad	Inchathotty - Neriamangalam	10.06963	76.75528	3	535	575	0.2	24	10	70	20	
18	charuparakadavu -opp	Kavalangad	Inchathotty - Neriamangalam	10.062006	76.768527	4	270	304	0.2	27.2	20	60	20	
19	pothupara thodu 2	Kavalangad	Inchathotty - Neriamangalam	10.07994	76.74107	4	250	300	0.2	40	15	65	20	
20	pothupara thodu1	Kavalangad	Inchathotty - Neriamangalam	10.08386	76.736404	4	320	356	0.25	36	20	70	10	
21	Avolichal THODU	Kavalangad	Inchathotty - Neriamangalam	10.07181	76.75072	4	310	356	0.20	36.8	15	60	25	
22	charupara VALIYA THODU1&2	Kavalangad	Inchathotty - Neriamangalam	10.08763	76.73054	4.5	270	420	0.50	337.5	20	70	10	
23	charupara kadavu THODU (1&2)	Kavalangad	Inchathotty - Neriamangalam	10.09166	76.72496	4.5	280	420	0.5	315	15	55	30	

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24	inchathotty1&2	Kavalangad	Inchathotty - Neriamangalam	10.104146	76.713304	5.6	300	450	0.5	420	20	60	20	
25	cheekoduthodu3	Kerrampara	Neriamangalam - Thattekkad	10.09992	76.716722	4.8	750	1050	0.4	576	15	55	30	
26	cheekoduthodu1&2	Kerrampara	Neriamangalam - Thattekkad	10.103145	76.712267	5	400	623	0.45	501.75	20	60	20	
27	Veliyachal - kondimattom - Ovungal	Kerrampara	Neriamangalam - Thattekkad	10.10734	76.69525	6	950	1390	0.5	1320	15	65	20	
28	Palamattom thodu	Kerrampara	Neriamangalam - Thattekkad	10.10605	76.70283	5	870	1170	0.4	600	20	55	25	
29	quarry thodu or kaalathodu	Kerrampara	Neriamangalam - Thattekkad	10.11226	76.69519	4	350	579	0.4	366.4	15	60	25	
30	Nadukani-muttathukandom thodu	Kerrampara	Neriamangalam - Thattekkad	10.11735	76.68456	5	1160	1460	0.45	675	20	55	25	

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							From	To			Sand	Silt	Clay	
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km														
90	Mukkadai 2nd order	Ayyampuzha	Chully	10.258804	76.462861	8.00	1.650	1.850	0.650	1040.00		100		
		Ayyampuzha	Kuttipara	10.244044	76.444744	20.00	2.948	2.958	1.300	260.00		100		
		Ayyampuzha	Murigedathupara	10253198	76.432266	15.00	4.380	4.405	1.200	450.00		100		
		Manjapra	Marigiri	10.228703	76.448036	14.00	4.725	4.745	1.100	308.00		100		
		Kalady	Marigiri	10.208423	76.460983	9.00	8.700	8.730	0.300	81.00		50	50	
91	Krariyeli 2nd Order	Vengoor	Punjakkara-Moonamthodu-Meykappala canal road	10.13583333	76.57444444	8	0.761	0.769	0.5	32		100		
		Vengoor	Perumbavoor Paniely Road	10.16638889	76.5725	15	4.972	4.979	0.6	63		50	50	Delta
		Vengoor	Krariyeli Kochupurakkankadavu Road	10.17527778	76.57166667	15	6.645	6.655	0.4	60		100		
92	Thottuva	Koovappady	Pappanpady-Akanad-Vengoor Road	10.1477778	76.5038889	8	1.565	3.15	0.25	3170		100		
		Mudakuzha	Kurichilakode	10.1625	76.4969444	10	4.18	4.78	0.3	1800		100		
		Koovappady	Vallom-Kodanad Road	10.1719444	76.4936111	8	5.125	6.745	0.3	3888		100		
		Koovappady	Kodanad	10.18	76.5002778	15	7.688	7.775	0.3	391.5		100		
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km														

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							From	To			Sand	Silt	Clay	
	Kunnuvazhi Thodu													
93	Stream- S1	Vazhakulam	Mudikkal Padasekaram (Kulakkattupadam Kunnuvazhithodu)	10.1137990	76.4412460	5	1340		0.50	3350	20	40	40	
94	Stream -S2	"	Orna padasekaram (Mukkoottinadathodu)	10.0964800	76.4634570	3	2460		0.50	3690	20	40	40	
95	Main Stream - MS	"	Cheruvelikkunnuthura	10.1070810	76.4390070	50	1220		1.00	61000	10	45	45	
96	Main Stream - MS	"	Chittethukudithazham	10.1101390	76.4284990	8	1570		1.00	12560	20	40	40	
97	Main Stream - MS	"	End of stream	10.1158680	76.4240860	8	3790		0.50	15160	20	40	40	
98	MS -end	"	End of stream	10.1158680	76.4240860	8	3790		2.00	60640	20	40	40	
	Marampilly Thodu													
99	S1	Vazhakulam	AVT Group (Arakkathazham Padasekaram)	10.0990060	76.4184940	2.5	1690		0.50	2112.5	20	40	40	
100	S2	Vazhakulam	Mullankunnu padasekaram	10.0879180	76.4339870	3	4380		0.50	6570	20	40	40	
101	Main Stream - MS	Vazhakulam	End of stream (Bridge)	10.1124960	76.4220000	3	50		1.00	150	20	40	40	
	Vallam Thodu													
102	S1	Rayamangalam	Rayamangalam padasekaram	10.1049610	76.4998990	3	870		0.60	1566	20	40	40	
103	S2	Rayamangalam	Turuthiply padasekaram	10.1068250	76.4876950	3	1500		0.60	2700	20	40	40	
104	S3	Perumbavoor	Palakkattuthazham padasekaram (Kandanthara Padasekaram)	10.1133340	76.4669300	4	645		0.60	1548	20	40	40	
105	S4	Okkal	Koduvelichira (ward - 8)	10.1580380	79.4645670	4	3500		0.50	7000	20	40	40	
106	S5	Okkal	Poopani			3	700		0.50	1050	20	40	40	
	Chalackal Thodu													
107	Main Stream	Keezhmad	Chalackal	10.1209400	76.3980500	6	85		1.20	408	50	30	20	
108	Main Stream	Keezhmad	Chalackal	10.1167300	76.4006700	5	900		0.80	1080	30	40	30	
109	MS end	Keezhmad	Thumbichal reservoir	10.1087700	76.4007900	3	1000		0.80	1200	20	20	60	
	Moonukaiyyani Thuruthi Thodu													
110	Main Stream	Keezhmad	Thottumugham	10.1085100	76.3708000	7	1200		1.20	7200	50	30	20	
111	Main Stream	Keezhmad	Edayapuram	10.1075750	76.3715000	7	1500		1.30	9750	30	50	20	
112	Main Stream	Keezhmad	Edayapuram	10.1083100	76.3765160	6	800		1.30	4160	30	50	20	
113	S1	Keezhmad	Madapillythazam	10.1015870	76.3767700	5	300		1.20	1080	30	50	20	
114	S2	Keezhmad	Moonukaiyyani chira	10.0929280	76.3713020	6	2100		1.20	10080	20	20	60	

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115	S3	Keezhmad	Keeramkunnu	10.1076150	76.3798790	4	300		1.00	600	30	50	20	
	Ovunkal Thodu													
116	Main Stream	Okkal	Vallom	10.1334347	76.4598845	5	560		1.00	1680	50	30	20	
117	Main Stream	Okkal	Vallom	10.1368555	76.4616331	4.5	600		1.20	1800	30	40	30	
118	Main Stream	Okkal	Chelamattom	10.1402923	76.4623033	4	300		1.20	720	30	40	30	
119	Main Stream	Okkal	Chelamattom	10.1411650	76.4592093	4	200		1.40	560	30	40	30	
	CHENGAL THODU FROM COAST GUARD TO PERIYAR													
120	Main Stream	Kanjoor	Coast guard	10.1548710	76.4046070	15	0.00	0.30	NIL	0	0	0	100	
121	Main Stream	Kanjoor	Coast guard	10.1551060	76.4062400	30	0.30	0.94	NIL	0	0	0	100	
122	Main Stream	Kanjoor	Nedumbassery	10.1571290	76.4079310	30	0.94	2.27	NIL	0	0	0	100	
123	Main Stream	Kanjoor	Piravoor -Thuravunkara	10.1565190	76.4153690	30	2.27	3.70	NIL	0	0	0	100	
124	Main Stream	Kanjoor	Chengal bhagavathi Temple	10.1569960	76.4268990	30	3.70	4.69	1.00	29700	0	0	100	
125	Main Stream	Kanjoor	Kanjoor	10.1509460	76.4260440	30	4.69	4.90	1.00	6300	0	0	100	
126	Main Stream	Kanjoor	Periyar	10.1476200	76.4296200	30	4.90	5.05	1.50	6750	0	0	100	
	Udumbuzha Thodu													
127	Main Stream	Kalady	Manikkya Mangalam Chira	10.154871	76.404607	3	0.00	1.40	NIL	0	20	30	50	
128	Main Stream	Kalady	Matoor Road Culvert	10.179055	76.442426	3	1.40	2.05	0.40	780	20	30	50	
129	Main Stream	Kalady	MC Road Culvert	10.179207	76.440796	15	2.05	2.70	0.50	4875	20	40	60	
130	Main Stream	Kanjoor	Railway Culvert	10.163259	76.427269	15	2.70	2.90	0.50	1500	10	30	60	
131	Main Stream	Kanjoor	Vadakkumbhagam Kalady	10.168253	76.434533	20	2.90	3.25	0.60	4200	20	30	50	
132	Main Stream	Kanjoor	Chengal Thodu	10.160172	76.421601	20	3.25	3.75	0.60	6000	20	30	50	
	Chengal Diversion Thodu and Chengal Thodu													
133	Main Stream	Kanjoor	Airport Runway West End	10.1501330	76.4195790	20	0.00	3.92	0.50	39200	0	50	50	
134	Main Stream	Sreemoolanagaram	Naduvannoor	10.1448820	76.3775750	30	3.92	6.18	0.50	33900	0	50	50	
135	Main Stream	Sreemoolanagaram	Naduvannoor Bridge	10.1448890	76.3775800	30	6.18	8.32	0.50	32100	0	50	50	
136	Main Stream	Chengamanad	Kaprassery-Moozhiyal Road	10.1451130	76.3686220	30	8.32	9.20	1.00	26400	0	50	50	
137	Main Stream	Chengamanad	Kaprassery	10.1385200	76.3563480	30	9.20	11.28	0.50	31200	0	50	50	
138	Main Stream	Chengamanad	Desom	10.1327410	76.3542400	30	11.28	14.38	0.50	46500	0	50	50	
139	Main Stream	Chengamanad	Desom	10.1314500	76.3533200	30	14.38	14.40	1.00	600	0	50	50	
140	Main Stream	Chengamanad	Periyar	10.1313300	76.3532400	30	14.40	14.50	0.50	1500	0	50	50	
	Kuzhippallam Thodu													
141	Main Stream	Sreemoolanagaram	Neduvannoor	10.1326320	76.3533600	5	0.00	0.97	0.50	14550	20	30	50	
142	Main Stream	Sreemoolanagaram	Neduvannoor-Airport road	10.1443860	76.3789960	30	0.97	1.10	0.50	1950	20	30	50	
143	Main Stream	Sreemoolanagaram	Neduvannoor	10.1449410	76.3775940	30	1.10	2.20	0.50	16500	20	30	50	
144	Main Stream	Sreemoolanagaram	Neduvannoor	10.1449340	76.3775790	30	2.20	2.70	0.50	7500	20	30	50	
145	Main Stream	Chengamanad	Kaprassery	10.1436630	76.3642180	30	2.70	3.20	0.50	7500	20	30	50	
146	Main Stream	Chengamanad	Neduvannoor	10.1448820	76.3775750	30	3.20	3.57	0.50	5550	20	30	50	
147	Main Stream	Chengamanad	Pallappadam road	10.1423120	76.3603630	5	3.57	3.88	0.50	4650	20	30	50	

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148	Main Stream	Chengamanad	Kaprassery	10.1451340	76.3686190	5	3.88	4.50	0.50	9300	20	30	50	
	Kanjoor Thodu													
148	Main Stream	Kanjoor	Periyar	10.1448800	76.4328300	15	0.00	0.36	NIL	0	10	20	70	
149	Main Stream	Kanjoor	Vadakkumbhagam(Thalipara bridge)	10.1427430	76.4278400	9.3	0.36	1.42	0.50	4929	10	20	70	
150	Main Stream	Kanjoor	Vadakkumbhagam	10.1542840	76.4231460	7.5	1.42	2.36	0.50	3525	10	20	70	
151	Main Stream	Kanjoor	Thekkumbhagam (Thattampady)	10.1351500	76.4198000	5	2.36	4.00	0.50	4100	10	20	70	
152	Main Stream	Kanjoor	Periyar	10.1195600	76.4072300	3	4.00	4.60	0.50	900	10	20	70	
	Thondikkadavu Thodu													
153	Main Stream	Sreemoolanagaram	Edanad-Sreemoolanagaram	10.3900700	76.4024080	3	0.00	0.02	0.50	30	10	40	50	
154	Main Stream	Sreemoolanagaram	Edanad-Sreemoolanagaram	10.1389220	76.4021050	3	0.02	1.57	0.50	2325	10	40	50	
155	Main Stream	Sreemoolanagaram	Tettali	10.1307600	76.3937000	4	1.57	2.05	0.50	960	10	40	50	
156	Main Stream	Sreemoolanagaram	Edanad-Sreemoolanagaram	10.127237`	76.3915720	4	2.05	2.10	0.50	100	10	40	50	
157	Main Stream	Sreemoolanagaram	Periyar	10.1258590	76.3914880	4	2.10	2.25	0.80	960	10	40	50	
	Thumba Thodu													
158	Main Stream	Sreemoolanagaram	Periyar	10.1200400	76.3791200	40	0.00	0.50	0.40	8000	20	40	40	
159	Main Stream	Sreemoolanagaram	Chowara Thuruth	10.1241930	76.3763700	40	0.50	1.90	0.50	28000	10	40	50	
160	Main Stream	Sreemoolanagaram	Purayar Thuruth road	10.1272150	76.3694700	40	1.90	3.68	0.50	35600	10	40	50	
161	Main Stream	Sreemoolanagaram	Purayar Thuruth road	10.1184750	76.3627380	40	3.68	3.70	0.40	320	20	30	50	
162	Main Stream	Sreemoolanagaram	Purayar Thuruth road	10.1182330	76.3625880	40	3.70	4.00	0.50	6000	20	30	50	
163	Main Stream	Sreemoolanagaram	Periyar	10.1192500	76.3554100	40	4.00	4.50	0.40	8000	20	30	50	
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA														
164	VEMBALA THODU	KADUNGALOOR		10.095397	76.326832	2.00	0	2	0.60	2.4				
165	VEMBALA THODU	KADUNGALOOR		10.095302	76.326822	2.00	2	5	0.60	3.6				
166	VEMBALA THODU	KADUNGALOOR		10.095367	76.326797	2.00	5	200	0.60	234				
167	VEMBALA THODU	KADUNGALOOR		10.09364	76.32654	2.00	200	489.54	0.60	347.448				
168	VEMBALA THODU	KADUNGALOOR		10.09114	76.32615	2.00	489.54	756.15	0.60	319.932				
169	VEMBALA THODU	KADUNGALOOR		10.08871	76.32661	2.00	756.15	977.23	0.60	265.296				
170	VEMBALA THODU	KADUNGALOOR		10.08638	76.32653	2.00	977.23	1319.71	0.60	410.976				
171	VEMBALA THODU	KADUNGALOOR		10.083833	76.326285	2.00	1319.71	1326.13	0.60	7.704				
172	VEMBALA THODU	KADUNGALOOR		10.083788	76.3263	3.00	1326.13	1343.66	0.60	31.554				

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173	VEMBALA THODU	KADUNGALOOR		10.083642	76.326212	3.00	1343.66	1349.23	0.60	10.026				
174	VEMBALA THODU	KADUNGALOOR		10.083597	76.326197	3.00	1349.23	1368	0.60	33.786				
175	VEMBALA THODU	KADUNGALOOR		10.083422	76.32617	3.00	1368	1368.22	0.60	0.396				
176	VEMBALA THODU	KADUNGALOOR		10.083507	76.32618	5.00	1368.22	1374.87	0.60	19.95				
177	VEMBALA THODU	KADUNGALOOR		10.08338	76.326133	5.00	1374.87	1389.86	0.60	44.97				
178	VEMBALA THODU	KADUNGALOOR		10.083288	76.326072	5.00	1389.86	1433.12	0.60	129.78				
179	VEMBALA THODU	KADUNGALOOR		10.082908	76.326087	7.00	1433.12	1456	0.60	96.096				
180	VEMBALA THODU	KADUNGALOOR		10.07671	76.28436	2.00	1456	1460	0.60	4.8				
181	PANACHITHODU	ELOOR	Thodu Starting	10.082033	76.286637	3.00	0	2	0.40	2.4				
182	PANACHITHODU	ELOOR	Panachi thode culvert	10.087015	76.290882	7.00	2	340	0.40	946.4				
183	PANACHITHODU	ELOOR		10.087015	76.290882	7.00	340	728.41	0.40	1087.548				
184	PANACHITHODU	ELOOR		10.080822	76.289852	7.00	728.41	764.57	0.40	101.248				
185	PANACHITHODU	ELOOR		10.080803	76.289845	6.00	764.57	1050.10	0.40	685.272				
186	PANACHITHODU	ELOOR	Koipanatte Culvert	10.078477	76.288758	5.00	1050.10	1071.33	0.40	42.46				
187	PANACHITHODU	ELOOR	Pallipuram chal-Lakshamveedu culvert	10.078393	76.288727	7.00	1071.33	1217.16	0.40	408.324				
188	PANACHITHODU	ELOOR		10.07758	76.28779	7.00	1217.16	1333.25	0.40	325.052				
189	PANACHITHODU	ELOOR	Y-Junction	10.076738	76.287092	3.00	1333.25	1411.09	0.40	93.408				
190	PANACHITHODU	ELOOR		10.076355	76.286527	3.00	1411.09	1541.82	0.40	156.876				
191	PANACHITHODU	ELOOR	Periyar Road	10.076658	76.28444	3.00	1541.82	1642.5	0.40	120.816				
192	PANACHITHODU	ELOOR	Palliyathu mutu to Periyar	10.076658	76.28444	3.00	1642.5	1646	0.40	4.2				
193	PANACHITHODU	ELOOR	Palliyathu mutu to Periyar	10.07672	76.284375	3.00	1646	1650	0.40	4.8				
194	Kolavelipadam thodu	Kadungaloor	Kolaveli padam	10.102048	76.33736	3.00	0	63.7	0.50	95.55				
195	Kolavelipadam thodu	Kadungaloor	Kolaveli padam	10.10241	76.33754	3.00	63.7	94.56	0.50	46.29				
196	Kolavelipadam thodu	Kadungaloor	Kolaveli padam	10.10265	76.33762	3.00	94.56	120.7	0.50	39.21				
197	Kolavelipadam thodu	Kadungaloor	Kolaveli padam	10.10289	76.33773	3.00	120.7	132.5	0.50	17.7				
198	Kolavelipadam thodu	Kadungaloor	Kolaveli padam	10.10300	76.33778	3.00	132.5	141.65	0.50	13.725				
199	Kolavelipadam thodu	Kadungaloor	Kolaveli padam	10.10307	76.33779	3.00	141.65	142	0.50	0.525				

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200	Varapuzha Thodu	Varapuzha		10.080627	76.272592	20.00	0.00	10.00	0.80	160				
201	Varapuzha Thodu	Varapuzha		10.080588	76.277236	10	10.00	25.95	0.80	127.6				
202	Varapuzha Thodu	Varapuzha		10.08112	76.27326	12	25.95	78.22	0.80	501.792				
203	Varapuzha Thodu	Varapuzha		10.08137	76.27371	12	78.22	137.54	0.80	569.472				
204	Varapuzha Thodu	Varapuzha		10.08181	76.2744	13	137.54	233.74	0.80	1000.48				
205	Varapuzha Thodu	Varapuzha		10.08227	76.27529	13	233.74	336.92	0.80	1073.072				
206	Varapuzha Thodu	Varapuzha		10.08259	76.27596	14	336.92	419.26	0.80	922.208				
207	Varapuzha Thodu	Varapuzha		10.08304	76.27689	15	419.26	530.77	0.80	1338.12				
208	Varapuzha Thodu	Varapuzha		10.083403	76.277295	12	530.77	632.50	0.80	976.608				
209	Varapuzha Thodu	Varapuzha		10.08567	76.27816	12	632.50	853.61	0.80	2122.656				
210	Varapuzha Thodu	Varapuzha		10.08626	76.27892	12	853.61	960.29	0.80	1024.128				
211	Varapuzha Thodu	Varapuzha		10.08657	76.27965	12	960.29	1050.21	0.80	863.232				
212	Varapuzha Thodu	Varapuzha		10.086675	76.280828	3.00	1050.21	1125.55	0.80	180.816				
213	Varapuzha Thodu	Varapuzha		10.086658	76.280707	3.00	1125.55	1142.40	0.80	40.44				
214	Varapuzha Thodu	Varapuzha		10.086642	76.280483	3.00	1142.40	1152.25	0.80	23.64				
215	Varapuzha Thodu	Varapuzha		10.08663	76.280403	3.00	1152.25	1157.70	0.80	13.08				
216	Varapuzha Thodu	Varapuzha		10.086655	76.280572	3.00	1157.70	1168.05	0.80	24.84				
217	Varapuzha Thodu	Varapuzha		10.086374	76.279953	4.00	1168.05	1192.95	0.80	79.68				
218	Varapuzha Thodu	Varapuzha		10.086548	76.280042	3.00	1192.95	1202.10	0.80	21.96				
219	Varapuzha Thodu	Varapuzha		10.086593	76.28018	3.00	1202.10	1211.40	0.80	22.32				
220	Varapuzha Thodu	Varapuzha		10.08653	76.27996	3.00	1211.40	1226.45	0.80	36.12				
221	Varapuzha Thodu	Varapuzha		10.086573	76.280088	4.00	1226.45	1238.65	0.80	39.04				
222	Varapuzha Thodu	Varapuzha		10.086728	76.280882	3.00	1238.65	1239.91	0.80	3.024				
223	Varapuzha Thodu	Varapuzha		10.086742	76.281023	3.00	1239.91	1247.10	0.80	17.256				
224	Varapuzha Thodu	Varapuzha		10.08673	76.280925	3.00	1247.10	1252.30	0.80	12.48				
225	Varapuzha Thodu	Varapuzha		10.086747	76.281097	3.00	1252.30	1263.00	0.80	25.68				
226	Varapuzha Thodu	Varapuzha		10.086753	76.281217	3.00	1263.00	1271.00	0.80	19.2				
227	Varapuzha Thodu	Varapuzha		10.08754	76.28273	3.00	1271.00	1282.00	0.80	26.4				
228	Varapuzha Thodu	Varapuzha		10.080833	76.272698	20.00	1282.00	1283.00	0.80	16				
229	Varapuzha Thodu	Varapuzha		10.08077	76.272557	20.00	1283.00	1285.00	0.80	32				
230	Kachappilly thodu	Kadungaloor		10.08893	76.32408	3.00	283.35	292.00	0.50	12.975				
231	Kachappilly thodu	Kadungaloor		10.088755	76.324518	3.00	292.00	297.90	0.50	8.85				
232	Kachappilly thodu	Kadungaloor		10.08878	76.32458	3.00	297.90	344.00	0.50	69.15				
233	Kachappilly thodu	Kadungaloor		10.088743	76.324465	3.00	344.00	346.18	0.50	3.27				
234	Punathil Thodu	Varapuzha	Varapuzha Branch Thodu	10.086263	76.28096	3.00	0	14.45	0.40	17.34				
235	Punathil Thodu	Varapuzha		10.086238	76.280908	2.50	14.45	46.15	0.40	31.7				
236	Punathil Thodu	Varapuzha		10.086253	76.280675	2.00	46.15	57	0.40	8.68				
237	Punathil Thodu	Varapuzha		10.08624	76.280468	2.00	57	102.52	0.40	36.416				
238	Punathil Thodu	Varapuzha		10.08624	76.280547	2.00	102.52	104.45	0.40	1.544				
239	Karuka thode	Alangatt panchayath	Poonthuruth	10.097551	76.295168	5	0	5	1.5	37.5				
240	Karuka thode	Alangatt panchayath	Poonthuruth	10.097935	76.29538	6	5	40	2.5	525				
241	Karuka thode	Alangatt panchayath	Karukapadam	10.097904	76.295571	6	40	65	3.5	525				
242	Karuka thode	Alangatt panchayath	Karukapadam	10.098302	76.29582	6	65	155	4.5	2430				
243	Karuka thode	Alangatt panchayath	Near SC colony	10.099896	76.296824	5	155	360	5.5	5637.5				

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244	Kakkunni Methanam thode	Alangatt panchayath	Kakkunni panayikulam	10.098518	76.303553	8	0	5	2	80				
245	Kakkunni Methanam thode	Alangatt panchayath	lodge stop	10.09887	76.302431	22	5	123	2	5192				
246	Kakkunni Methanam thode	Alangatt panchayath	Near SC Colony64	10.100917	76.298243	8	123	793	2	10720				
247	Kakkunni Methanam thode	Alangatt panchayath	Krukappadam	10.099896	76.296824	10	793	1038	2	4900				
248	Kakkunni Methanam thode	Alangatt panchayath	Chirayam Methanam Bridge	10.099545	76.290342	40	1038	1835	2	63760				
249	Kakkunni Methanam thode	Alangatt panchayath	Pallikadavu	10.097548	76.288299	10	1835	2305	2	9400				
250	Kakkunni Methanam thode	Alangatt panchayath	thode meets periyar	10.096491	76.287495	15	2305	2435	2	3900				
251	Manavala thode	Alangatt panchayath	Methanam	10.097216	76.287521	15	0	5	2	150				
252	Manavala thode	Alangatt panchayath	Manavala	10.097121	76.28588	8.9	5	195	2	3382				
253	Manavala thode	Alangatt panchayath	Manavala	10.096692	76.28575	15	195	310	2	3450				
254	Karipuzha angadikadavu thode	Alangatt panchayath	Angadikadav , Alangad panchayathBoundary	10.122286	76.294775	20	0	5	1.5	150				
255	Karipuzha angadikadavu thode	Alangatt panchayath	Koduvazhanga	10.120956	76.292633	12	5	337	1.2	4780.8				
256	Karipuzha angadikadavu thode	Alangatt panchayath	Kallupalam busstop, KottappuramKoonammavu pWD Road(Sreechithra Road)	10.119926	76.296122	6	337	560	1.5	2007				
257	Karipuzha angadikadavu thode	Alangatt panchayath	Kallupalam padam	10.117973	76.296548	7	560	1400	1.5	8820				
258	Karipuzha angadikadavu thode	Alangatt panchayath	Kunnelppilli	10.102905	76.307461	5	1400	1500	1.5	750				
259	Karipuzha angadikadavu thode	Alangatt panchayath	Kunnelppalli Valunkal (Kavathiyad)	10.111474	76.29914	4	1500	1870	1.5	2220				
260	Karipuzha angadikadavu thode	Alangatt panchayath	Ezhuvichira	10.112366	76.304928	10	1870	2500	2.5	15750				
261	Karipuzha angadikadavu thode	Alangatt panchayath	Karippuzha	10.104358	76.311207	20	2500	3743	1.2	29832				
262	Karipuzha angadikadavu thode	Alangatt panchayath	Kakkunnipalam	10.09887	76.302431	8	3743	3920	2.5	3540				
263	Ongi thode	kadungalloor panchayath	Eloorkkara	10.095241	76.334599	5	0	5	2.5	62.5				
264	Ongi thode	kadungalloor panchayath	Eloorkkara(Original alignment deviated from here)	10.095477	76.3337888	10	5	80	2.5	1875				

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265	Ongi thode	kadungalloor panchayath	Elenjichuvadu bus stop Eloorkkara	10.09578	76.333248	14.55	80	160	2.5	2910				
266	Ongi thode	kadungalloor panchayath	Eloorkkara	10.101587	76.312976	20	160	650	2.5	24500				
267	Ongi thode	kadungalloor panchayath	Paduvathil road	10.094858	76.327365	11.3	650	812	2.5	4576.5				
268	Ongi thode	kadungalloor panchayath	Kadungalloor Rd(Moopathadam)			40	812	2360	2.5	154800				
269	Ongi thode	kadungalloor panchayath	Kadungalloor Rd(Moopathadam)	10.101304	76.318667	67	2360	2370	2.5	1675				
270	Ongi thode	kadungalloor panchayath	perekadu	10.101587	76.312976	50	2370	3020	2.5	81250				
271	Ongi thode	kadungalloor panchayath	Karipuzha	10.102855	76.310834	6	3020	3300	2.5	4200				
272	Ongi thode	Angadikkadavu panchayath	Near PANAYIKULAM Juma Masjith(Kakkunnipalam)	10.099757	76.304504	8	3300	4400	2.5	22000				
273	Ongi thode	Angadikkadavu panchayath	Kakkunni branch thode starts	10.09847	76.303577	8	4400	4700	2.5	6000				
274	Ongi thode	Angadikkadavu panchayath	near Panayikulam Lodge stop	10.096828	76.302894	8	4700	4870	2.5	3400				
275	Ongi thode	Angadikkadavu panchayath	Panayikulam Lodge stop	10.096329	76.301948	7	4870	5000	2.5	2275				
276	Ongi thode	Angadikkadavu panchayath	Near lodge stop	10.095442	76.301756	2.5	5000	5100	2.5	625				
277	Ongi thode	Angadikkadavu panchayath	Panayikulam Binanipuram road	10.095005	76.301667	2.5	5100	5150	2.5	312.5				
278	Ongi thode	Angadikkadavu panchayath	Paddy field	10.09391	76.29816	2.5	5150	5620	2.5	2937.5				
279	Ongi thode	Angadikkadavu panchayath	Meenkuzhikandam	10.095458	76.297749	0.9	5620	5800	2.5	405				
280	Ongi thode	Angadikkadavu panchayath	Paddy field turn left	10.095799	76.297325	4	5800	5880	2.5	800				
281	Ongi thode	Angadikkadavu panchayath	Paddy field	10.096289	76.296229	2.5	5880	6020	2.5	875				
282	Ongi thode	Angadikkadavu panchayath	PoonthuruthuStarting point of Karuka thode	10.097551	76.295168	6	6020	6220	2.5	3000				
283	Ongi thode	Angadikkadavu panchayath	Poonthuruth	10.097418	76.294904	2.5	6220	6260	2.5	250				
284	Ongi thode	Angadikkadavu panchayath	Poonthuruth	10.097614	76.294246	7	6260	6360	2.5	1750				

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285	Ongi thode	Angadikkadavu panchayath	Poonthuruth	10.097636	76.294203	6	6360	6370	2.5	150				
286	Ongi thode	Angadikkadavu panchayath	Methanam(mouth to Periyar)	10.096278	76.293752	7	6370	6550	2.5	3150				
287	Pazhamthode	Alangatt panchayath	Pazhamthode	10.111075	76.289624	4.7	0	5	1	23.5				
288	Pazhamthode	Alangatt panchayath	Pazhamthode	10.110594	76.290468	8	5	40	1	280				
289	Pazhamthode	Alangatt panchayath	Pazhamthode	10.110203	76.290369	7	40	80	1	280				
290	Pazhamthode	Alangatt panchayath	Kottappillikunnu	10.109311	76.290224	4	80	185	1	420				
291	Pazhamthode	Alangatt panchayath	Kochirikka Mundone Road	10.107089	76.289179	6	185	530	1	2070				
292	Pazhamthode	Alangatt panchayath	Mundon Kochirikka Road	10.106802	76.286899	6	530	820	1	1740				
293	Pazhamthode	Alangatt panchayath	Koduvazhanga-Kochirikka	10.106052	76.285247	15	820	1035	1	3225				
294	Pazhamthode	Alangatt panchayath	Plackattampilly	10.105926	76.284452	5	1035	1130	1	475				
295	Pazhamthode	Alangatt panchayath	Plackattampilly	10.105971	76.284459	30	1130	1370	1	7200				
296	Plackattumpilli Chirayam thode	Alangatt panchayath	Plackattampilly	10.104852	76.282885	30	0	10	2	600				
297	Plackattumpilli Chirayam thode	Alangatt panchayath	Kureethazham	10.104784	76.28423	7	10	150	2	1960				
298	Plackattumpilli Chirayam thode	Alangatt panchayath	Mankuzhy	10.103903	76.285764	8	150	340	2	3040				
299	Plackattumpilli Chirayam thode	Alangatt panchayath	Mankuzhy	10.102079	76.287228	8	340	800	2	7360				
300	Plackattumpilli Chirayam thode	Alangatt panchayath	Near Viswapeedam school	10.101779	76.287831	4.6	800	930	2	1196				
301	Plackattumpilli Chirayam thode	Alangatt panchayath	Meets with Kakkunni Methanam thode at ch 2005 M	10.099149	76.288724	8	930	1280	2	5600				
302	Periyar to Periyar thode	Alangatt panchayath	Angadikadavu	10.122286	76.294775	20	0	10	1.5	300				
303	Periyar to Periyar thode	Alangatt panchayath	Koduvazhanga	10.120956	76.292633	12	10	300	2.5	8700				
304	Periyar to Periyar thode	Alangatt panchayath	Mecheri palam	10.125001	76.287957	20	300	1100	2.5	40000				
305	Periyar to Periyar thode	Alangatt panchayath	Kulithodu	10.118409	76.288824	10	1100	2110	2.5	25250				
306	Periyar to Periyar thode	Alangatt panchayath	Varattupady colony	10.111006	76.283061	16.5	2110	3680	3	77715				
307	Periyar to Periyar thode	Alangatt panchayath	neerkodu new bridge private	10.109712	76.281928	30	3680	3880	2.5	15000				
308	Periyar to Periyar thode	Alangatt panchayath	parappalam	10.108621	76.282325	38	3880	4000	2.5	11400				
309	Periyar to Periyar thode	Alangatt panchayath	plackattumpilly	10.104852	76.282885	30	4000	4570	2	34200				

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310	Periyar to Periyar thode	Alangatt panchayath	allothu bridge	10.104359	76.283062	10	4570	4620	2.5	1250				
311	Periyar to Periyar thode	Alangatt panchayath	Kongoorppilly	10.101294	76.284311	7	4620	5080	2.5	8050				
312	Periyar to Periyar thode	Alangatt panchayath	Adakkattukuzhi	10.099274	76.282363	15	5080	5390	2.5	11625				
313	Periyar to Periyar thode	Alangatt panchayath	Chingathara	10.097398	76.279943	5	5390	5730	2.5	4250				
314	Periyar to Periyar thode	Alangatt panchayath	Pallathunadu petta palam	10.096282	76.279429	5	5730	5890	2.5	2000				
315	Periyar to Periyar thode	Alangatt panchayath	Pallathunadu palam	10.093605	76.279866	13	5890	6190	2.5	9750				
316	Periyar to Periyar thode	Alangatt panchayath	Mouth of PP thodu meets with Periyar South	10.092548	76.282458	18	6190	6550	2.5	16200				
317	Vaduvathodu	Kadungalloor	start at Ch 250m	10.110187	76.346493	5	0	940	0.5	2820				
318	Idamula Thodu	Choornnikkara	starts at Ch 4400	10.082208	76.33365	15	0	374	0.5	2805				
319	Thumbungal thodu	Edathala	starts at Ch 7190	10.06692,	76.32607	13	0	6290	0.5	40885				
320	Thumbungal thodu	Kalamassery	starts at Ch 7191	10.06692,	76.32607	6	0	870	0.5	2610				
321	Edapally thodu	Kalamassery/Kochi	starts at Ch 12520	10.0436,	76.30317	12	0	10200	0.5	61200				
322	Kattukandathil thodu	eloor	starts at Ch 15400	10.0689,	76.28921	4	0	1130	0.5	2260				
323	Kattukandathil thodu	eloor	starts at Ch 15400	10.0689,	76.28921	4	0	750	0.5	1500				
324	Unthithodu	eloor	starts at Ch 16800	10.07088,	76.2853	8	0	2380	0.5	9520				
325	Kolarickal Thodu	Cheranelloor Panchayath	Near Chittoor Ferry	10.039573	76.269040	15.00	0	1800	0.75	20250				
326	Kandanadu Thodu	Kadamakkudy Panchayath	Near Kandanad Jetty	10.056393	76.278333	5.00	0	500	1.00	2500				
327	Kothadu Thodu	Kadamakkudy Panchayath	Near Kothadu Ferry	10.058328	76.272055	8.00	0	900	0.75	5400				
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH														
328	Thoomba thodu	Sreemoolanagaram grampanchayath and Aluva muncipality	From starting point near eastern end of Aluva Thuruth to exit to Periyar at opposite bank of Aluva manappuram (near apartment)	10.123337 to 10.119683	76.381853 to 76.356443	35m	0km	4.4km	80cm	70400	_	_	_	Full length desilting proposed for avg 20m width
329	Karinthiri Aar	Chengamanadu Panchayath	Karinthiriyar start point to joining point of periyar	10.15214 to 10.144654	76.330337 to 76.337795	43m	0km	1.54km	60cm	18480	_	_	_	Full length desilting proposed for avg 20m width

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330	Chengal thodu	Chengamanadu Panchayath	Chengal thodu from starting point near SFS Airport Royale Apartment, Chengamanad to mouth at Karinthiri Aar	10.134234 to 10.148347	76.355233 to 76.33733	12m	0 km	4.35km	80cm	27840	_	_	_	Full length desilting proposed for avg 8m width
331	Puthen thodu (connecting to Chengal thodu)	Chengamanadu Panchayath	Puthenthodu from paddy field to exit at Chengal thodu	10.148343 to 10.157435	76.340323 to 76.345542	6m	0km	1.68km	60cm	4032	_	_	_	Full length desilting proposed for avg 4m width
332	Cheriyathekkanam thodu	Kunnukara	Cheriyathekkanam thodu starting from Manjaly thodu to exit at Periyar	10.153974 to 10.146549	76.279979 to 76.283789	20m	0km	1.05km	60cm	6300	_	_	_	Full length desilting proposed for avg 10m width
333	Manjaly thodu	Kunnukara, Nedumbassery, Mookkannoor and Chengamanad Panchayats, Angamali Municipality	Starting from Puthenpalam bridge on Karukutty-Mookkannoor road to its mouth at Periyar near Kunnukara	10.225215 to 10.151696	76.39557 to 76.272489	30m	0km	21.6km	70cm	272160	_	_	_	Full length desilting proposed for avg width 18m
334	Puthenthodu- (link thodu between Manjaly thodu and Chalakudy river)	Kunnukara panchayath	Puthenthodu link - starting from Chalakudy river and end at Manjali thodu , kunnukara	10.173973 to 10.179842	76.313368 to 76.317006	12m	0km	785m	60cm	3357	_	_	_	Full length desilting proposed for avg width 7m. In addition, heavy laterite obstruction in the middle of thodu of size 6x4x2.5 m observed at GPS location 10.176279,76.315336 is to be removed
335	Kannakka thodu	Puthenvelikkara panchayath	Kannakka thodu starting point to Kannakka thodu near chalakka- kuthia thodu road	10.165039 to 10.165863	76.283847 to 76.291502	12m	0km	1.40km	80cm	8960	_	_	_	Full length desilting proposed for avg width 8m

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336	Chettikkad thodu	Kunnukara	From starting point at north side of Chalakka-kuthiathodu road upto its exit point to link thodu of Chalakudypuzha	10.165967 to 10.1635	76.291428 to 76.271228	20m	0km	3.40km	50cm	20400	_	_	_	Full length desilting proposed for 12m avg width
337	Pandipadam thodu	Puthenvelikkara panchayath	Starting from Thanthonnichira to exit at Periyar	10.169771 to10.166837	76.266602 to 76.259408	5m	0km	1.30km	50cm	1950	_	_	_	Full length desilting proposed for avg width 3m
338	Kuttikkattupallam thodu	Puthenvelikkara panchayath	From starting point near Kochukadavil temple to its exit at Periyar	10.175632 to 10.174183	76.250147 to 76.250419	5m	0km	0.22km	50cm	550	_	_	_	Full length desilting proposed for avg width 5m
339	Payikkatupallam thodu	Puthenvelikkara panchayath	Starting from Thondal thodu at approximately 240m south side of Thondal bridge upto its mouth at Periyar near Sation Kadavu-Malavana road	10.177099 to 10.176282	76.24927 to 76.248179	4m	0km	0.45km	70cm	1260	_	_	_	Full length desilting proposed for avg width 4m
340	Thondal thodu	Puthenvelikkara panchayath	From Keezhurpadam area in Puthenvelikkara panchayath to its mouth at Periyar to the south side of Station Kadavu bridge	10.185672 to 10.179109	76.272843 to 76.244386	7m	0km	3.95km	60cm	11850	_	_	_	Full length desilting proposed for avg width 5m
341	Periyar to Periyar	Alangad Panchayath	Chirayam	10.09249	76.281797	6m	0 km	0.35km	75cm	1575	_	_	_	
342	Periyar to Periyar	Alangad Panchayath	Chirayam	10.104502	76.283268	6.5m	0.35km	2.05km	75cm	8287.5	_	_	_	
343	Periyar to Periyar	Alangad Panchayath	Alangad	10.104808	76.283017	10m	2.05km	2.45km	75cm	3000	_	_	_	
344	Periyar to Periyar	Alangad Panchayath	Alangad	10.119442	76.28821	10m	2.45km	3.95km	65cm	9750	_	_	_	
345	Periyar to Periyar	Karumalloor Panchayath	Angadikadavu	10.111005	76.283247	12m	3.95km	6.55km	60cm	18720	_	_	_	
346	Periyar to Periyar	Karumalloor Panchayath	Angadikadavu	10.13178	76.298273	8m	6.55km	8.2km	60cm	6240	_	_	_	
347	Periyar to Periyar	Karumalloor Panchayath	Karumalloor	10.135822	76.292112		8.2km							
348	Kallikuzhy thodu	Karumalloor Panchayath	Near Muriyakel Chapel	10.140765	76.274991	4.5m	0 km	.025 km	20cm	22.5	_	_	_	
349	Kallikuzhy thodu	Karumalloor Panchayath	Near Muriyakel Chapel	10.14072	76.27499	4.5m	0.025Km	0.115 km	20cm	81	_	_	_	

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350	Kallikuzhy thodu	Karumalloor Panchayath	Near Manjaly Bridge	10.148625	76.270918	4m	0.115 km	1.35km	20cm	988	_	_	_	
351	Kallikuzhy thodu	Karumalloor Panchayath	Near Manjaly Bridge	10.149421	76.270772	5m	1.35km	1.4 km	20cm	50	_	_	_	
352	Kallikuzhy thodu	Karumalloor Panchayath	Near Manjaly Bridge	10.149434	76.270795		1.4 km							
353	Naduvilathattu thodu	Karumalloor Panchayath	Karumalloor	10.160788	76.254768	4.5m	0.0km	0.70km	60cm	1890	_	_	_	
354	Naduvilathattu thodu	Karumalloor Panchayath	Karumalloor	10.158185	76.258477	3.0m	0.70km	1.35km	60cm	1170	_	_	_	
355	Naduvilathattu thodu	Karumalloor Panchayath	Karumalloor	10.158185	76.258477	3.0m	1.35km	1.75km	90cm	1080	_	_	_	
356	Naduvilathattu thodu	Karumalloor Panchayath	Karumalloor	10.156717	76.263125	2.0m	1.75km	1.9km	90cm	270	_	_	_	
357	Naduvilathattu thodu	Karumalloor Panchayath	Karumalloor	10.154547	76.267498		1.90km							
358	Anachal thodu	Karumalloor Panchayath	Karumalloor	10.121672	76.269701	12m	0 Km	2.1Km	30cm	6300	_	_	_	
359	Anachal thodu	Karumalloor Panchayath	Vazhikulangara - Anachal road ,Karumalloor	10.140545	76.261042	12m	2.1Km	2.52km	75cm	1890	_	_	_	
360	Anachal thodu	Karumalloor Panchayath	Karumalloor	10.144224	76.260906	6m	2.52Km	3.14Km	75cm	2790	_	_	_	
361	Anachal thodu	Karumalloor Panchayath	Near Athani Paravur road	10.149759	76.260568	6.5m	3.14Km	3.15Km	75cm	48	_	_	_	
362	Anachal thodu	Karumalloor Panchayath	Karumalloor	10.149876	76.260972	6.5m	3.15Km	3.3Km	75cm	73	_	_	_	
363	Anachal thodu	Karumalloor Panchayath	Karumalloor	10.150789	76.261034	3m	3.3Km	4.92Km	90cm	437	_	_	_	
364	Anachal thodu	Karumalloor Panchayath	Near Manjaly juma masjid,Karumalloor	10.156704	76.263091		4.92Km							
365	Karukadamooppu thodu	Karumalloor Panchayath	Anchamparuthy	10.16149	76.25358	4.0m	0 km	0.600Km	30cm	720	_	_	_	
366	Karukadamooppu thodu	Karumalloor Panchayath	Mattummal road	10.161382	76.256263	4.0m	0.600Km	0.730Km	30cm	156	_	_	_	
367	Karukadamooppu thodu	Karumalloor Panchayath	Mattummal road	10.16136	76.256264	4.0m	0.730Km	0.740Km	30cm	12	_	_	_	
368	Karukadamooppu thodu	Karumalloor Panchayath	Aikya kerala road	10.160549	76.259066	4.5m	0.740Km	1.050Km	30cm	418.5	_	_	_	
369	Karukadamooppu thodu	Karumalloor Panchayath	Karumalloor	10.160534	76.259088	3.0m	1.050Km	1.400Km	30cm	315	_	_	_	
370	Karukadamooppu thodu	Karumalloor Panchayath	Karumalloor	10.157905	76.264637		1.4Km							
371	Paravur Puzha	Paravur Municipality	NIL											

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
372	Puthenthodu	Ezhikkara Panchayath	NIL											
373	Kuzhuveli thodu	Ezhikkara Panchayath	NIL											
374	Kayikkara thodu	Ezhikkara Panchayath	Kayikkara thodu near culvert	10.125105	76.22291	2m	0Km	0.110Km	75cm	165	_	_	_	
375	Kayikkara thodu	Ezhikkara Panchayath	Kayikkara thodu near culvert	10.12508	76.222837	5m	0.010Km	0.115Km	30cm	157	_	_	_	
376	Kayikkara thodu	Ezhikkara Panchayath	Kayikkara thodu near culvert	10.124742	76.222027	6m	0.115Km	0.150Km	30cm	63	_	_	_	
377	Kayikkara thodu	Ezhikkara Panchayath	Kayikkara thodu joining to Puthenthodu	10.124598	76.22164		0.150Km							
378	Kongini thodu	Ezhikkara Panchayath	NIL											
379	Kundekavu thodu	Ezhikkara Panchayath	NIL											
380	Kannanchira thodu													
381	Kannanchira thodu	Ezhikkara Panchayath	NIL											
382	Kundekkavu - Cherupilly Thodu													
383	Kundekkavu - Cherupil	Ezhikkara Panchayath	Start at kannanchira thodu	10.117723	76.229379	9 m	0 Km	0.820km	50 cm	3690	_	_	_	
384	Kundekkavu - Cherupil	Ezhikkara Panchayath	Kaitharam	10.121794	76.235319	9 m	0.820km	1.26 Km	50 cm	1980	_	_	_	
385	Kundekkavu - Cherupil	Ezhikkara Panchayath	Thonniyakavu road	10.123109	76.239064	9 m	1.26 Km	1.87 Km	50 cm	2745	_	_	_	
386	Kundekkavu - Cherupil	Ezhikkara Panchayath	On NH66	10.12474	76.244426	9 m	1.87 Km	2.32 Km	50 cm	2025	_	_	_	
387	Kundekkavu - Cherupil	Ezhikkara Panchayath	Joining at Pashni thodu	10.125904	76.248148		2.32 Km							
388	Kacheri thodu													
389	Kacherithodu	Paravur Municipality	Kacherithodu ,north paravur	10.152543	76.231058	5.5m	0 Km	0.165Km	30cm	272	_	_	_	
390	Kacherithodu	Paravur Municipality	Kacherithodu ,north paravur	10.153663	76.230443	6m	0.165Km	0.205Km	30cm	72	_	_	_	
391	Kacherithodu	Paravur Municipality	Kacherithodu ,north paravur	10.153975	76.230268	7m	0.205Km	0.208Km	30cm	6	_	_	_	
392	Kacherithodu	Paravur Municipality	Kacherithodu ,north paravur	10.153983	76.23023		0.208Km							
393	Pooyamppilly thodu													
394	Pooyampilly thodu	Paravur Municipality	Pooyampilly thodu from Vadakkekara	10.147837	76.209271	15m	0 Km	0.292Km	60cm	2628	_	_	_	

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
395	Pooyampilly thodu	Paravur Municipality	Pooyampilly thodu Near Needoor colony road, Vadakkekara	10.148842	76.207588	6m	0.292Km	0.386Km	60cm	338.4	_	_	_	
396	Pooyampilly thodu	Paravur Municipality	Pooyampilly thodu Near east side of Pooyappilly Gurumandhir, Vadakkekara	10.149383	76.206973	8m	0.386Km	0.550Km	50cm	656	_	_	_	
397	Pooyampilly thodu	Paravur Municipality	Pooyampilly thodu at Pooyappilly culvert, Vadakkekara	10.150769	76.206402	13m	0.550Km	0.603Km	50cm	344.5	_	_	_	
398	Pooyampilly thodu	Paravur Municipality	Pooyampilly thodu at Pooyappilly culvert, Vadakkekara	10.151237	76.206265	16m	0.603Km	1.72Km	50cm	8936	_	_	_	
399	Pooyampilly thodu	Paravur Municipality	Pooyampilly thodu	10.153093	76.198534		1.72Km							
400	Kaipram thodu													
401	Kaipram thodu	Paravur Municipality	Kaipram thodu from pattanam thodu thodu, Vadakkekara	10.153585	76.209107	6m	0 Km	0.347Km	60cm	1249	_	_	_	
402	Kaipram thodu	Paravur Municipality	Near Raja mill road , Vadakkekara	10.151847	76.207195	14m	0.347Km	0.450Km	50cm	721	_	_	_	
403	Kaipram thodu	Paravur Municipality	Kaipram thodu joining to Puyampilly main thodu	10.151501	76.206376		0.450Km							
404	Parayakkad Velankadavu thodu													
405	Parayakkad Velankadavu thodu	Paravur Municipality	Near Pallamthuruth bridge	10.15316	76.2187	30m	0 Km	0.87Km	20cm	5220	_	_	_	
406	Parayakkad Velankadavu thodu	Paravur Municipality	Near Pallamthuruth bridge	10.158142	76.221093	21m	0.87 Km	2.61Km	60cm	21924	_	_	_	
407	Parayakkad Velankadavu thodu	Paravur Municipality	Near Velan kadavu bridge	10.162323	76.222237		2.61Km							
408	Thachappilly puzha	Chendamangalam Panchayath	NIL											
409	Pashni thodu													
410	Pashni thodu	Paravoor Muncipality	Cheriyapilly	10.125311	76.248533	13m	0 km	1.10 km	60 cm	8580	_	_	_	
411	Pashni thodu	Paravoor Muncipality	Vaniyakkad	10.134342	76.245438	8m	1.10 km	1.70 km	60cm	2880	_	_	_	
412	Pashni thodu	Paravoor Muncipality	Vaniyakkad	10.139399	76.244004	8m	1.70 km	2.31 km	60cm	2928	_	_	_	
413	Pashni thodu	Paravoor Muncipality	Mannam street	10.144636	76.241885	8m	2.31 km	3.09km	30 cm	1872	_	_	_	
414	Pashni thodu	Paravoor Muncipality	Pallithazham Bridge	10.149492	76.237332	8m	3.09km	3.115km	60cm	120	_	_	_	
415	Pashni thodu	Paravoor Muncipality	Pallithazham Bridge	10.149405	76.237285	8m	3.115km	3.150km	60cm	168	_	_	_	
416	Pashni thodu	Paravoor Muncipality	Pallithazham Bridge	10.149878	76.237363	8m	3.150km	3.332km	60cm	873.6	_	_	_	
417	Pashni thodu	Paravoor Muncipality	Near Fire Station road	10.1515	76.237363	8m	3.332km	3.363km	60cm	148.8	_	_	_	

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
418	Pashni thodu	Paravoor Muncipality	Near Fire Station road	10.151748	76.237293	8m	3.363km	3.588km	60cm	1080	_	_	_	
419	Pashni thodu	Paravoor Muncipality	near Poothayil bridge	10.153667	76.236565	8m	3.588km	3.596km	40 cm	25.6	_	_	_	
420	Pashni thodu	Paravoor Muncipality	near Poothayil bridge	10.15359	76.236575	8m	3.596km	3.763km	41 cm	534.4	_	_	_	
421	Pashni thodu	Paravoor Muncipality	End of puzhayoram road	10.15513	76.236093	10m	3.763km	3.765km	42 cm	8	_	_	_	
422	Pashni thodu	Paravoor Muncipality	End of puzhayoram road	10.155133	76.236118	12m	3.765km	3.85km	20cm	204	_	_	_	
423	Pashni thodu	Paravoor Muncipality	End of puzhayoram road	10.155268	76.236068		3.85km				_	_	_	
424	Alunkal Kadavu thodu													
425	Alunkal Kadavu thodu	Chendamangalam panchayath	Munduruthi Road	10.15701	76.247533	4m	0.00 km	0.13km	60cm	312	_	_	_	
426	Alunkal Kadavu thodu	Chendamangalam panchayath	Munduruthi Road	10.158101	76.247777	4m	0.13km	0.498km	60cm	888	_	_	_	
427	Alunkal Kadavu thodu	Chendamangalam panchayath	Munduruthi culvert	10.161153	76.247359	4m	0.498km	0.78km	70cm	784	_	_	_	
428	Alunkal Kadavu thodu	Chendamangalam panchayath	Munduruthi culvert	10.162295	76.245658	4m	0.78km	1.12km	50cm	680	_	_	_	
429	Alunkal Kadavu thodu	Chendamangalam panchayath	Arankkavu culvert	10.160432	76.244518	5m	1.12km	1.79km	50cm	1675	_	_	_	
430	Alunkal Kadavu thodu	Chendamangalam panchayath	Thekkumpuram kadavu	10.157812	76.243192	6m	1.79km	2.15km	50cm	1080	_	_	_	
431	Alunkal Kadavu thodu	Chendamangalam panchayath	Vedimara kadavu road end	10.15617	76.244193	8m	2.15km	2.17km	50cm	80	_	_	_	
432	Alunkal Kadavu thodu	Chendamangalam panchayath	Vedimara kadavu	10.155858	76.244123		2.17km				_	_	_	
433	Korakkara thodu													
434	Korakkara thodu	Chendamangalam Panchayath	Vadakumpuram	10.169324	76.232058	3m	0 Km	0.25Km	30cm	225	_	_	_	
435	Korakkara thodu	Chendamangalam Panchayath	Near kovilakam road,Chendamangalam	10.169558	76.232767	2m	0.25Km	2.17Km	60cm	2304	_	_	_	
436	Korakkara thodu	Chendamangalam Panchayath	Near kovilakam road,Chendamangalam	10.1714	76.24578		2.17Km				_	_	_	
437	Paliyam thodu													
438	Paliyam thodu	Chendamangalam Panchayath	Near Little flower Chapel,Vadakumpuram	10.169862	76.227245	4.5m	0.0km	0.61km	60cm	1647	_	_	_	
439	Paliyam thodu	Chendamangalam Panchayath	Vadakumpuram	10.170512		6m	0.61km	0.69km	60cm	288	_	_	_	
440	Paliyam thodu	Chendamangalam Panchayath	Vadakumpuram	10.171107	76.231078	4m	0.69km	0.79km	60cm	240	_	_	_	

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
441	Paliyam thodu	Chendamangalam Panchayath	Near Ayyappa temple	10.171785	76.231623	4m	0.79km	0.90km	60cm	264	_	_	_	
442	Paliyam thodu	Chendamangalam Panchayath	Chendamangalam	10.170463	76.227587	6m	0.90km	1km	60cm	360	_	_	_	
443	Paliyam thodu	Chendamangalam Panchayath	Near Govt.school ,Chendamangalam	10.172033	76.233633	3m	1km	1.64km	60cm	1152	_	_	_	
444	Paliyam thodu	Chendamangalam Panchayath	Near kovilakam road,Chendamangalam	10.175373	76.237213	3m	1.64km	1.9Km	90cm	702	_	_	_	
445	Paliyam thodu	Chendamangalam Panchayath	Near kovilakam road,Chendamangalam	10.175876	76.237433		1.9Km				_	_	_	
446	V.P. Thuruth thodu													
447	V.P. Thuruth thodu	Puthenvelikkara Panchayath	Chira near Sacred heart church	10.180233	76.236299	2.5	0Km	0.088Km	30cm	66	_	_	_	
448	V.P. Thuruth thodu	Puthenvelikkara Panchayath	Puthenvelikkara	10.180944	76.236705	3m	0.088Km	0.090Km	30cm	18	_	_	_	
449	V.P. Thuruth thodu	Puthenvelikkara Panchayath	Puthenvelikkara	10.180902	76.23676	6m	0.090Km	0.22Km	30cm	3.6	_	_	_	
450	V.P. Thuruth thodu	Puthenvelikkara Panchayath	Puthenvelikkara	10.181866	76.237164		0.022Km				_	_	_	
451	Kesavathuruth thodu													
452	Kesavathuruth thodu	Kottuvally Panchayath	Kesava Thuruth Thodu,Vazhikulangara Anachal Road	10.141443	76.252383	9m	0 Km	1.82Km	50cm	8190	_	_	_	
453	Cheriya Pazhampilly Thuruthu Tributary	Chendamangalam GP	Paliyam	10.177769 to 10.181449	76.236351 to 76.227211	40	0	1.100	0.80	35200	20	20	60	Silt deposit found for entire stretch
454	Thekkethuruthu Tribnutary	Chendamangalam GP Vadakkekkara GP	Gothuruthu	10.183702 to 10.193041	76.228036 to 76.204926	40	0	4.960	0.80	158720	20	20	60	Silt deposit found for entire stretch
455	Chettikkadu Sub Tributary	Vadakkekkara GP	Malyankara	10.187379 to 10.172082	76.203682 to 76.182107	40	0	3.310	0.80	105920	15	10	75	Silt deposit found for entire stretch
456	Kurumbathuruthu - Akathuchal Tributary	Puthenvelikkara GP Chendamangalam GP	Kurumbathuruthu	10.199629 to 10.193616	76.228628 to 76.220656	65	0	3.100	1.00	201500	15	10	75	Silt deposit found for entire stretch
457	Thuruthippuram Tributary	Kodungallor Municipality Puthenvelikkara GP	Malyankara	10.193117 to 10.204103	76.215621 to 76.230510	400	0	3.000	0.80	960000	20	20	60	Silt deposit found for entire stretch
458	Vijayan Thodu Tributary	Kodungallor Municipality	Malyankara	10.197584 to 10.201174	76.206483 to 76.211517	21	0	0.800	0.80	13440	20	20	60	Silt deposit found for entire stretch

Sl no	Name of Tributary	Name of Local body	Name of location/ local name of loaction	Latitude	Longitude	Width of River/Thodu in meter	Chainage		Approx Depth of Siltation	Approx Quantity	Composition of soil in %			Remarks
							From	To			Sand	Silt	Clay	
459	Elichira Sub Tributary	Puthenvelikkara GP Poyya GP	Puthenvelikkara-Mala Road	10.203993 to 10.205187	76.231848 to 76.245609	50	0	2.200	0.60	66000	20	20	60	Silt deposit found for entire stretch
460	Karooppadanna Sub Tributary	Kodungallor Municipality Vellangalloor GP	Pulloott	10.203993 to 10.205188	76.231848 to 76.245610	250	0	7.500	0.60	1125000	20	20	60	Silt deposit found for entire stretch
461	Thachappilly Sub Tributary	Kodungallor Municipality Vellangalloor GP	Thachappilly	10.203993 to 10.205189	76.231848 to 76.245611	60	0	3.350	0.60	120600	20	20	60	Silt deposit found for entire stretch
462	Neythikkudy Sub Tributary	Kodungallor Municipality Mala GP	Neythikkudy	10.203993 to 10.205190	76.231848 to 76.245612	45	0	6.000	0.60	162000	20	20	60	Silt deposit found for entire stretch

WASTE DEPOSIT IN RIVER PERIYAR

WASTE DEPOSIT IN RIVER PERIYAR												
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km												
								Type of waste		Nature of waste		
Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Indusrtial	Domestic	Solid	Liquid	Remarks
1	Periyar	Upputhara	left bank Ward 5	near upputhara pump house	97.00 Km	9.697476	77.02079	nil	yes	yes	yes	waste disposal from houses
2	Periyar	Upputhara	left bank Ward 5	central junction	98.35 Km	9.700104	77.022178	nil	yes	yes	yes	waste from houses and shops
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km												
NIL												
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km												
No waste deposit found in this reach												
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km												
No waste deposit found in this reach												
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA												
3	Periyar	KADUNGALLOOR	9	KWA PUMP HOUSE	231.96	10.106527	76.334865		YES	YES		WASTE DUMPED
4	Periyar	KADUNGALLOOR	17	INDUSTRIAL AREA	237.15	10.077492	76.313535	YES			YES	INDUSTRIAL AREA
5	Periyar	KADUNGALLOOR	17	CMRL	237.46	10.076788	76.311527	YES			YES	EFFLUENT
6	Periyar	KADUNGALLOOR	17	CMRL	237.69	10.076968	76.30844	YES			YES	CMRL OUTLET
7	Periyar	KADUNGALLOOR	18	SUDCHEMI	238.43	10.07452	76.306738	YES			YES	SUDCHEMI
8	Periyar	KADUNGALLOOR	18	SUDCHEMI	238.49	10.07734	76.30316	YES			YES	SUDCHEMI
9	Periyar	ELOOR	6	FACT	238.74	10.078492	76.301208	YES			YES	FACT DISCHARGE
10	Periyar	KADUNGALLOOR	18	BINANI	239.07	10.08097	76.300003	YES			YES	BINANI
11	Periyar	KADUNGALLOOR	18	BINANI	239.23	10.082295	76.299503	YES			YES	BINANI
12	Periyar	ELOOR	6	IRE	239.29	10.08274	76.299278	YES			YES	IRE
13	Periyar	ELOOR	6	FACT	9000	10.078492	76.301208	YES			YES	FACT DISCHARGE
14	Periyar	ELOOR	6	FACT	9200	10.078492	76.301208	YES			YES	FACT DISCHARGE
15	Periyar	KALAMASSERY	12	FROM KALAMASSERY DUMPING YARD	7190	10.06692,	76.32607	YES			YES	KALAMASSERY DUMPING YARD
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH												
16	Periyar	Puthenvelikkara GP Chendamangalam GP Vadakkekkara GP	8	Thekkethuruth River Tail End (LHS1 / LHS2)	22.500km	10.193026	76.201104	Yes	Yes		Yes	Tributary of Periyar and Sub Tributary of Thekkethuruthu River is polluted with Domestic and Peeling Shed discharge. The polluted water is ultimately reaching Periyar Main River

Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
17	Periyar	Puthenvelikkara GP	9	Kurumbathuruthu-Akathuchal Tail End (RHS1)	20.700km	10.193616	76.220656	Yes	Yes		Yes	Tributary of Periyar is polluted with Domestic and Peeling Shed discharge. The polluted water is ultimately reaching Periyar Main River
18	Periyar	Kodungalloor Municipality	10	Thuruthippuram Tail End (RHS2)	21.400km	10.193616	76.220656	Yes	Yes		Yes	Tributary of Periyar is polluted with Domestic and Peeling Shed discharge from Sub Tributaries also. The polluted water is ultimately reaching Periyar Main River
19	Periyar	Kodungalloor Municipality	11	Vijayan Thodu Tail End (RHS3)	22.200km	10.197584	76.206483	Yes	Yes		Yes	Tributary of Periyar is polluted with Domestic and commercial waste discharge from nearby institutions The polluted water is ultimately reaching Periyar Main River
20	Periyar	Vadakkekkara GP Kodungalloor Municipality Eriyad GP	1	Sathar Island LHS / RHS	23.200km	10.18501	76.182514	Yes	Yes		Yes	Domestic discharge from LHS and RHS of Sathar Island Tributary. Waste deposit from anchored Fishing Boats

WASTE DEPOSIT IN TRIBUTARIES

WASTE DEPOSIT IN TRIBUTARIES												
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km												
								Type of waste		Nature of waste		
Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Indusrtial	Domestic	Solid	Liquid	Remarks
1	Chottupara Thodu	Vandiperiyar Grama Panchayath & Origin in Kumili Grama Panchayath	4,5,6 & 7	Vandiperiar to Walerdie	0 to 3.250 km	Various locations	various locations	No	Yes	Yes	Yes	Solid waste, waste from commercial establishments, waste from residences aredepostining n the thodu for a long strech from Vandiperiyar town to Walerdi.
2	Anakkuzhy Thodu	Vandiperiyar Grama Panchayath	2	Amman kovil	1.600 km	Various locations	various locations	No	No	Yes	No	Solid waste disposal noticed in Amman kovil
3	Elappara thodu	Elappara Panchayath	13	Elappara town	4.31 km to 5 km	Various locations	various locations	No	Yes	No	Yes	
4		Munnar	17	Nallathanny junction, Munnar	8.855km	10.088845,	77.059512		Y	Y	Y	Disposal of waste into river from commercial establishments
5			17	Foot bridge (near PWD office)	8.926km	10.088484	77.060412		Y	Y	Y	Disposal of waste into river from commercial establishments
6			17	Confluence of Colony thodu	9.006	10.088523,	77.060389		Y	N	Y	Disposal of waste into river from commercial establishments
7			10	Churchil bridge	9.221km	10.087327	77.060974		Y	N	Y	Disposal of waste into river from commercial establishments
8			10	confluence of Nadayar thodu	9.351	10.086028,	77.060251		Y	N	Y	Disposal of waste into river from commercial establishments
9			10	Munnar Main junction new Brige	9.425	10.085986,	77.060912		Y	N	Y	Disposal of waste into river from commercial establishments
10	Muthirapuzha			Munnar Main junction old Brige	9.435	10.086032,	77.060912		Y	N	Y	Disposal of waste into river from commercial establishments
11			10	Confluence of Periyavarai river & kundala river	9.575	10.084707	77.061906		Y	N	Y	Disposal of waste into river from commercial establishments
12			10	Pipe line bridge near bypass bridge (U/S of bypass bridge)	9.885	10.082192	77.062261		Y	Y	N	Disposal of waste into river from commercial establishments
13			10	Munnar bypass bridge	9.985	10.082118,	77.062274		Y	Y	Y	Disposal of waste into river from commercial establishments
14			10	D/S of Munnar bypass bridge	9.985	10.082118,	77.062274		Y	Y	Y	Disposal of waste into river from commercial establishments
15			10	Munnar head work dam	13.225	10.068086	77.06685		Y	N	Y	Disposal of waste into river from commercial establishments
16		Munnar	17	Culvert near instant tea factory	0.05	10.095974	77.04066	Yes	NO	Yes	No	waste from nallathanni Tea factory industrial unit
17			17	culvert near shristy charitable trust	0.429	10.095943	77.0406	NO	Yes	N	Yes	domestic waste

Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
18	Nallathanni		17	culvert near tea Business support office	0.609km	10.0581361	77.022711	NO	Yes	N	Yes	Disposal of liquid waste into rivers from commercial establishments
19			17	culvert near tea Factry	1.235km	10.095896,	77.040695	NO	Yes	N	Yes	Disposal of liquid waste into rivers from commercial establishments
20			17	culvert near tea museum	2.525	10.093924,	77.050308	NO	Yes	N	Yes	Disposal of liquid waste into rivers from commercial establishments
21			17	culvert near little flower girls highschool	2.625	10.093399,	77.050897	NO	Yes	N	Yes	Disposal of liquid waste into rivers from near by buildings
22			17	culvert near pentacostal mission	3.07	10.090322,	77.054292	NO	Yes	N	Yes	Disposal of liquid waste into rivers from near by buildings
23			17	Near cattle shed near nallathanninriver	3.465	10.089210,	77.057179	NO	Yes	Yes	Yes	Solid and liquid waste are discharged from cattle shed located on side of the Nallathanny river
24			17	Foot bridge behind sree krishna Hotel	3.701	10.088824,	77.059137	NO	Yes	Yes	Yes	Solid and liquid waste are discharged from hotels and small business located on side of the Nallathanny river
25			17		3.975	10.088894,	77.059532	NO	Yes	Yes	Yes	Solid and liquid waste are discharged from hotels and small business located on side of the Nallathanny river
26			17	Nallathannu confluence to Muthirapuzha	4.00.	10.088812,	77.059731,	NO	Yes	Yes	Yes	Solid and liquid waste are discharged from hotels and small business located on either side of the Nallathanny river
27	Colony thodu		10	New Colony Road (culvert)	0.065to1.071	10.089038	77.073396	No	Yes	Yes	Yes	Disposal of waste into river fromcommercial establishments @11 point
28			10	Culvert on munnar colony thodu(al buhari hotel)	1.135 to 1.235	10.087731	77.066719	No	Yes	Yes	Yes	Disposal of waste into river from commercial establishments@5point
29			10	Excess of household waste and toilet waste	1.29 to1.650	10.087812,	77.06232	No	No	Yes	Yes	Excess of household waste and toilet waste @3 point
30			10	Culvert (PIPE CULVERT)	1.740 to 1.750	10.08784	77.06145	No	No	Yes	Yes	Sewage and solid waste are widely discharged from hotels and houses located along the side of the colony thodu@ 4point
31	Chockamadu Thodu		10	Near Tea Factory & Labour Quarters	0.595 to 1.50	10.068634,	77.073837	No	Yes	Yes	Yes	liquid waste from labour Quarters and tea factory @ 4 point

Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
32	Lakshmi Thodu		10	Culvert near sevenmala tea estate office	7.597	10.070707	77.047688	No	Yes	N	Yes	liquid waste
33			10	Culvert near ksrtc pine plantation	9.227	10.070345	77.060844	No	Yes	Yes	No	solid waste
34			10	Solid waste is deposited on the right banks of Lakshmi thodu near hydel park	9.4	10.069981	77.061845	No	Yes	Yes	Yes	both liquid &Solid waste is deposited on the right banks of Lakshmi thodu near hydel park
35	Nadayar Thodu		10	Private shop above Thodu	0.655 to 0.66	10.085767,	77.059858	No	Yes	No	Yes	Disposal of liquid waste into thodu from commercial establishments
36	Panniyar	Santhanpara G.P	4	Pooppara New Bridge	4.8 km	9° 58' 42"	77° 12' 31"	No	Yes	Yes	No	
37	Panniyar	Santhanpara G.P	4	Pooppara Old Bridge	4.9 km	9° 58' 43"	77° 12' 28"	No	Yes	Yes	No	
38	Panniyar	Rajakkad G.P	8	D/S of Kuthunkal waterfalls	24.1 km	9° 56' 24.8"	77° 6' 21.6"	No	Yes	Yes	No	
39	Shanthanpara River	Santhanpara G.P	5	Chennakkadavu bridge	4.9 km	9° 58' 7"	77° 13' 5"	No	Yes	Yes	No	
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km												
NIL												
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km												
40	Mukkadai	Kalady		Kottamam	14.385	10.177873	76.45732			solid		Remains of old demolished bridge obstructing the flow
41	Krariyeli Thodu	Vengoor		Perumbavoor Paniely Road	4.981	10.1663889	76.5725	Yes	-		Yes	Industrial waste from nearby Milk industry in U/s side
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km												
	Kunnuvazhithodu											
42	Main Stream - MS	Vazhakulam			1.22	10.107081	76.439007	Y	N	Y	Y	From Plywood company
43	Main Stream - MS	Vazhakulam		Chittethukudithazham	2.79	10.110139	76.428499			Y	N	Demolished bridge waste
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA												
44	PANACHITHODU	ELOOR	29	Y Junction	1333.25	10.076738	76.287092		yes	yes		
45	Onji thode	Kadungalloor panchayath	20	perekadu	2370	10.101587	76.312976		yes	yes		
46	Periyar to Periyar	Alangad panchayath	2,3,4	Kulithodu	2110	10.118409	76.288824		yes	yes		
47	Periyar to Periyar	Alangad panchayath	4,12	Varattupady colony	3680	10.111006	76.283061		yes	yes		

Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
48	Periyar to Periyar	Alangad panchayath	13,15,16	Kongoorppilly	5080	10.101294	76.284311		yes	yes		
49	Periyar to Periyar	Alangad panchayath	13,16	Adakkattukuzhi	5390	10.099274	76.282363		yes	yes		
50	Periyar to Periyar	Alangad panchayath	13,16	Pallathunadu petta palam	5890	10.096282	76.279429		yes	yes		
51	Periyar to Periyar	Alangad panchayath	13,16	Pallathunadu palam	6190	10.093605	76.279866		yes	yes		
52	Plackattumpilly Chirayam thode	Alangad panchayath	13	Near Viswapeedam school	930	10.101779	76.287831		yes	yes		
53	vaduvathodu	kadungalloor	7	near culverts	505	10.10958	76.3453		yes	yes		
54	edapally thodu	cochin	37	Near railway bridge,	1000	10.036072	76.303722		yes	yes		
55	edapally thodu	cochin	37	Near Chambokadavu bridge	1500	10.032957	76.30477		yes	yes		
56	edapally thodu	cochin	38	Near NH bridge Edapally	2500	10.025223	76.308795		yes	yes		
57	edapally thodu	cochin	38	Near Marotty chodu palam	2850	10.023087	76.310547		yes	yes		
58	edapally thodu	cochin	38	Near timber bridge	3230	10.020017	76.311333		yes	yes		
59	edapally thodu	cochin	38	Near pipe line bridge	4150	10.01482	76.315993		yes	yes		
60	edapally thodu	cochin	41	Near Chembumukku bridge	5100	10.010415	76.319725		yes	yes		
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH												
61	Pashni thodu (Sub tributary of Paravurpuzha)	Paravoor Muncipality		Near Peruvaram bridge	2.31 km	10.144499	76.241928		Yes	Yes		
62		Paravoor Muncipality						NIL				
63		Paravoor Muncipality						NIL				
64		Paravoor Muncipality						NIL				
65		Paravoor Muncipality		Near Anganwadi road	2.77km	10.148021	76.239825		Yes	Yes		
66	Cheriya Pazhampilly Thuruthu Tributary	2,3,6,7	All Wards	Paliyam	Entire Stretch	10.177769 to 10.181449	76.236351 to 76.227211	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
67	Thekkethuruthu Tribnutary	Chendamangalam GP	All Wards	Gothuruthu	Entire Stretch	10.183702 to 10.193041	76.228036 to 76.204926	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries

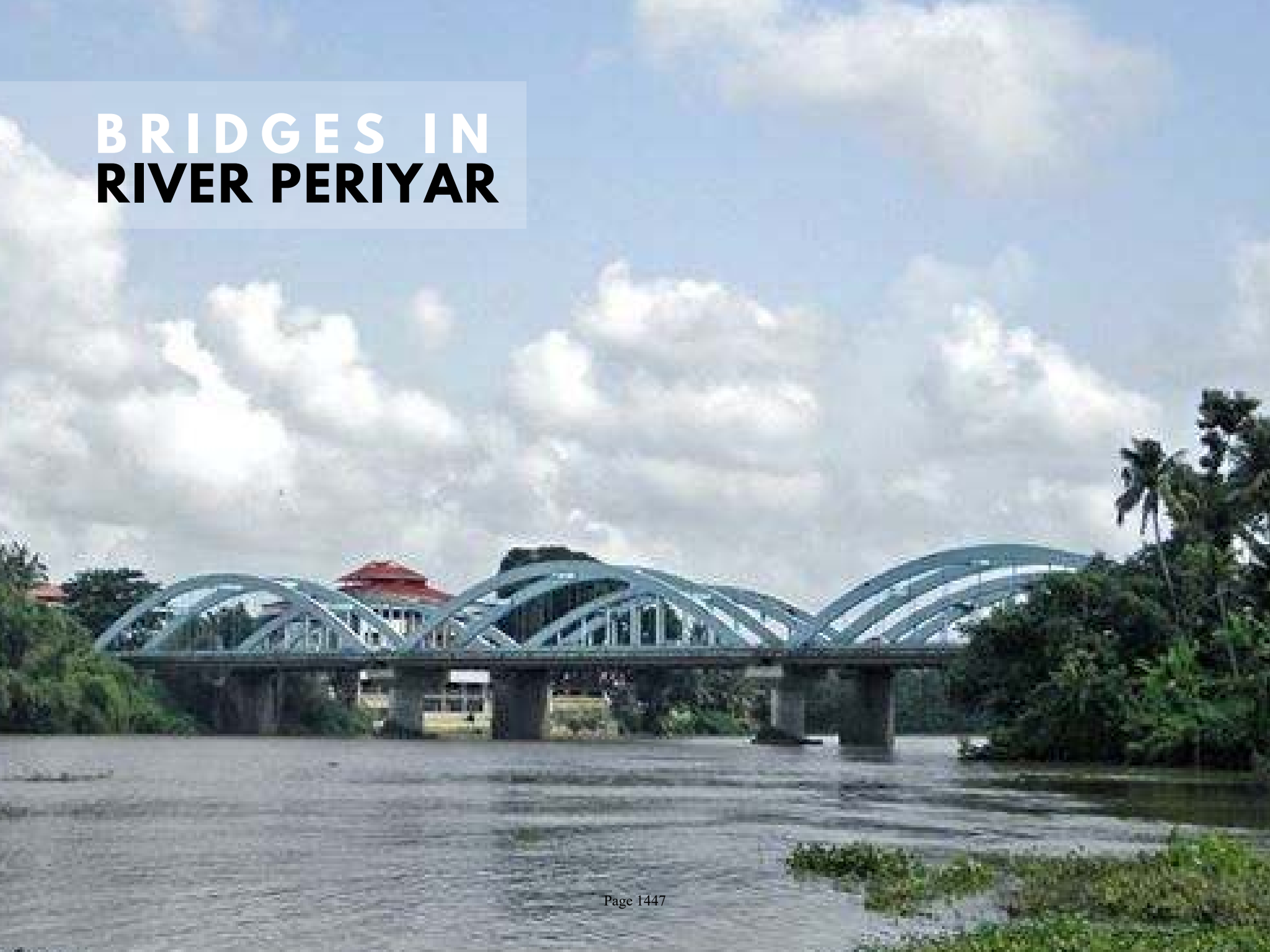
Sl no	Name of River	Name of Local body	Ward No:	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Type of waste		Nature of waste		Remarks
								Indusrtial	Domestic	Solid	Liquid	
68	Chettikkadu Sub Tributary	Vadakkekkara GP	7,9,11	Malyankara	Entire Stretch	10.187379 to 10.172082	76.203682 to 76.182107	Yes	Yes	Yes	Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
69	Kurumbathuruthu - Akathuchal Tributary	Puthenvelikkara GP Chendamangalam GP	2, 4, 5, 7	Kurumbathuruthu	Entire Stretch	10.199629 to 10.193616	76.228628 to 76.220656	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
70	Thuruthippuram Tributary	Kodungallor Municipality Puthenvelikkara GP	All Wards	Malyankara	Entire Stretch	10.193117 to 10.204103	76.215621 to 76.230510	Yes	Yes	Yes	Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
71	Vijayan Thodu Tributary	Kodungallor Municipality	3	Malyankara	Entire Stretch	10.197584 to 10.201174	76.206483 to 76.211517	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
72	Elichira Sub Tributary	Puthenvelikkara GP Poyya GP	3,6,7,9	Puthenvelikkara-Mala Road	Entire Stretch	10.203993 to 10.205187	76.231848 to 76.245609	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
73	Karooppadanna Sub Tributary	Kodungallor Municipality Vellangalloor GP	All Wards	Pulloott	Entire Stretch	10.203993 to 10.205188	76.231848 to 76.245610	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
74	Thachappilly Sub Tributary	Kodungallor Municipality Vellangalloor GP	2,5,8	Thachappilly	Entire Stretch	10.203993 to 10.205189	76.231848 to 76.245611	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries
75	Neythikkudy Sub Tributary	Kodungallor Municipality Mala GP	3,4,6,9	Neythikkudy	Entire Stretch	10.203993 to 10.205190	76.231848 to 76.245612	Yes	Yes		Yes	Waste water discharge from domestic and commercial establishments situated on banks of Tributaries

Identified points of river Periyar/stretches/drain based on KSPCB preliminary monitoring results *Idukki District*			
IDUKKI STRETCH (*NALLATHANNI – MUTHIRAPUZHA - NARIAMANGALAM*) RIVER			
SAMPLING POINT	**BOD(mg/L)**	**COLIFORM (Cfu/100 ml)**	**LOCAL BODY**
Nallathanni River near Srishti Charitable Trust (D/s of Tata Instant Tea),Munnar	4.7	1200	Munnar Grama panchayath
Muthirappuzhayar near Avondale cottages	1	7800	Munnar Grama panchayath
Periyar at Panamkutty Bridge	1.3	4100	Vellathooval & Kanjikkuzhy Panchayath
Periyar at Kanjiraveli	1.4	2700	Adimali Panchayath
Nallathanni River Near Pentecost Church	4.4	4800	Munnar Grama panchayath
Muthirappuzha River at head works(KSEB),Munnar	2.8	8700	Munnar Grama panchayath
River Periyar at Upputhara Bridge	2.9	1600	Upputhara & Ayyappancovil Gramapanchayath
Uppar River at Ellackal Bridge	3.8	8600	Byson valley Panchayath
Periyar at Karimban old bridge	1.7	3800	Vazhathope & Mariyapuram panchayath
STREAMS/TRIBUTARIES			
Perinjankuttyar at Konnathady	1	3600	Konnathady Panchayath
Thottiyar at Kandamalipadipalam	3.2	3800	Adimali Panchayath
Deviyar at Deviyar Bridge	2.7	1600	Adimali Panchayath
Kundala River at a Bridge connecting two parallel roads,Munnar	2.4	12000	Munnar Grama panchayath
KannimalaRiver,Munnar	1.9	4400	Munnar Grama panchayath
Chottuparathodu at Vandiperiyar	3.7	1400	Vandiperiyar
Stream at backside of Edassery Eastend (Pankaj Cottage)	4.6	15000	Munnar Grama panchayath
Deviyar River near confluence point of Thalamalithodu and Polinjapalamthodu	2.7	4900	Adimali Panchayath
DRAINS			
Nadayar Drain near Silver Spoon Restaurant,Munnar	6.6	1600	Munnar Grama panchayath
Drain Behind Broad Bean Resort	1.8	8400	Munnar Grama panchayath
KambilikandamThodu at Panamkutty	0.7	4700	Konnathady Panchayath
Drain at River Periyar near Springdale Resort Vandiperiyar	5.4	4200	Vandiperiyar
Ernakulam District			
PERUMBAVOOR STRETCH (*NARIAMANGALAM – MARAMPILLY*) RIVER			
Near Avolichal near pumping station	3.1	1	Kavalangadu Panchayath
Near Inchathotty hanging bridge	6.1	8	Keerampara Panchayath
Near Thattekad Bridge, Velielchal	3	14	Keerampara Panchayath
Manikandachal, Pooyamkutty	3.9	NIL	Kuttampuzha Panchayath
Paniyeliporu, Near Whispering waters	3.5	NIL	Vengoor Panchayath
STREAMS/TRIBUTARIES			
VallomAngadikadavu- Near T P Hassan Memmorial Hall	4.2	NIL	Okkal Panchayath
MudickalNear Pump House	3.5	NIL	Vazhakkulam Panchayath

SAMPLING POINT	BOD(mg/L)	COLIFORM (Cfu/100 ml)	LOCAL BODY
ERNAKULAM STRETCH (*MARAMPILLY - ALUVA - EDAMULA*) RIVER			
NEAR OLD MALAYATTOOR CHURCH	3.2	380	Malayattoor Neeleeshwaram
MEKKALADY	0.2	6200	Kalady
CHEMBAKASSERY KADAV	1.1	8000	Aluva
ALUVA MANAPPURAM	0.3	8000	Aluva
STREAM/TRIBUTARIES			
NEAR TO GLASS FACTORY ROAD	10.5	150000	Kalamassery
EDAPALLY THODU	0.2	4000	Kalamassery, Kochi Corpn
RIVER KALAMASSERY BRIDGE	1.1	7800	Kalamassery
DRAINS			
MALAYATTOOR THAZHE PALLI THODU	0.7	4000	Malayattoor Neeliswaram
NEELEESWARAM THODU	1.4	5200	Malayattoor Neeliswaram
MOOKKADA THODU	0.25	3850	Aluva
CHENGAL THODU	1.3	4000	Kalady
NEAR ULIYANNOOR BRIDGE	10.6	40000	Aluva
ARATTUKADAVU THODU KALAMASSERY	4.8	800000	Kalamassery
ARRAKKA CANAL	0.6	3600	Aluva
ASHRAMAM ROAD	0.4	7400	Aluva
ALUVA MARKET/JEWEL RIVER WOODS FLAT	1.8	4400	Aluva
NEAR HOTEL PERIYAR	13.5	260000	Aluva
LOTUS SHANTI LOTUS	0.1	350	Aluva
PUTHALAM KADAVU	44.5	250000	Kalamassery
NEAR TO GLASS FACTORY ROAD	10.5	150000	Kalamassery
EDAPALLY THODU	0.2	4000	Kalamassery, Kochi Corpn
6.2.1. ELOOR STRETCH (*ALUVA – VARAPPUZHA*) RIVER			
Eloor ferry	1.1	2900	Eloor
Unthithodu confluence point	1.9	4200	Eloor
Methanam Bridge	0.9	2600	Eloor and Kadungaloor
Vettukadavu	1.1	3200	Kadungaloor
Pathalam bund down stream	1.2	3000	Eloor and Kadungaloor
STREAM/TRIBUTARIES			
Manjummal bund down stream	1.9	2500	Eloor and Kalamassery Municipality
Puthalamkadavu	1.3	2700	Kalamassery Municipality
DRAINS			
Drain between alpha crumb rubber and Malaya rubtec	420	7000	Eloor Industrial Development area

SAMPLING POINT	BOD(mg/L)	COLIFORM (Cfu/100 ml)	LOCAL BODY
Drain joining at upstream near to navigation channel of pathalam bund	180	2400	Under Irrigation department
Drain near to Marksmen marine products		3000	Eloor Industrial Development area
Storm water drain of Indogerman	440		Indogerman
Edayattuchal	500	1700	Kadungallur Grama Panchayath
Stream joining upstream of methanam bridge	500	3600	Kadungallur Grama Panchayath
Ongithodu	220	1700	Kadungallur Grama Panchayath & Alangad Grama Panchayath
Stream near Adichilikadavu	420	3500	Eloor Muncipality
D-Drain Fact UD	420		FACT UD
C-Drain Fact UD	320	3800	FACT UD
O4-TCC ,Storm water drain	540		TCC
Drain at Pathalam bridge	240	4100	Eloor Muncipality
E-drain Fact PD	640	2600	FACT PD
B-drain Fact PD	120	1900	FACT PD
IRE Drain	560		IRE
Drain at Manjaly Bridge	200	900	Puthenvelikkara Grama Panchayth
Drain at Pazhampillythuruthu bridge	360	2100	Puthenvelikkara Grama Panchayth
Drain near to Ryan school	160	200	Puthenvelikkara Grama Panchayth
Unthithodu	80	1900	Eloor Muncipality,(Its under Kuzhikandamthodu Remediation)
Drain at Amrutha sag pharma -Eloor	120	5000	Eloor Muncipality
Drain at Eloor ferry road near to ferry	140	4300	Eloor Muncipality
Drain at Periyarroad,Verapoli	180	3600	Eloor Muncipality
Palliyattukarakadavu	120	4700	Eloor Muncipality
Drain near to Popular lime shell	160	3200	Eloor Muncipality
Thrissur District			
STREAM/TRIBUTARIES			
ManimukkamThodu	0.6	2500	Kodungallur Municipality
NOTE:			
BOD limiting value:3mg/l			
Coliform :2500 cfu/100ml			

BRIDGES IN RIVER PERIYAR



BRIDGES IN RIVER PERIYAR										
LOCATION OF BRIDGE TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km										
Sl no	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of bridge**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Periyar	Vandiperiyar Grama Panchayath	Keerikkara	6.580 km	9.60877	77.077768	RCC Pier and Slab for Pedestain use	No		
2	Periyar	vandiperiyar	2	85.4km	9˚63'15" N,	77˚05'10" E	Foot bridge	Yes	No, reconstruction needed	the half portion of bridge is collapse. The damaged portions of bridge are still present at the downstream of the bridge.
3	Periyar	alady porikanni pedestrian bridge	alady	94.72km	9.6783411	77.0273455	concrte bridge	yes		already collapsed .only pier is remaining now
4	Periyar	Ayyappankovil bridge	mattukatta	100.45km	9.716803	77.032643	concrete bridge	yes		submerged condition
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km										
NIL										
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km										
NO STRUCTURE FOUND TO BE DEMOLISHED / RECONSTRUCTED										
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km										
5	Kuzhippallam Thodu	Nedumbassery	Kapprassery	2.7	10.143663	76.364218	Partially Demolished Bridge	Yes	N/A	
6	Kuzhippallam Thodu	Nedumbassery	Neduvannoor	3.2	10.143663	76.364218	VCB damaged	Yes	N/A	
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA										
NO STRUCTURE FOUND TO BE DEMOLISHED / RECONSTRUCTED										
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH										
7	Periyar	Aluva Muncipality	Mangalapuzha bridge	2.3km	10.126463	76.341213	NH Highway bri	No	No	
8	Periyar	Karumaloor, Chengamanad Panchayats	Thadikkal kadavu bridge	6.53km	10.14975	76.318587	Bridge	No	No	
9	Periyar	Karumaloor,Kunnukara Panchayats	Purappillykavu Bridge	11.35km	10.145382	76.28346	Regulator cum b	No	No	
10	Periyar	Karumaloor,Kunnukara Panchayats	Manjali bridge	13 km	10.144691	76.279599	Bridge	No	No	
11	Periyar	Puthenvelikkara Panchayath	Station kadavu bridge	17.26km	10.179237	76.243787	Bridge	No	No	
12	Periyar	Chendamangalam Panchayath	Pazhampillythuruth bridge	17.50 km	10.175277	76.238187	Bridge	No	No	
13	Periyar	Vadakkekkara GP	Moothakunnam Bridge	22.715km	10.194690	76.201205	Road Bridge	No	No	
14	Periyar	Kodungallor Municipality	Kottapuram Bridge	22.95km	10.199232	76.200644	Road Bridge	No	No	
15	Periyar	Vadakkekkara GP	Sathar Island Bridge	23.3km	10.185733	76.187891	Road Bridge	No	No	

TOTAL NUMBER OF BRIDGES IN MAIN RIVER	**15**

BRIDGES IN RIVER PERIYAR										
LOCATION OF BRIDGE TO BE DEMOLISHED / RENOVATED IN VARIOUS REACHES										
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km										
Sl no	**Name of Tributary**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of bridge**	**Whether Demolished & reconstruction needed**	**Demolision only**	**Remarks**
1	Chottupara Thodu	Vandiperiyar Grama Panchayath &	21 bridges in the tributory	From 0.050 km to 8.700 km	21 bridges	21 bridges	RCC bridges without central pier	Yes for 6 bridges	Nil	6 bridges are creating obstruction
2	Anakkuzhy Thodu	Vandiperiyar Grama Panchayath	Chandravanam	0.030 km	9.608363	77.078216	RCC bridge with single pier	No		
3	Vellaramkunnu thodu	vandiperiyar	Vellaramkunnu thodu	6.65	9˚63’16” N,	77˚07’25” E.	Checkdam	Yes	No, reconstruction needed	Wing walls did not have enough height due to this bank of the thodu will erode it will affect strength of checkdam.
4	Thengakkal thodu/Manjumala thodu	vandiperiyar	Thengakkal	3.17	9˚62’11” N,	77˚04’59” E.	Checkdam	Yes	No, reconstruction needed	Wing walls did not have enough height due to this bank of the thodu will erode it will affect strength of checkdam.
5	Ladrum	peerumedu	Ladrum estate	2.14	9˚60’00” N	, 77˚02’75” E	Culvert	Yes	No, reconstruction needed	The upstream and downstream banks are not protected. Left bank abutment is in damaged condition. The abutments are constructed inside the thodu. The culvert may cause obstructions to the smooth flow of water
6	Ladrum thodu	Vandiperiyar panchayat	100 adi palam	5/600	9°61'61"N	77°05'56"E	RCC	No	Near by constructed a steel bridge	The damaged portions of bridges are stil present. This may causes obstruction to smooth flow of water
		Upputhara and Elappara Panchayath	4th Mile, Kodaikkanal Bridge	3.75 km	9.659616	76.988466	bridge	Yes	Nil	Damaged Condition
		Upputhara and Elappara Panchayath	Near Elampadam bhagam	6.234 Km	9.665821	76.968929	Steel Foot Bridge	yes	yes	Obstruction to the smooth flow of water in rainy season

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
7	Chinnar thodu	Upputhara and Elappara Panchayath	Eettathodu Palam (Board Pady)	6.94 km	9.665859	76.968962	Concrete Bridge	Yes	Nil	Damaged Condition
		Elappara Panchayath	Kochukarimthiri bridge	9.943 km	9.663013	76.950543	Concrete Bridge	Yes	Nil	The damaged portions of bridges are still present. This may causes obstruction to smooth flow of water
8	Elappara thodu	Elappara Panchayath	Vadakkekara bhagam bridge	0.180km	9.656592	76.997837	Masonry	Yes	Nil	The damaged portions of bridges are still present. This may causes obstruction to smooth flow of water
		Elappara Panchayath		From 4.50 km to 5.700 km	9.632497	76.978982	bridges	Yes for 3 bridges	Nil	3 bridges are creating obstruction
9	Pasupara thodu	Upputhara Panchayath	Cross Bar near Alampally Pump House	6.062 km	9.695423	77.014257	cross bar			The length of cross bar is less than that of thodu. Hence the cross bar may cause obstructions to the smooth flow of water. During the monsoon season, water flows through the sides of the cross bar and floods nearby houses.
10	Oorampara thodu	Ayyppankovil GP	thonythadi	0.072km	9.697511	77.030411	RCC slab culvert	yes		collapsed condition
11	Vellilamkandom thodu	Kanchiyar Panchayath	Labbakkada	0/250	9.7288	77.058714	Culvert	yes	Reconstruction needed to increase the Span	
	Vellilamkandom thodu	Kanchiyar	Mannarmattompa dy	0/935	9.722921	77.056712	Culvert	yes	Reconstruction needed to increase the Span	
12	Kozhimalathodu	Kanchiyar	Rajapuram	0/680	9.738257	77.023768	Culvert	yes	Reconstruction needed to increase the Span	

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13	Kozhimalathodu	Kanchiyar	Manjappara	0/897	9.739541	77.022438	Culvert	yes	Reconstruction needed to increase the Span	
	Palakkada thodu	Kanchiyar	Kattappana-Kuttikkanam road	3/500	9.744832	77.070524	Bridge	yes	Reconstruction needed to increase the Span	
14	Kattappanayar	Kattappana Muncipality	Ambalakkavala in Adimaly-Kumily Road At O.J.Pady	5/003	9.738633	77.110805	Bridge	yes	Reconstruction needed to increase the Span	
15	Kattappanayar	Kattappana Muncipality	Near St.John's hospital,Kattappana	5/826	9.744713	77.108872	Bridge	yes	Reconstruction needed to increase the Span	
	Kattappanayar	Kanchiyar Panchayath	JohnykadaChappath Palam	10/667	9.755873	77.084848	Bridge	yes	Reconstruction needed to increase the height	
16	Tributaries of Kattappanayar-Kattappana Thodu	Kattappana Muncipality	Parakadavu in Thodupuzha-Puliyanmala Road	1/130	9.753343	77.127308	Pipe Culvert	yes		
17	Tributaries of Kattappanayar-Valiyakandam Thodu	Kattappana Muncipality	Near Pentecost Church	2/969	9.753891	77.104818	Culvert	yes	Reconstruction needed to increase the Span	
	Thankamany Thodu	Kamakshy/Erattayar Panchayath	Harithapady	0/135	9.838728	77.039519	Culvert	yes	Reconstruction needed to increase the height	
18	Thankamany Thodu	Kamakshy/Erattayar Panchayath	Koothrapallipady	2/295	9.828678	77.052178	Culvert	yes	Reconstruction needed to increase the Span	
19	Thankamany Thodu	Kamakshy/Erattayar Panchayath	Pezhnalpurayidam	3/270	9.823282	77.058852	Culvert	yes	Reconstruction needed to increase the Span	

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19	Thankamany Thodu	Kamakshy/Erattayar Panchayath	Kumarakam-Cumbum Road	4/460	9.817838	77.066582	Bridge	yes	Reconstruction needed to increase the Span of Bridge	
20	Thankamany Thodu	Kamakshy/Erattayar Panchayath	Nalumukku Jn	6/000	9.809478	77.077773	Bridge	yes	Reconstruction needed to increase the Span of Up streame side	
21	Tributary of Thankamany thodu - Nellippara Thodu	Kamakshy/Erattayar Panchayath	Vazhavara-Nalumukku Road	4/975	9.808759	77.072298	Culvert	yes	Reconstruction needed to increase the Span	
	Narakakkanam Thodu	MariyapuramPanchayath	Near Narakakkanam Jn	1/510	9.838204	76.998025	Culvert	yes	Reconstruction needed to increase the Span	
22	Perinjamkutty Aar	Konnathady	Chinnar	ch.20/030m	9.922324	77.014988	old Chappath	No	Yes	
23	colony thodu	Munnar	near sangeetha hotel	1.195	10.08659	77.065805	Culvert	yes	NA	Flow obstructed as the abutment of private bridge is located in the river
24		Munnar	culvert (foot bridge near Govt Hostel)	1.235	10.08823	77.063379	Foot Bridge	yes	NA	Foot bridge was partially destoryed in flood
25		Munnar	pump shed near camp munnar hotel	1.065	**10.087659**	**77.065805**	old pump shed	NA	demolising	Old pumpshed situated in thodu obstructing flow to be demolished
26	Uppar thodu	Bysonvalley	Foot bridge near servic centre	8.46	10.088812	77.059731	Foot Bridge	yes	NA	Flow obstructed as the abutment of private bridge is located in the river
27		Bysonvalley	Foot bridge near Jalanidhi pump house	9.124	10.00608	77.114538	Foot Bridge	yes	NA	Abutment failure
28	Ellapetty thodu	Devikulam	culvert (Cuvert near Ellapetty tea factory)	0.098	10.127528,	77.203635	Culvert	yes	NA	Abutment failure

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29	Nadayar thodu	Munnar	Checkdam Near EX MLA Residence	0.3	10.127060,	77.204101	Checkdam	yes	NA	Damaged to be reconstructed
30		Munnar	Private shop above Thodu	0.655	10.085767,	77.059858	Private shope	NA	Yes	Flow obstructed as the piller of private shop is located in the river , hence to be demolished
31	Pazhayarikandam-Thattekkanni Thodu	Kanjikuzhy	Tattekkanni	2000.00	9.99157	76.898953	Culvert	Not	Not Required	
32	Vanchikkal-Thattekkanni Thodu	Kanjikuzhy	Tattekkanni	1500.00	9.999851	76.883886	Culvert	Not	Not Required	
33	Pambla thodu	Kanjikuzhy	Mayilapuzha	2.3 km	9.960416	76.902075	culvert	Not	Not Required	Structure is safe and does not create obstructions to flow
34			Pazhayarikandam junction	3.45 km	9.966475	76.909064	foot path	Not	Not Required	Structure is safe and does not create obstructions to flow
35			Pazhayarikandam	3.7 km	9.966753	76.911299	culvert	Not	Not Required	Structure is safe and does not create obstructions to flow
36			Pilla city	4.55 km	9.968434	76.913465	check dam	Not	Not Required	Structure is safe and does not create obstructions to flow
37			Prabhacity	5.2 km	9.966055	76.919037	check dam	Not	Not Required	Structure is safe and does not create obstructions to flow
38			Vattompara	7.1 km	9.9593	76.92996	culvert	Not	Not Required	Structure is safe and does not create obstructions to flow
39			Punnayar	9.35 km	9.964093	76.946577	check dam cum bridge	Not	Not Required	Structure is safe and does not create obstructions to flow
40			Pambla	8.2 km	9.961724	76.938982	culvert	Not	Not Required	Structure is safe and does not create obstructions to flow
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km										
		Munnar GP	Bridge	4.210	10°09´4.27"	76°59´58.31"	RCC	No	No	

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41	Karinthiriyar from Pettimudi	Munnar /Mankulam GP	Karimunda city foot bridge	15.040	10°07´58.7"	76°56´24.1"	RCC	No	No	
		Munnar /Mankulam GP	Georgiar hanging bridge	16.050	10°08´08.1"	76°56´00.1"	RCC	No	No	
		Munnar /Mankulam GP	Kuwait city Bridge	16.950	10°08´14.71"	76°55´53.57"	RCC	No	No	
42	Mankulam Ar	Munnar GP	Culvert road cross	0.740	10°05´26.08”	77°01´26.44”	RCC	No	No	
		Munnar GP	Culvert at crossing road	4.320	10°05´9.67”	76°59´51.42”	RCC	No	No	
		Munnar GP	Culvert at crossing road	5.460	10°05´07.66”	76°59´27.00”	RCC	No	No	
		Munnar GP	Road Bridge U/s of Viripara checkdam bridge	10.080	10°04´43.17”	76°57´44.01”	RCC	No	No	
		Munnar GP	Bridge road crossing (Viripara bridge Mankulam road)	10.910	10°05´01.08”	76°57´4.84”	RCC	No	No	
		Munnar GP	Cause way Mankulam ar	16.690	10°06´22.12”	76°55´50.71”	RCC	No	No	
		Mankulam GP	Bridge	18.390	10°07´6.75”	76°55´32.78”	RCC	No	No	
		Mankulam GP	Bridge Mankulam Thodu	19.580	10°07´33.89”	76°55´07.77”	RCC	No	No	
		Mankulam GP	Bridge u/s of Perumbankuthu waterfalls	22.380	10°08´17.53”	76°54´51.62”	RCC	No	No	
43	Anakulam Tributary Thodu	Mankulam GP	Culvert	0.170	10°09´36.37"	76°54´51.0"	RCC	No	No	
		Mankulam GP	Incomplete VCB	0.300	10°09´36.37"	76°54´48.1"	RCC	No	No	
44	Kadalar	Munnar GP	culvert	0.090	10°08´34.00"	77°03´7.00"	RCC	No	No	
		Munnar GP	culvert	1.580	10°08´3.1"	77°02´44.93"	RCC	No	No	
		Munnar GP	culvert	2.540	10°07´58.61"	77°02´18.43"	RCC	No	No	
		Munnar GP	culvert	2.750	10°07´59.04"	77°02´13.14"	RCC	No	No	
		Mankulam GP	culvert	5.670	10°07´53.21"	76°00´57.08"	RCC	No	No	
45	Kozhyalakudyar	Mankulam GP	Check dam of length 17.000 m	5.040	10°09´58.97"	76°55´19.85"	RCC	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
		Mankulam GP	Bridge	5.160	10°09´59.35"	76°55´19.84"	RCC	No	No	
46	Parekudy thodu	Mankulam GP	Culvert	1.440	10°08´9.31"	76°56´16.81"	RCC	No	No	
47	tributary 1	Mankulam GP	Culvert	1.250	10°09´3.48"	77°01´13.57"	RCC	No	No	
48	Vathikudy tributary	Vathykudy GP	Culvert	1.260	10°07´13.6"	76°53´8.19"	RCC	No	No	
		Vathykudy GP	Culvert	3.070	10°07´46.9"	76°53´29.46"	RCC	No	No	
49	Mamala thodu	Forest	Mamala chappath	2.55	10.084368	76.818826	RCC	No	No	
		Kuttampuzha GP	Foot bridge	2.91	10.088613	76.820794	RCC	No	No	
		Kuttampuzha GP	Elamblassery bridge with CD	3.34	10.088980	76.820659	RCC	No	No	
		Forest	Urulakuzhy CD	4.72	10.095780	76.812988	RCC	No	Yes	
50	Elamblassery thodu	Kuttampuzha GP	Damaged CD U/S of Thangappan padi Bridge	0.220	10.08627000	76.83436800	RCC	No	Yes	
		Kuttampuzha GP	Thangappan padi	0.226	10.08651433	76.83435600	RCC	No	No	
		Kuttampuzha GP	Foot bridge near Angan vaadi	0.507	10.08628804	76.83259885	RCC	No	No	
		Kuttampuzha GP	Sadhanandhan padi Paalam	1.182	10.08844647	76.82833326	RCC			
		Kuttampuzha GP	Foot bridge	1.500	10.08952900	76.82583100	RCC	No	No	
51	Cheriya thodu	Kuttampuzha GP	Culvert at ayurveda pady	0.162	10.09520818	76.81154030	RCC	No	No	
52	Kai thodu to Elamblassery thodu	Kuttampuzha GP	Origin (not accessable)	0	10.088200	76.835100	RCC	No	No	
		Kuttampuzha GP	Venunarayanan pa	0.103	10.088157	76.835063	RCC	No	No	
		Kuttampuzha GP	Foot bridge near Kerala state Bamboo corporation,Sub dippo Elamblassery	0.178	10.087525	76.835277	RCC	No	No	
		Kuttampuzha GP	Meeting point wth Elamblassery thodu	0.267	10.086831	76.835357	RCC	No	No	
		Kuttampuzha GP	Culvert no.1 (nea	0.035	10.153216	76.812976	RCC	No	No	
		Kuttampuzha GP	VCB d/s of culver	0.095	10.153163	76.812980	RCC	No	No	
		Kuttampuzha GP	Culvert no.2	0.102	10.153090	76.812149	RCC	No	No	
		Kuttampuzha GP	Culvert 3	0.212	10.153142	76.811118	RCC	No	No	

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53	Vellamakuthu thodu	Kuttampuzha GP	Culvert 4	0.338	10.153358	76.810100	RCC	No	No	
		Kuttampuzha GP	VCB	0.364	10.153460	76.809731	RCC	No	No	
		Kuttampuzha GP	culvert 5	0.380	10.153370	76.809842	RCC	No	No	
		Kuttampuzha GP	Culvert 6	0.452	10.153652	76.809139	RCC	No	No	
		Kuttampuzha GP	Culvert 7	0.552	10.154159	76.808401	RCC	No	No	
		Kuttampuzha GP	VCB at Vellaram	0.796	10.154365	76.806282	RCC	No	No	
		Kuttampuzha GP	Parameswaranpad	0.968	10.155253	76.804974	RCC	No	No	
		Kuttampuzha GP	Parameswaranpad	0.972	10.155284	76.804897	RCC	No	No	
		Kuttampuzha GP	VCB at u/s of foot	2.112	10.159570	76.795854	RCC	No	No	
		Kuttampuzha GP	Bridge and footbri	2.119	10.159603	76.795918	RCC	No	No	
		Forest	Bridge near Anaku	2.765	10.161278	76.790272	RCC	No	No	
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km										
54	Mukkadai	Kalady	Manickamangala m	12.928	10.192815	76.449798	Bridge	Yes		Width of thodu reduced considerably due to the construction of the bridge
55	Pallupetta	Malayattoor-Neeleeswaram	Near Ottu Company	2.66	10.192673	76.48134	R.C.C Culvert	Yes		
56	Krariyeli	Vengoor	Paniely	4.468	10.16222222	76.57194444	Cross bar		Yes	
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km										
A	Ovunkal Thodu									
57	"	Okkal	Chelamattom Temple Road	0.33	10.140292	76.4623033	Culvert	No	No	
58	"	Okkal	Chelamattom	0.903	10.136856	76.46163306	Culvert	No	No	
59	"	Okkal	Chelamattom Temple vallom Kadavu Road	1.33	10.133435	76.45988446	Culvert	No	No	
B	Vallam Thodu									
60	"	Perumbavoor & Vazhakulam	Koduveli bridge	0.10	10.1694444	76.46527	Culvert	No	No	
61	"	Perumbavoor & Vazhakulam	MC road cross bri	0.15	10.13361	76.468611	Bridge	No	No	
62	"	Perumbavoor & Vazhakulam	Bridge under cons	1.28	10.128888	76.48055	Bridge	No	No	
63	"	Perumbavoor & Vazhakulam	Vallam LIS	2.8	10.12166	76.462777	LIS	No	No	
64	"	"	Poopani	0.01	10.133611	76.471666	Bridge	No	No	
65	"	"	Allapra	0.768	10.10888	76.475277	Bridge	No	No	
66	"	"	Allapra	0.298	10.110833	76.471666	Bridge	No	No	
67	"	"	Vattakkattupady	0.518	10.1113055	76.466944	Bridge	No	No	
68	"	"	Pathippalam	0.757	10.114166	76.465277	Bridge	No	No	
69	"	"	Chira	4.16	10.118055	76.463333	Chira	No	No	
70	"	"	Thuruthiply	1.18	10.088333	76.479722	Bridge	No	No	
71	"	"	Kandanthara LIS	0.459	10.113334	76.464643	LIS	No	No	

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72	"	"	Vallom	0.994	10.120833	76.45972222	Bridge	No	No	
C	Kunnuvazhy Thodu									
73	"	Vazhakulam	Orna	0.42	10.10	76.4538888	Bridge	No	No	
74	"	"	Pond	1.18	10.101646	76.452777	Pond	No	No	
75	"	"	Mudikkal	1.86	10.100277	76.447777	Bridge	No	No	
76	"	"	Cheruvelikkunnut	1.05	10.106944	76.438888	Thura	No	No	
77	"	"	Cheruvelikkunnu	1.27	10.106944	76.438611	Bridge	No	No	
78	"	"	Kunnuvazhi bridg	2.47	10.111944	76.425833	Bridge	No	No	
D	Marampilly Thodu									
79	"	Vazhakulam	Mullankunnu Aqu	0.020	10.087145	76.43398	Aqueduct	No	No	
80	"	"	Bridge	1.020	10.106388	76.426944	Bridge	No	No	
81	"	"	AVT group	0.010	10.121111	76.419166	Bridge	No	No	
82	"	"	Bridge	0.700	10.109722	76.420833	Bridge	No	No	
83	"	"	Marampilly	0.030	10.112222	76.421944	Bridge	No	No	
E	Chalackal Thodu									
84	"	Keezhmad	Mosko Road	0	10.10878	76.40079	Culvert	No	No	
85	"	Keezhmad	Pongam Veli Bridge	1.18	10.11673	76.40067	Culvert	No	No	
86	"	Keezhmad	Chalakkal	1.39	10.117394	76.400193	Culvert	No	No	
87	"	Keezhmad	Aluva Munnar Road	1.96	10.12094	76.39805	Culvert	No	No	
F	Moonukaiyyani Thuruthi Thodu									
88	"	Keezhmad	Estate Road	0	10.092913	76.371193	Culvert	No	No	
89	"	Keezhmad	Kalung	1.3	10.101576	76.376753	Culvert	No	No	
90	"	Keezhmad	Keezhmadu Road	0.309	10.101576	76.376753	Culvert	No	No	
91	"	Keezhmad	Kunnumpuram	0.788	10.105065	76.38631	Culvert	No	No	
92	"	Keezhmad	Madapillythazam	0.868	10.105065	76.385608	Foot Bridge	No	No	
93	"	Keezhmad	Madapillythazam	1.65	10.107615	76.37988	Culvert	No	No	
94	"	Keezhmad	Green Ln	0.21	10.108267	76.376514	Culvert	No	No	
95	"	Keezhmad	Edayapuram	1.01	10.107565	76.371475	Bridge	No	No	
96	"	Keezhmad	Therad Bridge	0.426	10.098767	76.364092	Bridge	No	No	
97	"	Keezhmad	Edayapuram	1.05	10.102789	76.366824	Bridge	No	No	
98	"	Keezhmad	Thottumugham Br	0.28	10.108415	76.370827	Bridge	No	No	
99	"									
G	CHENGAL THODU FROM COAST GUARD TO PERIYAR									
100	"	Nedumbassery	Coast guard	0.300	10.15511	76.40624	New bridge coast guard	No	No	
101	"	"	Nedumbassery	0.940	10.15713	76.40793	New bridge	No	No	

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102	"	"	Piravoor - Thuravunkara	2.270	10.15652	76.41537	Chappaath	No	No	
103	"	Kanjoor	Chengal bhagavathi Temple	3.700	10.15700	76.42690	New bridge	No	No	
104	"	"	Kanjoor	4.690	10.15095	76.42604	Bridge	No	No	
H	Kanjoor Thodu									
105	"	Kanjoor	Vadakkumbhagam(Thalipara bridge)	0.360	10.142743	76.427840	Bridge	No	No	
106	"		Thattampady road Bridge-1	0.450	10.142398	76.426842	Bridge	No	No	
107	"		Thattampady road Bridge-2	0.940	10.140697	76.423398	Bridge	No	No	
108	"		Venmany Road Culvert	2.050	10.154284	76.423146	Bridge	No	No	
109	"		Thekkumbhagam (Thattampady)	2.375	10.135150	76.419800	Culvert	No	No	
110	"		Thiruvanikkualm	2.830	10.135150	76.419800	Culvert	No	No	
111	"		Thiruvanikkualm Road	3.060	10.129104	76.416161	Culvert	No	No	
112	"		Thiruvanikkualm Road	3.480	10.126128	76.415027	Culvert	No	No	
I	Thondikadavu Thodu									
113	"	Sreemoolanagaram	Edanad-Sreemoolanagaram	0.04	10.138922	76.402105	Culvert	No	No	
114	"	"	Edanad-Edakkandam Road	0.55	10.137285	76.397700	Culvert	No	No	
115	"	"	Edanad-Thettali Cross Road	1.125	10.133433	76.395557	Culvert	No	No	
116	"	"	Tettali	1.57	10.130760	76.393700	Culvert	No	No	
117	"	"	Edanad-Sreemoolanagaram	2.08	10.127237`	76.391572	Culvert	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
J	Thumba Thodu									
118	"	Aluva	Chowara Thuruth	0.50	10.124193	76.376370	Bridge	No	No	
119	"	"	Purayar Thuruth road	1.90	10.127215	76.369470	Steel Narrow Bridge	No	No	
120	"	"	Purayar Thuruth road	3.68	10.118475	76.362738	Bridge	No	No	
121	"	"	Purayar Thuruth road	3.70	10.118233	76.362588	Railway bridge	No	No	
K	Chengal Diversion Thodu and Chengal Thodu									
122	"	Kanjoor	Airport Runway West End	0.00	10.150133	76.419579	New bridge	No	No	
123	"	Kanjoor	Naduvannoor	3.92	10.144882	76.377575	New bridge	No	No	
124	"		Naduvannoor Bridge	6.18	10.144889	76.377580	Bridge	No	No	
125	"		Kaprassery-Moozhiyal road	8.32	10.145113	76.368622	Railway bridge	No	No	
126	"		Kaprassery	9.20	10.138520	76.356348	Aanippaara Bridge	No	No	
127	"		Desom	11.28	10.132741	76.354240	NH Bridge	No	No	
128	"		Desom	14.38	10.131450	76.353320	Bridge	No	No	
L	Kuzhippallam Thodu									
129	"	Nedumbassery	Edanad Road	0.12	10.141505	76.385957	Bridge	No	No	
130	"		Neduvannoor-Airport road	0.95	10.145900	76.379086	Culvert	No	No	
131	"		Neduvannoor-Airport road	0.97	10.144386	76.378996	Rail bridge	No	No	
132	"		Neduvannoor	1.10	10.144941	76.377594	Chappaath	Yes	No	
133	"		Neduvannoor	2.20	10.144934	76.377579	Bridge		No	
134	"		Kaprassery	2.70	10.143663	76.364218	Partially Demolished Bridge	Yes	No	
135	"		Neduvannoor	3.20	10.144882	76.377575	VCB Damaged	Yes	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
136	"		Pallappadam road	3.57	10.142312	76.360363	Bridge	No	No	
137	"		VIP Road	3.88	10.138550	76.356311	Culvert	No	No	
M	Udumbuzha Thodu									
138	"	Kalady	Manikkya Mangalam Chira	0.00	10.154871	76.404607	Culvert	No	No	
139	"	Kalady	Matoor Road Culvert	1.40	10.179055	76.442426	Road culvert	No	No	
140	"	Kalady	MC Road Culvert	2.05	10.179207	76.440796	Culvert	No	No	
141	"	Kalady	Railway Culvert	2.70	10.163259	76.427269	Railway culvert	No	No	
142	"	Kalady	Vadakkumbhagam Kalady	3.00	10.168253	76.434533	Culvert	No	No	
143	"	Kalady	Chengal Thodu	3.75	10.160172	76.421601	Culvert	No	No	
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA										
144	Vembala thodu	Kadungloor		5.00	10.095367	76.326797	Culvert	No		
145	Vembala thodu	Kadungloor		1368.22	10.083507	76.32618	Culvert	No		
146	Vembala thodu	Kadungloor		1374.87	10.08338	76.326133	Culvert	No		
147	Panach Thodu	Eloor	Panachi Thodu Culvert	2	10.087015	76.290882	Culvert	No		
148	Panach Thodu	Eloor		728.41	10.080822	76.289852	Culvert	No		
149	Panach Thodu	Eloor		764.57	10.080803	76.289845	Culvert	No		
150	Panach Thodu	Eloor		1071.33	10.078393	76.288727	Culvert	No		
151	Panach Thodu	Eloor	Periyar Road	1541.82	10.076658	76.28444	Culvert	No		
152	Varapuzha Thodu	Varapuzha		0	10.080627	76.272592	Bridge	No		
153	Varapuzha Thodu	Varapuzha		78.22	10.08112	76.27326	Bridge	No		
154	Varapuzha Thodu	Varapuzha		960.29	10.08626	76.27892	Bridge	No		
155	Varapuzha Thodu	Varapuzha		1192.95	10.086374	76.279953	Culvert	No		
156	Varapuzha Thodu	Varapuzha		1238.65	10.086573	76.280088	Culvert	No		
157	Kachappilly Thodu	Kadungloor		283.35	10.08893	76.32408	Culvert	No		

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
158	Kachappilly Thodu	Kadungloor		292.00	10.088755	76.324518	Culvert	No		
159	Kachappilly Thodu	Kadungloor		297.90	10.08878	76.32458	Culvert	No		
160	Kachappilly Thodu	Kadungloor		346.18	10.088743	76.324465	Culvert	No		
161	Karuka thode	Alangatt panchayath	Poonthuruth	0	10.097551	76.295168	nil			
162	Karuka thode	Alangatt panchayath	Poonthuruth	40	10.097935	76.29538	nil			
163	Karuka thode	Alangatt panchayath	Karukapadam	65	10.097904	76.295571	nil			
164	Karuka thode	Alangatt panchayath	Karukapadam	155	10.098302	76.29582	nil			
165	Karuka thode	Alangatt panchayath	Near SC colony	360	10.099896	76.296824	nil			
166	Kakkunni Methanam thode	Alangatt panchayath	Kakkunni panayikulam	0	10.098518	76.303553	nil			
167	Kakkunni Methanam thode	Alangatt panchayath	lodge stop	123	10.09887	76.302431	double span culvert	yes		
168	Kakkunni Methanam thode	Alangatt panchayath	Near SC Colony64	793	10.100917	76.298243	foot slab	yes		
169	Kakkunni Methanam thode	Alangatt panchayath	karukapadam	1038	10.099896	76.296824	nil			
170	Kakkunni Methanam thode	Alangatt panchayath	Chirayam Methanam Bridge	1835	10.099545	76.290342	methanam bridge	No		
171	Kakkunni Methanam thode	Alangatt panchayath	Pallikadavu	2305	10.097548	76.288299	nil			
172	Kakkunni Methanam thode	Alangatt panchayath	methanam(chirayil)	2435	10.096491	76.287495	nil			
173	Manavala thode	Alangatt panchayath	Methanam	0	10.097216	76.287521	nil			
174	Manavala thode	Alangatt panchayath	Manavala	195	10.097121	76.28588	nil			
175	Manavala thode	Alangatt panchayath	Manavala	310	10.096692	76.28575	VCB	No		
176	Karipuzha angadikadavu thode	Alangatt panchayath	Angadikadav , Alangad panchayathBoundary	0	10.122286	76.294775	culvert	Yes		

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
177	Karipuzha angadikadavu thode	Alangatt panchayath	Koduvazhanga	337	10.120956	76.292633	nil			
178	Karipuzha angadikadavu thode	Alangatt panchayath	Kallupalam busstop, KottappuramKoonammavu pWD Road(Sreechithra Road)	560	10.119926	76.296122	culvert	Yes		
179	Karipuzha angadikadavu thode	Alangatt panchayath	Kallupalam padam	1400	10.117973	76.296548	footslab	Yes		
180	Karipuzha angadikadavu thode	Alangatt panchayath	Kunnelppilli	1500	10.102905	76.307461	PVIP Canal crossing	No		
181	Karipuzha angadikadavu thode	Alangatt panchayath	Kunnelppalli Valunkal (Kavathiyad)	1870	10.111474	76.29914	culvert	yes		
182	Karipuzha angadikadavu thode	Alangatt panchayath	Ezhuvichira	2500	10.112366	76.304928	culvert	yes		
183	Karipuzha angadikadavu thode	Alangatt panchayath	Karippuzha	3743	10.104358	76.311207	nil			
184	Karipuzha angadikadavu thode	Alangatt panchayath	Kakkunnipalam	3920	10.09887	76.302431	nil			
185	Ongi thode	kadungalloor panchayath	Eloorkkara	0	10.095241	76.334599	nil			
186	Ongi thode	kadungalloor panchayath	Eloorkkara(Original alignment deviated from here)	80	10.095477	76.3337888	nil			
187	Ongi thode	kadungalloor panchayath	Elenjichuvadu bus stop Eloorkkara	160	10.09578	76.333248	double box culvert	Yes		
188	Ongi thode	kadungalloor panchayath	Eloorkkara	650	10.101587	76.312976	nil			
189	Ongi thode	kadungalloor panchayath	Paduvathil road	812	10.094858	76.327365	bridge	yes		

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
190	Ongi thode	kadungalloor panchayath	Kadungalloor Rd(Moopathadam)	2360			bridge	yes		
191	Ongi thode	kadungalloor panchayath	Kadungalloor Rd(Moopathadam)	2370	10.101304	76.318667	bridge	yes		
192	Ongi thode	kadungalloor panchayath	perekadu	3020	10.101587	76.312976	nil			
193	Ongi thode	kadungalloor panchayath	Karipuzha	3300	10.102855	76.310834	bridge	Yes		
194	Ongi thode	Angadikkadavu panchayath	Near PANAYIKULAM Juma Masjith(Kakkunnipalam)	4400	10.099757	76.304504	nil			
195	Ongi thode	Angadikkadavu panchayath	Kakkunni branch thode starts	4700	10.09847	76.303577	nil			
196	Ongi thode	Angadikkadavu panchayath	near Panayikulam Lodge stop	4870	10.096828	76.302894	foot slab	Yes		
197	Ongi thode	Angadikkadavu panchayath	Panayikulam Lodge stop	5000	10.096329	76.301948	double span culvert	Yes		
198	Ongi thode	Angadikkadavu panchayath	Near lodge stop	5100	10.095442	76.301756	nil			
199	Ongi thode	Angadikkadavu panchayath	Panayikulam Binanipuram road	5150	10.095005	76.301667	culvert	yes		
200	Ongi thode	Angadikkadavu panchayath	Paddy field	5620	10.09391	76.29816	culvert	yes		
201	Ongi thode	Angadikkadavu panchayath	Meenkuzhikandam	5800	10.095458	76.297749	culvert	yes		
202	Ongi thode	Angadikkadavu panchayath	Paddy field turn left	5880	10.095799	76.297325	nil			
203	Ongi thode	Angadikkadavu panchayath	Paddy field	6020	10.096289	76.296229	culvert	Yes		
204	Ongi thode	Angadikkadavu panchayath	PoonthuruthuStarting point of Karuka thode	6220	10.097551	76.295168	nil			
205	Ongi thode	Angadikkadavu panchayath	Poonthuruth	6260	10.097418	76.294904	foot bridge	Yes		
206	Ongi thode	Angadikkadavu panchayath	Poonthuruth	6360	10.097614	76.294246	culvert	Yes		
207	Ongi thode	Angadikkadavu panchayath	Poonthuruth	6370	10.097636	76.294203	culvert	Yes		
208	Ongi thode	Angadikkadavu panchayath	Methanam(mouth to Periyar)	6550	10.096278	76.293752	nil			

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
209	Pazhamthode	Alangatt panchayath	Pazhamthode	0	10.111075	76.289624	Double span VCB-Pazham thode project - large waterbody	No		
210	Pazhamthode	Alangatt panchayath	Pazhamthode	40	10.110594	76.290468	Nil			
211	Pazhamthode	Alangatt panchayath	Pazhamthode	80	10.110203	76.290369	Culvert	Yes		
212	Pazhamthode	Alangatt panchayath	Kottappillikunnu	185	10.109311	76.290224	Foot slab	Yes		
213	Pazhamthode	Alangatt panchayath	Kochirikka Mundone Road	530	10.107089	76.289179	culvert	Yes		
214	Pazhamthode	Alangatt panchayath	Mundon Kochirikka Road	820	10.106802	76.286899	Culvert	Yes		
215	Pazhamthode	Alangatt panchayath	Koduvazhanga-Kochirikka	1035	10.106052	76.285247	Culvert	Yes		
216	Pazhamthode	Alangatt panchayath	Plackattampilly	1130	10.105926	76.284452	Tripple span VCB	No		
217	Pazhamthode	Alangatt panchayath	Plackattampilly	1370	10.105971	76.284459	Bridge	No		
218	Plackattumpilli Chirayam thode	Alangatt panchayath	Plackattampilly	0	10.104852	76.282885	Bridge	No		
219	Plackattumpilli Chirayam thode	Alangatt panchayath	Kureethazham	150	10.104784	76.28423	Tripple span VCB (7m span)	No		
220	Plackattumpilli Chirayam thode	Alangatt panchayath	Mankuzhy	340	10.103903	76.285764	Doublespan culvert (2X2.5m)	Yes		
221	Plackattumpilli Chirayam thode	Alangatt panchayath	Mankuzhy	800	10.102079	76.287228	footslab	Yes		
222	Plackattumpilli Chirayam thode	Alangatt panchayath	Near Viswapeedam school	930	10.101779	76.287831	culvert	Yes		
223	Plackattumpilli Chirayam thode	Alangatt panchayath	Meets with Kakkunni Methanam thode at ch 2005 M	1280	10.099149	76.288724	Nil			
224	Periyar to Periyar thode	Alangatt panchayath	Angadikadavu	0	10.122286	76.294775	Doble span culvert	Yes		

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
225	Periyar to Periyar thode	Alangatt panchayath	Koduvazhanga	300	10.120956	76.292633	Nil			
226	Periyar to Periyar thode	Alangatt panchayath	Mecheri palam	1100	10.125001	76.287957	bridge	No		
227	Periyar to Periyar thode	Alangatt panchayath	Kulithodu	2110	10.118409	76.288824	bridge	Yes		
228	Periyar to Periyar thode	Alangatt panchayath	Varattupady colony	3680	10.111006	76.283061	pipe culvert - 5nos, 90cm dia pipe laid as ventway & filled entire cross section with earth	Yes		
229	Periyar to Periyar thode	Alangatt panchayath	neerkodu new bridge private	3880	10.109712	76.281928	New Bridge	No		
230	Periyar to Periyar thode	Alangatt panchayath	parappalam	4000	10.108621	76.282325	continuous VCB	No		
231	Periyar to Periyar thode	Alangatt panchayath	plackattumpilly	4570	10.104852	76.282885	Bridge (18 m span)	No		
232	Periyar to Periyar thode	Alangatt panchayath	allothu bridge	4620	10.104359	76.283062	Bridge	No		
233	Periyar to Periyar thode	Alangatt panchayath	Kongoorppilly	5080	10.101294	76.284311	Bridge	Yes		
234	Periyar to Periyar thode	Alangatt panchayath	Adakkattukuzhi	5390	10.099274	76.282363	Foot bridge	Yes		
235	Periyar to Periyar thode	Alangatt panchayath	Chingathara	5730	10.097398	76.279943	Footslab	No		
236	Periyar to Periyar thode	Alangatt panchayath	Pallathunadu petta palam	5890	10.096282	76.279429	Doble span culvert	Yes		
237	Periyar to Periyar thode	Alangatt panchayath	Pallathunadu palam	6190	10.093605	76.279866	culvert (3m span)	Yes		
238	Periyar to Periyar thode	Alangatt panchayath	Mouth of PP thodu meets with Periyar South	6550	10.092548	76.282458	Nil			
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH										
239	Thoombathodu	Sreemoolanagaram grampanchayath	Chowara bridge	0.48km	10.124178	76.377716	bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
240	Thoombathodu	Chengamanad Panchayat	Near Shiva temple Purayar	2.00km	10.126759	76.368792	Footpath crossing	No	No	
241	Thoombathodu	Chengamanad Panchayat	Thoomba thodu bridge	3.70km	10.118152	76.362609	bridge	No	No	
242	Thoombathodu	Chengamanad Panchayat	Railway bridge	3.80km	10.118286	76.361974	Railway bridge	No	No	
243	Karinthiri Aar	Chengamanad Panchayat	Kandanthuruth bridge,near Chengamanad pump house	0.68km	10.151485	76.33541	Bridge	No	No	
244	Chengal thodu	Chengamanad Panchayat	near Salem-Highway	0.400km	10.132455	76.353273	Bridge	No	No	
245	Chengal thodu	Chengamanad Panchayat	Panayikadavu bridge	3.78km	10.148328	76.340257	Bridge	No	No	
246	Chengal thodu	Chengamanad Panchayat	Thalakolli bridge	3.95km	10.147778	76.338738	Bridge	No	No	
247	Puthen thodu (Sub tributary of Chengal thodu)	Chengamanad Panchayat	Puthenthodu near Panayikadavu bridge	0.05km	10.148338	76.340313	bridge	No	No	
248	Puthen thodu (Sub tributary of Chengal thodu)	Chengamanad Panchayat	Puthenthodu near Pump house	1.15km	10.153623	76.347835	bridge	No	No	
249	Cheriyathekkanam	Kunnukara Grama Panchayath	Near karikkathuruth bridge	0.7km	10.14827	76.283861	bridge	No	No	
250	Manjali thodu	Mookkannoor Panchayat	Puthenpalam bridge on Karukutty-Mookkannoor road	0 km	10.225215,	76.39557	bridge	No	No	
251	Manjali thodu	Mookkannoor Panchayat	Bharaniparambu bridge near LI scheme ,Mookkannoor	1.63km	10.212442	76.395952	bridge	No	No	
252	Manjali thodu	Angamali Municipality	Kothakulangara bridge ,Angamaly	3.48 km	10.208478	76.381915	bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
253	Manjali thodu	Angamali Municipality	Angamaly walkway	4.16km	10.203897	76.378718	walkway bridge	No	No	
254	Manjali thodu	Angamali Municipality	Angadikadavu bridge, Angamaly	4.96 km	10.197343	76.379018	Bridge	No	No	
255	Manjali thodu	Angamali Municipality	Railway bridge ,Angamaly	5.42 km	10.195798	76.37476	bridge	No	No	
256	Manjali thodu	Nedumbassery Panchayat	Madhurapuram-mallussery bridge ,Nedumbassery .	8.9 km	10.180177	76.348816	bridge	No	No	
257	Manjali thodu	Nedumbassery Panchayat	Alungalkadavu bridge ,Nedumbassery	9.63 km	10.175498	76.346273	bridge	No	No	
258	Manjali thodu	Nedumbassery Panchayat	Chundamthuruth bridge Nedumbassery	12.06 km	10.168105	76.330362	bridge	No	No	
259	Manjali thodu	Kunnukara Panchayat	Oozhamkadavu bridge , Kunnukara	15.12 km	10.17089	76.309962	bridge	No	No	
260	Manjali thodu	Kunnukara Panchayat	Chalakka Korekadavu bridge, Kunnukara	19.7km	10.154899	76.286685	Bridge	No	No	
261	Manjali thodu	Kunnukara Panchayat	near Ryan school, Kunnukara	19.78km	10.1548	76.28684	Bridge	No	No	
262	Manjali thodu	Kunnukara Panchayat	Cheriyathekkanam bridge-Kunnukara	20.72km	10.15379	76.279932	bridge	To be reconstructed	No	
263	Puthen thodu connecting Manjali thodu	Kunnukara Grama Panchayath	Ayirur puthenthodu bridge , kunnukara	0.22km	10.177967	76.316438	Bridge	No	No	
264	Kannakka thodu	Kunnukara Grama Panchayath	Bridge on Chalakka Kuthiathode road	1 km	10.165967	76.291428	Bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
265	Chettikkadu thodu	Kunnukara Grama Panchayath	Cherukadappuram sluice bridge,Kunnukara	2.34 km	10.161221	76.278824	Bridge	No	No	
266	Pandipadam thodu	Puthenvelikkara Grama Panchayath	Culvert near Thanthonnichira, Puthenvelikkara	0 km	10.169771	76.266602	Culvert	No	No	
267	Pandipadam thodu	Puthenvelikkara Grama Panchayath	Near padasekharam road	0.38 km	10.172184	76.265386	Culvert	No	No	
268	Pandipadam thodu	Puthenvelikkara Grama Panchayath	Culvert near Pandipadam-Choukkakadavu road	0.705 km	10.170698	76.262801	Culvert	No	No	
269	Pandipadam thodu	Puthenvelikkara Grama Panchayath	Near culvert on byelane of Choukakadavu road	1.14 km	10.167875	76.260364	Culvert	No	No	
270	Kuttikkattupallam thodu	Puthenvelikkara Grama Panchayath	Culvert near Station kadavu-Malavana road	0.16 km	10.174686	76.250793	Culvert	No	No	
271	Payikkattupallam thodu	Puthenvelikkara Grama Panchayath	Culvert across Station Kadavu-Malavana road	0.39 km	10.176662	76.248593	Culvert	No	No	
272	Thondal thodu	Puthenvelikkara Grama Panchayath	Near byelane of Thirutha road	0.195 km	10.185834	76.271072	Culvert	No	No	
273	Thondal thodu	Puthenvelikkara Grama Panchayath	Elanthikkara road	0.535km	10.185699	76.268000	Culvert	No	No	
274	Thondal thodu	Puthenvelikkara Grama Panchayath	Byelane to Elanthikkara road	0.810km	10.184033	76.266281	Slab Crossing	No	No	
275	Thondal thodu	Puthenvelikkara Grama Panchayath	Intermediate portion of Thondalthodu	1.00km	10.182627	76.265217	Slab Crossing	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
276	Thondal thodu	Puthenvelikkara Grama Panchayath	Culvert on byelane of Elanthikkara road	1.22km	10.181192	76.263887	Culvert	No	No	
277	Thondal thodu	Puthenvelikkara Grama Panchayath	Thondalthodu sluice near Thazhanchirapadam	1.83km	10.179170	76.259224	Sluice	No	No	
278	Thondal thodu	Puthenvelikkara Grama Panchayath	Culvert near Thazhanchirapadam road	1.84km	10.179062	76.259299	Culvert	No	No	
279	Thondal thodu	Puthenvelikkara Grama Panchayath	Intermediatecrossing - near western boundary of Thazhanchirapadam	2.84km	10.180951	76.252104	Slab Crossing	No	No	
280	Thondal thodu	Puthenvelikkara Grama Panchayath	Culvert on byelane near Thazhanchirapadam	2.89km	10.180923	76.251826	Culvert	No	No	
281	Thondal thodu	Puthenvelikkara Grama Panchayath	Thondal bridge	3.07km	10.180589	76.250325	Bridge	No	No	
282	Thondal thodu	Puthenvelikkara Grama Panchayath	intermediate culvert - south side of thondal bridge	3.34km	10.180365	76.249862	Culvert	No	No	
283	Thondal thodu	Puthenvelikkara Grama Panchayath	near Kurunnilakkal temple road-	3.64km	10.180222	76.246005	Slab crossing	No	No	
284	Thondal thodu	Puthenvelikkara Grama Panchayath	sluice near kurunnilakkal temple road	3.72km	10.180195	76.24551	Concrete Sluice	No	No	
285	Thondal thodu	Puthenvelikkara Grama Panchayath	Culvert near stationkadavu - Malavana road	3.87km	10.179719	76.244574	Culvert	No	No	
286	Periyar to periyar	Alangad Panchayath	chirayam	0.35km	10.104502	76.283268	Culvert	No	No	
287	Periyar to periyar	Alangad Panchayath	chirayam	2.05km	10.104818	76.28293	Plackattampilly bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
288	Periyar to periyar	Alangad Panchayath	Colonypady	2.85km	10.110975	76.283225	Pipe Culvert	No	No	
289	Periyar to periyar	Alangad Panchayath	Angadikadavu	5.65km	10.122312	76.294895	Culvert	No	No	
290	Periyar to periyar	Karumalloor	Karumalloor	6.40km	10.129783	76.293732	Kanjirakkattu Bridge	No	No	
291	Kallikuzhy Thodu	Karumalloor Panchayath	Near Muriakkal chapel	0.0 Km	10.140765	76.274991	Culvert	No	No	
292	Kallikuzhy Thodu	Karumalloor Panchayath	Karumalloor	0.1Km	10.148625	76.270918	Culvert	No	No	
293	Naduvilathattu Thodu	Karumalloor	Near Mattummal road	0.15Km	10.160426	76.256087	Culvert	No	No	
294	Naduvilathattu Thodu	Karumalloor	Near Aikya Kerala Road	0.55Km	10.158179	76.25847	Culvert	No	No	
295	Naduvilathattu Thodu	Karumalloor	Near Mattuppuram	0.86Km	10.157861	76.260861	Culvert	No	No	
296	Naduvilathattu Thodu	Karumalloor	Kambivelikakam road	1.17Km	10.156717	76.263125	Pipe Culvert	No	No	
297	Anachal thodu	Kottuvally Panchayath	Near Vazhikulangara Anachal road	2.10Km	10.140545	76.261042	Bridge	No	No	
298	Anachal thodu	Kottuvally Panchayath	Near Aluva Paravr road	2.52Km	10.144224	76.260906	Bridge	No	No	
299	Anachal thodu	Karumalloor Panchayath	Near Athani Paravur Road	3.14Km	10.149759	76.260568	Bridge	No	No	
300	Anachal thodu	Karumalloor Panchayath	Pipe culvert	4.63Km	10.155708	76.262679	Culvert	No	No	
301	Karukadamooppu thodu	Karumalloor Panchayath	Near Mattummal road	0.35Km	10.16136	76.2562	Culvert	No	No	
302	Karukadamooppu thodu	Karumalloor Panchayath	Aikyakerala road	0.68Km	10.160548	76.259135	Culvert	No	No	
303	Karukadamooppu thodu	Karumalloor Panchayath	Near Mattupuram	1.0Km	10.160548	76.259135	Culvert	No	No	
304	Karukadamooppu thodu	Karumalloor Panchayath	Near Mattupuram	1.2Km	10.159168	76.261442	Culvert	No	No	
305	Karukadamooppu thodu	Karumalloor Panchayath	Anganvadi	1.35Km	10.158271	76.263434	Culvert	No	No	
306	Paravur puzha	Paravur Municipality	At Mattummal road	1.45Km	10.14838	76.211983	Mattummel bridge	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
307	Paravur puzha	Paravur Municipality	Vadakkekara	1.90Km	10.150903	76.214985	Vadekkekara	No	No	
308	Paravur puzha	Paravur Municipality	Near koottukadu road	2.80Km	10.154015	76.222645	Koottukadu bridge	No	No	
309	Paravur puzha	Chendamangalam Panchayath	Thattukadavu road ,Chendamangalam	3.53Km	10.153823	76.229088	Thattukadavu bridge	No	No	
310	Paravur puzha	Chendamangalam Panchayath	Koottichira road	3.63Km	10.154128	76.230125	Bridge near koottichira	No	No	
311	Paravur puzha	Chendamangalam Panchayath	Chendamangalam	4.20Km	10.155132	76.234018	Chendamangalam bridge	No	No	
312	Paravur puzha	Chendamangalam Panchayath	Munduthuruthy road ,Chendamangalam	5.96Km	10.156957	76.247485	Munduthuruthy bridge	No	No	
313	Puthenthodu	Ezhikkara panchayath	Pulinganad	0.85Km	10.0983	76.228902	Pulinganad Bridge atEzhikkara	No	No	
314	Puthenthodu	Ezhikkara panchayath	Ezhikkara	1.5Km	10.103712	76.22739	Kadakkara Bridge	No	No	
315	Puthenthodu	Ezhikkara panchayath	Ezhikkara	2.85Km	10.114407	76.22457	Lanka Bridge	No	No	
316	Puthenthodu	Ezhikkara panchayath	Ezhikkara	5.35Km	10.13432	76.21497	Thalakattu Bridge	No	No	
317	Puthenthodu	Ezhikkara panchayath	Ezhikkara	5.70Km	10.136967	76.214712	Chakkathara Bridge	No	No	
318	Puthenthodu	Ezhikkara panchayath	Ezhikkara	6.45Km	10.143503	76.212977	Perumbadanna bridge	No	No	
319	Kuzhuveli thodu	Ezhikkara panchayath	Ezhikkara				NIL	NIL	NIL	
320	Kayikkara thodu	Ezhikkara panchayath	Ezhikkara	0.10Km	10.12472	76.222007	Culvert	No	No	
321	Kongini thodu	Ezhikkara panchayath	Ezhikkara	0.620Km	10.134583	76.212573	Culvert	No	No	
322	Kundekavu thodu	Ezhikkara panchayath	Chathanad road	0.20Km	10.120545	76.22566	Kundekavu bridge	No	No	
323	Kannachira thodu	Ezhikkara panchayath	Ezhikkara	0.00 Km	10.113137	76.231392	Bridge	No	No	
324	Kannachira thodu	Ezhikkara panchayath	Nikathil Bhuvaneswari temple	1.450Km	10.122975	76.228025	culvert	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
325	Kannachira thodu	Ezhikkara panchayath	Kudiakulangara Kalikkulangara road	2.50 Km	10.12892	76.224667	culvert	No	No	
326	Kannachira thodu	Ezhikkara panchayath	Byelane to Chathanad road	2.76 Km	10.13075	76.223175	culvert	No	No	
327	Kannachira thodu	Ezhikkara panchayath	Chathanad road	3.34 Km	10.135058	76.220806	culvert	No	No	
328	Kundekkavu - Cherupilly Thodu									
329	Kundekkavu - Cherupilly Thodu	Ezhikkara panchayath	Kaitharam road	0.82Km	10.121794	76.235319	Kaitharam culvert	No	No	
330	Kundekkavu - Cherupilly Thodu	Ezhikkara panchayath	Thonniyakavu-Trikkapuram road	1.26 Km	10.123109	76.239064	Thonniyakavu Bridge	No	No	
331	Kundekkavu - Cherupilly Thodu	Ezhikkara panchayath	NH66	1.87 Km	10.12474	76.244426	Bridge on NH66	No	No	
332	Kacheri thodu						NIL	NIL	NIL	
333	Pooyampilly thodu	Paravur Municipality	Culvert near Nedoor colony road	0.292Km	10.148842	76.207588	Pooyappilly Culvert	No	No	
334	Pooyampilly thodu	Paravur Municipality	Pooyappilly Culvert at Vadakkekara	0.550Km	10.150769	76.206402	Culvert	No	No	
335	Kaipram thodu									
336	Parayakkad Velankadavu thodu	Paravur Municipality	Cheriapallamthuruth	2.6Km	10.162275	76.2222		No	No	
337	Parayakkad Velankadavu thodu	Paravur Municipality	Velan kadavu	3.6Km	10.158085	76.227957	Velankadavu Bridge	No	No	
338	Parayakkad Velankadavu thodu	Paravur Municipality	Paravur	4.6Km	10.157342	76.23326	Thooyithara bridge	No	No	
339	Thachappilly puzha	Paravur Municipality	Vadakumpuram	0.45Km	10.169283	76.229297	Bridge at Vadakumpuram			
340	Thachappilly puzha	Paravur Municipality	Parayakkad	1.1Km	10.166091	76.226113	Bridge near Parayakkad KAPPELA			

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
341	Pashni thodu	Paravur Municipality	Vaniyamkadu	1.10km	10.134342	76.248533	Bridge at Vaniyamkadu	No	No	
342	Pashni thodu	Paravur Municipality	Vaniyamkadu	1.7Km	10.139399	76.244004	Bridge at Vaniyamkadu	No	No	
343	Pashni thodu	Paravur Municipality	Pervaram	2.31Km	10.144636	76.241885	Peruvaram Bridge	No	No	
344	Pashni thodu	Paravur Municipality	Pallithazham	3.1km	10.149405	76.237285	Bridge at Pallithazham	No	No	
345	Pashni thodu	Paravur Municipality	Fire station road	3.25Km			Bridge near fire station road	No	No	
346	Pashni thodu	Paravur Municipality	Paravur , Near poothayil road	3.59Km	10.153667	76.236565	Poothayil Bridge	No	No	
347	Alunkal Kadavu thodu	Chendamangalam Panchayath					Nil	No	No	
348	Korakkara thodu	Chendamangalam Panchayath	Kollamparambu - Panayathara road	0.25Km	10.169558	76.232767	Culvert	No	No	
349	Korakkara thodu	Chendamangalam Panchayath	Paliyam road	0.40Km	10.169842	76.23416	Culvert	No	No	
350	Korakkara thodu	Chendamangalam Panchayath	CHM Kovilakam road	2.08Km	10.170801	76.245615	Culvert	No	No	
351	Paliyam thodu	Chendamangalam Panchayath	Chalipalam	0.10Km	10.17164	76.227658	Culvert at Chalipalam	No	No	
352	Paliyam thodu	Chendamangalam Panchayath	Near Little flower chapel	0.20Km	10.171645	76.227663	Culvert near Little Flower Chapel	No	No	
353	Paliyam thodu	Chendamangalam Panchayath	Near Govt.school	0.90Km	10.170463	76.227587	Culvert near Govt.School	No	No	
354	Paliyam thodu	Chendamangalam Panchayath	Near Govt.school	0.95Km	10.172038	76.233557	Culvert near Govt.School	No	No	
355	Paliyam thodu	Chendamangalam Panchayath	Near Kovilakam road	1.4Km	10.172809	76.237512	Culvert at Kovilakam Road	No	No	

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
356	Paliyam thodu	Chendamangalam Panchayath	Pazhampilly thuruth	1.75Km	10.175313	76.23714	Culvert at Pazhampilly thururh	No	No	
357	V.P. Thuruth thodu	Puthenvelikkara Panchayath	V.P Thuruth	0.095Km	10.180902	76.23676	V.P. Thuruth	No	No	
358	Kesavathuruth thodu	Kottuvally Panchayath	Vazhikulangara Anachal road	0.40Km	10.137993	76.253472	Bridge	No	No	
359		Kottuvally Panchayath	Vazhikulangara Anachal road	1.50Km	10.138041	76.253461	Sluice cum bridge	No	No	
360	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Kurumbathuruth u bridge	0.546km	10.191779	76.224887	Road bridge	No	No	
361	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.394km	10.187721	76.23114	Culvert	No	No	
362	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.400km	10.187777	76.231189	Culvert	No	No	
363	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.500km	10.188301	76.231804	Culvert	Yes	No	Re-construction required
364	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.580km	10.188772	76.232429	Culvert	Yes	No	Re-construction required
365	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara	1.700km	10.189543	76.232998	Culvert	Yes	No	Re-construction required
366	RHS 1-Kurumbathuruth-Akathuchal distributary	Puthenvelikkara GP	Puthenvelikkara Thuruthipuram Road	1.850km	10.191061	76.233271	Filled Road	Yes	No	No culvert provided
367	LHS 1	Chendamangalam GP	Paliyam boat jetty bridge	0.265km	10.17761	76.233254	Road bridge	Yes	No	Re-construction required

Sl no	Name of Tributary	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of bridge	Whether Demolished & reconstruction needed	Demolision only	Remarks
368	LHS 2-Thekkethuruth distributary	Chendamangalam GP	CP thuruth road bridge	0.095km	10.182398	76.227472	Road bridge	Yes	No	Re-construction required
369	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Vadakkumpuram-Gothuruth bridge	0.315km	10.181203	76.226187	Road bridge	No	No	
370	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Thekkethuruth vadathodu road bridge	1.706km	10.188301	76.231804	Road bridge	Yes	No	Re-construction required
371	LHS 2-Thekkethuruth distributary	Chendamangalam GP	Gothuruth bridge	2.667km	10.184171	76.206196	Road bridge	No	No	
372	LHS 2-ST 1-Thekkethuruth Chettikkad subtributary	Vadakkekkara GP	Kuriyappilly old bridge	0.108km	10.187577	76.202481	Road bridge	Yes	No	Re-construction required
373	LHS 2-ST 1-Thekkethuruth Chettikkad subtributary	Vadakkekkara GP	Kuriyappilly new bridge	0.150km	10.187476	76.202058	Road bridge	No	No	
374	RHS 2-Thuruthipuram tributary	Kodungalloor Municipality	Thuruthipuram bridge	0.370km	10.199092	76.213699	Road bridge	No	No	
375	Elichira Sub Tributary	Puthenvelikkara GP	Thuruthoor-Poyya Bridge	0.800km	10.2018404	76.2348951	Road bridge	No	No	
376	Elichira Sub Tributary	Puthenvelikkara GP	Elichira Sluice	2.20km	10.205266	76.245616	Road bridge	Yes	No	Re-construction required
377	Karoopadanna Sub Tributary	Kodungalloor Municipality	Mala-Krishnankotta Bridge	0.70km	10.21042	76.216966	Road bridge	Yes	No	
378	Karoopadanna Sub Tributary	Kodungalloor Municipality	Pulloott Bridge	3.00km	10.227284	76.208027	Road bridge	Yes	No	
379	Thachappilly Sub Tributary	Puthenvelikkara GP	Elichira Sluice	3.35km	10.238178	76.227402	Road bridge	Yes	No	
380	Neythikkudy Sub Tributary	Puthenvelikkara GP	Elichira Sluice	6.00km	10.242386	76.241934	Road bridge	Yes	No	
	TOTAL NUMBER OF BRIDGES IN TRIBUTARIES							**380**		

Sturcture in River										
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km										
Sl no	**Name of River**	**Name of Local body**	**Name of location**	**Chainage**	**Latitude**	**Longitude**	**Type of struture**	**Whether Demolished & reconstruction needed**	**Demolisio n only**	**Remarks**
1	Periyar	Upputhara and Ayyappankovil panchayath	Near Malankara Tea Factory	91.716 km	9.658379	77.016685	Check Dam	NA	NA	
2	Periyar	Vazhathoppu	Karimban	128.90	9.899051	76.974737	Old Chappath	No	Yes	
3	Periyar	Kanjikuzhy, Vellathooval	main course	136.6 km	9.96148	76.980765	check dam	reconstuction preferable	No	reconstruction of structure is preferable as the check dam is in a damaged condition
4	Periyar	Kanjikuzhy	Lower Periyar	139.65 km	9.96148	76.9567799	Dam	NO	NO	structure is in safe condition
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km										
NIL										
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km										
NO STRUCTURE FOUND TO BE DEMOLISHED / RECONSTRUCTED										
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km										
5	Periyar	Kalady/Okkal	Kalady Bridge	209.550	10.162487	76.441343	Bridge	No		
6	Periyar	Kanjoor/Okkal	Sabari Rail Bridge	210.225	10.158427	76.436502	Railway Bridge	No		Construction Stage
7	Periyar	Kanjoor/Okkal	Vallam Kadavu Bridge	215.900	10.158427	76.436502	Bridge	No		
8	Periyar	Sreemoolanagaram/Vazhakkulam	Sreemoolam Bridge	221.400	10.115160	76.419399	Bridge	No		
9	Periyar	Sreemoolanagaram/Keezhmad	Mahilalayam Bridge	226.460	10.118847	76.377428	Bridge	No		
10	Periyar	Aluva	Aluva Railway Bridge	228.650	10.114142	76.360426	Railway Bridge	No		
11	Periyar	Aluva	Manappuram Foot Bridge	229.250	10.115016	76.354943	Foot Bridge	No		
12	Periyar	Aluva	Marthandavarma Bridge	230.130	10.112222	76.347623	Bridge	No		NH Twin Bridge

Sl no	Name of River	Name of Local body	Name of location	Chainage	Latitude	Longitude	Type of struture	Whether Demolished & reconstruction needed	Demolisio n only	Remarks
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA										
13	Periyar	**Aluva**	Marthanda Varma Bridge	230.130	10.112857	76.347445	RCC Bridge	No		
14	Periyar	Kadungalloor	Uliyannoor	230.613	10.111475	76.343988	RCC Aqueduct	No		
15	Periyar	Kadungalloor	Elookara	232.780	10.099873	76.336585	RCC Bridge	No		
16	Periyar	Eloor Muncipality	Pathalam	236.330	10.082788	76.31984	RCC Bridge	No		
17	Periyar	Eloor Muncipality	Pathalam	237.870	10.076878	76.307893	RCC Bridge cu	No		
18	Periyar	Eloor Muncipality	Vettukadavu	240.580	10.093677	76.295057	RCC Bridge	No		
19	Periyar	Varappuzha	Varappuzha	244.490	10.072446	76.282568	RCC Bridge	No		
20	Periyar	**Aluva**	Marthanda Varma Bridge	0	10.112857	76.347445	RCC Bridge	No		
21	Periyar	KADUNGALLOOR	Pvip Aqueduct	756	10.10613,	76.34732	RCC Aqueduct	No		
22	Periyar	KADUNGALLOOR	Uliyannoor Bric	890	10.1051,	76.34711	RCC Bridge	No		
23	Periyar	Choornikkara	Idamula Bridge	4080	10.08142,	76.31749	RCC Bridge	No		
24	Periyar	Kalamassery	Muttom bridge	7460	10.06628,	76.32374	RCC Bridge	No		
25	Periyar	Kalamassery	Fact Kalamasse	7600	10.06579,	76.32243	RCC Bridge	No		
26	Periyar	Kalamassery	Puthalam Kada	8210	10.06339,	76.31834	RCC Bridge	No		
27	Periyar	Kalamassery	Manjummel RC	10000	10.05787,	76.30743	RCC Regulator	No		
28	Periyar	Eloor	Muttar Bridge	12860	10.04428,	76.30073	RCC Bridge	No		
29	Periyar	Eloor	Cheranallor Co	15410	10.064,	76.2943	RCC Bridge	No		
30	Periyar	Varappuzha	Varappuzha	17290	10.072446	76.282568	RCC Bridge	No		
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH										
NIL – NO OBSTRUCTING STRUCTURE ACROSS PERIYAR										

TOTAL NUMBER OF OBSTRUCTING STRUCTURE IN RIVER	**30**

PUMPING STATIONS

PUMPING STATIONS FOR RIVER										
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km										
Sl no	**Name of River**	**Name of Local body**	**Name of location/ local name of loaction**	**Chainage**	**Latitude**	**Longitude**	**Left Bank / Right Bank**	**Approx. Qty of water taken per year**	**Agency**	**Remarks**
1	Periyar	vandiperiyar	Near check dam, Near Manjumala Attoram	74.05 km	9.56708	77.08577	Left	0.75 MLD x 365 = 273.75	KWA	
2	Periyar	Thekkady	Near Periyar house	Forest	Forest	Forest	Right	4.75 MLD x 365 = 1733.75	KWA	
3	Periyar	upputhara pump house	upputhara	97.73	9.698145	77.020804	LH	2200 lakh litres	KWA	
4	Periyar	thonithady pump house	thonithady	98.57	9.698943	77.030368	RH	3000 lakh litres	KWA	
5	Idijamala Thodu (Tributory)	Erattayar	Idinjamala	4/850	9.809139	77.103774	RB		KWA	
6	Kattappayar (Tributory)	Kattappana Municipality	School Kavala	6/326	9.747089	77.107309	LB		KWA	
7	Kallar (Tributory)	Nedumkandam	Kallar	31.02	9.82641°N	77.16019°E	LB		Jalanidhi	
8		Nedumkandam	Kallar	30.85	9.826241°N	77.161551°E	RB		Jalanidhi	
9		Nedumkandam	Kallar	29.76	9.829119°N	77.171061°E	RB		KWA	
10		Nedumkandam	Kallar	29.32	9.827921°N	77.173631°E	RB		Jalanidhi	
11	Kundala (Tributory of Muthirappuzha)	Munnar	Near KTDC Park Munnar	25.716km	10.08458,	77.070092	left Bank	36000cum	KWA	
12	Muthirapuzha	Pallivassal	near kunjithanny bridge	20.98	10.014139,	77.064042	Right bank	3650cum	KWA	
13	Muthirapuzha	Pallivassal	Pallivasal (near ellackal)	22.81km	10.001453,	77.067044	Right bank	182500cum	KWA	
14	Muthirapuzha	Pallivassal	Mavelikunnu pump house	23.12	10.001453,	77.067044	Left bank	3330 cum	Jalanidhi	
15	Uppar	Bysonvalley	pump house in tea company thodu (uppar)	9.134	10.006023,	77.114215	right bank	6120cum	Jalanidhi	
16	Uppar	Bysonvalley	Near Tea company pump house	9.14	10.006023,	77.114215	left bank	7740 cum	Jalanidhi	
17	Uppar	Bysonvalley	Pallithazham pump house	11.134	10.001065	77.096441	Left bank	3960 cum	Jalanidhi	
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km										
NIL										
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km										
		Pindimana	Pindimana	180.55km	10.152436	76.646561	L/B	1277.5 mld	KWA	
		Pindimana	Kottappady	182.30km	10.17166667	76.61638889	L/B	346.75mld	KWA	
		Vengoor	Panamkuzhy	193.55km	10.18777778	76.56361111	L/B	730mld	KWA	
		Koovappady	Cheranellur	201.05km	10.16833333	76.45694444	L/B	1825mld	KWA	

Sl no	Name of River	Name of Local body	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Left Bank / Right Bank	Approx. Qty of water taken per year	Agency	Remarks
18	Periyar	Malayattoor Neeleeswaram	Illithodu	194.506km	10.196583	76.52663	R/B	730mld	KWA	
		Malayattoor Neeleeswaram	Neeleswaram	203.950km	10.18416667	76.47472222	R/B	1350.5mld	KWA	
		Kalady	Kalady	209.550km	10.16555556	76.44361111	R/B	3467.5mld	KWA	
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km										
19	PERIYAR	KANJOOR	KANJOOR-EDANAD	211.7	10.14742	76.428379	RIGHT		Minor Irrigation	
20	PERIYAR	KANJOOR	PALLIKKADAVU	212.05	10.143552	76.43061	RIGHT		Minor Irrigation	
21	PERIYAR	KANJOOR	MURIYAMANGALAM	212.79	10.145042	76.43804	RIGHT		Minor Irrigation	
22	PERIYAR	PERUMBAVOOR	VALLAM	216.06	10.13111111	76.45833333	LEFT	752.4 m3/hr	Minor Irrigation	
23	PERIYAR	PERUMBAVOOR	VALLAM	216.149	10.1300751	76.458464	LEFT	6570 MLD	KWA	
24	PERIYAR	KANJOOR	THIRUVILAMCHUZHI	216.31	10.136852	76.450158	RIGHT		Minor Irrigation	
25	PERIYAR	VAZHAKULAM	VAZHAKULAM	218.85	10.71671	76.262034	LEFT	370 m3/hr	Minor Irrigation	
26	PERIYAR	SREEMOOLANAGARAM	SOUTH VELLARAPILLY	219.740	10.1231450	76.4327880	RIGHT		Minor Irrigation	
27	PERIYAR	VAZHAKULAM	MARAMPILLY PUMP HOUSE	221.532	10.1135840	76.4184790	LEFT	4380 MLD	KWA	
28	PERIYAR	KEEZHMADU	CHALAKKAL	222.630	10.1176160	76.4074820	LEFT	23400 m3/Day	Minor Irrigation	
29	PERIYAR	SREEMOOLANAGARAM	SREEBHOOTHAPURAM	223.450	10.1229800	76.4042420	RIGHT		Minor Irrigation	
30	PERIYAR	SREEMOOLANAGARAM	V.K.R.MENON	224.450	10.1254030	76.3936420	RIGHT		Minor Irrigation	
31	PERIYAR	SREEMOOLANAGARAM	CHOWARA	225.065	10.1248180	76.3876820	RIGHT		Minor Irrigation	
32	PERIYAR	SREEMOOLANAGARAM	KWA CHOWARA	225.270	10.1054510	76.3599300	RIGHT	27922 MLD	KWA	
33	PERIYAR	KEEZHMADU	KEEZHMADU NO.1	226.470	10.1156680	76.3769180	LEFT	17712 m3/Day	Minor Irrigation	
34	PERIYAR	ALUVA	ALUVA PUMP HOUSE	228.430	10.1104600	76.3610290	LEFT	118625 MLD	KWA	
35	PERIYAR	CHANGAMANAD	AVANAMKOD	229.420	10.1204520	76.3555080	RIGHT		Minor Irrigation	

Sl no	Name of River	Name of Local body	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Left Bank / Right Bank	Approx. Qty of water taken per year	Agency	Remarks
36	THUMBA THODU	SREEMOOLANAGARAM	VARIAKKAD(CHOWARA)	0.710	10.1241320	76.3759980	RIGHT		Minor Irrigation	
37	THUMBA THODU	SREEMOOLANAGARAM	MATHER COMPOUND	1.520	10.1261330	76.3722300	RIGHT		Minor Irrigation	
38	CHENGAL THODU	KANJOOR	PULIAMBILLY	0.500	10.1559550	76.4172970	LEFT		Minor Irrigation	
39	CHENGAL THODU	KANJOOR	PIRAROOR	1.200	10.1595510	76.4189490	LEFT		Minor Irrigation	
40	CHENGAL THODU	KANJOOR	CHENGAL	1.800	10.1604660	76.4216380	LEFT		Minor Irrigation	
41	CHENGAL THODU	KANJOOR	NEDUVANNOOR	7.800	10.1343440	76.3772780	LEFT		Minor Irrigation	
42	OKKAL THODU	OKKAL	OKKAL	0.500	10.1452778	76.4680556	LEFT	140.40 m3/Day	Minor Irrigation	
43	KADANTHARA	PERUMBAVOOR	KADANTHARA	0.459	10.1133333	76.4669444	LEFT	82.78 l/s	Minor Irrigation	
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA										
44	PERIYAR	KADUNGALLOOR	WARD 9	233.26	10.096133	76.334913	RIGHT		KWA	
45	Periyar	Kalamassery	Kinfra Pump house	8440	10.0612	76.3173	LB			
46	Periyar	Choornnikkara	LI scheme	6000	10.074	76.3326	LB			
47	Periyar	Kalamassery	KRL Pump house	4880	10.08128	76.3353	LB			
48	Periyar	Kalamassery	Amirtha Pump house	6131	10.07116	76.32833	LB			
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH										
49	Periyar	Aluva Municipality	Avanamcode pump No.1A	0.48 km	10.120665	76.35561	Right bank		Irrigation Department	
50	Periyar	Karumaloor Panchayath	Veliyathunadu pump house East	3.00km	10.131812	76.337218	Left Bank		Irrigation Department	
51	Periyar	Karumaloor Panchayath	Veliyathunadu No.2 pump house	4.25km	10.150111	76.312326	Left Bank		Irrigation Department	
52	Periyar	Chengamanadu Panchayath	Desam East LIS	4.36km	10.141873	76.338102	Right bank		Irrigation Department	
53	Periyar	Chengamanadu Panchayath	South Aduvassery	5.90km	10.153083	76.323799	Right bank		Irrigation Department	
54	Periyar	Karumaloor Panchayath	Veliyathunadu No.1 LI scheme	6.25km	10.149912	76.321099	Left Bank		Irrigation Department	
55	Periyar	Kunnukara Panchayath	Kuttippuzha No.1 LI scheme	7.19km	10.143265	76.303342	Right bank		Irrigation Department	
56	Periyar	Kunnukara Panchayath	Kuttippuzha No.2 pumphouse	8.65km	10.143265	76.303342	Right bank		Irrigation Department	
57	Periyar	Karumaloor Panchayath	Karumaloor No.2 LI scheme	9.62km	10.135822	76.292112	Left Bank		Irrigation Department	

Sl no	Name of River	Name of Local body	Name of location/ local name of loaction	Chainage	Latitude	Longitude	Left Bank / Right Bank	Approx. Qty of water taken per year	Agency	Remarks
58	Periyar	Karumaloor Panchayath	Karumaloor No.1 LI scheme	10.40km	10.136637	76.29123	Left Bank		Irrigation Department	
	TOTAL NUMBER OF PUMPING STATIONS IN RIVER							**58**		

FOREST DETAILS

FOREST DETAILS ON THE MAIN RIVER BANK							
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km							
Sl no	**Name of River**	**Chainage**		**Latitude**	**Longitude**	**Left Bank / Right Bank**	**Remarks**
		From	**To**				
1	Periyar	0	66.365			Right bank	
2	Periyar	0	65.185			Left Bank	
3	Periyar	100.50	119.90	9.717232	77.033054	Both Banks	Idukki Reservoir
4	Muthirapuzha	0	6.185	0.1499&10.10917	77.068132&77.05804	both bank	from origination to Periavarai location the river course passess through forest and plantation area
5	Kundala	0	24.255	152415 &10.0837	77.178463&77.0828	Both bank	From origination to Culvert near Grahamsland New division at ch 24.255 river passess throgh Forest area, land under possession of KSEB in the vicinity of Madupetty dam and kundala dam. Also some extent belongs to plantatation
6	Periyar	143/550	156/050			Right Bank	
7	Periyar	143/550	144/700			Left Bank	
8	Periyar	136.6 km	139.65			Right Bank and Left bank	Both banks under the ownership of forest
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km							
NIL							
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km							
9	Periyar	179.550	194.060	10.13676667	76.66381389	Right Bank	Right Bank from Bhoothathankettu barrage to Illithode - 14.440km
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km							
10	PERIYAR	209.55	230.13				NIL
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA							

Sl no	Name of River	Chainage		Latitude	Longitude	Left Bank / Right Bank	Remarks
		From	To				
NIL							
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH							
11	Periyar	0	17.5	_	_	_	No forest area along the course of Periyar from Aluva Manappuram to Munambam

CONSOLIDATED DETAILS

CONSOLIDATED DETAILS REGARDING PERIYAR BASIN STUDY																			
Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km																			
1	**0**	**154.4**	**Sivagiri Hills**	**Karimanal Bridge**	**Main River**		**Periyar**	**154.4**	**20**	**6**	**4**	**4**	**476278.2**	**2**	**0**	**3**	**0**	**31111.63**	**2**
2	0	4.35	Gavi	periyar river chainage 65. 91km	Tributary	L/B	Gavi thodu	4.35	1	0	0	0	0	0	0	0	0		Nil
3	0	1.955	Poabs Estate	periyar river chainage 66.185 km	Tributary	L/B	Vallakadavu poabs Estate thodu	1.955	0	4	0	0	150	0	0	0	0		Nil
4	0	0.104	kocokkad	periyar river chainage 70.061 km	Tributary	L/B	Kocokkad thodu	0.104	0	2	0	0	100	0	0	0	0		Nil
5	0	0.067	HPC Estate	periyar river chainage 71.195 km	Tributary	R/B	Hpc Thodu	3.067	0	1	0	0	200	0	0	0	0		Nil
6	0	0.689	Injakkadu	periyar river chainage 71.966 km	Tributary	R/B	Injakkadu Thodu	0.689	0	2	0	0	150						Nil
7	0	3.867	Aranakkal Estate	periyar river chainage 72.450 km	Tributary	L/B	Aranakkal Estate thodu	3.867	0	2	0	0	180	0	0	0	0		Nil
8	0	forest	sathram	periyar river chainage 73.3 km	Tributary	L/B	Vandiperiyar Sthram Thodu	3.852	1	2	0	0	100	0	0	0	0		Nil
9		3.86	chelimada	inside forest	Tributary	R/B	Kumily Thodu	3.86	2	6	0	0	150	0	0	0	0		Nil
10	0	8.73 Km	Vandiperiyar	Chottupara	Tributary	R/B	Chottupara Thodu	8.73 Km	21	nil	nil	nil	nil	many	many	nil	nil	nil	nil
11	0	2.60 Km	Periyar river	Mepparattu	Tributary	R/B	Anakkuzhy thodu	2.60 Km	1	1	nil	nil	nil	nil	nil	nil	nil	nil	nil
12	0	0.675 Km	Keerikara chapath bridge	Pekkanam checkdam	Tributary	L/B	Chandravanam Thodu	0.675Km	1	2	nil	nil	nil	nil	nil	nil	nil	nil	nil
13	0	4.8 Km	D/S side of chandravanam bridge	Keerikara Thodu	Tributary	L/B	Keerikkara thodu	4.8 Km	3	1	1	1	2500	nil	nil	nil	nil	nil	nil
14	0	1.72KM	Ranikovil estate	Keerikara Thodu	Sub Tributory	R/B	Ranikovil kaythodu	1.72 Km	nil	1	1	nil	nil	nil	nil	nil	nil	nil	nil

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
15	0	8.6 Km	D/S side of keerikara thodu joining point(R/B)	Vellaramkunnu	Tributary	R/B	Vellaramkunnu Anakuzhi thodu	8.6 Km	9	4	1	nil	1000	nil	nil	nil	nil	nil	nil
16	0	2.63KM	Chenkara	Thavaranapalam	Sub Tributory	R/B	Chenkara kurisumala thodu	2.63Km	nil	1	nil	nil	nil	nil	nil	nil	nil	nil	nil
17	0	2.10KM	Mathakanam	Vellaramkunnu thazhbhagam	Sub Tributory	R/B	Mathakanam Kuttikalliseri thodu,	2.10Km	nil		nil	nil	500	nil	nil	nil	nil	nil	nil
18	0	0.50KM	Vellaramkunnu	Vellaramkunnu thazhbhagam	Sub Tributory	L/B	Sankunnipalam thodu	0.500Km	nil	1	nil	nil	nil	nil	nil	nil	nil	nil	nil
19	0	3.47 Km	D/s side of Keerikkara bridge	Manjumala	Tributary	L/B	Manjumala thodu	3.47Km	5	2	nil	nil	2000	nil	nil	nil	nil	nil	nil
20	0	6.3 Km	D/S side of keerikara thodu joining point(LB)	koduvakkanam	Tributary	L/B	Ladrum thodu	6.3 Km	3	3	1	nil	1000	nil	nil	nil	nil	nil	nil
21	0	13.20 Km	U/s of santhipalam	Sasthanada	Tributary	R/B	Sasthanada Moogalar thodu	13.20 Km	16	2	nil	nil	3500	nil	nil	nil	nil	nil	nil
22	0	1.50KM	Sangaragiri bhagam	U/S of Chittimala bridge	Sub Tributory	R/B	Chittimala thodu	1.50Km	nil	2	nil	nil	nil	nil	nil	nil	nil	nil	nil
23	0	1.00KM	Korangusasthanada	Sasthanada	Sub Tributory	R/B	Korangusasthanada thodu	1.00Km	nil	5	nil	nil	nil	nil	nil	nil	nil	nil	nil
24	0	15.546 Km	Moonattumukku bhagam	Vagamon Nallathanny bhagam hills	Tributary	L/B	Chinnar thodu	15.546 km	13	nil	2	1	36150	nil	nil	nil	nil	nil	nil
25	0	13.212 Km	Near Karimthiri New Bridge	Vattapathal bhagam	Sub Tributory	L/B	Pasupara thodu	13.212 km	9	2	nil	1	nil	nil	nil	nil	nil	nil	nil
26	0	8.43 Km	4th mile Kottadimakkal bhagam	Tyfoid Estate Bhagam	Sub Tributory	R/B	Elappara thodu	8.43 km	9	3	1	1	15150	nil	nil	nil	nil	nil	nil

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
27	0	8 Km	Near Kochumarimthiri ST. Thomas Church bhagam	Vagamon Vazhikkadavu bhagam	Sub Tributory	L/B	Arappukadu thodu	8 km	1	1	nil	nil	2760	nil	nil	nil	nil	nil	nil
28	0	1.58 Km	Chappath	Karinthiri estate	Tributary	L/B	Karinthiri Thodu	1.58 Km	5	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
29	0	0.45 km	old post office chappath	Malabar coffee estate	Tributary	R/B	old post offie thodu	0.45 Km	1	2	nil	nil	nil	nil	nil	nil	nil	nil	nil
30	0	0.4 Km	alady	Poovanthikudi	Tributary	R/B	Alady thodu	0.4 Km	2	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
31	0	1.5 Km	akkupalam	laksham veedu launtry	Tributary	L/B	Akkuppala Thodu	1.5 Km	5	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
32	0	2.08 Km	Illipalam	launtry estate	Tributary	L/B	Kalllukad Illipalam Thodu	2.08 Km	11	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
33	0	3.75 Km	Upputhara central junction	Eettakanam	Tributary	L/B	Eettakanam Thodu	3.75 Km	4	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
34	0	5.19 Km	thonithady	sulthaniya estate	Tributary	R/B	Oorampara thodu	5.19 Km	9	nil	1	nil	nil	nil	nil	nil	nil	nil	nil
35	0	1.68Km	thundathil padi	edapookulam lourdh matha grotto	Sub Tributary	L/B	Edappookulam thodu	1.68 Km	3	nil	nil	nil	nil	nil	nil	nil	nil	nil	nil
36	0	2.61km	a pady field at about 750m from Labbakada to Vellilamkandam road	Idukki reservoir at Vellilamkandam	Tributary	R/B	Vellilamkandam Thodu	2.61km	1	2	NIL		1200	NIL	NIL		NIL		NIL
37	0.00	2.36km	Arayathinalpady Irrigation pond	joins with Idukki reservoir	Tributary	R/B	Mattapilly thodu	2.36km	1	2	NIL		900.00	NIL	NIL		NIL		NIL
38	0	3.51km	1.60km from Kanjikallu forest boundary	joins with Idukki reservoir at 600m from Murikkattukdi Jn	Tributary	R/B	Murikkattukdi thodu	3.51km	1	1	NIL		700	NIL	NIL		NIL		NIL

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
39	0.00	1.70km	Kozhimala nirappu	joins to Idukki reservoir@104.6Km	Tributary	R/B	Kozhimala thodu	1.70km	0	2	NIL		950.00	NIL	NIL		NIL		NIL
40	0	5.75km	Kalthotty	with Idukki reservoir at Anjurali behind water falls@109.8	Tributary	R/B	Palakada thodu	5.75km	1	8	NIL		1500	NIL	NIL		NIL		NIL
41	0.00	12.87km	Cheyithanmala	joins with Idukki reservoir at Anjurali. @110.5km	Tributary	R/B	Kattappanayar	12.87km	11	13	NIL	1	5000.00	NIL	NIL		NIL		NIL
42	0	3.67km	two small streams from Pliyanmala and Anakuthy	joining Kattappanayar near St.Johns Hospital.	Sub-Tributary	R/B	1.Kattappana Thodu	3.67 km	2	8	NIL		2000	NIL	NIL		NIL		NIL
43	0.00	3.58km	strats near Vellayamkudi	joining Kattappanayar at upstream of Anjalipalam	Sub-Tributary	R/B	2.Valiyakandam Thodu	3.58km	0	10	NIL		2500.00	NIL	NIL		NIL		NIL
44	0	5.35	Kallar tunnel tail end at Mannakudi	Erattayar tunnel point	Tributary	R/B	Erattayar River	5.35km	7	0	NIL		2000	NIL	NIL	1	NIL		NIL
45	0.00	4.5	Athikayam in Kattappana Muncipality	joining Erattaar river aty downstream of bridge at Kumarakam – Cumbum road	subTributary	R/B	1.Uppukandam Thodu	5.91km	0	7	NIL		2500.00	NIL	NIL		NIL		NIL

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
46	0	1.4km	Mannakudi	joining Erattayar river at downstream of Mannakudi bridge.	Sub-Tributary	R/B	2.Mannakudi Thodu	1.40km	1	4	NIL		1200	NIL	NIL		NIL		NIL
47	0	8.9km	Thankamany town	joins with Erattayar river very close to Erattayar Tunnel point.	Tributary	R/B	Thankamany Thodu	8.9km	11	10	NIL		3000	NIL	NIL		NIL		NIL
48	0.00	5.67km	Illikkalpady near Kalvary moun	joins with Thanakamany thodu near Nalumukku Jn	Sub-Tributary	R/B	1. Nellipara Thodu	5.67km	0	4	NIL		2300.00	NIL	NIL		NIL		NIL
49	0	4.85km	kannimala in Kamakshy Panchayath	Erattayar reservoir near Water Authority Pump house.		R/B	2. Idinjamala Thodu	4.85km	0	7	NIL	1	1000	NIL	NIL		NIL		NIL
50	0.00	3.2km	cardamom hills of Chakkupallam GP	Idukki reservoir at Anchuruly	Tributary	R/B	KALLAR PUZHA	32KM	26	25	1	3	17400.00	NIL	NIL		NIL		NIL
51	0	9.43	puliyanmala area in Vandanmedu GP	reaches Kallar river in Balagram	Sub-Tributary	R/B	Puspakandom Ramakkalmedu thodu	9.43KM	10	7	NIL		7100	NIL	NIL		NIL		NIL
52	0.00	11.8	cardamom hills in Vandanmedu GP,	joins kallar river at Angeekoottar in Karunapuram GP.		L/B	Alliyar	11.8	9	1	NIL		4200.00	NIL	NIL		NIL		NIL
53	0	8km	puliyanmala area in Vandanmedu GP	Kallar river in Balagram		R/B	Compayar	8KM	11	10	NIL	2	8400	NIL	NIL		NIL		NIL

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
54	0.00	6.33km	puliyanmala area in Vandanmedu GP	Kallar river in Balagram		L/B	Balagram - Puliyanmala THodu	6.33KM	4	6	NIL		2640.00	NIL	NIL		NIL		NIL
55	0	8km	starts from downstream of Kallar dam	Perinjamkutty Aar at Ch.5/750.		R/B	Kallar Thodu	5.750km	0	4	NIL		8000	NIL	NIL	1	NIL		NIL
56	0.00	2.10km	Kalvarimount .	diverted to Idukki reservoir through Narakakanam Tunnel.	Tributary	R/B	Narakakkanam Thodu	2.10km	1	2	NIL		900.00	NIL	NIL		NIL		NIL
57	0	2km	inside Idukki forest near left bank of Cheruthoni dam	Periyar river at chainage 121.68	Tributary	R/B	Cheruthoni- jilla Asupathri thodu	2KM	0	5	NIL	NIL	840	NIL	NIL	NIL	NIL		NIL
58	0.00	6km	originates in Narakakanam area of Mariyapuram Grama Panchayath	diverted to Idukki reservoir through tunnel.		R/B	Nayarupara Thodu	6KM	1	7	NIL	NIL	nil	NIL	NIL	NIL	NIL		NIL
59	0	7km	Thankamany in Kamakshy Panchayth	Periyar river at chainage 122.85	Tributary	R/B	Mariyapuram Thodu	7KM	7	6	NIL	NIL	2550	NIL	NIL	NIL	NIL		NIL
60	0.00	9km	Maniyarankudy area of Vazhathoppe panchayath	Periyar river at chainage 123.90		R/B	Peppara Thodu	9KM	9	7	NIL	NIL	4200.00	NIL	NIL	NIL	NIL		NIL
61	0	3km	Maniyarankudy area of Vazhathoppe panchayath	Periyar river at chainage 124.85.	Tributary	R/B	Vazhathoppe Pallithazham thodu	3KM	1	8	NIL	NIL	900	NIL	NIL	NIL	NIL		NIL

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
62	0.00	7.2km	inside Idukki forest near Palkulamedu of Idukki-Kanjikuzhy Panchayath	Periyar river at chainage 126.49		R/B	Palkulamedu-Asoka jn, thodu	7.2KM	2	11	NIL	NIL	3840.00	NIL	NIL	NIL	NIL		NIL
63	0	10km	near Udayagiri of Kamakshy panchayath	Periyar river at chainage 127.13	Tributary	R/B	Vimalagirithodu	10KM	6	8	NIL	NIL	4310	NIL	NIL	NIL	NIL		NIL
64	0.00	4km	Challikkada	Periyar river at ANTOPURAM (Ch. 129.12km	Tributary	R/B	Upputhodu thodu	4 km	1	3	nil	nil	nil	nil	nil	Nil	nil	600	Nil
65	0	5km	Edakkadu	Periyar river at PERIYAR VALLEY (Ch. 129.94 km).	Tributary	L/B	Churuli Thodu	5 km	2	4	nil	nil	1500	nil	nil	Nil	nil	500	Nil
66	0.00	2km	Pallipady	Periyar river at PERIYAR VALLEY (Ch. 132.76km).	Tributary	L/B	Keerithodu Thodu	2 km	1	2	nil	nil	nil	nil	nil	Nil	nil	400	Nil
67	0	26km	Mankuva	joins with PERIYAR at Periyar valley (Ch. 133.86 km	Tributary	R/B	Perinjamkutty Aar	26 km	8	14	1	2	43117	nil	nil	2 (a new dam is under construction)	nil	12000	Nil
68	0.00	1km	Panamkutty – Thekkinthandu	Periyar river at PERIYAR VALLEY (Ch. 135.35km).	Tributary	L/B	Pakuthippalam Thodu	1 km	nil	2	nil	nil	nil	nil	nil	nil	nil	nil	Nil
69	0.00	37.34	Naymakkadu	Panamkutty	Tributary	R/B	Muthirapuzha river	37.34	15	10	nil	3	221185	21	nil	2	0	5465	5

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
70	Rock removal				Tributary	R/B	do						3800						
71	0	26.656	chittuvarai	Confluence of mithirapuzha	SubTributary	L/B	Kundala river	26.656	Nil	7	Nil	1	13388	NIL	NIL	2	NIL	350	NIL
72	0	3	Yellapetty	Confluence of Kundala Dam	Sub Tributary	L/B	Yellapetty thodu	3.0km	Nil	3	1	NIL	NIL	NIL	NIL	NIL	NIL	200	NIL
73	0	4.0km	Nallathanny estate	Nallathanny junction	Tributary	R/B	Nallathanny river	4.0km	NIL	9	Nil	NIL	4288	13	1	Nil	NIL	700	NIL
74	0	0.7	Nadayar Estate	Munnar Town	Tributary	R/B	Nadayar Thodu	.70km	Nil	2	1	NIL	NIL	2	NIL	NIL	NIL	900	NIL
75	0	1.75km	M.G colony	Munnar Town	Tributary	L/B	Colony thodu	1.75km	Nil	16	2	NIL	1728	23	NIL	NIL	NIL	555	NIL
76	0	9.4	Lakshmi Estate	RA head work	Tributary	R/B	Lakshmi thodu (sevenmala)	9.4	NIL	10	NIL	NIL	NIL	4	NIL	NIL	NIL	2540	NIL
77	0	1.5	Chockanadu	RA head work	Tributary	L/B	Chockanadu thodu	26.32	NIL	2	NIL	NIL	6270.4	3	NIL	NIL	Nil	1050	Nil
78	0	15.34	Muttkadu hills & Odk	U/S of ellackal Bridge	Tributary	L/B	Uppar Thodu	15.34	NIL	15	2	3	5600	NIL	NIL	NIL	NIL	3700	NIL
79	0.00	33.7	Anayirankal dam	panniyarkutty	Tributary	L/B	Panniyar river	33.7 km	10	1	Nil	0	6000	3	Nil	2	1	2	Nil
80	0.00	2	Rajakkad	Kallimali	SubTributary	R/B	Rajakkadu-kallimali thodu	2 km	2	3	Nil	0	Nil	Nil	Nil	Nil	Nil	Nil	Nil
81	0.00	3.3	Kulatharkkuzhy	Panniyarkutty	SubTributary	R/B	Kulatharakuzhy - Panniyarkutty thodu	3.30 km	1	2	Nil	0	Nil	Nil	Nil	Nil	Nil	Nil	Nil
82	0.00	0.8	Undamala	Panniyarkutty	SubTributary	R/B	Undamala - Panniyarkutty thodu	0.80 km	Nil	1	Nil	0	Nil	Nil	Nil	Nil	Nil	Nil	Nil
83	0.00	3.35	Ambalamkunnu	Panniyarkutty	SubTributary	R/B	Ambalamkunnu - Panniyarkutty thodu	3.35 km	1	1	Nil	0	Nil	Nil	Nil	Nil	Nil	Nil	Nil
84	0.00	7.2	Mathikettan	Santhanpara	SubTributary	L/B	Santhanpara river	7.20 km	1	Nil	Nil	0	Nil	1	Nil	Nil	Nil	Nil	Nil
85	0.00	2.1	Cheriyar	Thottikkanam	SubTributary	L/B	Cheriyar river	2.10 km	3	nil	Nil	0	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
86	0	18.95	KSEB Tunnel from viripara D/S	Kallarkutty Dam	Tributary	L/B	Ambazhachal River	18.95 Km	19	4	1	0	800	0	0	0	1	1	0
87	0	1.07	Peechadu Thaliyam Check dam	Confluence Point of thodu to kallar.	SubTributary	L/B	Peechadu Thaliyam check dam – Kallar Thodu	1.07 km	1	2	0	0	3000	0	0	0	0	0	0
88	0	2.19	Thokkupara tunnel near by bridge	Confluence Point of thodu to kallar.	SubTributary	R/B	Thokkupara - Ambazhachal thodu	2.19 km	4	1	0	0	500	0	0	0	0	0	0
89	0	9.5	Varikkamuthan	Pampla Thodu	Tributary	L/B	Pampla Thodu	9.5	1	2	Nil	Nil	6915	Nil	Nil	Nil	Nil	1	
90	0	2	Pazhayirikandam	Thattekanni	Tributary	L/B	Thattekanni	2	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
91	0	2.5	Vanchikal	Thattekanni	Tributary	L/B	Thattekanni	2.5	Nil	1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km																			
1	0.00	18.70	10.213711 76.8873	10.163075 76.786838		RB	Muthirapuzhayar	18.70	Nil	Nil	Nil	Nil	-	Nil	Nil	Nil	Nil	Nil	Nil
2	0.00	3.53	10.195589 76.920358	10.191369 76.896967		L/B	Irupukalkudy	3.53	-	-	-	-	-	-	-	-	-	-	-
3	0.00	5.41	10.21105 76.833392	10.187831, 76.824003		RB	Kunjippara	5.41	-	-	-	-	-	-	-	-	-	-	-
3	0.00	41.43	10°09´59.52"77°01´14.68"	10°09´9.52" 76°44´13.00"		LB	Karinthiriyar	41.43	4	2	-	-	27000 m3	-	-	-	-	-	-
4	0.00	3.57	10.15040556 77.02878056	10.15402222 77.02405278		L/B	Tributory 1	3.57	-	1	-	-	-	-	-	-	-	-	-
5	0.00	1.65	10.14078611 76.96588889	10.12880833 76.97358611		R/B	Tributory 2	1.65	-	-	-	-	-	-	-	-	-	-	-
6	0.00	12.16	10.14332778 77.05293333	10.12733611 76.97245556		L/B	Kadalar	12.16	-	5	-	-	-	-	-	-	-	-	-
7	0.00	22.82	10.08845556 77.02840000	10.14051944 76.91365000		L/B	Mankulam ar	22.82	7	6	-	1	-	-	-	-	-	-	-
8	0.00	1.47	10.14341389 76.94793889	10.13563611 76.93772500		R/B	Parekudy Thodu	1.47	-	1	-	-	-	-	-	-	-	-	-
9	0.00	4.83	10.17836389 76.92861944	10.14897222 76.90399444		R/B	Ettacholayar	4.83	-	-	-	-	-	-	-	-	-	-	-

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
10	0.00	0.500	10.15896667 76.91556667	10.16144722 76.91233611		L/B	Anakulam Tributary Thodu	0.50	-	3	-	-	-	-	-	-	-	-	-
11	0.00	5.67	10.16509722 76.95965278	10.16816667 76.91852778		L/B	Kozhyalakudyar	5.67	1	1	-	-	-	-	-	-	1	-	-
12	0.00	3.91	10.109866111 76.11255556	10.13626389 76.89361667		L/B	Vathikudy tributary	3.91	-	2	-	-	-	-	-	-	-	-	-
13	0.00	15.00	10.05180000 76.93289722	10.12345833 76.84639167		L/B	Kunjiar	15.00	-	-	-	-	-	-	-	-	-	-	-
14	0.00	9.50	10.076229 76.823466	10.1253 76.81920000		L/B	Mamala Thodu	9.50	-	2	-	-	-	-	-	-	-	-	-
15	0.00	3.01	10.153222 76.813008	10.162126 76.788801		R/B	Vellaramakuthu thodu	3.01	3	11	-	-	-	-	-	-	-	-	-
16	0.00	2.19	10.08683100 76.83535700	10.09138100 76.82084400		R/B	Elamblassery thodu	2.19	2	3	1	-	-	-	-	-	-	-	-
17	0.00	1.32	10.09891200 76.80228100	10.09494800 76.81298800		L/B	Cheriya thodu	1.32	-	1	-	-	-	-	-	-	-	-	-
18	0.00	0.267	10.08820000 76.83510000	10.08683100 76.83535700		L/B	Kaithodu to Elamblassery thodu	0.27	1	1	-	-	-	-	-	-	-	-	-
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km																			
1	179550	209550	Bhoothathankettu	Kalady Bridge	River		Periyar	30.00	3	3		7	2103410.53 m3						
2	0	12800	Forest	Periyar River	Tributary	R/B	Thundam Thodu	12.80		2									
3	0	3560	Forest	Periyar River	Tributary	R/B	Illithodu	3.56		2									
4	0	3835	Kottamam	Periyar River	Tributary	R/B	Pallupetta Thodu	3.835	1	1	1								
5	0	415	Manjapra	Manjapra	Tributary	R/B	Mukkadai Thodu-1st order,Left	0.415		2									
5	0	15108	Ayyampuzha	Periyar River	Tributary	R/B	Mukkadai Thodu-2nd order	15.108	11	9			2139m3						
6	0	7290	Meykappala	Periyar River	Tributary	L/B	Krariyeli Thodu-2nd order	7.29	5	6	1		155m3		1				
	0	2740	Forest	Meykappala			Krariyeli Thodu-1st order ,Left	2.74	2	2									

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
	0	1930	Kanichattupara	Meykappala			Krariyeli Thodu-1st order ,Right	1.93		2									
7	0	7775	Nedungapra	Periyar River	Tributary	L/B	Thottuva Thodu	7.775	5	1			9249.50m3						
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km																			
1	209.55	230.13	Kalady	Aluva	Periyar			20.58	9	Nil	Nil	4	984447	Nil	1	Nil	Nil	30870	
2	0	1.56	Vallom	Chelamattom	Tributary	L/B	Ovunkal Thodu	1.56	3	Nil	Nil	Nil	4760	Nil		Nil	Nil	1560	
3	0	21.78	Vallom	Vazhakkulam	Tributary	L/B	Vallam Thodu	21.78	12	2	Nil	Nil	13864	Nil	Nil	Nil	Nil	32670	
4	0	5.84	Marampally	Marampally	Tributary	L/B	Kunnuvazhi Thodu	5.84	4	1	Nil	1	156400	Nil	Nil	Nil	Nil	7300	
5	0	3.74	Marampally	Marampally	Tributary	L/B	Marampilly Thodu	3.74	4	1	Nil	Nil	8832.5	Nil	Nil	Nil	Nil	3740	
6	0	2.07	Chalakkal	Chalakkal	Tributary	L/B	Chalackal Thodu	2.07	5	Nil	Nil	Nil	2688	Nil	Nil	Nil	Nil	1552.5	
7	0	8.07	Thottumugham	Keezhmadu	Tributary	L/B	Moonukaiyyani Thuruthi Thodu	8.07	11	1	Nil	Nil	32870	Nil	Nil	Nil	Nil	10087.5	
8	0	5.05	Kanjoor	Nedumbassery	Tributary	R/B	Chengal Thodu from coast guard to Periyar	5.05	5	3	Nil	Nil	42750	Nil	Nil	Nil	Nil	31562.5	
9	0	3.75	Chengal	Nedumbassery	Tributary of Chengal Thodu		Udumbuzha Thodu	3.75	4	Nil	Nil	Nil	17355	Nil	Nil	Nil	Nil	11250	
10	0	4.37	Kaprassery	Desom	Tributary of Chengal Thodu		Kuzhippallam Thodu	4.37	5	Nil	2	Nil	67500	Nil	Nil	Nil	Nil	16387.5	
11	0	14.5	Desom	Kanjoor	Tributary of Chengal Thodu		Chengal Diversion Thodu and Chengal Thodu	14.5	7	1	Nil	Nil	211400	Nil	Nil	Nil	Nil	90625	
12	0	4.6	Kanjoor	Kanjoor	Tributary	R/B	Kanjoor Thodu	4.6	8	Nil	Nil	Nil	13454	Nil	Nil	Nil	Nil	9200	
13	0	2.25	Sreemoolanagaram	Muply	Tributary	R/B	Thondikadavu Thodu	2.25	5	Nil	Nil	Nil	4375	Nil	Nil	Nil	Nil	1968.75	
14	0	4.5	Thuruth	Chowara	Tributary	R/B	Thumba Thodu	4.5	3	2	Nil	Nil	85920	Nil	Nil	Nil	Nil	45000	
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA																			
1	Marthandavarmma	varappuzha(muttar stretch)					**Muttar stretch**	17.29	9	2	0	4	709960	0	3	0	0	through out the stretch	
						L/B	Vaduvathodu	940	4	0	0	0	2350	1	0				
						L/B	Idamula Thodu	374	1	0	0	0	2805	0	0				

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
						L/B	Thumbungal thodu	6290	7	1	0	0	40885	0	0				
						L/B	Thumbungal thodu	870	2	0	0	0	2610	0	0				
						L/B	Edapally thodu	10200	13	3	0	0	61200	7	0				
						L/B	Kattukandathil thodu	1130	2	0	0	0	2260	0	0				
						L/B	Kattukandathil thodu	750	3	0	0		1500	0	0				
						R/B	Unthithodu	2380	8	0	0	0	9520	0	0				
2	Marthand avarmma	varappuzha(Varattar stretch)			Main		**Varattar stretch**	14360	6	1	0	1	1764949.3	1	9	0	0	through out the stretch	
						L/B	Kolavelippadam thodu	505	0	0	0	0	213	0	0				
						R/B	Vembala Thodu	1570	0	3	0	0	1962.70	0	0				
						R/B	Kachappilly thodu	346	0	4	0	0	94.245	0	0				
						R/B	Punathil thodu	1284	0	0	0	0	95.68	0	0				
						L/B	Panachi Thodu	1650	0	5	0	0	3978.8	1	0				
						R/B	Varappuzha thodu	1284	3	2	0	0	11313	0	0				
						R/B	Karuka thode	360	0	0	0	0	9155	0	0				
						R/B	Kakkunni Methanam thode	2435	1	2	2	0	97952	0	0				
						R/B	Manavala thode	310	0	1	0	0	6982	0	0				
						R/B	Karipuzha angadikadavu thode	3920	0	6	5	0	67849.89	0	0				
						R/B	Ongi thode	6550	4	10	14	1	323779	1	0				
						R/B	Pazhamthode	1370	1	7	5	0	15713.5	0	0				
						R/B	Plackattumpilli Chirayam thode	1280	1	3	3	0	19756	1	0				
						R/B	Periyar to Periyar thode	6550	6	7	7	0	265690	6	0				

Sl No	Main/LB/ RB	No: L/B or R/B	Chainage		Location		Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
			From	To	From	To													
3	Varappuzha	Vaduthala (Vaduthala Stretch)			Main		Vaduthala Stretch	800	2	15	0	0	2500000	0	0				
						L/B	Kolarikkal Thodu	1800	3	0	0	0	20250	0	0				
						R/B	Kandanadu Thodu	500	2	0	0	0	2500	0	0				
						L/B	Kothad Thodu	900	2	0	0	0	5400	0	0				
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH																			
							PERIYAR FROM ALUVA MANAPPURAM TO MUNAMBAM	27.47Km	9	Nil	Nil	Nil	3659388	5	Nil	Nil	Nil	50950	_
						L/B		68.738km	40	35	Nil	Nil	459696.4	4	Nil	Nil	Nil	_	_
						R/B		190.96km	35	25	Nil	Nil	3096079	7	Nil	Nil	Nil	_	_

ABSTRACT DETAILS

CONSOLIDATED DETAILS REGARDING PERIYAR BASIN STUDY														
Main/LB /RB	No: L/B or R/B	Name of River/ Tributary	Total Length	No: of Bridges	No: of Other structures	No: of Damaged structures	No: of Drinking water Pump houses	Approx. Qty of Sedimentation in m3	No: of Domestic waste deposit points	No of : Industrial waste deposit points	No; of Major Dams	No : of Private Hydroelectric projects	Area of Thick Vegetation (m2)	No of : Flood plain Area
REACH I - FROM ORIGIN TO KARIMANAL BRIDGE - CH: 0.00m TO 154.40 Km														
Main		Periyar	154.4	20	6	4	4	476278.2	2	0	3	0	31111.63	2
L/B	35		241.637	107	90	10	7	92781.4	30	0	4	2	6759	0
R/B	54		66.156	221	265	7	13	382930	40	1	6	0	22205	5
REACH II - FROM KARIMANAL BRIDGE TO BHOOTHATHANKETTU BARRAGE - CH: 154.40 Km TO 179.550 Km														
Main			0	0	0	0	0	0	0	0	0	0	0	0
L/B	12		119.68	13	24	1	1	34852.1	0	0	0	1	0	0
R/B	7		37.26	15	1	0	0	1708	0	0	0	0	0	0
REACH III - FROM BHOOTHATHANKETTU BARRAGE TO KALADY BRIDGE - CH: 179.550 Km TO 209.550 Km														
Main		Periyar	30	3	3	0	7	2103410.53	0	0	0	0	0	0
L/B	2		19.735	12	11	1		9404.5	0	1	0	0	0	0
R/B	5		35.72	12	16	1		2139	0	0	0	0	0	0
REACH IV - FROM KALADY BRIDGE TO MARTHANDAVARMA BRIDGE - CH: 209.550 Km TO 230.13 Km														
Main		Periyar	20.58	9	0	0	4	984447	0	1	0	0	30870	0
L/B	6		43.06	39	5	0	1	219414.5	0	0	0	0	56910	0
R/B	7		39.02	37	6	2	0	442754	0	0	0	0	205993.75	0
REACH V - FROM MARTHANDAVARMA BRIDGE TO VADUTHALA														
Main		Periyar	32.45	17	18	0	5	4990580.53	1	12	0	0	0	12
L/B			25.409	37	9	0	0	143921.8	9	0	0	0	0	0
R/B			30.139	26	45	36	1	832363.293	8	0	0	0	0	1
REACH VI - FROM MARTHANDAVARMA BRIDGE TO MUNAMBAM - MANGALAPPUZHA BRANCH														
Main		Periyar	27.47	9	0	0	0	3587344	5	0	0	0	50950	0
L/B	1		68.738	40	35	0	0	524031	4	0	0	0	0	0
R/B	1		190.96	35	25	0	0	3096079	7	0	0	0	0	0
ALL REACH TOGETHER														
Main		**Periyar**	**264.90**	**71**	**51**	**5**		12241246.86	**8**	**13**	**3**	**1**	**112931.63**	**14**
L/B	**56**		**518.26**	**250**	**151**	**11**	**8**	**926926.60**	**43**	**1**	**4**	**2**	**63669.00**	**0**
R/B	**74**		**399.26**	**346**	**358**	**46**	**14**	**4757973.29**	**55**	**1**	**6**	**0**	**228198.75**	**6**
TOTAL			**1182.41**	**667.00**	**560.00**	**62.00**	**43.00**	**17926146.75**	**106.00**	**15.00**	**13.00**	**3.00**	**404799.38**	**20.00**