Volume II

Sand Auditing Report

Govt. of Kerala

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Sand Auditing Report

Pamba River

(videG.O.(Ms) No. 161/12/RD dt.21-04-2012)

Govt. of Kerala

Submitted by

Consultancy Group for Research and Forecasting (C-Graf)
Department of Futures Studies
University of Kerala
Kariavattom, Trivandrum 695 581

December, 2014

Sand Auditing Report

Submitted to

Department of Revenue and Disaster Management

Government of Kerala

Govt. of Kerala

Consultancy Group for Research and Forecasting (C-Graf)
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Sand Auditing Report

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Chapter 1

Introduction

1.0 River Health – A global concern

Globalisation has led to rapid development in infrastructure in recent years. The spurt of growth in construction industry has led to an increased demand for river sand as a source of construction material. This demand has in turn led to indiscriminate sand mining activities and has become a problem of global concern.

The unscientific, thoughtless and aggressive mining of sand has given rise to serious problems. This include river bank erosion, caving of embankments, river bed degradation, river buffer zone encroachment, deteriorating water quality, drop in underground water table, acute drinking water shortage etc. Very often, mining crosses the threshold limit and this jeopardises the health of the river and causes environmental disasters. Kerala, the southernmost state of India is also feeling the heat of this global phenomenon.

1.1 Rivers of Kerala

There are 44 rivers in Kerala, all but three originating in the Western Ghats.] 41 of them flow westward and 3 eastward. The rivers of Kerala are small, in terms of length, breadth and water discharge. The rivers flow faster, owing to the hilly terrain and as the short distance between the Western Ghats and the sea. All the rivers are entirely monsoon-fed and many of them shrink into rivulets or dry up completely during summer.All of these rivers have had major influences on the political and cultural life of the people from pre-historic times. Many centers of civilization and learning flourished around river basins. Much later, even during foreign colonisation of the region, we find that all of their settlements were along river coasts. Due to the mountainous terrain and undeveloped surface transport, majority of trade happened through the waterways. With a natural abundance of inland waterways, most of the commercial towns started on the banks of one of these rivers. Thus we find that all notable towns in Kerala are situated on the bank of one of these rivers.

1.2 Role of Revenue Department in River Bank Mapping and Sand Auditing

To address the issues connected with river health, the Department of Revenue and Disaster Management of Government of Kerala had embarked to formulate scientific studies to generate data on the mineable sand in the river. This is also in tune with the Kerala Protection of River Banks and Regulation of Removal of Sand Act, 2002. With all these factors in reckoning, the Department had decided to undertake sand auditing and mapping of rivers and river banks so as to determine the immediate threats faced by rivers and river banks and to assess the amount of extractable sand from the rivers without detrimentally affecting the existence of rivers.

1.3 About the River Pamba

The Pamba river is the third longest river in the state of Kerala after Periyar and Bharathappuzha and the longest river in the erstwhile princely state of Travancore. Sabarimala temple dedicated to Lord Ayyappa is located on the banks of the river Pamba. Sabarimala temple dedicated to Lord Ayyappa is located on the banks of the river Pamba. River Pamba is considered as the Dakshina Ganga due to its association with Kerala's Largest Pilgrim Centre - Sabarimala. The river is also known as 'Dakshina Bhageerathi'.

The Pamba is the third longest river in Kerala. It is formed by the confluence of Pamba Ar, Kakki Ar, Arudai Ar, Kakkad Ar and Kall Ar. The Pamba Ar in turn is formed by several streams having their origin in the Pullichimalai, Nagamalai and Sundaramalai in the Peermade plateau at an altitude of +1650 m. The river flows through Ranni, Kozhenchery, Thiruvalla, Chengannur, Kuttanad, Karthikapally, and Ambalappuzha Taluks and finally empties into the Vembanad Lake. This river enriches Pathanamthitta, Alappuzha districts of Kerala state. Kuttanad, an important rice cultivating area in Kerala gets the irrigation water from the Pamba river.

The river flows downwards in a north-westerly direction till it receives some more streams from Maruvattapara Malai. It then flows in southwesterly direction till its confluence with Kakki Ar. The Pamba after receiving Kakki Ar flows in a westerly direction till Arudai Ar joins it near Udumpara Malai. The river then flows in a southwesterly direction till Ponachi and in southeasterly course until the Kakkad Ar joins the river near Perunad. The river then flows in a southern direction upto Vadasserikkara where it is joined by the Kall Ar. It then flows in northwest upto Panni before taking southwestern course. The river is known as Panni Ar here. The river flows in western course upto Kuriannur and in southern direction upto Kozhencherry and takes a westerly direction upto Pandanad. The river splits into two branches near Pandanad. One branch flows in southwesterly direction and is joined by a branch of Achankovil River. The Manimala River joins the Pamba near Nirettupuram. The river thereafter flows northward and falls into Vembanad lake.

1.3.1 Map of Pamba river

1.3.2 Table of basic data

Districts through which the river flows	Pathanamthitta, Idukki, Alleppey
Origin– Starting point	Pulichimalai Hill, Peerumedu
Outlet – Ending point	Vembanad Lake
Study area – Starting point	Athikkayam bridge
Study area – Ending point	Viyapuram bridge
Basin area	2235 sq km
Length of main stream	176 km
Main geological features	Charnockites with narrow bands of pyroxenegranulities, magnetite, magnetitequartz rock; granulatic in texture and colour varies from bluish to dark
Main tributaries	Kakkiyar,Azhuthayar,Kakkattar,Kallar, Pambi,Pambiar
Hydro electric projects	Sabarigiri, Sabarigiri Augmentation, Kakkad
Dams	Kakki, Anthodu, Pamba, Upper Moozhiyar, Gavi, Kallar, Meenar I, Meenar II, Veluthodu, Moozhiyar
Irrigation Projects	Maniyar
Average annual rainfall	3600 mm
Average annual stream flow	3423.7 Mm3
Taluks	Ranni, Kozhenchery, Thiruvalla, Chenganur, Karthikapally, Ambalapuzha
Panchayats	Athikayam, Ranni- Perinad, Vadaserikkara, Ranni, Ranni-Pazhayangadi, Ranni-Angadi, Ayroor, Cherukolpuzha, Mallapuzhaseri, Thottapuzhaseri, Kozhenchery, Aranmula, Koipuram, Thriuvanvandoor, Pandanad, Bhudanoor, Mannar, Niranam, Viyapuram, Kadapra
Source	http://www.kerenvis.nic.in/; http://nwda.gov.in/

1.3.3 Geographical Information

The river Pamba rises at an altitude of 1650 m in the Peermade Plateau in the Idukki district of Kerala and after traversing a distance of 176 km joins the Arabian Sea branching into a number of channels. The basin extends over an area of 2235 km2. The entire catchment area lies in Kerala state. The basin is bounded on the east by Western Ghats and on the west by Arabian Sea.

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Chapter II

Sand auditing

2.0 Objectives

The most important objectives of the study are

- To minimize the negative impacts of sand mining
- To create/generate profiles throughout the stretch of the river at regular intervals
- To quantify the optimum mineable sand
- To maximize the health and functions of the river

2.1 Sand – The fine aggregate

Sand is weathered particle formed from igneous, metamorphic and sedimentary rocks. With the increase in constructional activity demand for sand is also increasing day after day. Among many other natural sources of sand, river sand is widely used for construction activities. As river sand can be used straightaway without any kind of processing, it is indiscriminately exploited by mankind. This kind of senseless mining from rivers is affecting river health, more importantly, causing irreparable damage to the environment.

The in-channel and near channel mining of sand inevitably alters the sediment budget of the river, in addition to considerably changing the channel hydraulics (Bull and Scott 1974; Erskine et. al, 1985)and productivity of the system (UNEP 1990). Degradation of river environment due to sand mining could lead to serious environmental hazards including habitat transformations, biodiversity alterations and damage to civil construction structures attached to the river environment (FAO 1998).

2.2 River Sand Mining – Environmental issues

Sand and gravel are extracted from river channels for different purposes and for a variety of reasons (a) for improving navigation, (b) for developing agricultural drainage systems (c) for regulating flood (d) for the production of aggregate materials and so forth. Extraction of these materials for aggregates is the largest mining industry not only in terms of quantity but also in terms of revenue (Kondolf et al 2002). .

Excessive instream sand and gravel mining causes the degradation of rivers. Instream mining lowers the stream bottom , which eventually erodes the bank. Depletion of sand in the stream bed and along coastal areas causes the deepening of rivers and estuaries and the enlargement of river mouths and coastal inlets. It may also lead to saline water intrusion. The effect of mining is compounded when the sea level rises.

Indiscriminate and excessive mining weakens the bridge piers, threatens the bridge, river banks and nearby structures. Sand mining also affects the adjoining ground water system.

Instream mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology. Impacts include bed degradation, bed coarsening, lowered water tables near the streambed and channel instability.

2.2.1 Riparian Habitat, Flora and Fauna

Instream mining can have other costly effects beyond the immediate mine sites. Many hectares of fertile streamside land are lost annually, as well as valuable timber resources and wildlife habitats in the riparian areas. Degraded stream habitats result in loss of fisheries productivity, biodiversity, and recreational potential.

The most important effects of instream sand mining on aquatic habitats are bed degradation and sedimentation, which can have substantial negative effects on aquatic life. The stability of sand-bed and gravel-bed streams depends on a delicate balance between streamflow, sediment supplied from the watershed, and channel form. Mining-induced changes in sediment supply and channel form disrupt channel and habitat development processes. Furthermore, movement of unstable substrates results in downstream sedimentation of habitats. The affected distance depends on the intensity of mining, particles sizes, stream flows, and channel morphology.

The complete removal of vegetation and destruction of the soil profile destroys habitat both above and below the ground as well as within the aquatic ecosystem, resulting in the reduction in faunal populations.

Channel widening causes shallowing of the streambed, producing braided flow or subsurface intergravel flow in riffle areas, hindering movement of fishes between pools. Channel reaches become more uniformly shallow as deep pools fill with gravel and other sediments, reducing habitat complexity, riffle-pool structure, and numbers of large predatory fishes.

2.2.2 Stability of Structures

Sand-and-gravel mining in stream channels can damage public and private property. Channel incision caused by gravel mining can undermine bridge piers and expose buried pipelines and other infrastructure.

Several studies have documented the bed degradation caused by the two general forms of instream mining: (1) pit excavation and (2) bar skimming. Bed degradation, also known as channel incision, occurs through two primary processes: (1) headcutting, and (2)"hungry" water. In headcutting, excavation of a mining pit in the active channel lowers the stream bed, creating a nick point that locally steepens channel slope and increases flow energy. During high flows, a nick point becomes a location of bed erosion that gradually moves upstream (Fig. 1).

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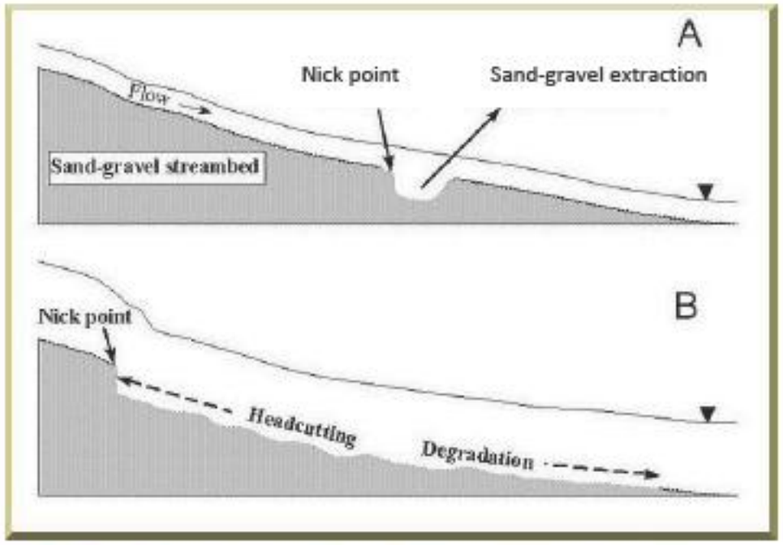

Fig. 1 Diagram of sand-and-gravel stream bed showing (A) the nick point that develops with a pit excavation, and (B) the upstream head cutting and downstream bed degradation that develop during high flows.

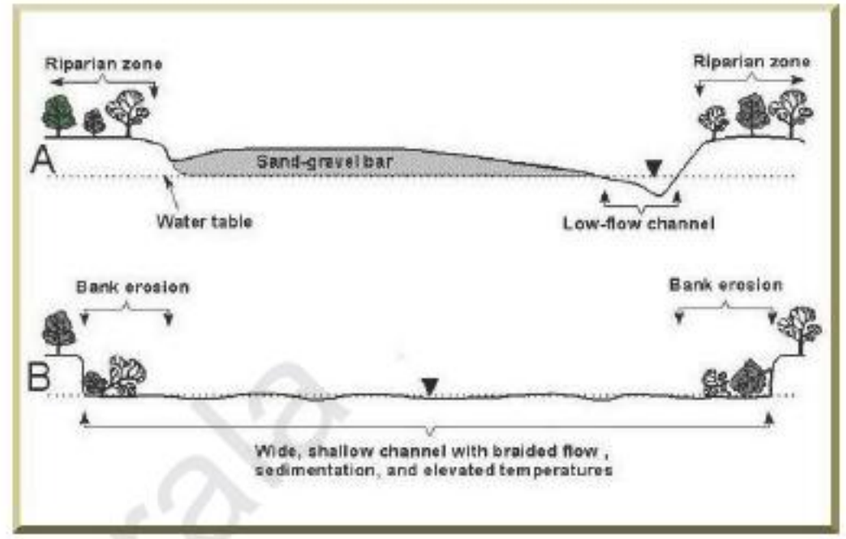

Fig. 2 Diagram of channel cross sections showing (A) a typical sand-gravel bar in relation to the low-flow channel, riparian zone and water table, and (B) the wide shallow channel that results from unrestricted mining and that is characterized by bank erosion, braided flow, sedimentation, and increased water temperatures.

Headcutting mobilizes substantial quantities of streambed sediments which are then transported downstream to deposit in the excavated area and locations further downstream. In gravel-rich streams, effects downstream of mining sites may be short-lived when mining ends, because the balance between sediment input and transport at a site can reestablish itself relatively quickly. Effects in gravel-poor streams may develop rapidly and persist for many years after mining has finished. Regardless of downstream effects, headcutting in both gravel-rich and gravel-poor streams remains a major concern. Headcuts often move long distances upstream and into tributaries, in some watersheds moving as far as the headwaters or until Halted by geologic controls or man-made structures.

Channel incision not only causes vertical instability in the channel bed, but also causes lateral instability in the form of accelerated stream bank erosion and channel widening. Incision increases stream bank heights, resulting in bank failure when the mechanical properties of the bank material cannot sustain the material weight. Channel widening causes shallowing of the streambed (Fig. 2) as deep pools fill with gravel and other sediments.

Shallowing and widening of the channel also increases stream temperature extremes, and channel instability increases transport of sediments downstream. Mining-induced bed degradation and other channel changes may not develop for several years until major channel-adjustment flows occur, and adjustments may continue long after extraction has ended.

2.2.3 Groundwater

Apart from threatening bridges, sand mining transforms the riverbeds into large and deep pits; as a result, the groundwater table drops leaving the drinking water wells on the embankments of these rivers dry. Bed degradation from instream mining lowers the elevation of streamflow and the floodplain water table which in turn can eliminate water table-dependent woody vegetation in riparian areas, and decrease wetted periods in riparian wetlands.

2.2.4 Water Quality

Instream sand mining activities will have an impact upon the river's water quality. Impacts include increased short-term turbidity at the mining site due to resuspension of sediment, sedimentation due to stockpiling and dumping of excess mining materials and organic particulate matter, and oil spills or leakage from excavation machinery and transportation vehicles.

Increased riverbed and bank erosion increases suspended solids in the water at the excavation site and downstream. Suspended solids may adversely affect water users and aquatic ecosystems. The impact is particularly significant if water users downstream of the site are abstracting water for domestic use. Suspended solids can significantly increase water treatment costs.

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Chapter 3

Methodology

3.0 Methodology proper

The study is carried out in three phases, namely

Phase I -	Resource estimation -	A realistic estimation of the sand resource in a given stretch
Phase II -	Resource allocation -	Sustainable level of sand mining
Phase III-	Performance evaluation -	Evaluation of the performance of mining activities during the period of auditing

3.1 Resource estimation - Phase I

- The river channel is divided into segments based on natural and administrative considerations.
- Natural means identification of the segment ofriver channel where sand deposits are likely to be seen. Swift flowing mountainous segments, segments with continuous rocky bottom and segments where the width is less than permissible levels are excluded. The segments of the stream with significant tidal influence are avoided to prevent saline water ingress.
- Estimation of the sand resource in the river channel using suitable methods –pitting, coring and spiking
- A profile is taken across the river at an interval of two times the width of the river or 500 m, which-ever is less using autolevel.
- Readings are taken from one edge and progresses to the next point that is 20m away; this process continues till it reaches at the other end. Whenever there is an abrupt change in profile, readings are taken at closer intervals.
- A permanent identifiable landmark is identified from which water level is measured during summer time.
- Thethickness of sand bed up to 2 m depth from the summer level is obtained at each point by pitting, coring or spiking.
- A longitudinal cross-section is then prepared

3.2 Resource estimation – Phase II

- Estimation of mineable quantity of sand in the river channel. *Mineable quantity of sand means the resource up to a specific depth say less than 2 m from the summer water level.*
- Each profile has a zone of influence of 500 m or twice the width of river as the case may be.
- Estimate the volume of sand up to 2 m from the water level in the river during lean flow for each segment (multiply the cross sectional area of sand in each profile with the width of influence). Add up the segments gives the resource for the entire river/Panchayat.
- If the variation in the volume of sand between adjacent profiles is more than 50 %, profiles have to be taken in between.
- Deduct the sand deposit available in prohibited areas.

3.2.1 Prohibited areas

- Areas mentioned in the Act **(Kerala Protection of river banks and regulation of removal of sand act, 2001)**
- Notified biological hot spots & sensitive areas
- Reaches with placers and other economic minerals
- River reaches critically affected by bank sliding/slumping/bank erosion
- Any other reach that need protection as decided by experts

3.3 Resource Allocation

- Estimate the quantity of sand that can be mined in a year by dividing the total mineable sand in the segment by the number of years mining can be permitted in the river. This is to be fixed by taking into account the status of the river environment; tentatively fixed as 20 years
- The figure so arrived is in cubic metres. This is to be converted into number of lorry loads by applying the conversion factor.
- The total quantity of sand that can be exploited from a given segment in a year is now known. This is to be divided by the number of days during which mining can be permitted. For this purpose the period of mining should be clearly defined. There should be ban on mining activity during the monsoon period.

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3.4 Salient features

3.4.1 Available sand

The total Available sand is **9,79,280 cu.m.** The details are depicted in the following tables

Table No:I
Sand availability in each profile- Volume I(Cherukolpuzha to Athikayam)

Sl No	Profile No	Cross sectional Area (sq.m)	Zone of Influence (m)	Total Volume of sand(cu.m.)	Exceptional Area Details	Volume of sand above SWL (cu.m.)	Total Available sand upto 2 m of SWL (cu.m.)
1	1	123.00	150.00	18450.00		3249.000	16017.000
2	2	141.48	150.00	21222.00		4456.500	17677.500
3	3	129.62	150.00	19443.00		2968.500	18273.000
4	4	184.18	131.25	24173.63	Within the limit of 500 mtr from bridge	0.000	0.000
5	5	298.98	150.00	44847.00	Within the limit of 500 mtr from bridge	0.000	0.000
6	6	185.00	187.50	34687.50	Within the limit of 500 mtr from bridge	0.000	0.000
7	7	136.04	156.25	21256.25	Within the limit of 500 mtr from bridge	0.000	0.000
8	8	193.54	143.75	27821.38	Within the limit of 500 mtr from bridge	0.000	0.000
9	9	173.00	156.25	27031.25		0.000	23239.060
10	10	173.00	118.75	20543.75		0.000	17661.690
11	11	0.00	93.75	0.00		0.000	0.000
12	12	203.55	156.25	31804.69		0.000	25067.190
13	13	132.78	175.00	23236.50		0.000	18089.750
14	14	170.00	162.50	27625.00		0.000	25652.250
15	15	195.42	175.00	34198.50		0.000	27205.500
16	16	156.08	137.50	21461.00		1731.125	20895.880
17	17	206.02	118.75	24464.88		2814.375	23443.630
18	18	210.21	168.75	35472.94		190.688	21736.690
19	19	190.66	156.25	29790.63		1142.188	27460.940
20	20	195.00	125.00	24375.00		4225.000	21442.500
21	21	98.33	131.25	12905.81		0.000	10641.750
22	22	129.85	162.50	21100.63		1280.500	17517.500
23	23	133.16	175.00	23303.00		1947.750	20650.000
24	24	126.25	150.00	18937.50		0.000	17065.500
25	25	81.75	150.00	12262.50		5631.000	11926.500
26	26	88.50	150.00	13275.00		2422.500	13275.000
27	27	204.70	162.50	33263.75		10569.000	28925.000
28	28	181.00	187.50	33937.50	Within the limit of 500 mtr from bridge	0.000	0.000
29	29	120.00	225.00	27000.00	Within the limit of 500 mtr from bridge	0.000	0.000
30	30	156.20	175.00	27335.00	Within the limit of 500 mtr from bridge	0.000	0.000
31	31	128.00	137.50	17600.00	Within the limit of 500 mtr from bridge	0.000	0.000
32	32	115.59	175.00	20228.25	Within the limit of 500 mtr from bridge	0.000	0.000
33	33	104.38	181.25	18918.88		1993.750	15480.560
34	34	156.22	162.50	25385.75		4723.875	21329.750
35	35	163.61	137.50	22496.38		0.000	17402.000
36	36	158.81	137.50	21836.38		4538.875	21836.380
37	37	215.44	143.75	30969.50		6382.500	29386.810
38	38	199.40	137.50	27417.50		4862.000	25759.250
39	39	158.00	143.75	22712.50		918.560	20007.130
40	40	125.06	125.00	15632.50		3817.500	14793.750
41	41	88.30	112.50	9933.75		267.750	9033.750
42	42	135.96	131.25	17844.75		1874.250	17348.630

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Sl No	Profile No	Cross sectional Area (sq.m)	Zone of Influence (m)	Total Volume of sand(cu.m.)	Exceptional Area Details	Volume of sand above SWL (cu.m.)	Total Available sand upto 2 m of SWL (cu.m.)
43	43	48.36	156.25	7556.25		592.188	7556.250
44	44	118.67	150.00	17800.50		5725.500	16381.500
45	45	151.60	112.50	17055.00		0.000	14536.130
46	46	91.36	112.50	10278.00		3999.375	10278.000
47	47	82.00	112.50	9225.00		0.000	9225.000
48	48	82.00	106.25	8712.50		0.000	8712.500
49	49	100.00	137.50	13750.00		0.000	8089.130
50	50	85.00	143.75	12218.75		2716.880	12218.750
51	51	96.63	125.00	12078.75		657.500	10010.000
52	52	19.05	125.00	2381.25		0.000	2381.250
53	53	20.00	143.75	2875.00		0.000	2875.000
54	54	118.29	150.00	17743.50		2281.500	17743.500
55	55	60.73	125.00	7591.25		0.000	7591.250
56	56	110.54	93.75	10363.13	Within the limit of 500 mtr from bridge	0.000	0.000
57	57	81.00	112.50	9112.50	Within the limit of 500 mtr from bridge	0.000	0.000
TOTAL		7731.30	8262.50	1144943.11		87980.129	743840.100
Sand availability in each profile- Volume II (Cherukolpuzha to Viyapuram)							
1	1	295.93	231.25	68433.81	Within the limit of 500 mtr from bridge	0.000	0.000
2	2	153.44	209.25	32107.32	Within the limit of 500 mtr from bridge	0.000	0.000
3	3	236.27	178.00	42056.06	Within the limit of 500 mtr from bridge	0.000	0.000
4	4	185.07	172.00	31832.04		2094.960	31546.520
5	5	50.00	140.75	7037.50		0.000	7037.500
6	6	208.33	118.75	24739.19		0.000	19755.250

Sl No	Profile No	Cross sectional Area (sq.m)	Zone of Influence (m)	Total Volume of sand(cu.m.)	Exceptional Area Details	Volume of sand above SWL (cu.m.)	Total Available sand upto 2 m of SWL (cu.m.)
7	7	216.54	137.50	29774.25		6209.500	26296.880
8	8	166.34	165.63	27550.89		0.000	4962.130
9	9	120.00	150.00	18000.00		3894.000	16875.000
10	10	225.46	112.75	25420.62		7689.550	23143.070
11	11	190.00	115.50	21945.00		10062.360	19729.710
12	12	157.22	146.75	23072.04		1904.815	19183.160
13	13	137.16	171.88	23575.06		4527.188	21226.560
14	14	136.03	150.00	20404.50		2395.500	10302.000
15	18	130.00	215.00	27950.00	Within the limit of 500 mtr from bridge	0.000	0.000
16	22	213.00	162.75	34665.75		1813.035	10152.350
17	24	91.33	181.50	16576.40		0.000	2619.050
18	27	102.66	220.25	22610.87		0.000	22610.870
TOTAL		2718.85	2748.26	429317.49		40590.908	235440.050
Total volume of mineable sand (vol1 + vol2) =(743840 + 235440)							9,79,280

Finally, the volume of sand available with each panchayat for distribution is given below

Table No :II
Panchayat wise mineable sand

SL No	Name of Panchayat	Total Available sand upto 2 m of SWL (cu.m.)	Volume of sand above SWL (cu.m.)
1	Cherukolpuzha	157252.000	10388.69
2	Ranni	142194.440	23680.91
3	Vadaserikkara	156860.640	19889.82
4	Kozhenchery	100028.890	19388.69

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SL No	Name of Panchayat	Total Available sand upto 2 m of SWL (cu.m.)	Volume of sand above SWL (cu.m.)
5	Mallapuzhassery	6385.700	906.52
6	Aranmula	11305.435	No Sand
7	Ayirur	186421.800	11436.17
8	Angadi	62420.030	11922.255
9	Pazhayangadi	67860.660	10712.90
10	Thottapuzhassery	88550.390	20245.08
	Total mineable sand	**9,79,280**	**1,28,571**

3.4.2. Environmental Issues

The following environmental issues were found during the study

1. Waste deposit
2. Illegal sand mining and Sand erosion
3. Encroachment of streams
4. Encroachment of river

3.4.2.1 Waste deposit

Almost all the small canals (brook) converging on to Pamba river carry with them huge quantities of domestic waste. For instance

1. The Kozhenchery brook carries all the waste from the market
2. In sub pamba, at Mannar, huge quantities of waste are being deposited from hotels and households; it is a common sight to see people coming in cars and motor cycles and throwing waste from the bridge
3. In places like Mannar, Kozhencherry, Venganoor, Ranni and Vadaserikkara; it is seen thatthe household waste water is channelized to the river clandestinely
4. It is also a common sight to see the families residing in the river banks as well as pilgrims resort to open defecation leading to contamination of river water; the absence of toilets in their houses being the major reason This is more prominent in places like Kozhenchery, Vadaserikkara, Ranni bridge, Aranmula, Cherukolpuzha, Maramon, Poovathummoodu, Athikkayam and Mannar
5. In low lying areas of the river as well as in areas where the flow is very less, one can see huge quantities of waste piling up; this is predominant in areas near Parumala and the boundary areas of Pandanadu and Thriuvanvandur

3.4.2.2 Illegal sand mining

Indiscriminate sand mining, especially in Aranmula (near Kozhipalam) has rendered the river very deep; the depth extending to more than 6 mts resulting in soil erosion from both the banks of the river. The large scale erosion is also visible in Cherukol , Arattupuzha and Vadaserikkara. The absence of retaining walls at least in some areas has resulted in loss of land, agricultural and other infrastructural losses to some of the families.

3.4.2.3 Encroachment of brooks

In almost all the small canals, there is large scale land encroachment resulting in substantial reduction of the width of the canal. The encroachment is either for increasing the land holdings or for increasing the pathways

3.4.2.4 Encroachment of river

Throughout the length of the river, people has resorted encroachment of puramboke land mostly for agricultural purposes. For the Maramon convention, the organizers have encroached the river area and converted it into a ground with retaining walls.

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3.5 List of identifiable ghats

During the course of the study, we were able to identify the following sand ghats

Sl.No	Name of Ghat	Dimension	Segment No.	Side of river bank
1	Changayil	10 x 2 m	59	Left
2	Kidangamoozhi	8 x 4 m	69	Left
3	Madathil	20 x 4 m	102	Left
4	Chovoor	15 x 4 m	108	Right
5	Menamthottam	10 x 3 m	147	Left
6	Kizhkozhur	50 x 4 m	167	Right
7	Mukkannoor	5 x 2 m	187	Left
8	Panchayat	10 x 4 m	195	Left
9	Pump house	30 x 5 m	204	Left
10	Cherukolpuzha	20 x 4 m	218	Left
11	Thondiyil	10 x 5 m	243	Left
12	Keezhoor	20 x 4 m	250	Right
13	Madathum	10 x 3 m	262	Left
14	Maraman	25 x 4 m	289	Right
15	Anjilimoottil	30 x 4.5 m	315	Left
16	Madathum	30 x 5 m	373	Left
17	Mithramadom	20 x 3 m	438	Left

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SAND VOLUME DISTRIBUTION MAPS

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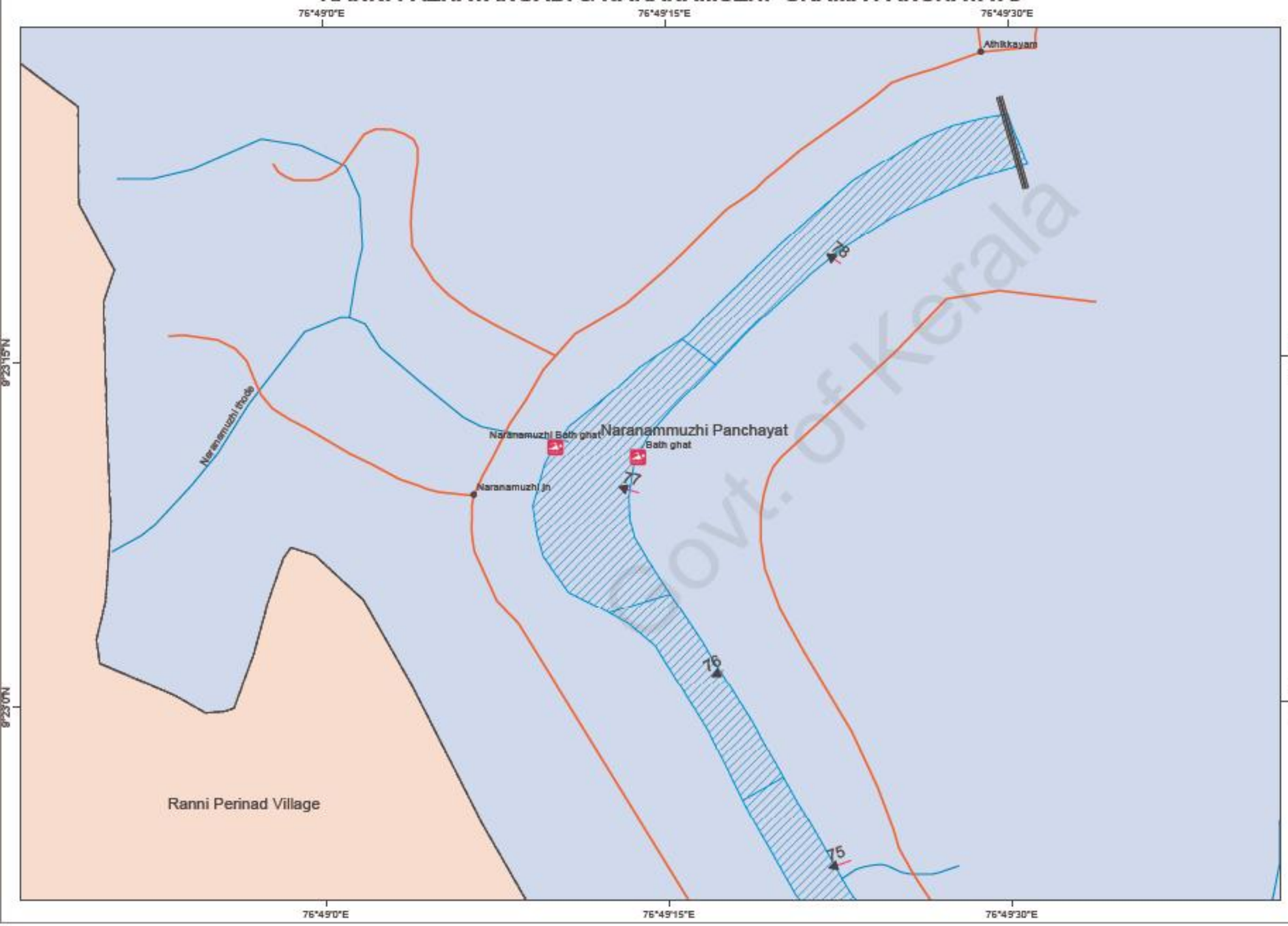
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.1

RANNI PAZHAYANGADI & NARANAMUZHI GRAMA PANCHAYATS



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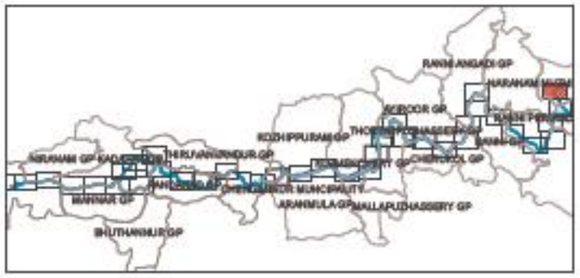
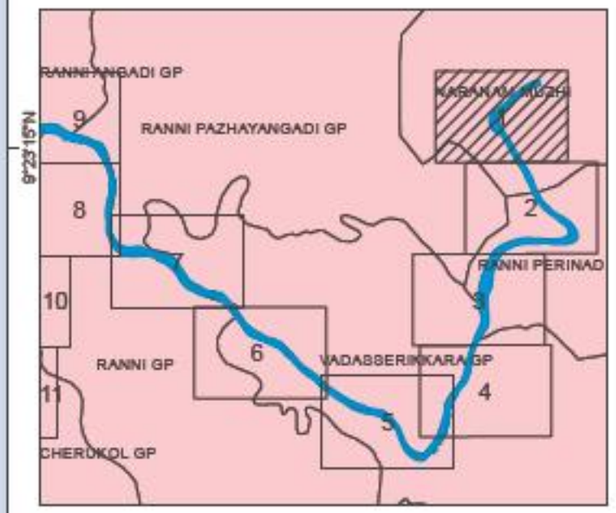




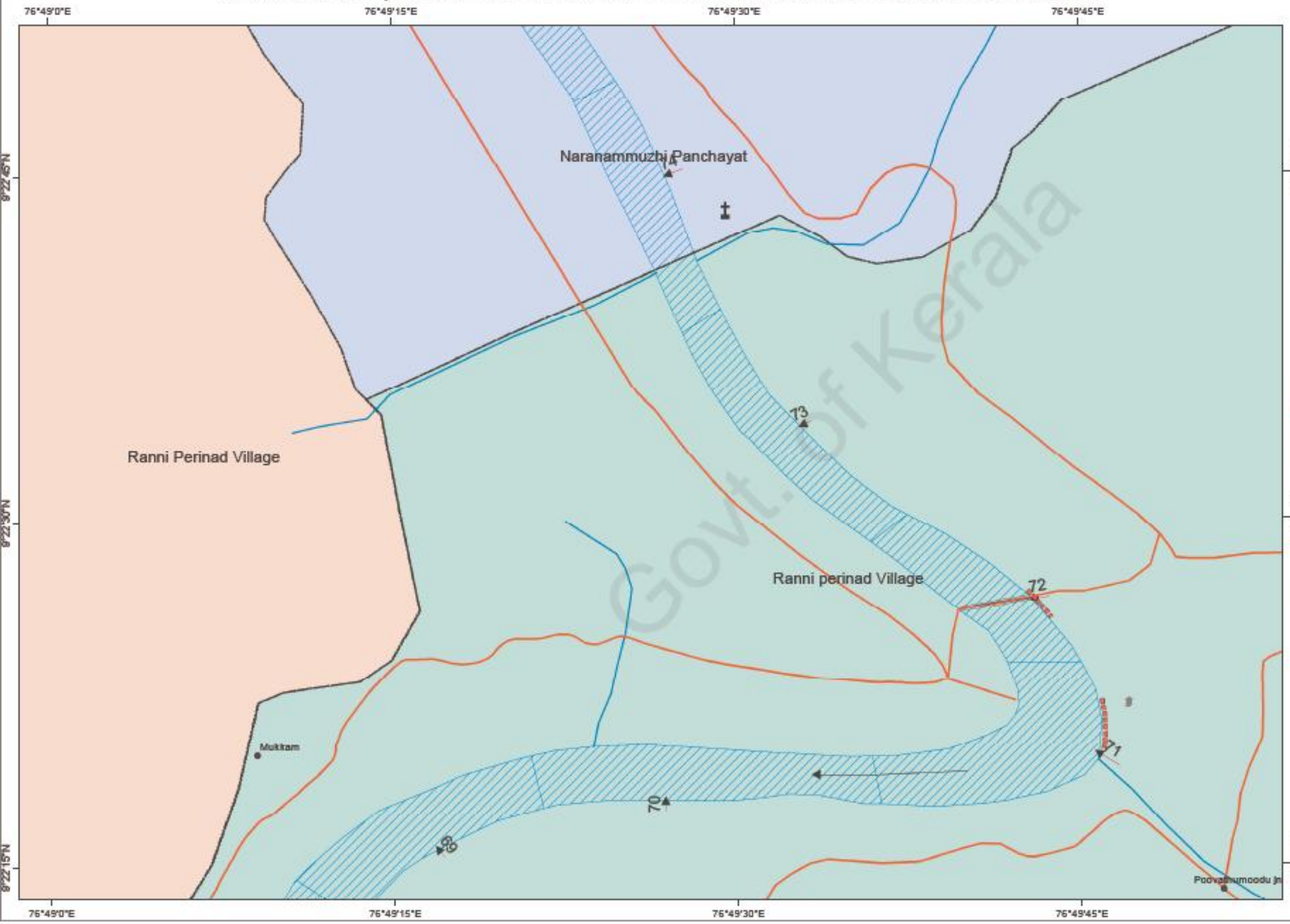
LEGEND

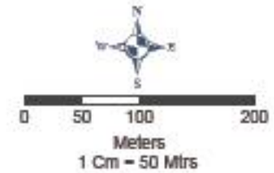
- No sand deposit
- Profile
- Bathghat
- Bridge
- Road
- Tributaries / Streams
- Village Boundary
- Naranamuzhi Panchayat
- Ranni pazhayangadi Panchayat

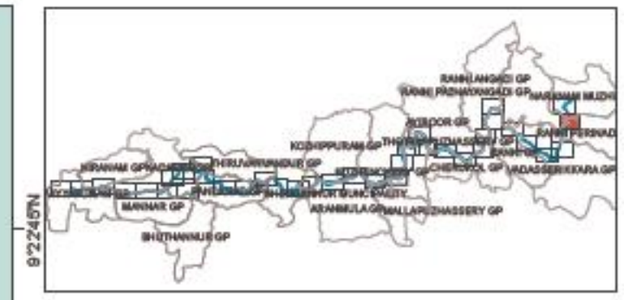
PAMBA RIVER, PATHANAMTHITTA DISTRICT

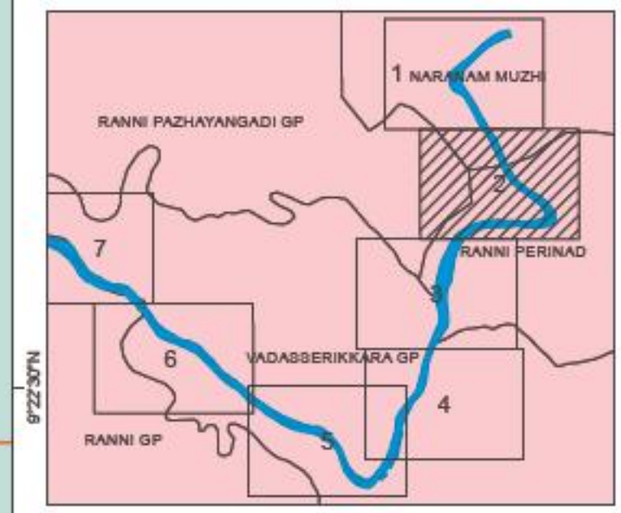
SAND VOLUME DISTRIBUTION MAP - 4.1.2

NARANAMUZHI, RANNI PAZHAYANGADI & RANNI PERINAD GRAMA PANCHAYATS









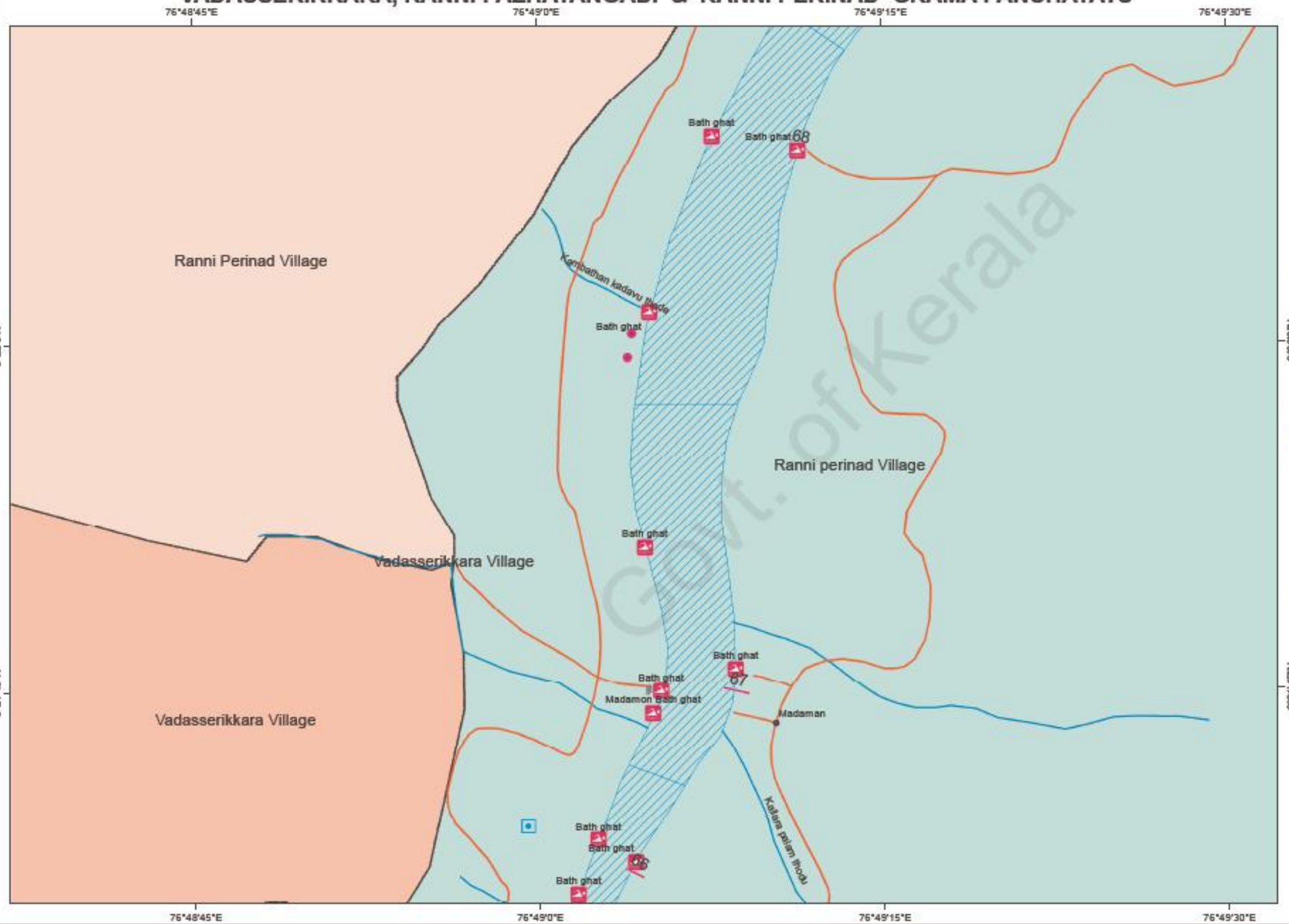
LEGEND

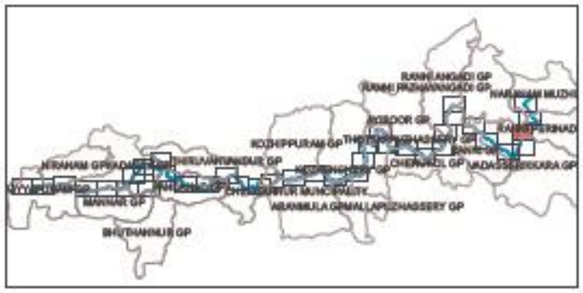
- No sand deposit
- Profile
- Bathghat
- Church
- Pump house
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Naranamuzhi Panchayat
- Ranni pazhayangadi Panchayat
- Ranni Perinad Panchayat

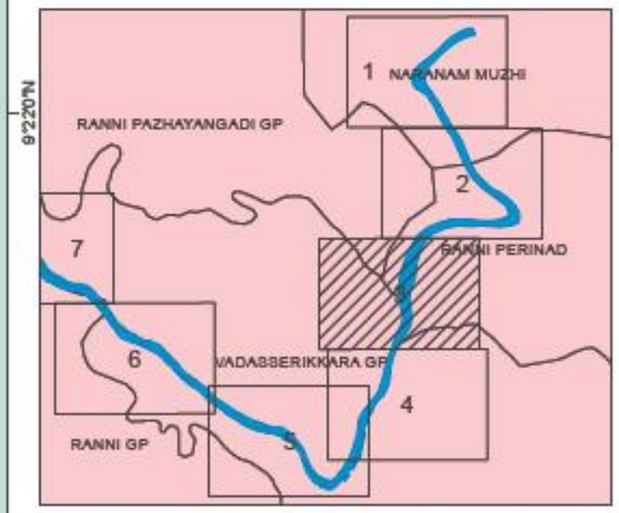
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.3

VADASSERIKKARA, RANNI PAZHAYANGADI & RANNI PERINAD GRAMA PANCHAYATS







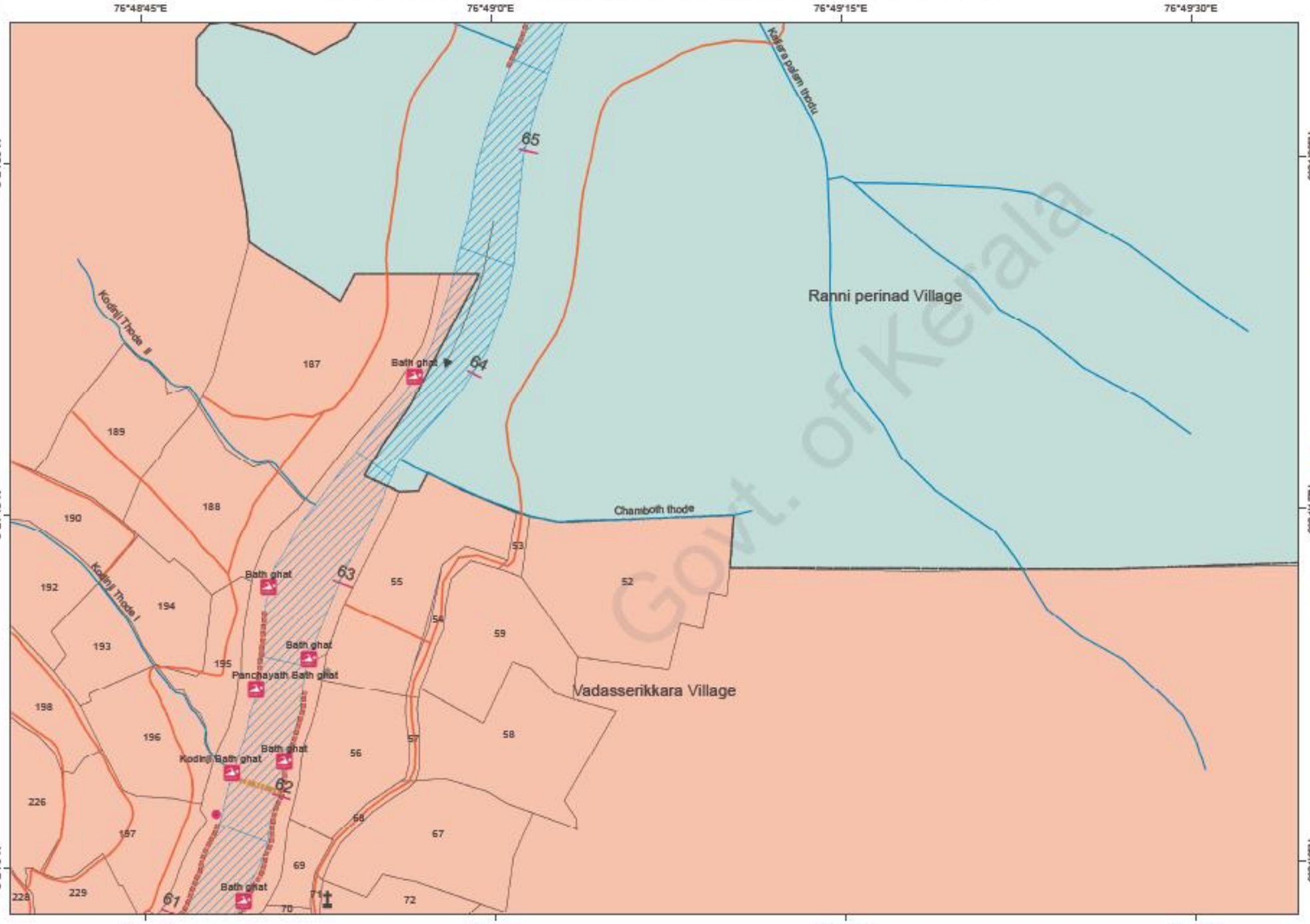
LEGEND

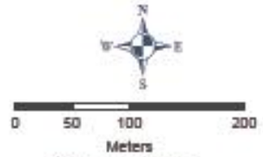
- No sand deposit
- Profile
- Bathghat
- Quarry
- Pump house
- Ferry ghat
- Protection wall
- Check dam
- Road
- Tributaries / Streams
- Village Boundary
- Vadasserikkara Panchayat
- Ranni pazhangadi Panchayat
- Ranni Perinad Panchayat

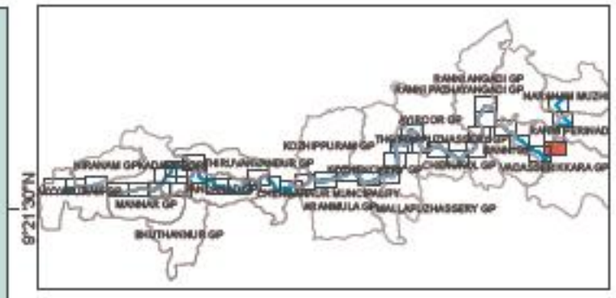
PAMBA RIVER, PATHANAMTHITTA DISTRICT

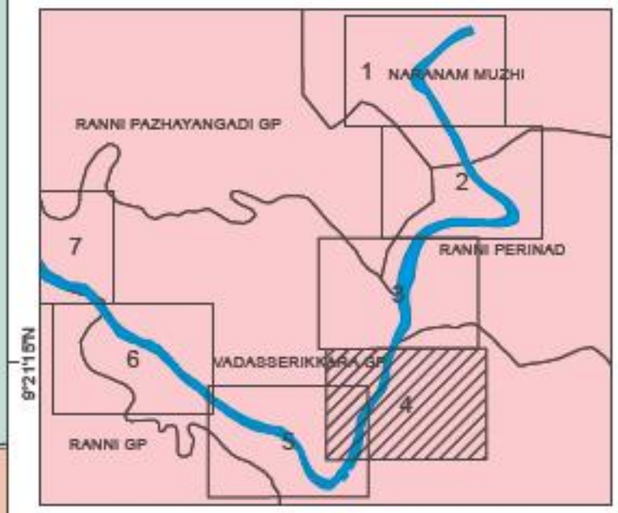
SAND VOLUME DISTRIBUTION MAP - 4.1.4

VADASSERIKKARA & RANNI PERINAD GRAMA PANCHAYATS









LEGEND

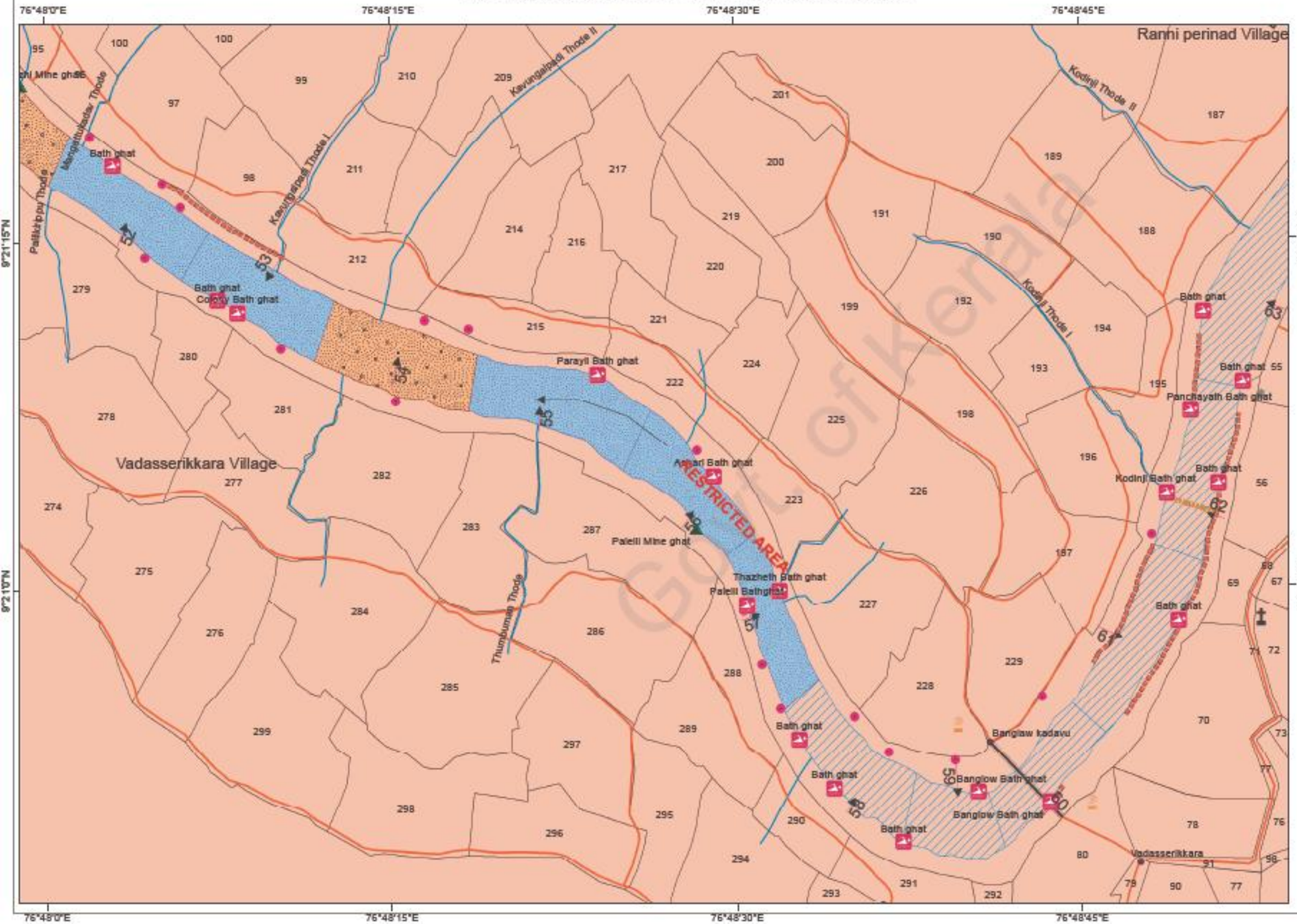
- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- Church
- Protection wall
- Check dam
- Road
- Tributaries / Streams
- Village Boundary
- Vadasserikkara Panchayat
- Ranni Perinad Panchayat

Govt. of Kerala

PAMBA RIVER, PATHANAMTHITTA DISTRICT

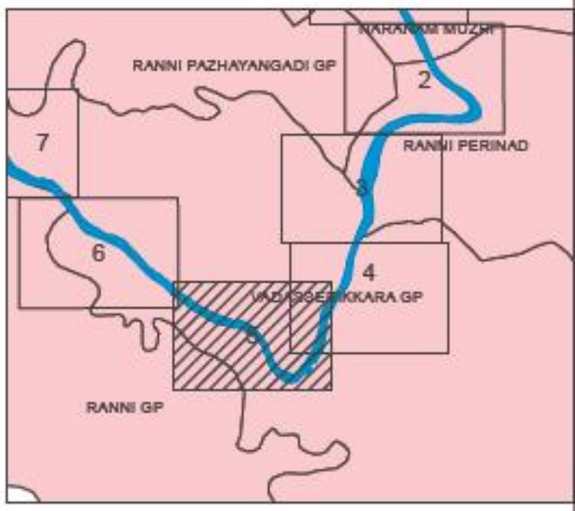
SAND VOLUME DISTRIBUTION MAP - 4.1.5

VADASSERIKKARA GRAMA PANCHAYAT



0 37.5 75 150
Meters

1 Cm = 50 Mtrs



LEGEND

- No sand deposit
- 1 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Pump house
- Water intake point
- Temple
- Church
- Bridge
- Protection wall
- Check dam
- Road
- Tributaries / Streams
- Village Boundary
- Vadasserikkara Panchayat

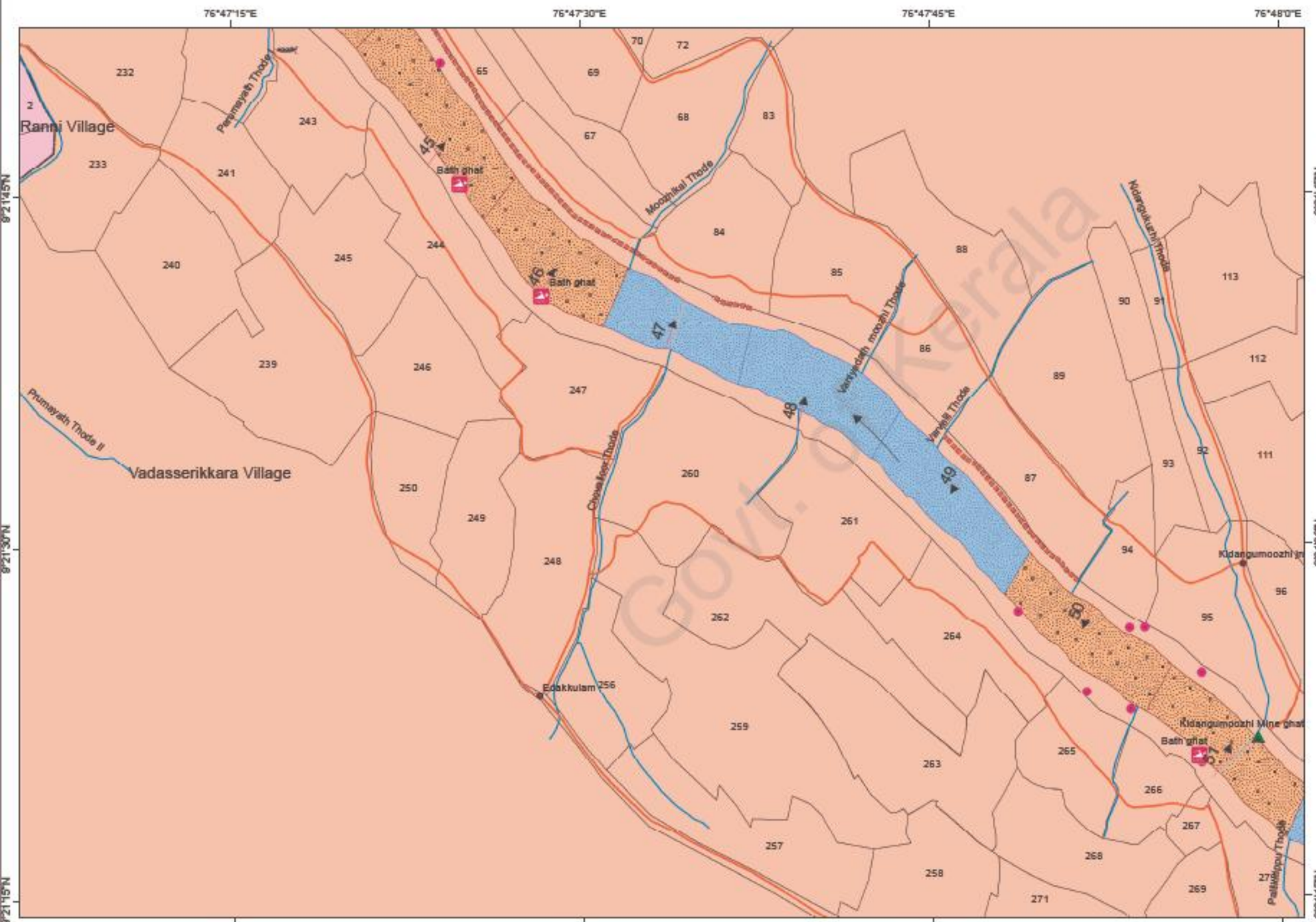
Government of Kerala

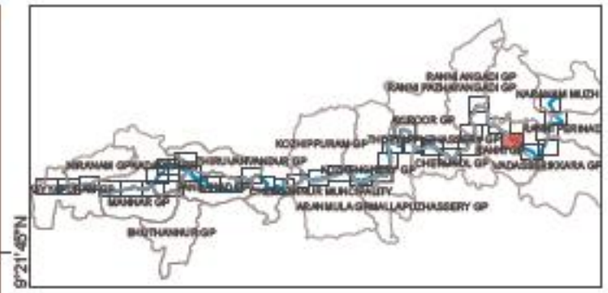
PAMBA RIVER, PATHANAMTHITTA DISTRICT

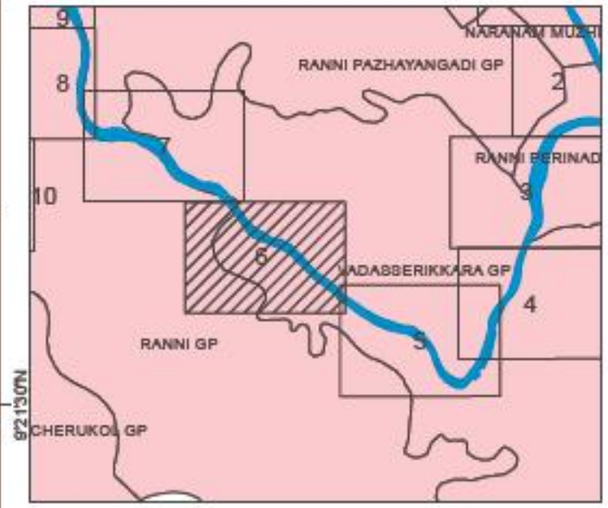
SAND VOLUME DISTRIBUTION MAP - 4.1.6

VADASSERIKKARA GRAMA PANCHAYAT

1 Cm = 50 Mtrs







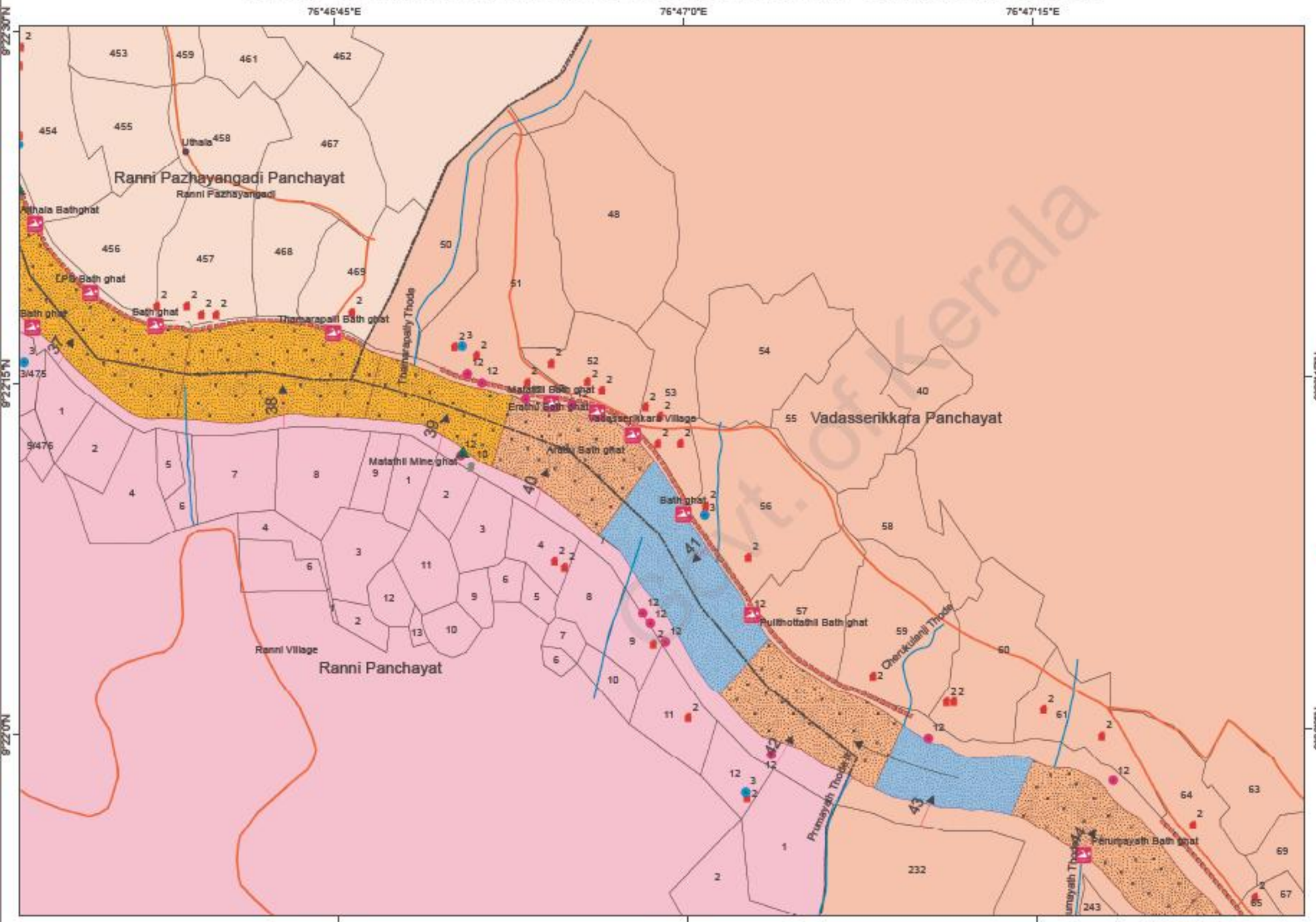
LEGEND

- 1 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Vallapura
- Water intake point
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Vadasserikkara Panchayat

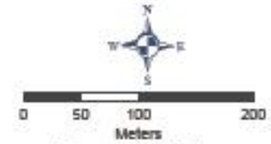
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.7

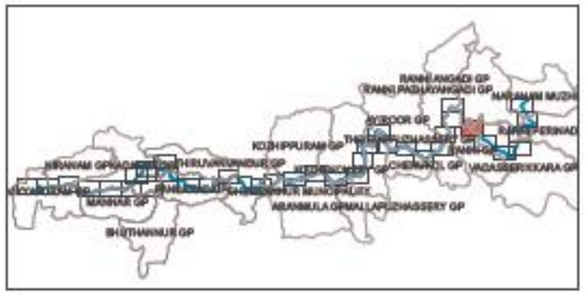
RANNI, RANNI PAZHAYANGADI & VADASSERIKKARA GRAMA PANCHAYATS

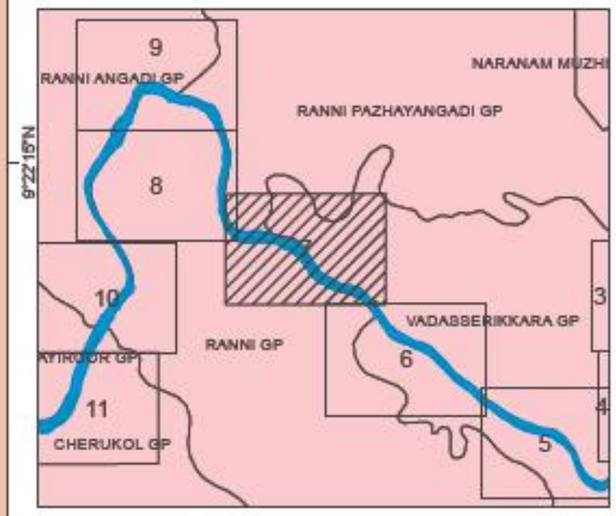


Govt. of Kerala



1 Cm = 50 Mtrs





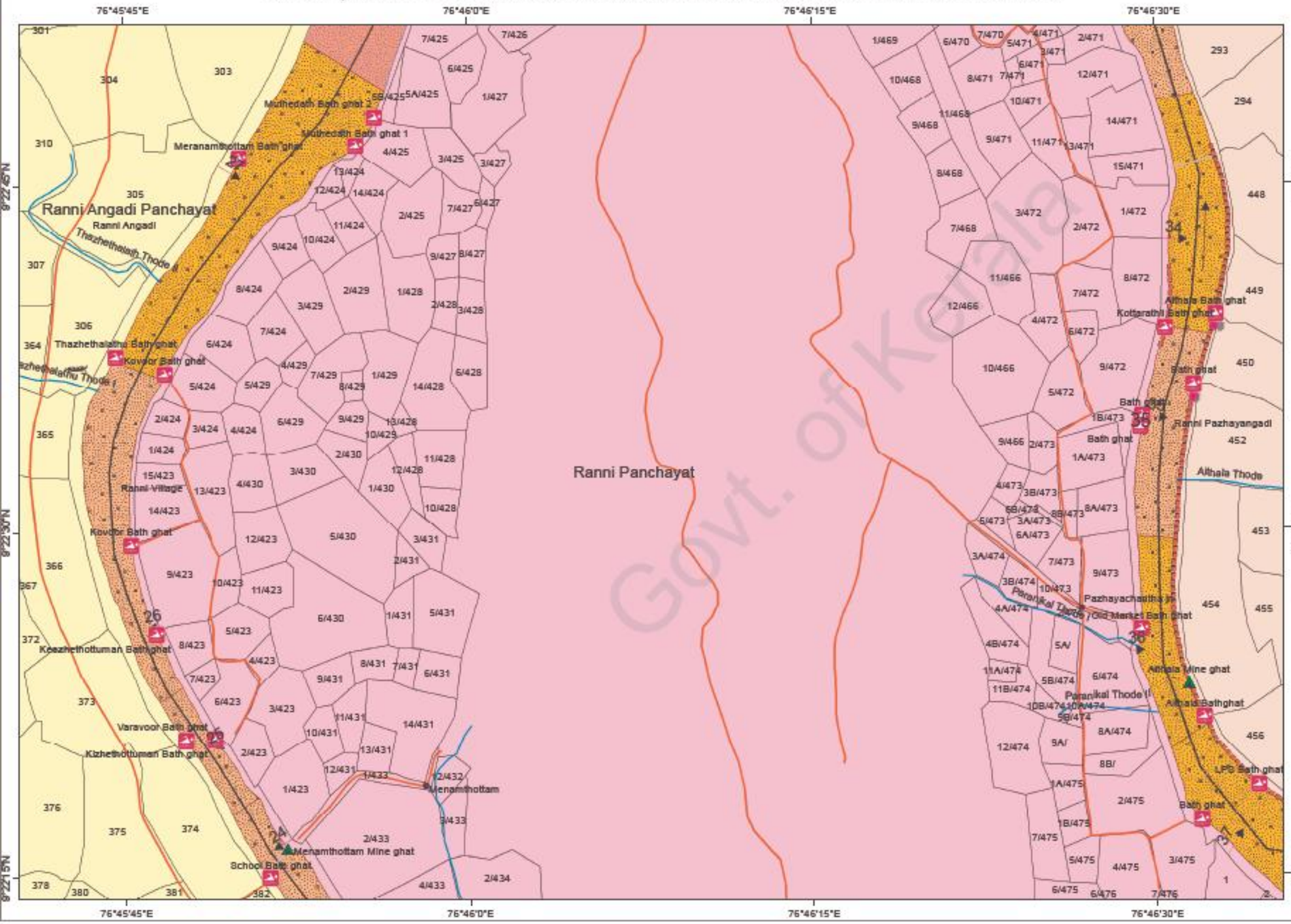
LEGEND

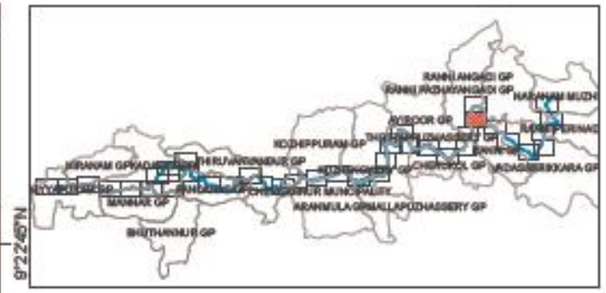
- 1 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Mineghat
- pump house
- Water intake point
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Vadasserikkara Panchayat
- Ranni Panchayat
- Ranni Pazhayangadi Panchayat

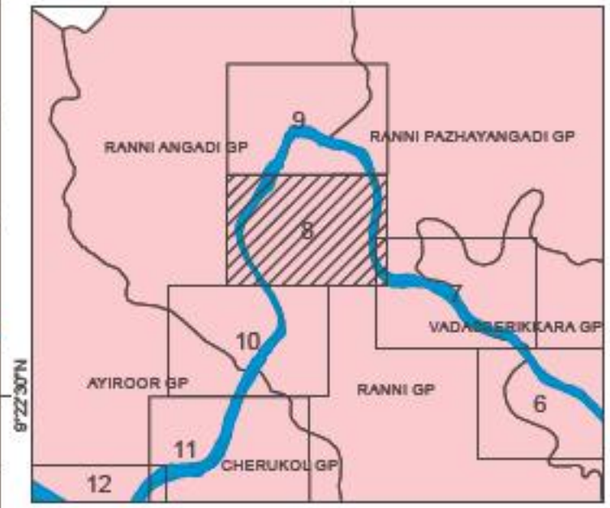
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.8

RANNI, RANNI PAZHAYANGADI & RANNI ANGADI GRAMA PANCHAYATS







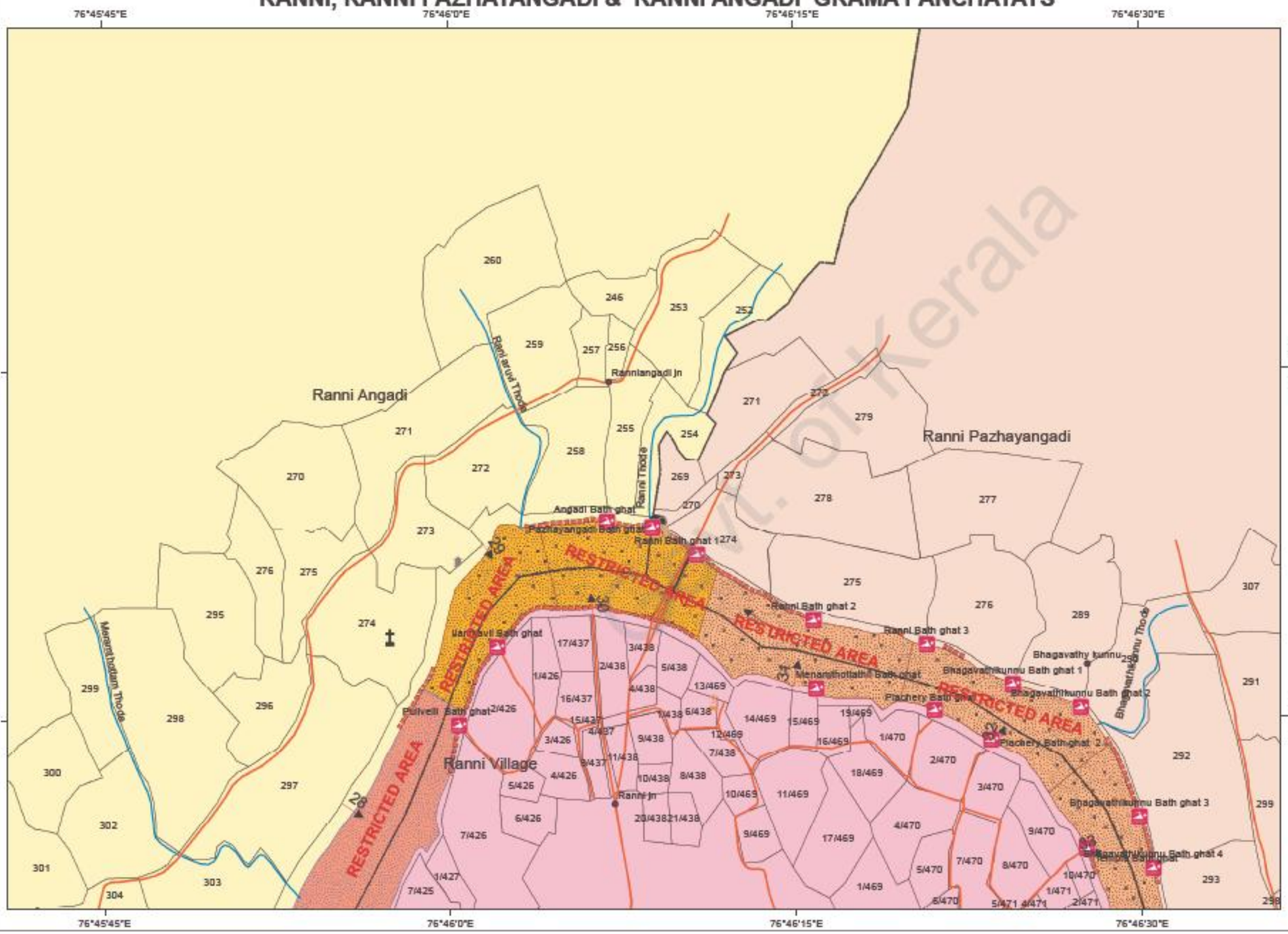
LEGEND

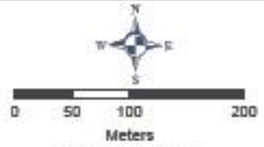
- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- 30001 to 40000 Cubic meter
- Profile
- Bathghat
- Mineghat
- pump house
- Water intake point
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Ranni Angadi Panchayat
- Ranni Panchayat
- Ranni Pazhayangadi Panchayat

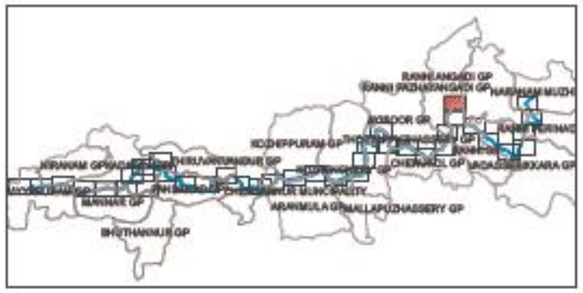
PAMBA RIVER, PATHANAMTHITTA DISTRICT

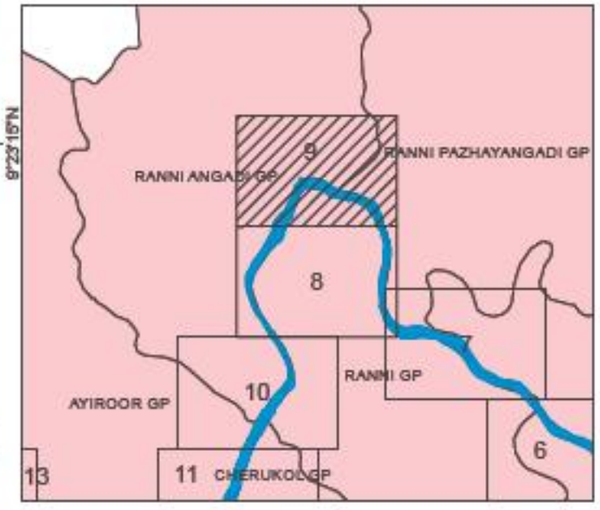
SAND VOLUME DISTRIBUTION MAP - 4.1.9

RANNI, RANNI PAZHAYANGADI & RANNI ANGADI GRAMA PANCHAYATS









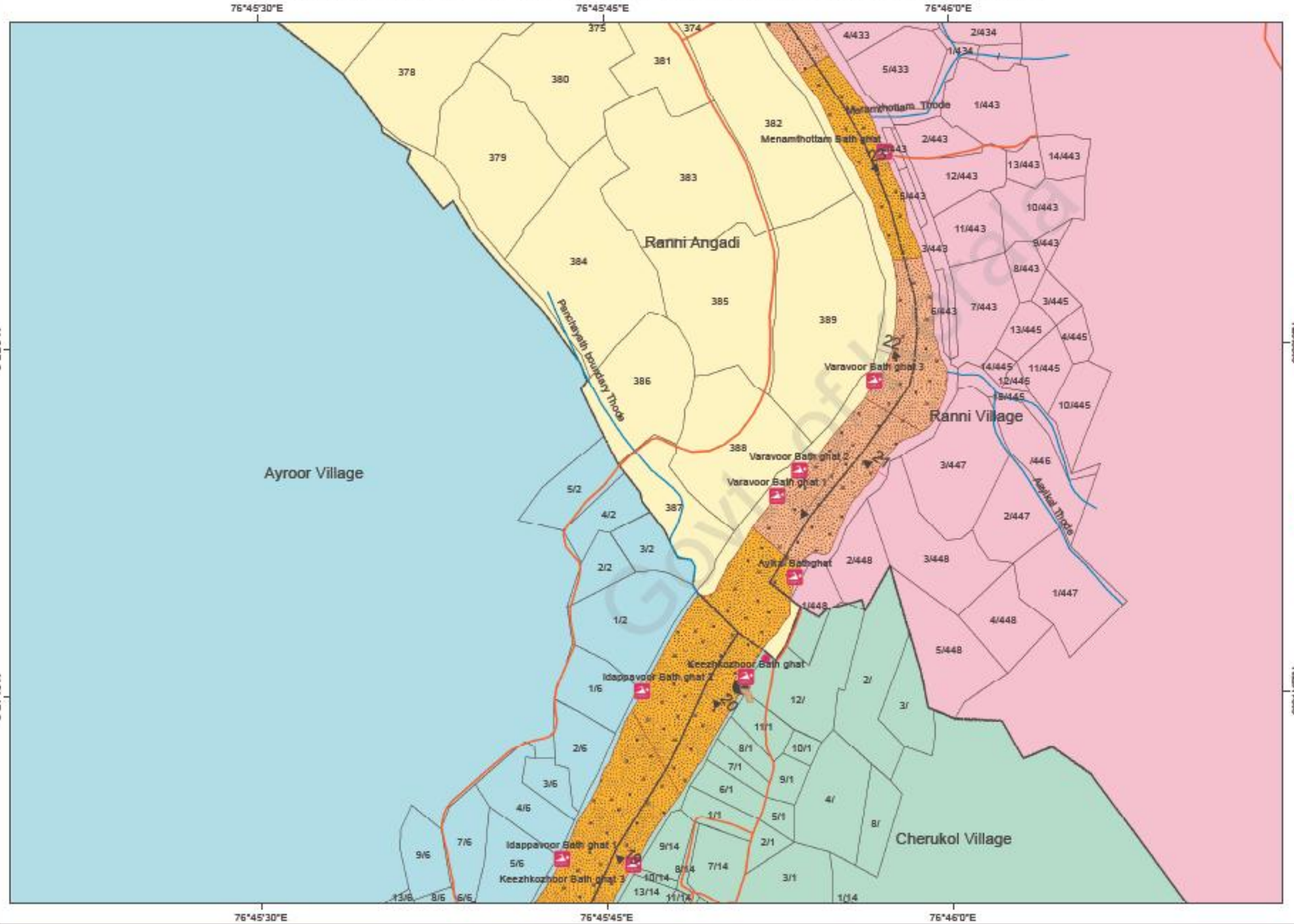
LEGEND

- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- 30001 to 40000 Cubic meter
- Profile
- Bathghat
- pump house
- Temple
- Church
- Waste water discharge
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Ranni Angadi Panchayat
- Ranni Panchayat
- Ranni Pazhayangadi Panchayat

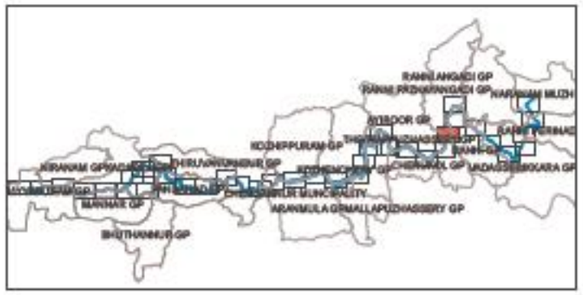
PAMBA RIVER, PATHANAMTHITTA DISTRICT

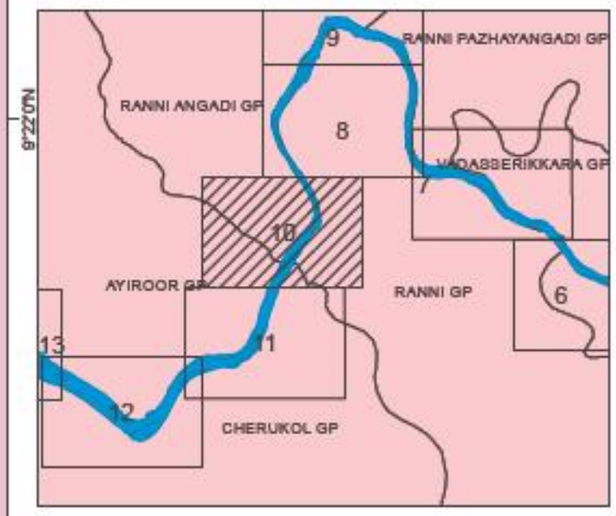
SAND VOLUME DISTRIBUTION MAP - 4.1.10

RANNI, RANNI ANGADI AYROOR & CHERUKOL GRAMA PANCHAYATS



0 50 100 200
Meters
1 Cm = 50 Mtrs





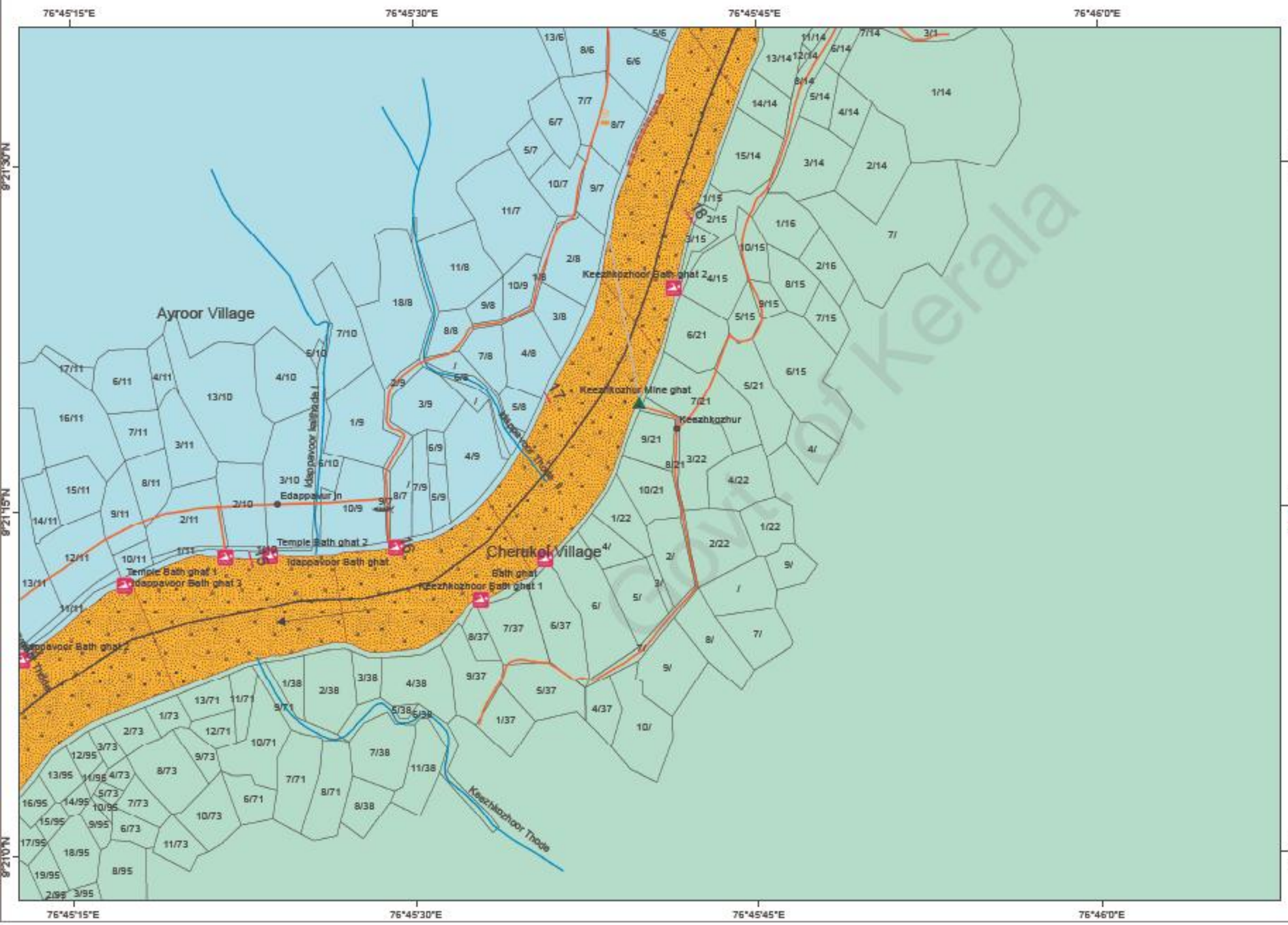
LEGEND

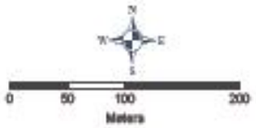
- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Water intake point
- Waste water discharge
- Road
- Tributaries / Streams
- Village Boundary
- Ranni Angadi Panchayat
- Ranni Panchayat
- Ayroor Panchayat
- Cherukol Panchayat

PAMBA RIVER- PATHANAMTHITTA DISTRICT

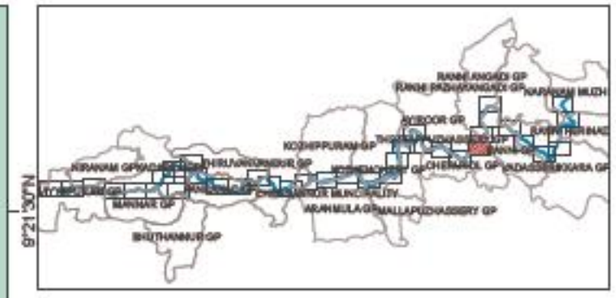
SAND VOLUME DISTRIBUTION MAP - 4.1.11

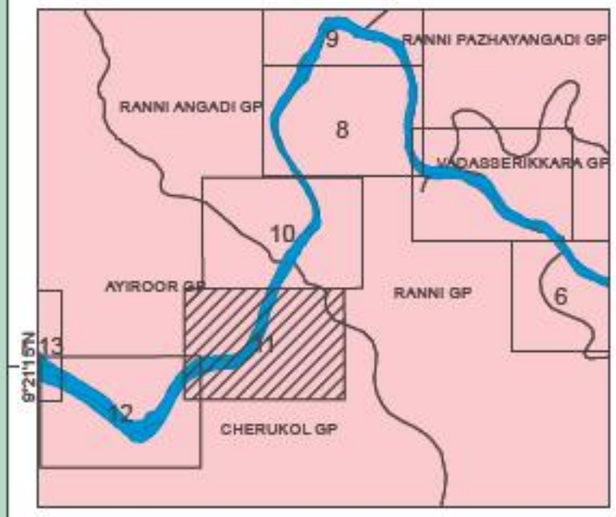
AYROOR & CHERUKOL GRAMA PANCHAYATS





1 Cm = 50 Mtrs





LEGEND

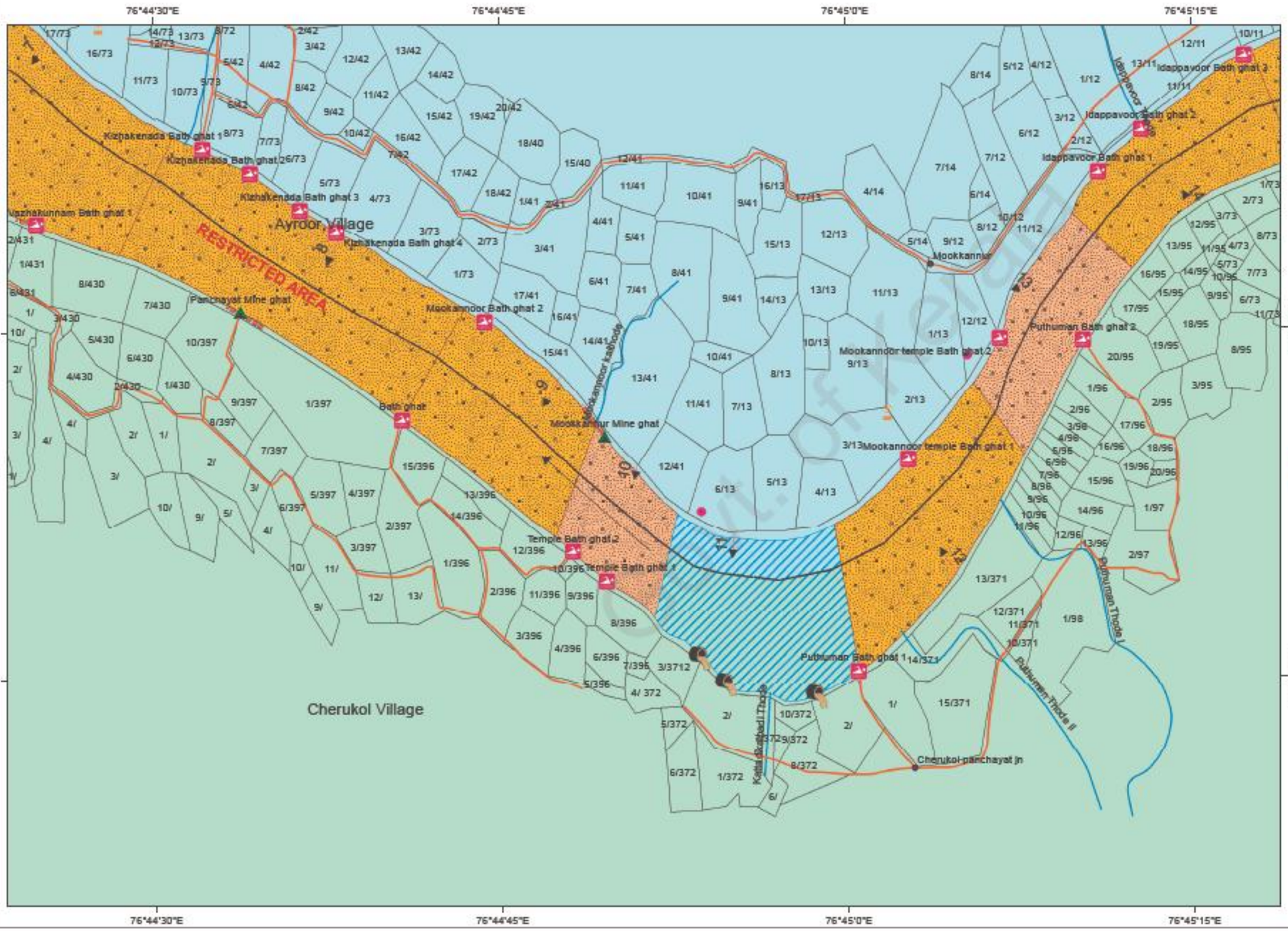
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Temple
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Ayroor Panchayat
- Cherukol Panchayat
- Village Boundary

Govt. of Kerala

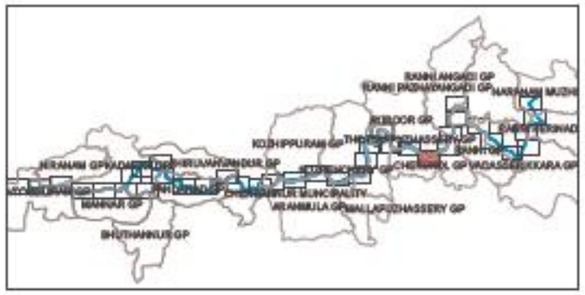
PAMBA RIVER, PATHANAMTHITTA DISTRICT

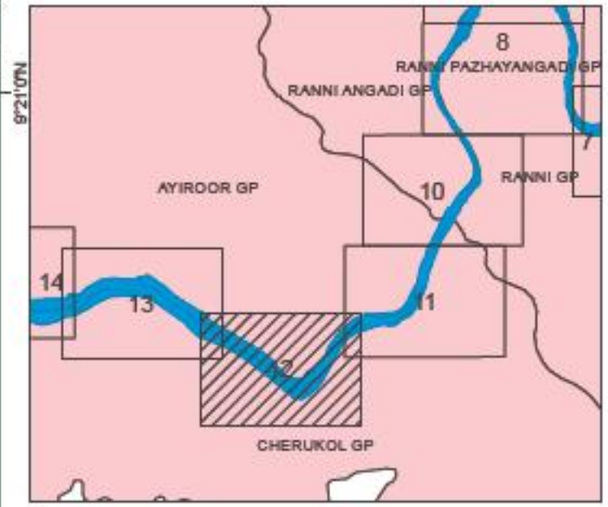
SAND VOLUME DISTRIBUTION MAP - 4.1.12

AYROOR & CHERUKOL GRAMA PANCHAYATS



0 50 100 200
Meters
1 Cm = 50 Mtrs





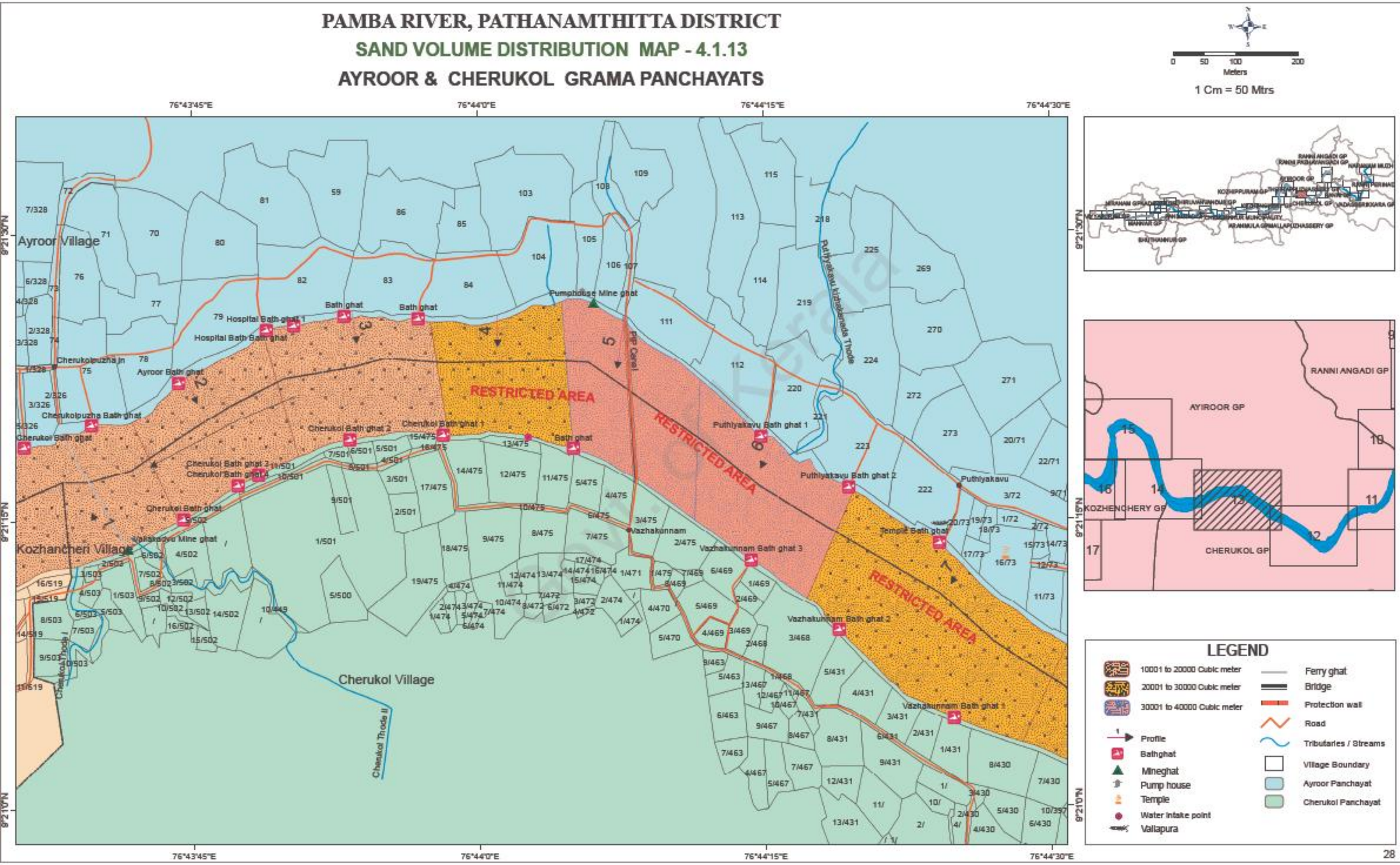
LEGEND

- No sand deposit
- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Waste water discharge
- Temple
- Vallapura
- Protection wall
- Road
- Tributaries / Streams
- Ayroor Panchayat
- Cherukol Panchayat
- Village Boundary

PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.13

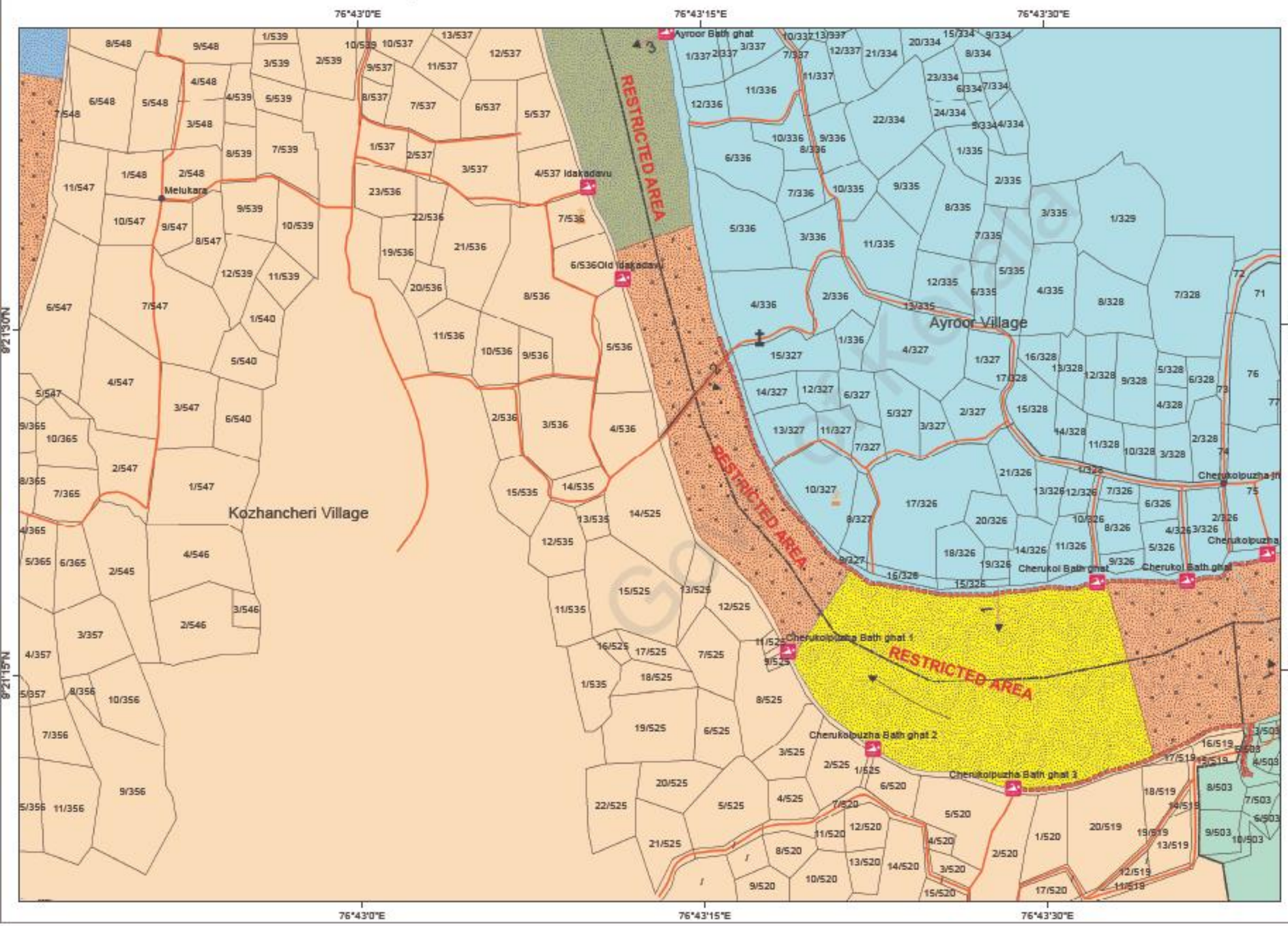
AYROOR & CHERUKOL GRAMA PANCHAYATS

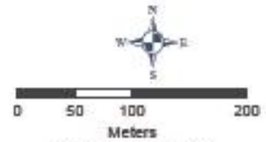


PAMBA RIVER, PATHANAMTHITTA DISTRICT

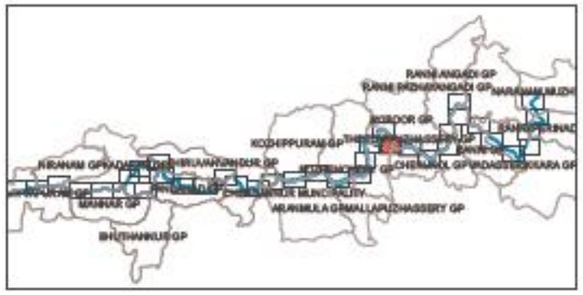
SAND VOLUME DISTRIBUTION MAP - 4.1.14

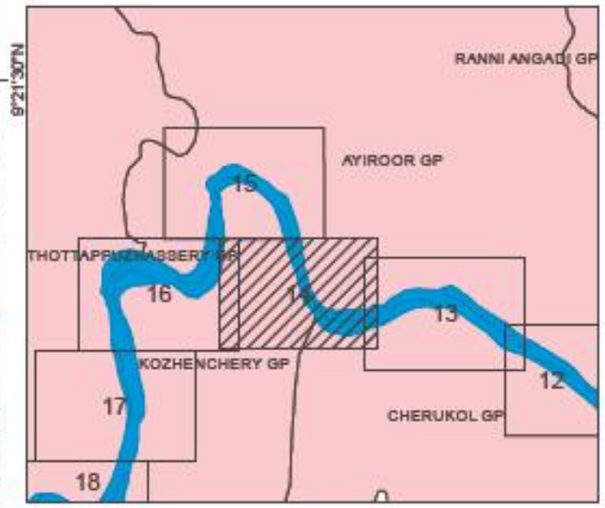
AYROOR, CHERUKOL & KOZHENCHERY GRAMA PANCHAYATS





1 Cm = 50 Mtrs





LEGEND

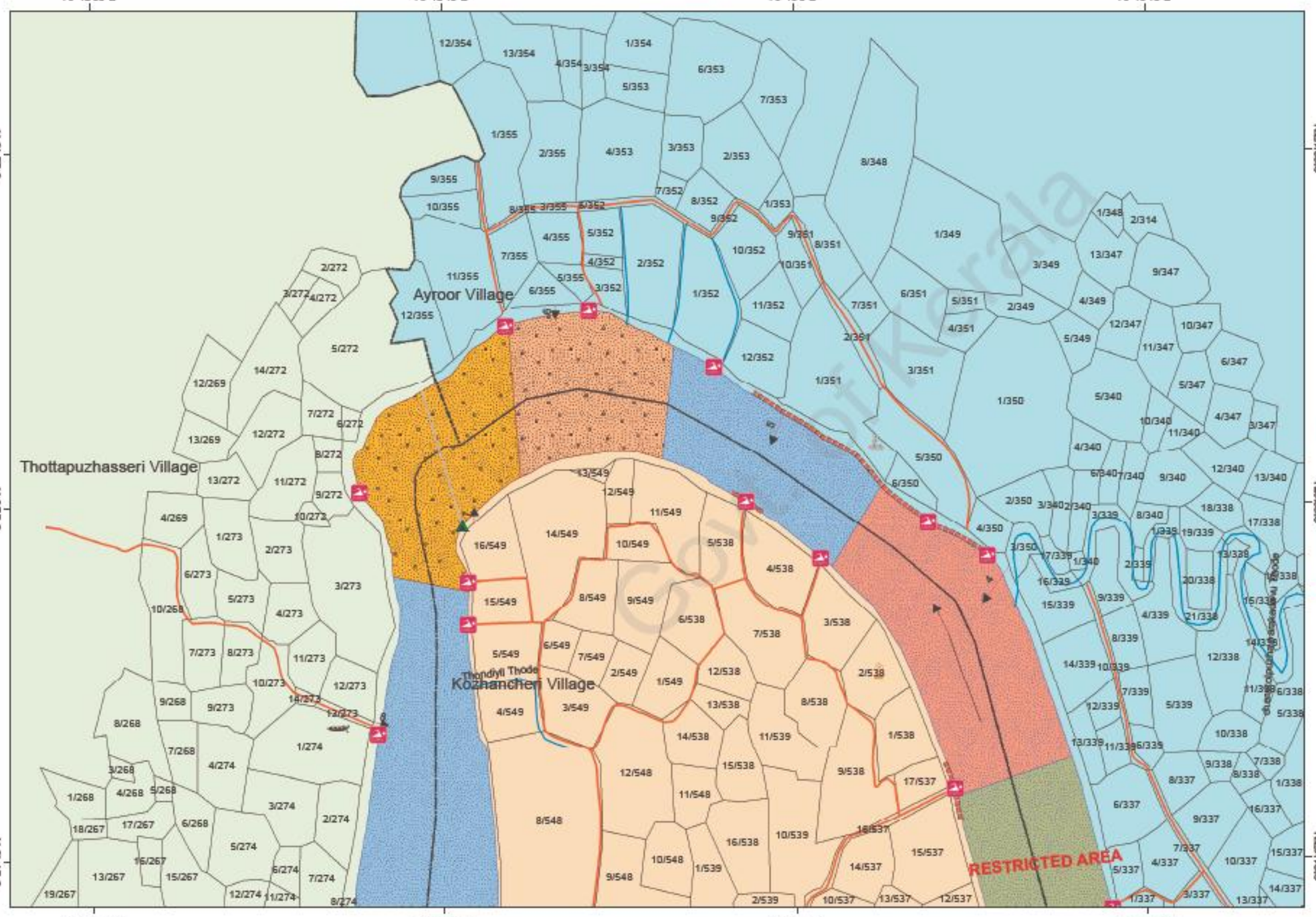
- 1 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- 40000 to 60000 Cubic meter
- 60001 and above Cubic meter
- Profile
- Bathghat
- Temple
- Church
- Ferry ghat
- Protection wall
- Bridge
- Road
- Tributaries / Streams
- Village Boundary
- Ayroor Panchayat
- Cherukol Panchayat
- Kozhancheri Panchayat

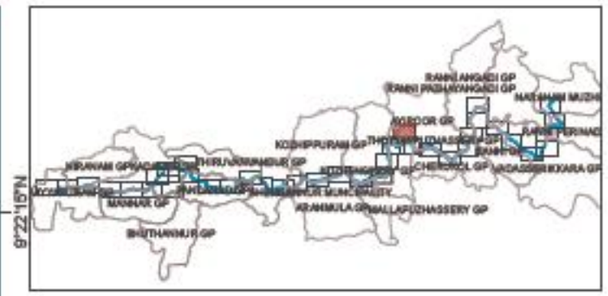
PAMBA RIVER, PATHANAMTHITTA DISTRICT

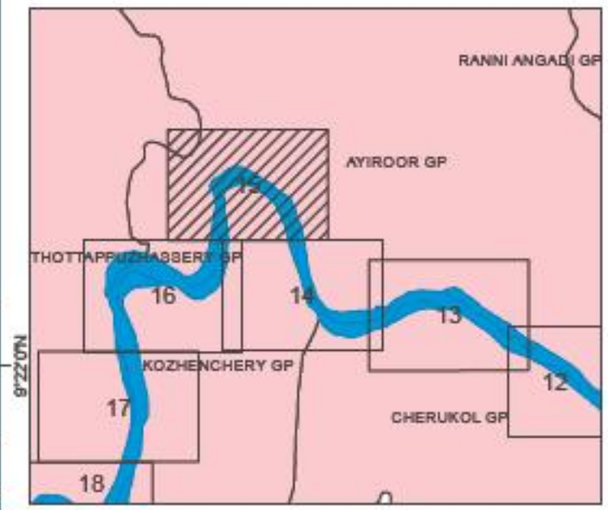
SAND VOLUME DISTRIBUTION MAP - 4.1.15

AYROOR, THOTTAPPUZHASSERY & KOZHENCHERY GRAMA PANCHAYATS

0 50 100 200
Meters
1 Cm = 50 Mtrs







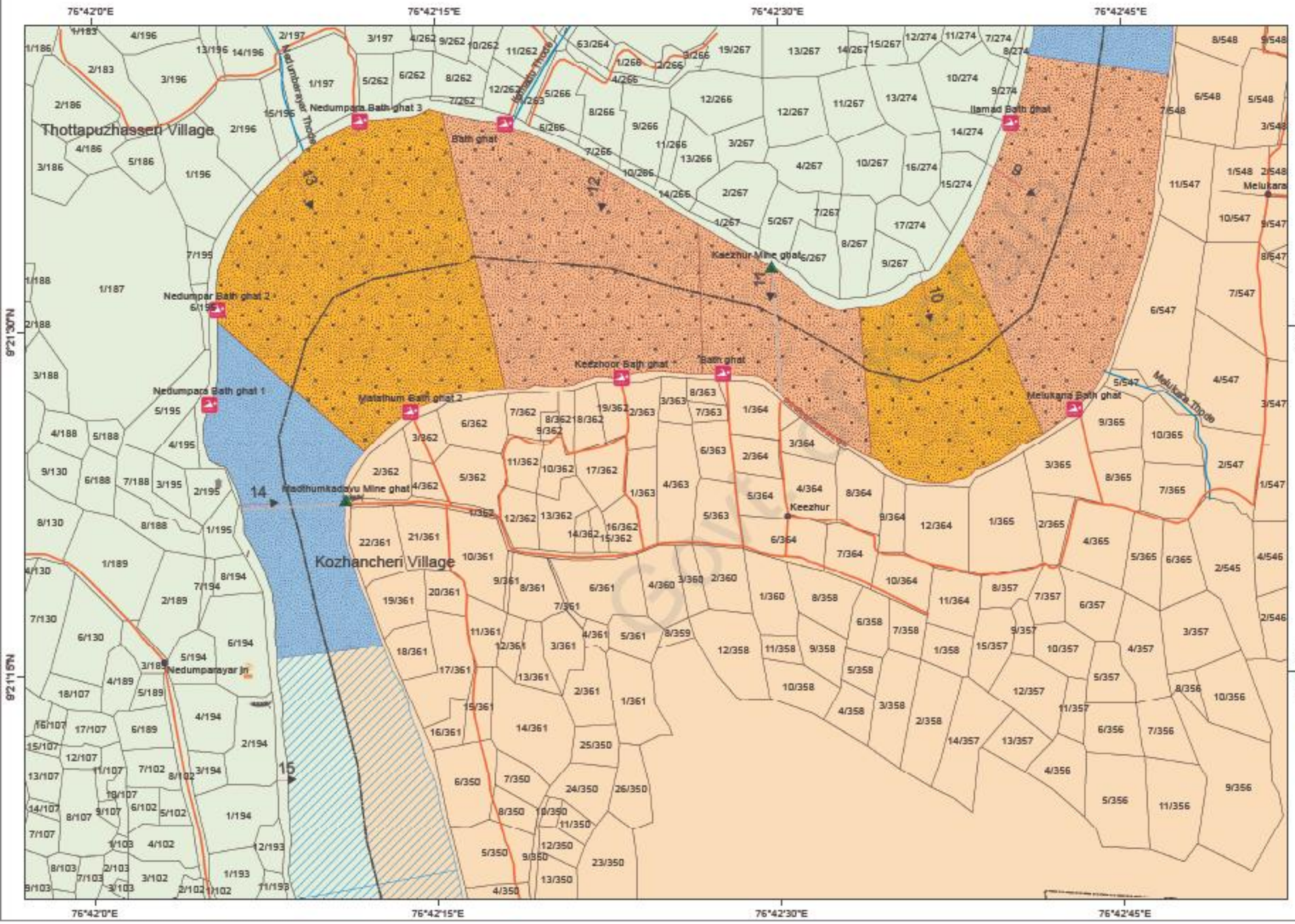
LEGEND

- 0 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- 30001 to 40000 Cubic meter
- 40001 to 60000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Temple
- Kavu
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Ayroor Panchayat
- Thottapuzhasseri Panchayat
- Kozhancheri Panchayat

PAMBA RIVER, PATHANAMTHITTA DISTRICT

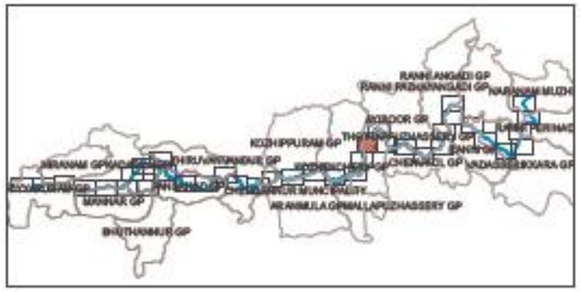
SAND VOLUME DISTRIBUTION MAP - 4.1.16

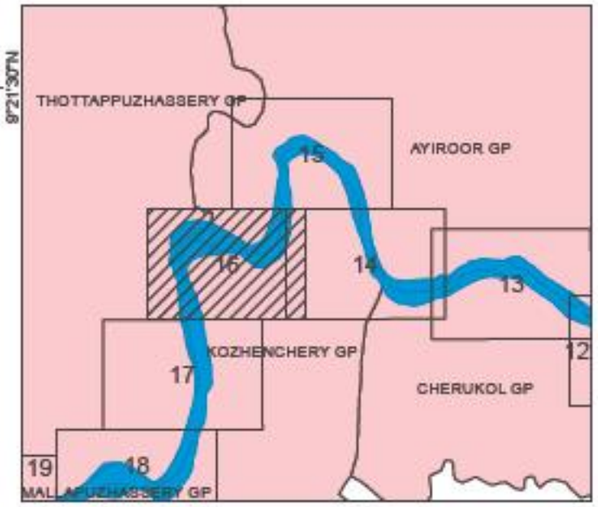
THOTTAPUZHASSERY & KOZHENCHERY GRAMA PANCHAYATS



N
W E
S

0 50 100 200
Meters
1 Cm = 50 Mtrs





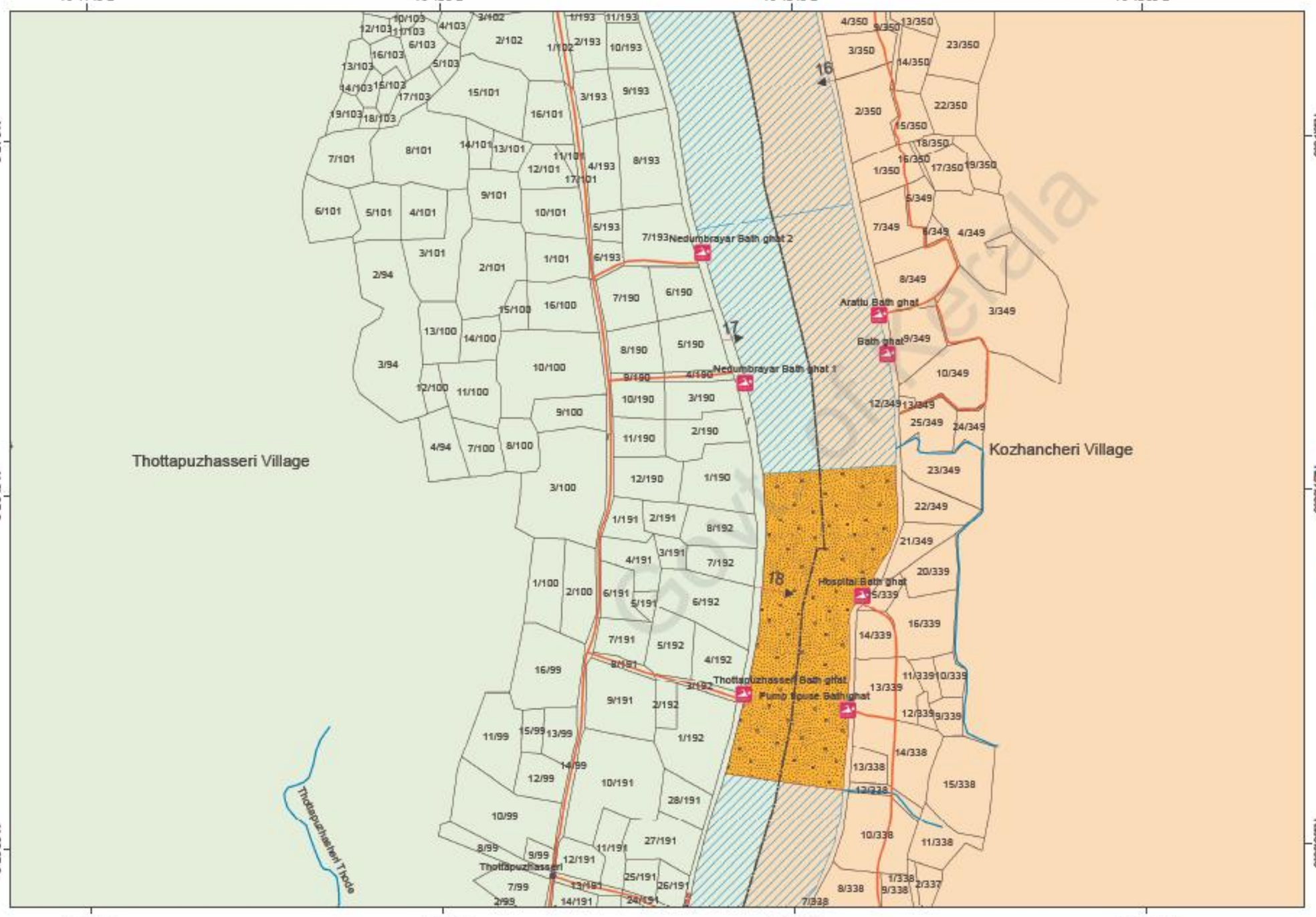
LEGEND

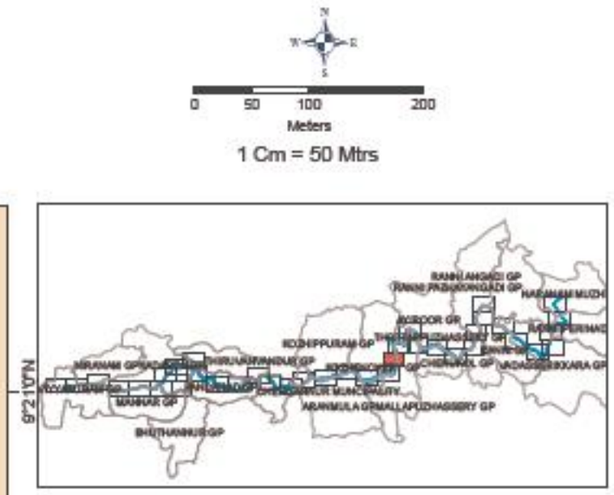
- No sand deposit
- 1 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Temple
- Vallapura
- Pump house
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Thottapuzhasseri Panchayat
- Kozhancheri Panchayat

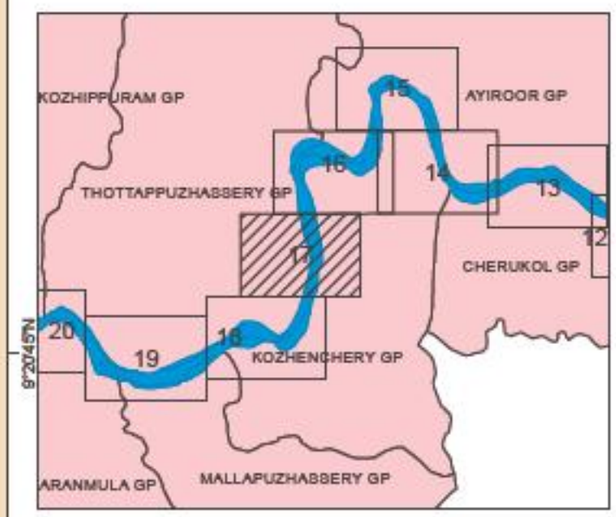
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.17

THOTTAPUZHASSERY & KOZHENCHERY GRAMA PANCHAYATS







Meters: 0 50 100 200

1 Cm = 50 Mtrs

LEGEND

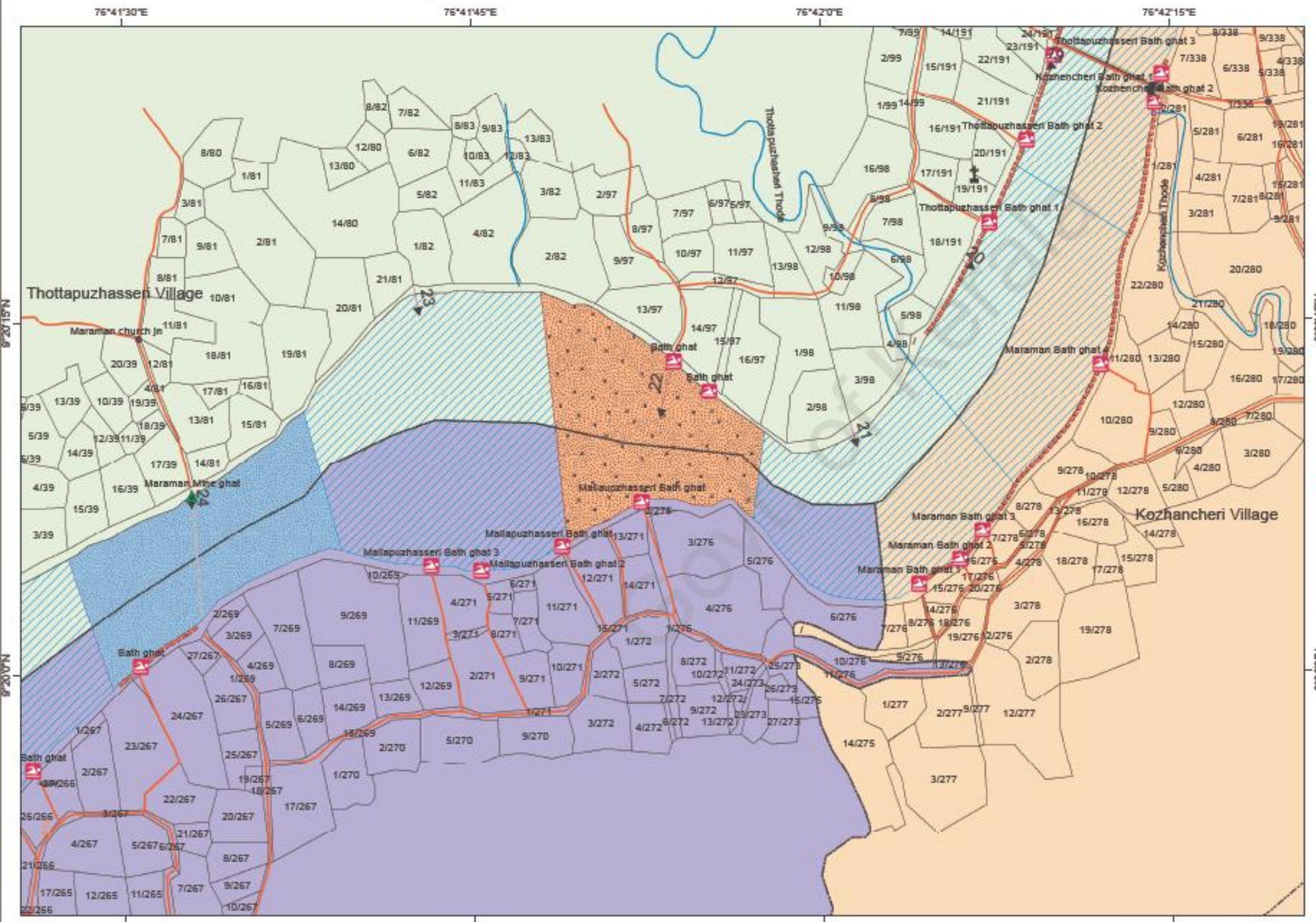
- No sand deposit
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Pump house
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Thottapuzhasseri Panchayat
- Kozhancheri Panchayat

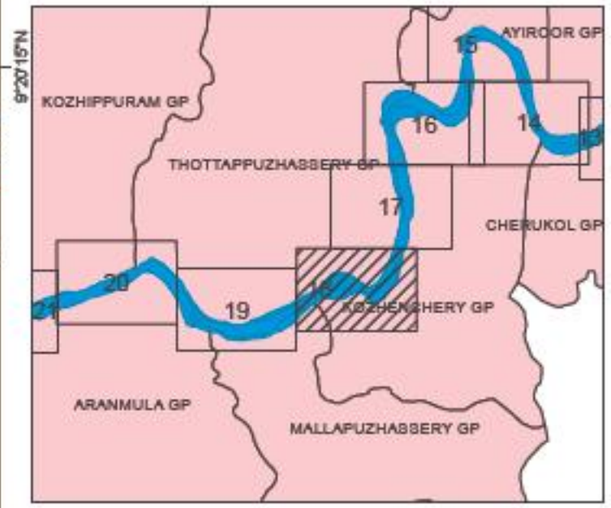
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.18

MALLAPUZHASSERY, THOTTAPUZHASSERY & KOZHENCHERY GRAMA PANCHAYATS

1 Cm = 50 Mtrs





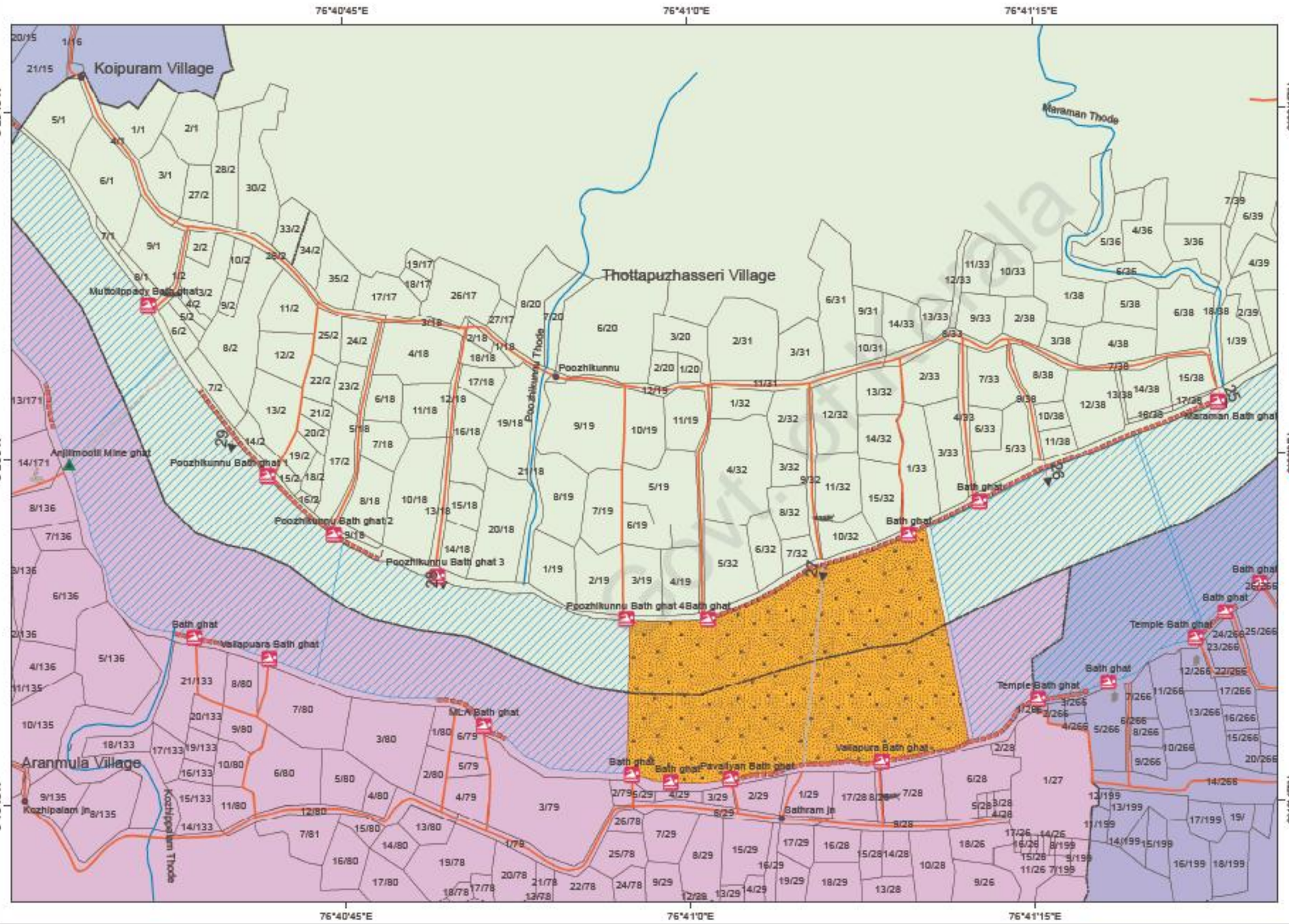
LEGEND

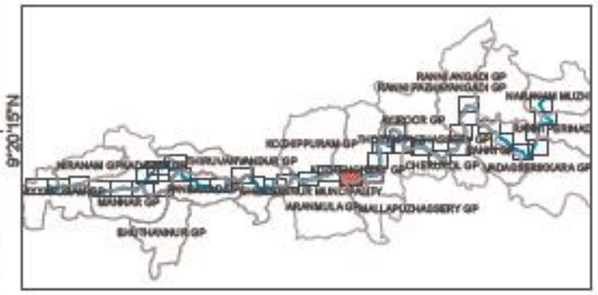
- No sand deposit
- 1 to 10000 Cubic meter
- 10001 to 20000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Ferry ghat
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Thottapuzhasseri Panchayat
- Kozhancheri Panchayat
- Mallapuzhasseri Panchayat

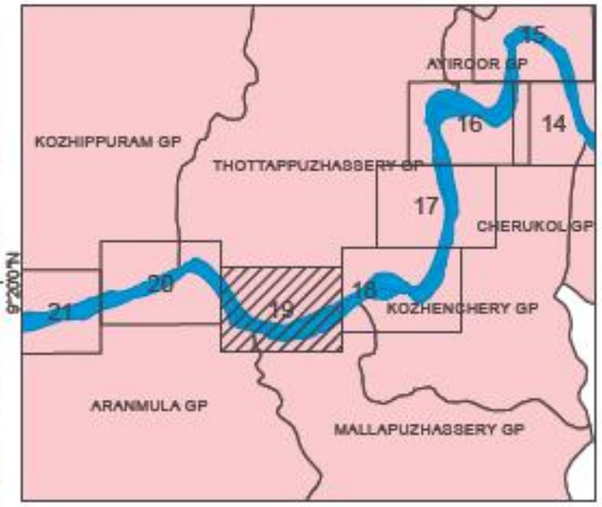
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.19

ARANMULA, MALLAPUZHASSERY, THOTTAPUZHASSERY & KOIPURAM GRAMA PANCHAYATS







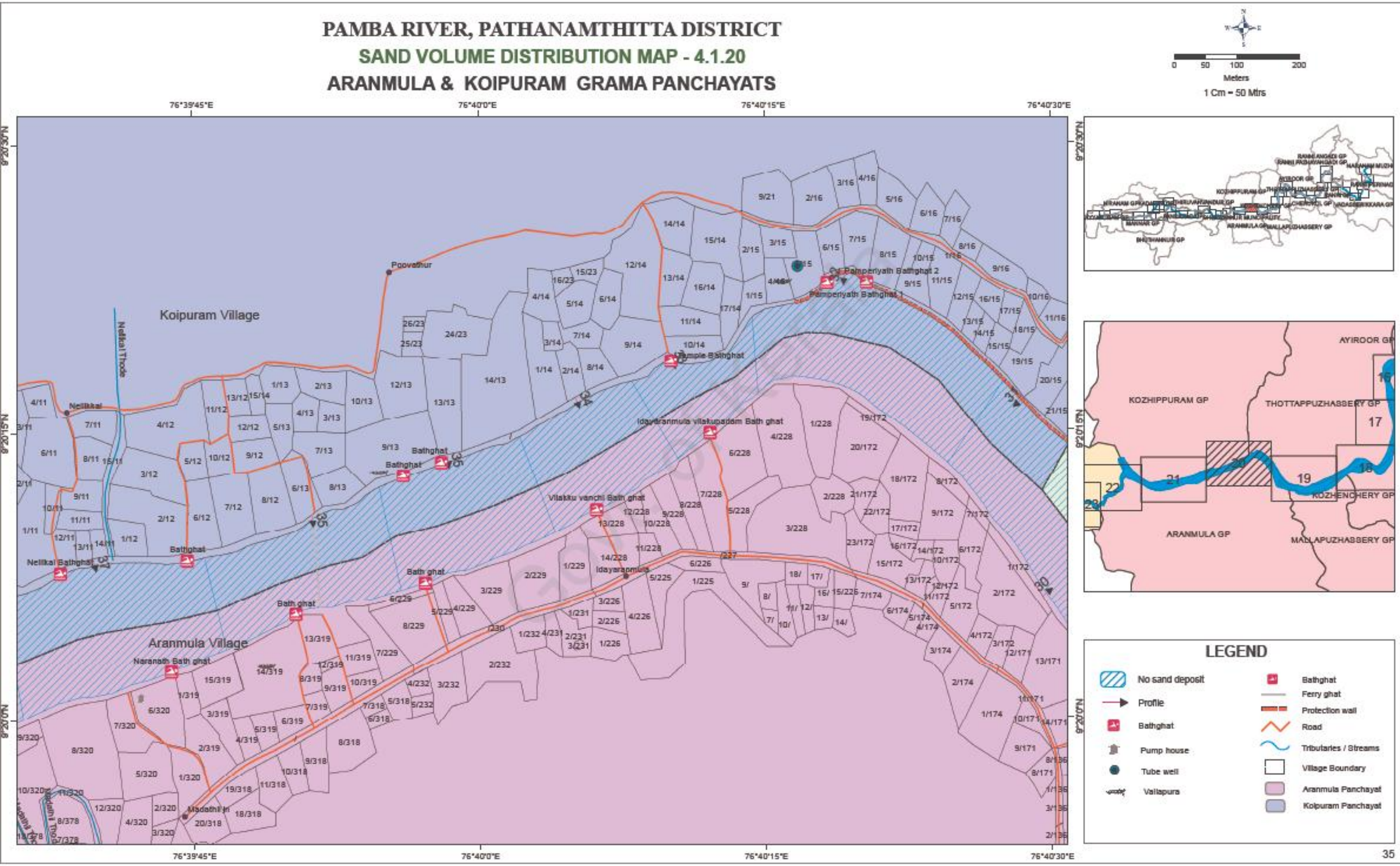
LEGEND

- No sand deposit
- 20001 to 30000 Cubic meter
- Profile
- Bathghat
- Mineghat
- Kavu
- Pump house
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Thottapuzhasseri Panchayat
- Mallapuzhasseri Panchayat
- Aranmula Panchayat
- Koipuram Panchayat

PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.20

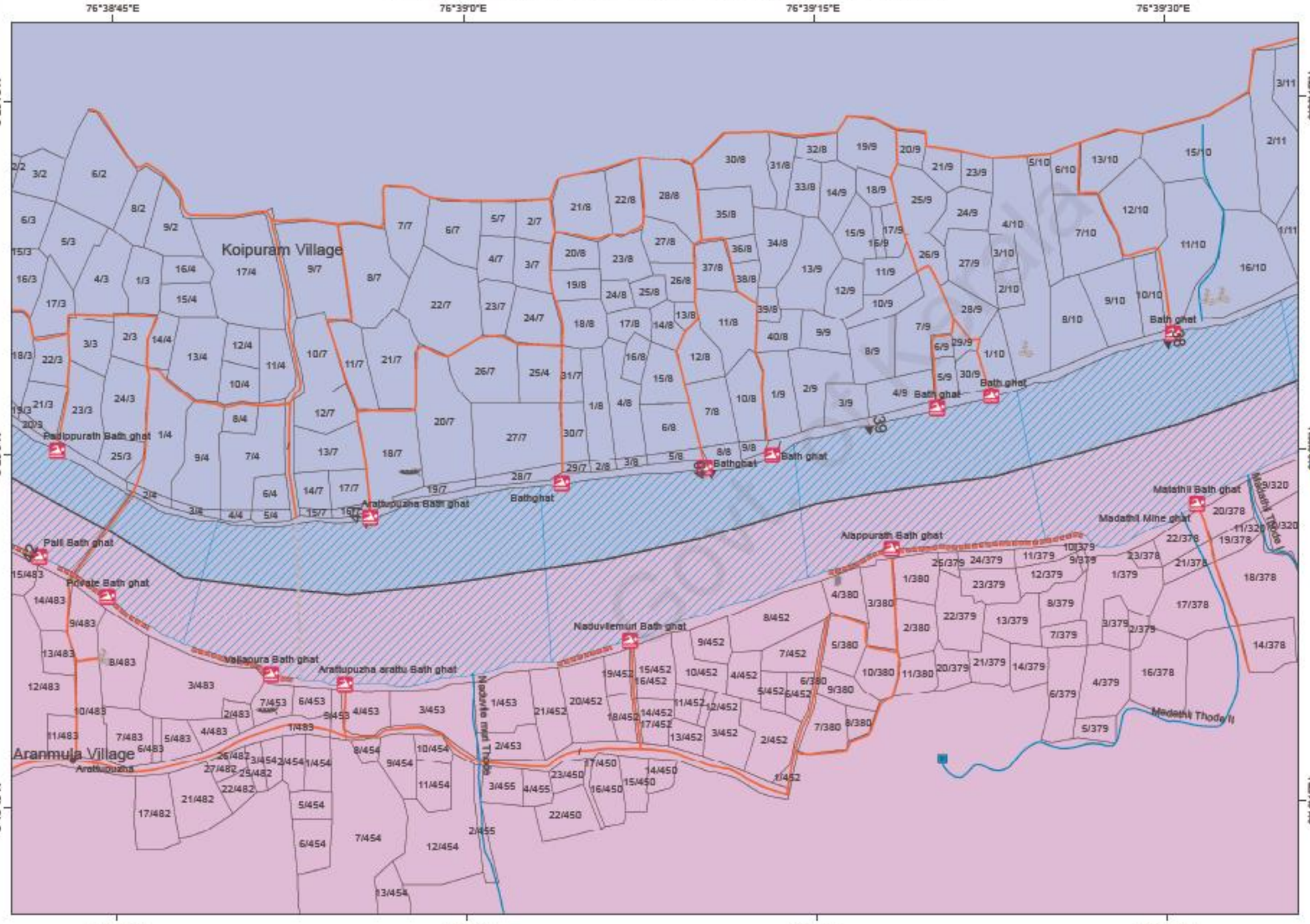
ARANMULA & KOIPURAM GRAMA PANCHAYATS

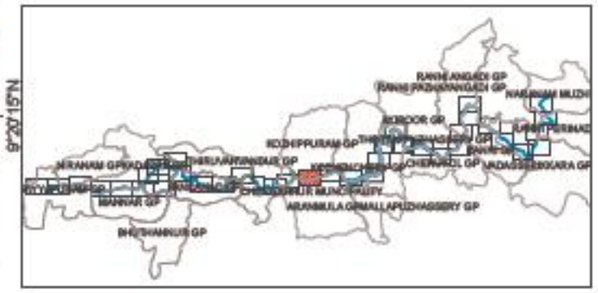


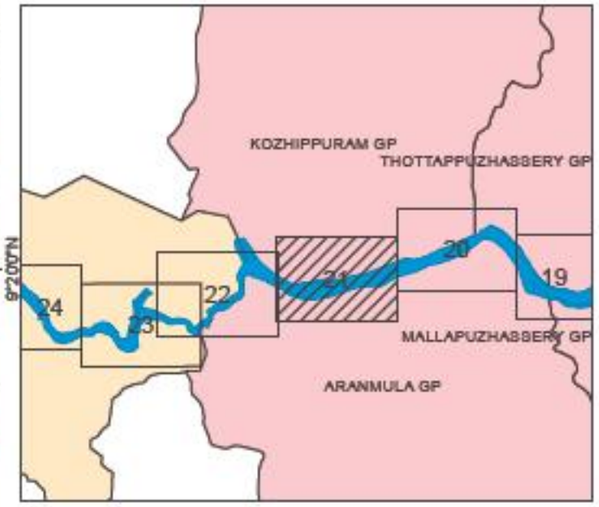
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.21

ARANMULA & KOIPURAM GRAMA PANCHAYATS







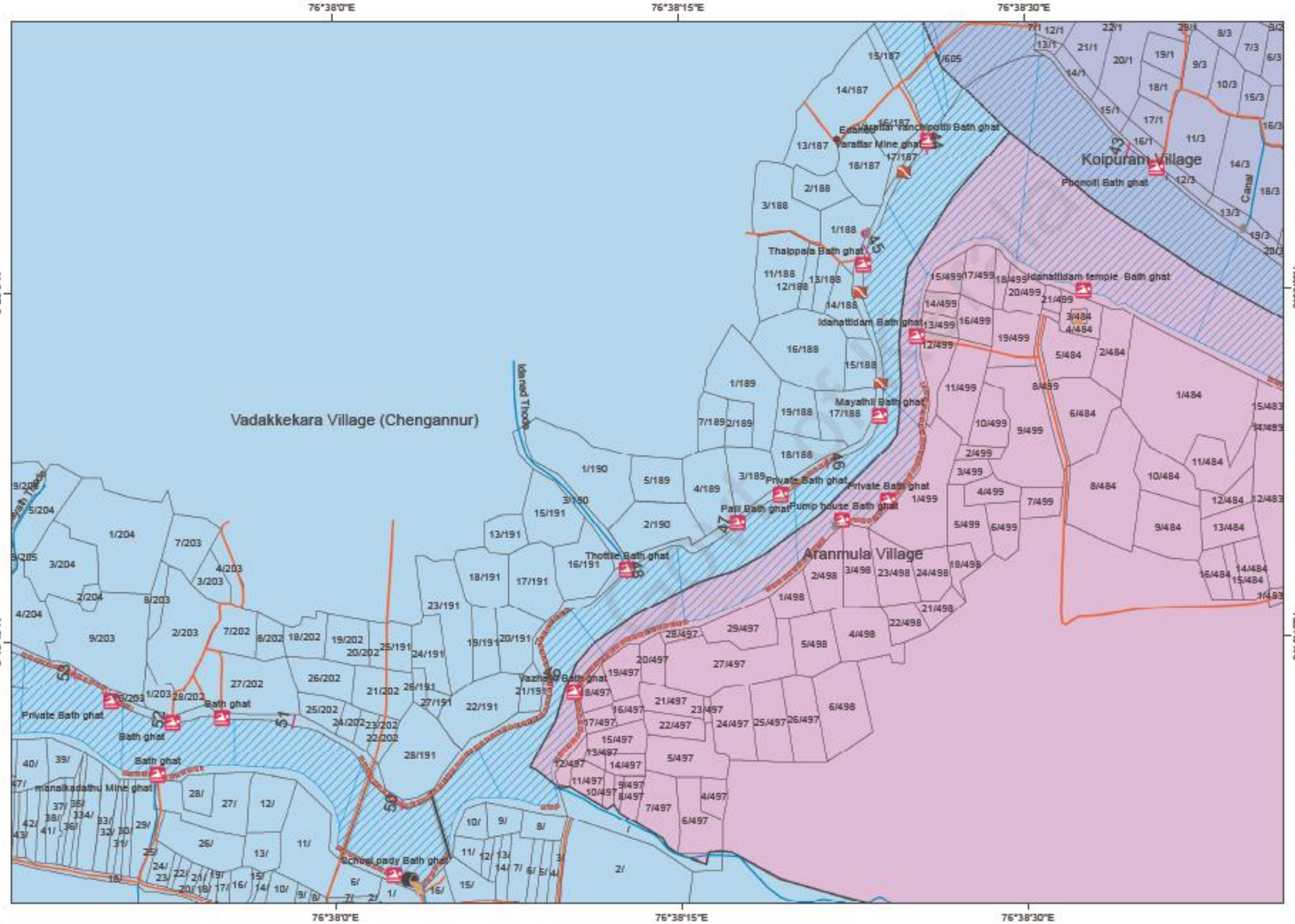
LEGEND

- No sand deposit
- Profile
- Bathghat
- Pump house
- Pond
- Kavu
- Vallapura
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Aranmula Panchayat
- Kolpuram Panchayat

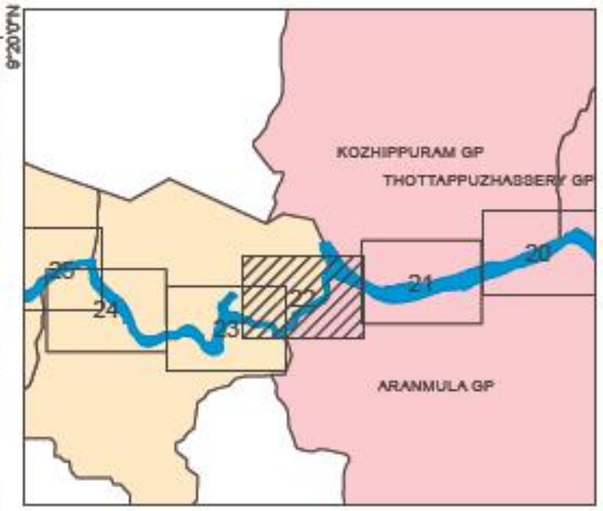
PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.22

ARANMULA, KOIPURAM GRAMA PANCHAYATS & CHENGANNUR MUNCIPALITY



1 Cm = 50 Mtrs



LEGEND

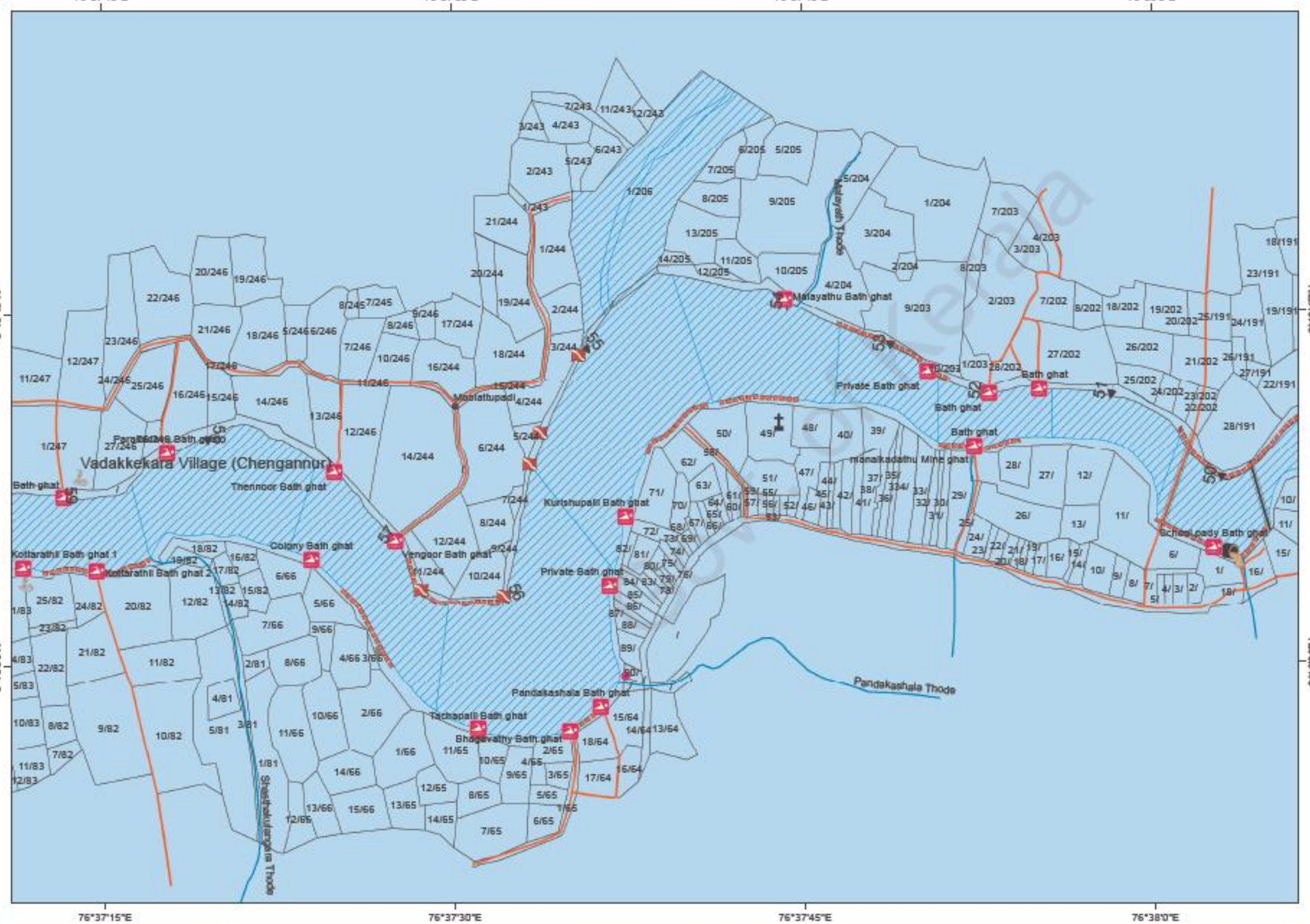
- No sand deposit
- Profile
- Bathghat
- Pump house
- Temple
- Water intake point
- Waste water discharge
- Breakwater
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Aranmula Panchayat
- Koipuram Panchayat
- Chengannur Muncipality
- Village Boundary

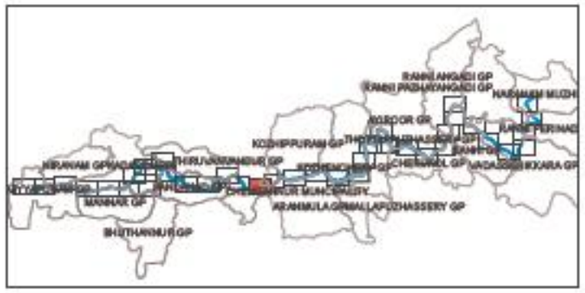
PAMBA RIVER- ALAPPUZHA DISTRICT

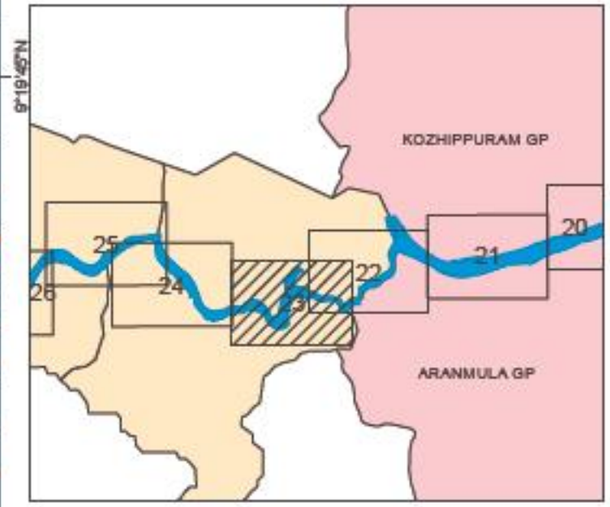
SAND VOLUME DISTRIBUTION MAP - 4.1.23

CHENGANNUR MUNCIPALITY

1 Cm = 50 Mtrs







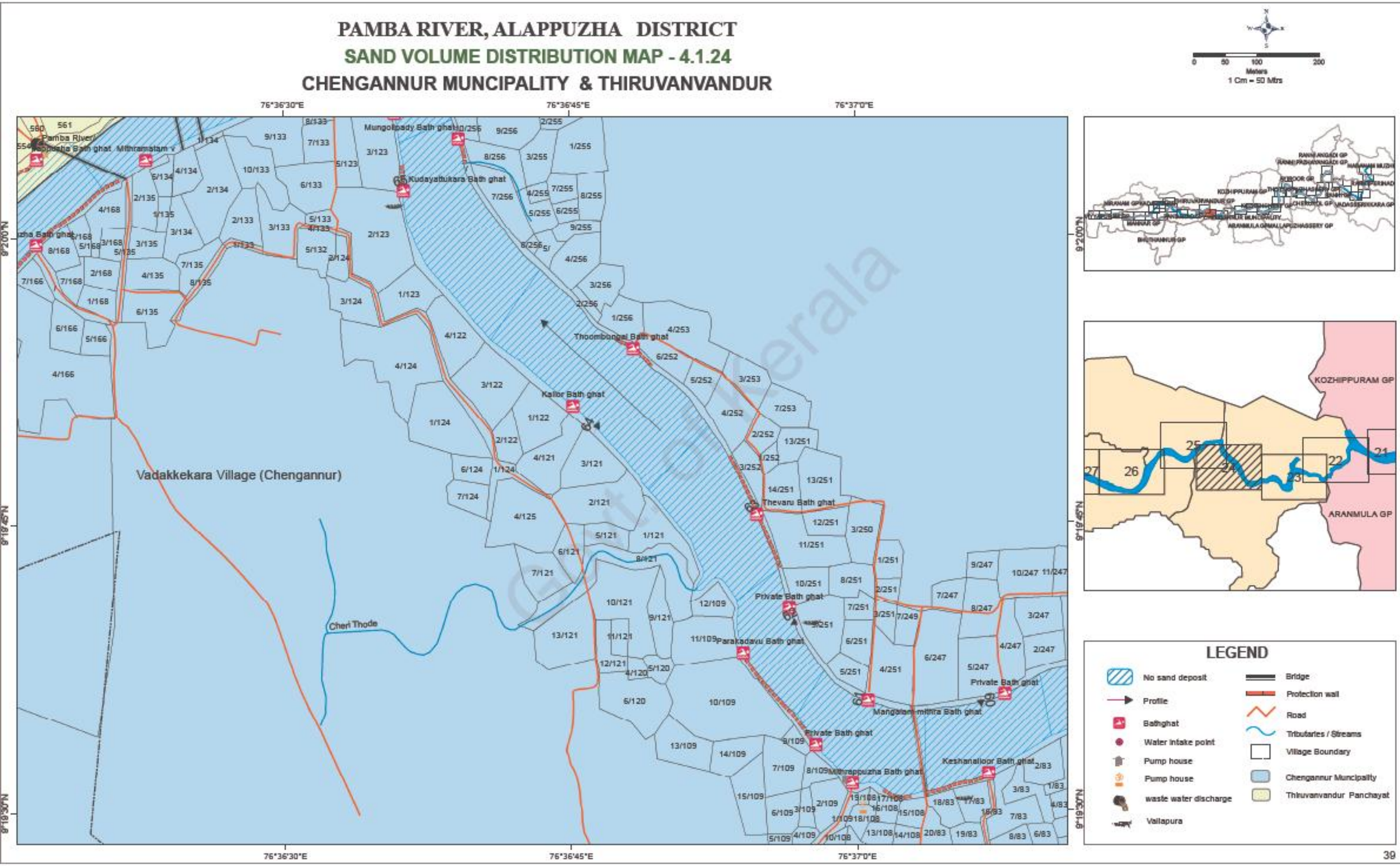
LEGEND

- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- Church
- Kavu
- Waste water discharge
- Ferryghat
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Chengannur Muncipality
- Village Boundary

PAMBA RIVER, ALAPPUZHA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.24

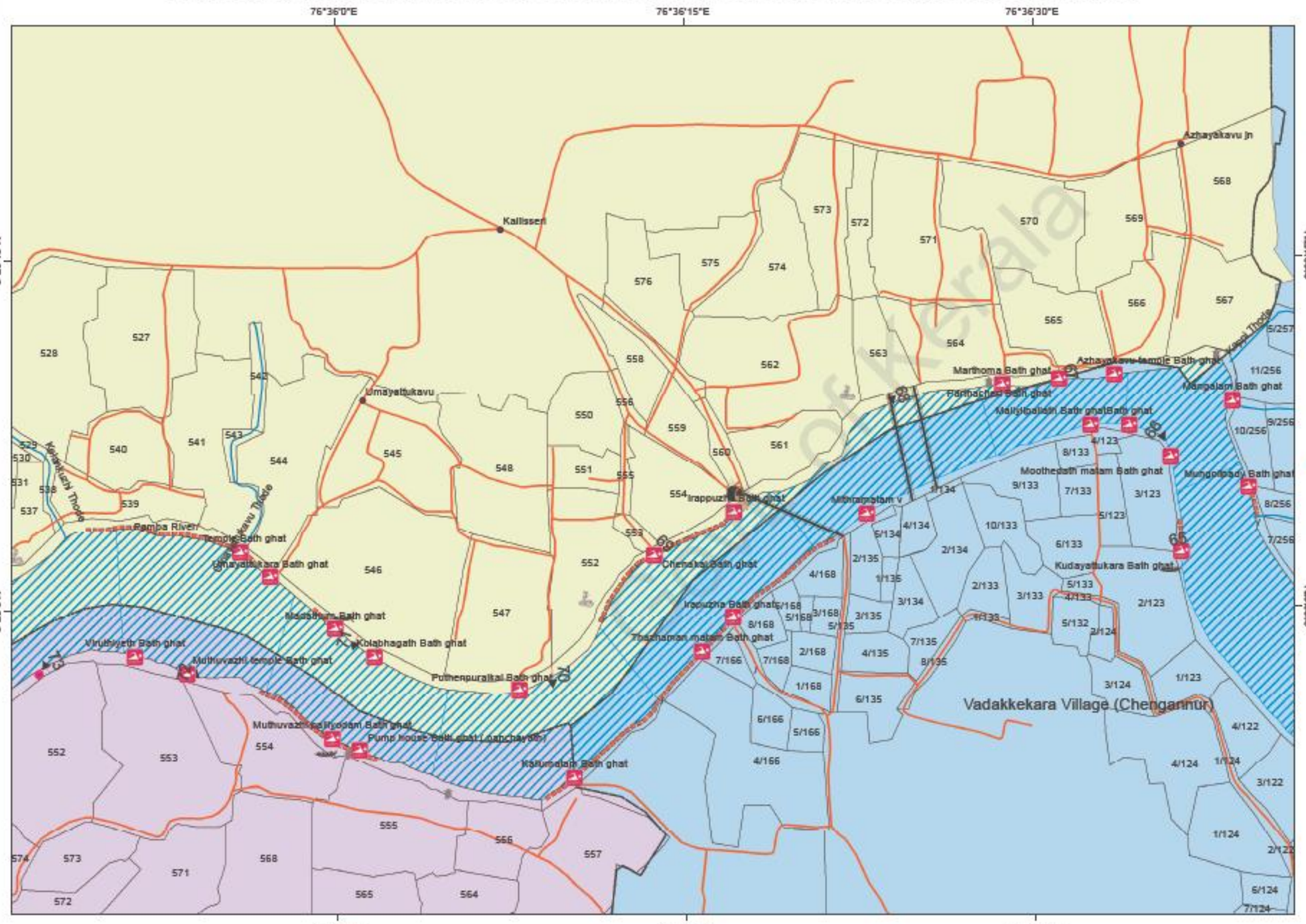
CHENGANNUR MUNCIPALITY & THIRUVANVANDUR

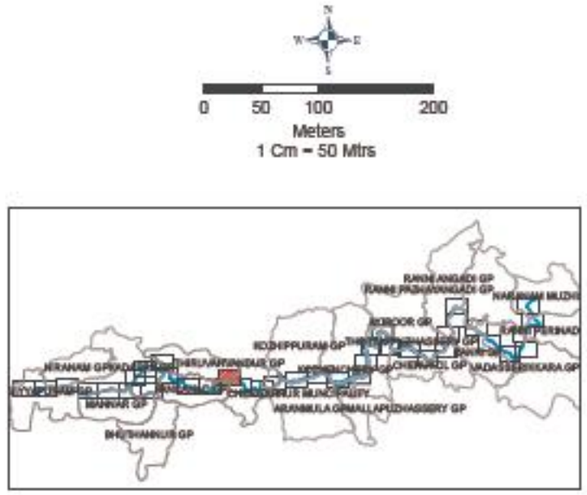


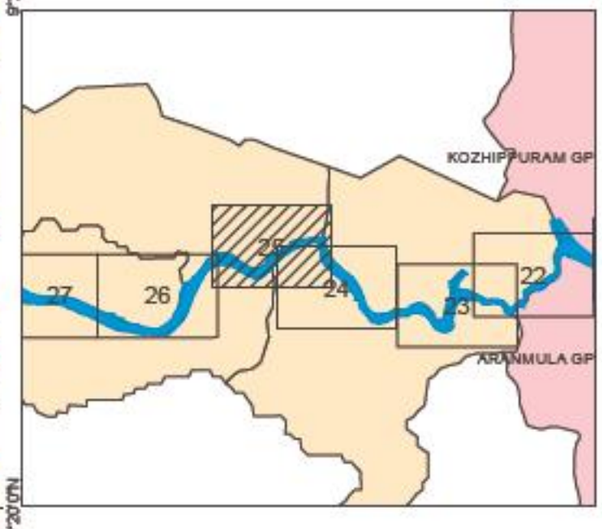
PAMBA RIVER, ALAPPUZHA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.25

PANDANAD, THIRUVANVANDUR GRAMA PANCHAYATS & CHENGANNUR MUNCIPALITY







0 50 100 200
Meters
1 Cm = 50 Mtrs

LEGEND

- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- Kavu
- Waste water discharge
- Vallapura
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Chengannur Muncipality
- Thiruvanvandur Panchayat
- Pandanad Panchayat
- Village Boundary

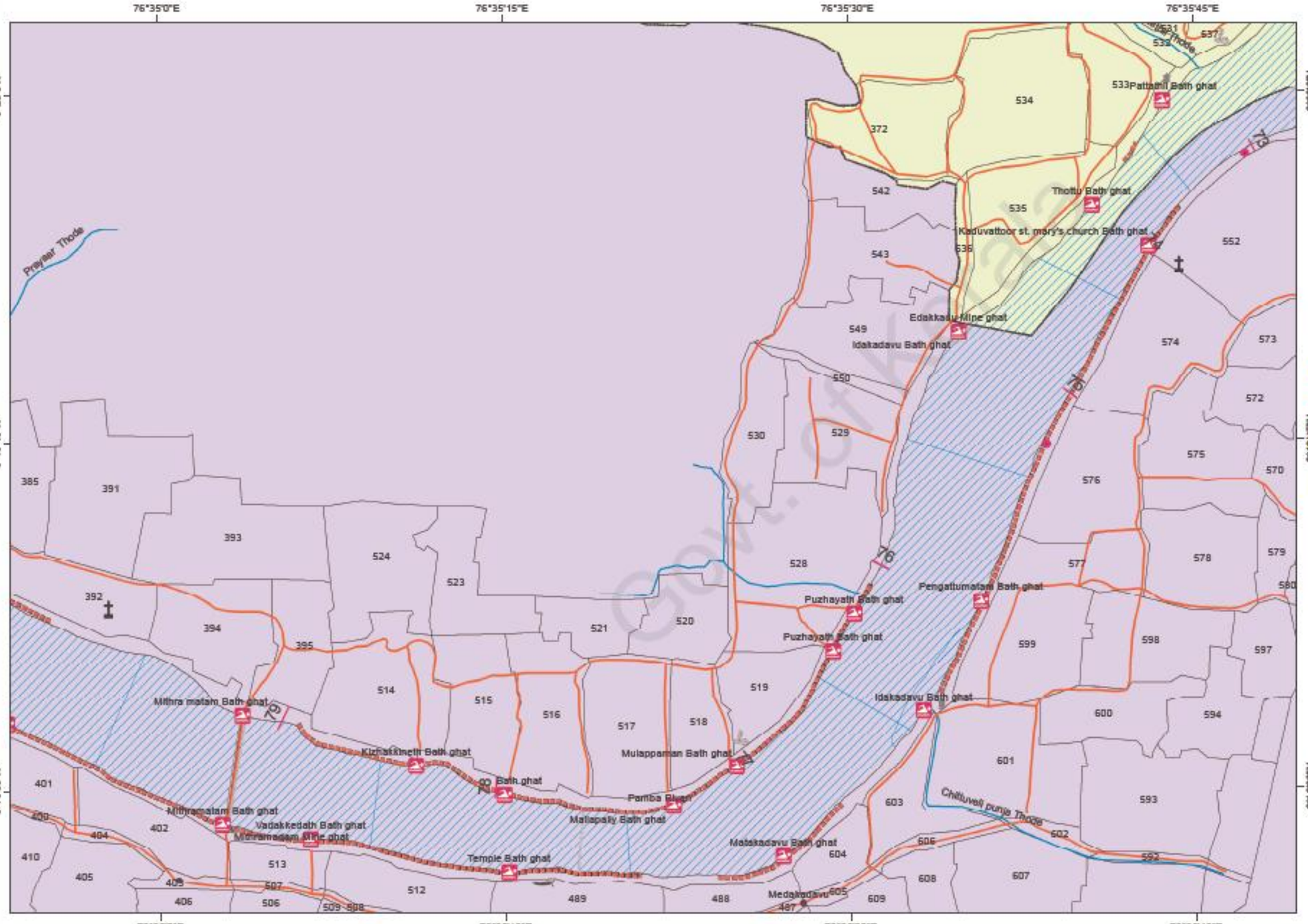
PAMBA RIVER, ALAPPUZHA DISTRICT

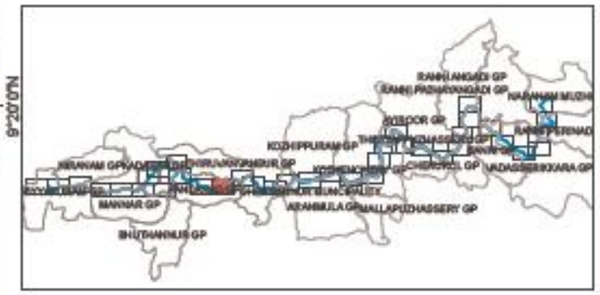
SAND VOLUME DISTRIBUTION MAP - 4.1.26

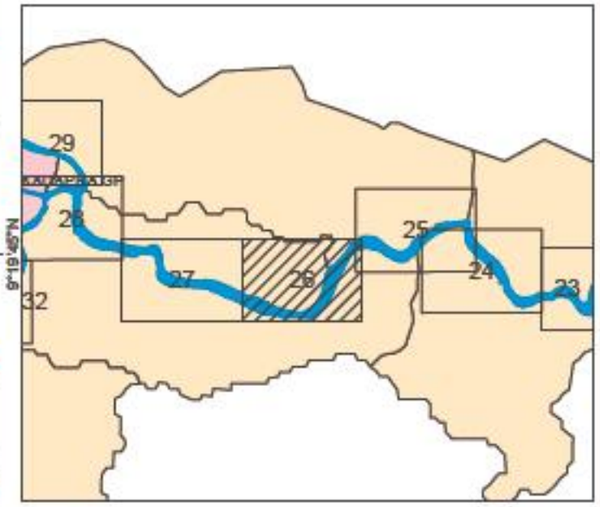
PANDANAD & THIRUVANVANDUR GRAMA PANCHAYATS

0 50 100 200
Meters

1 Cm = 50 Mtrs







LEGEND

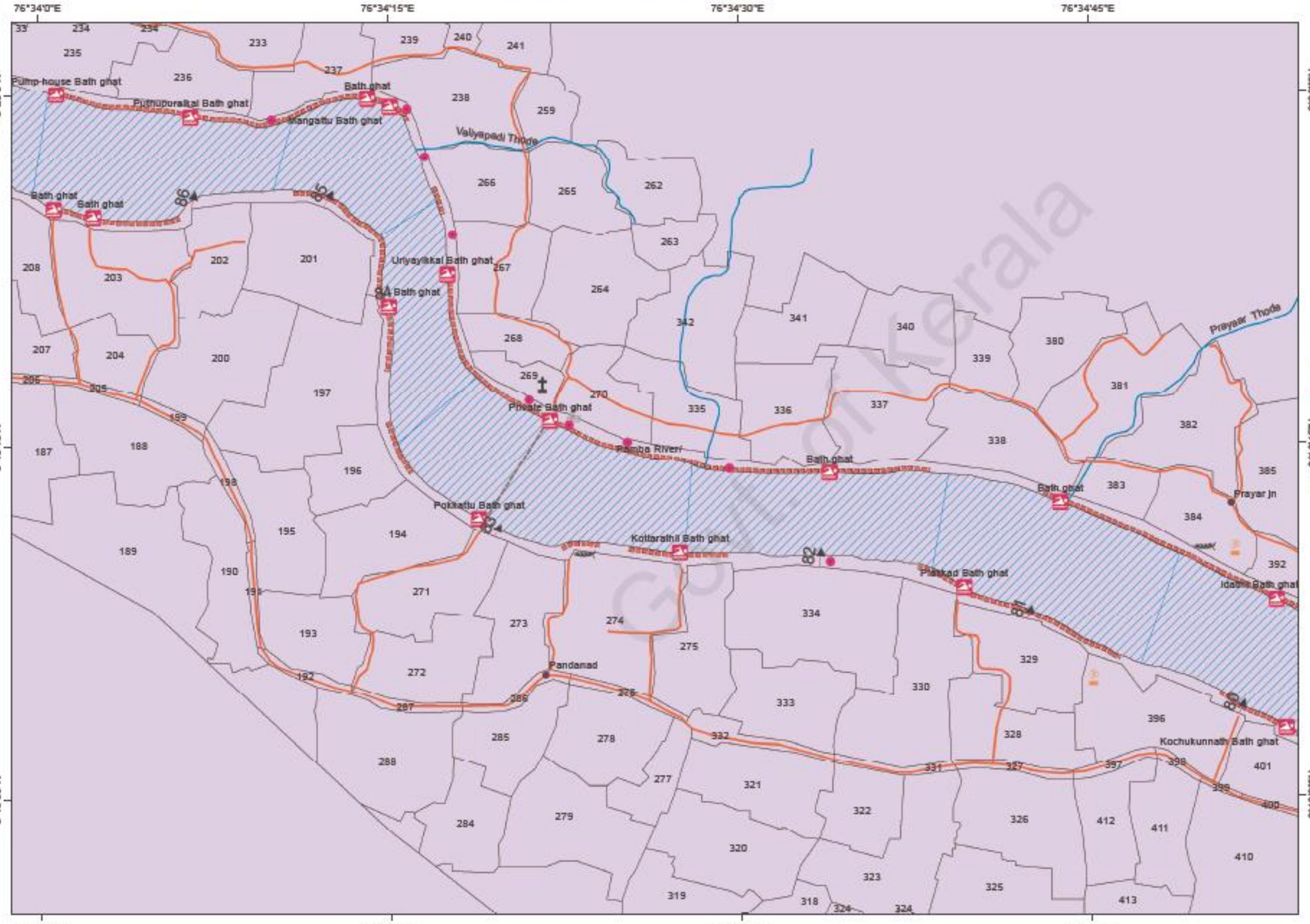
- No sand deposit
- Profile
- Bathghat
- Water intake point
- Mineghat
- Pump house
- Church
- Kavu
- Ferry ghat
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Thiruvanvandur Panchayat
- Pandanad Panchayat
- Village Boundary

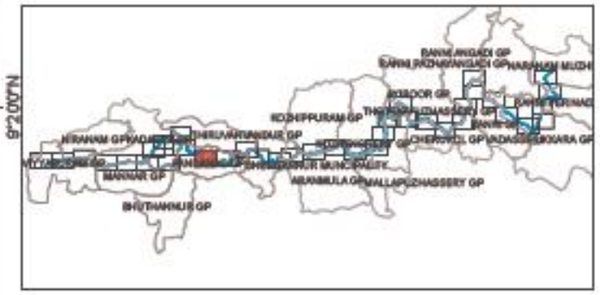
PAMBA RIVER, ALAPPUZHA DISTRICT

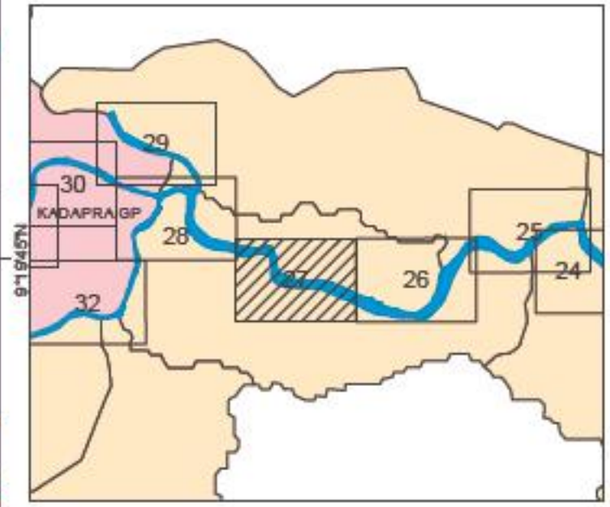
SAND VOLUME DISTRIBUTION MAP - 4.1.27

PANDANAD GRAMA PANCHAYAT

1 Cm = 50 Mtrs







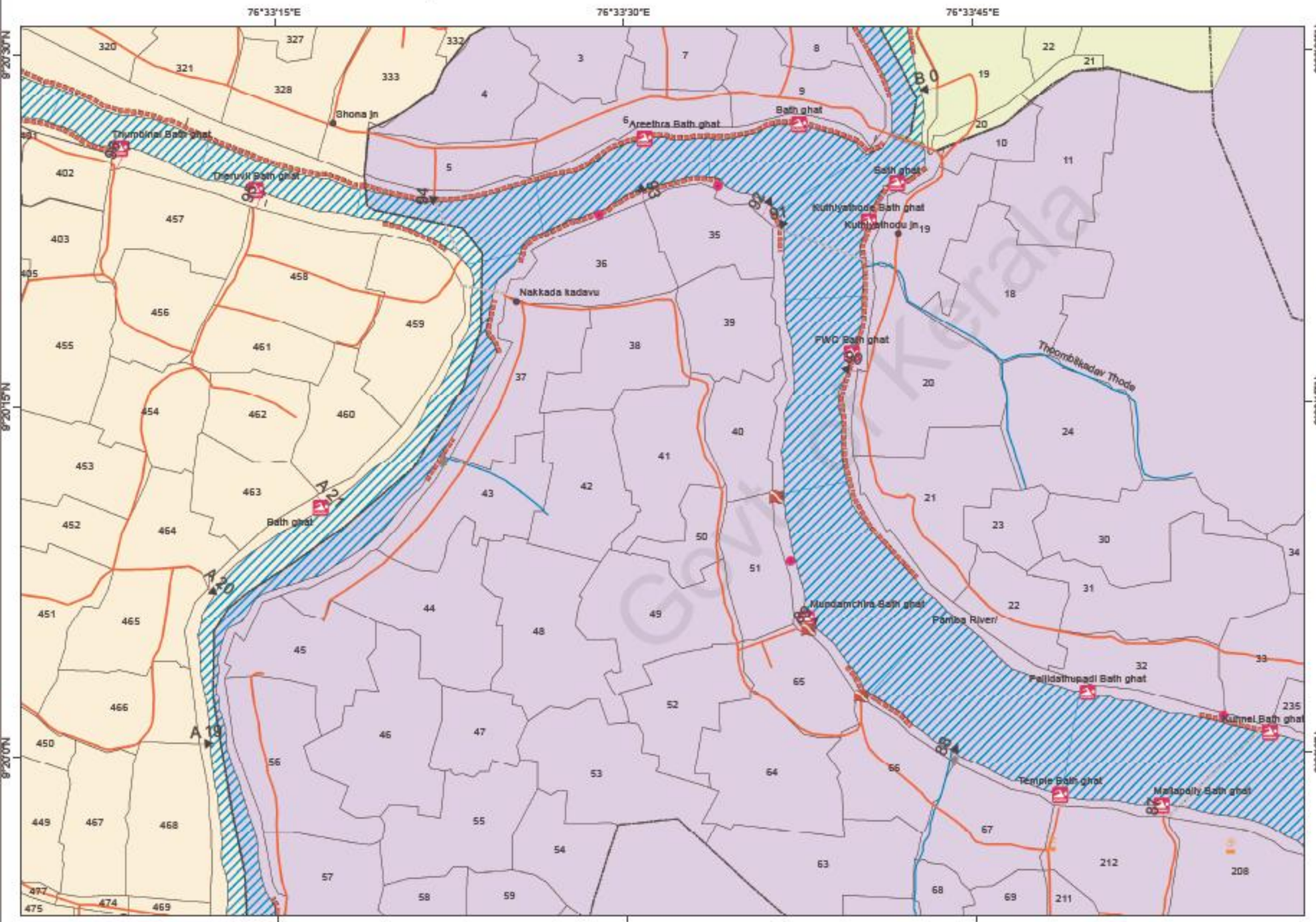
LEGEND

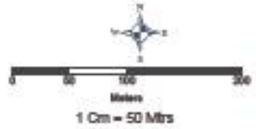
- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- Church
- Temple
- Kavu
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Village Boundary
- Pandanad Panchayat

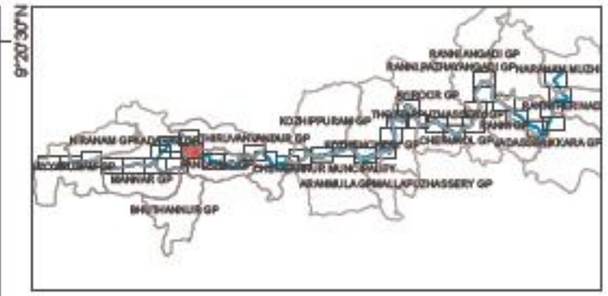
PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

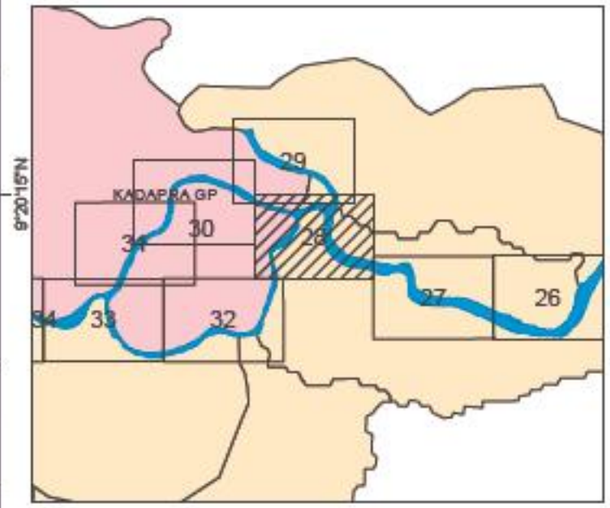
SAND VOLUME DISTRIBUTION MAP - 4.1.28

PANDANAD, KADAPRA & THIRUVANVANDUR GRAMA PANCHAYATS









LEGEND

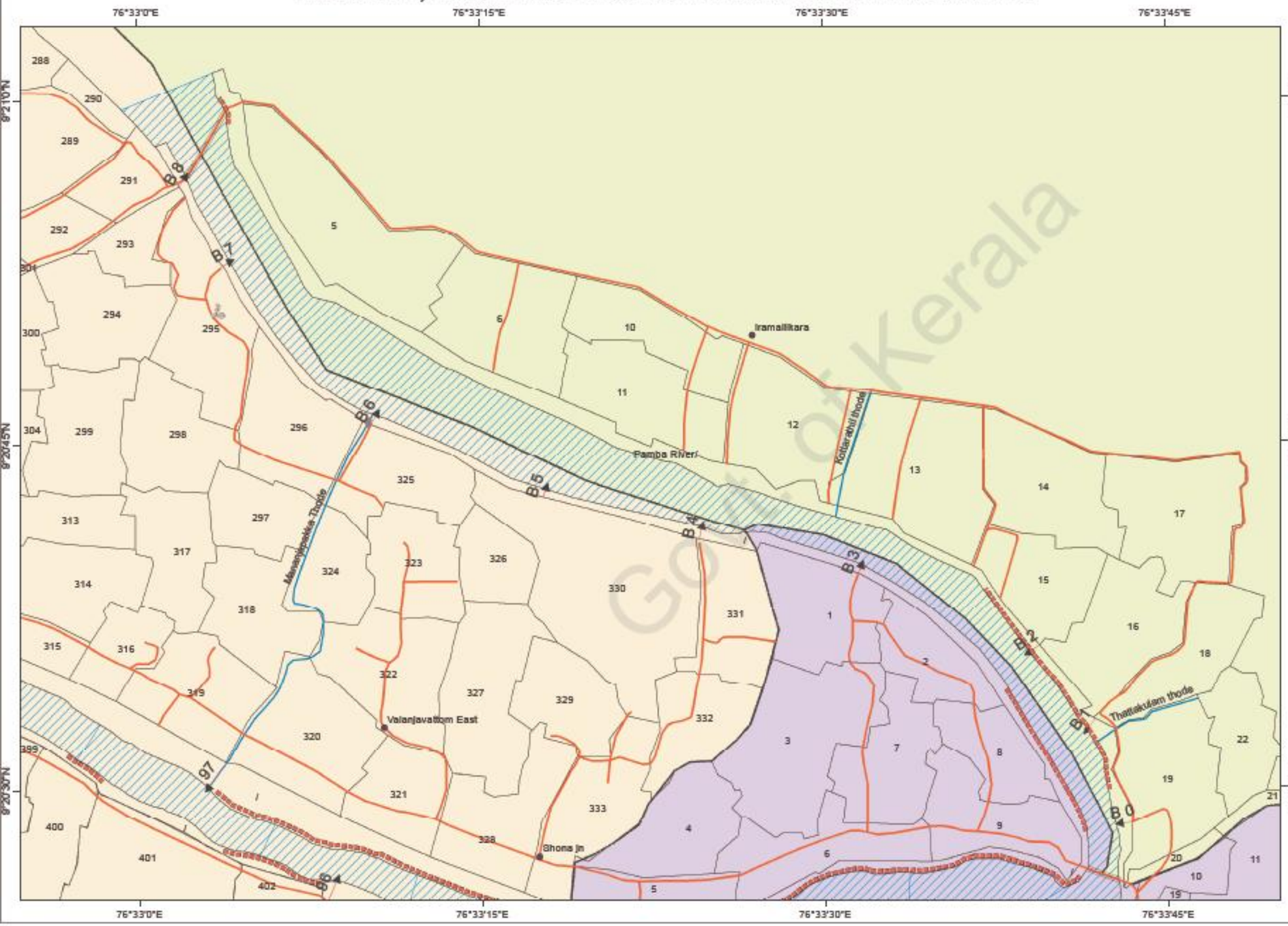
- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- Temple
- Break water
- Ferry ghat
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Pandanad Panchayat
- Thiruvanvandur Panchayat
- Kadapra Panchayat
- Village Boundary

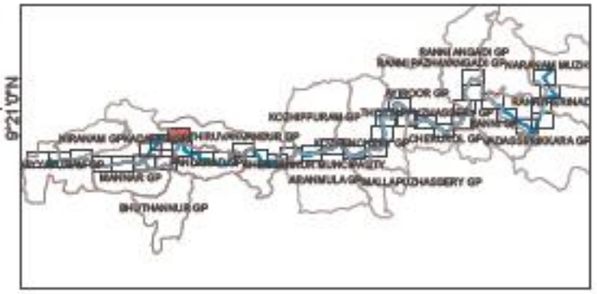
PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

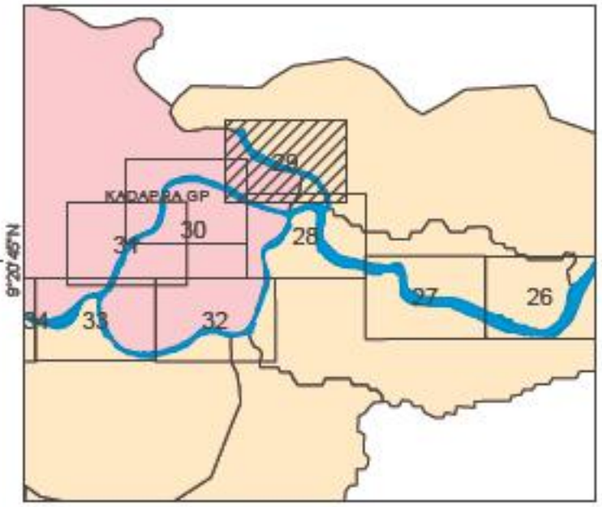
SAND VOLUME DISTRIBUTION MAP - 4.1.29

PANDANAD, KADAPRA & THIRUVANVANDUR GRAMA PANCHAYATS

0 50 100 200
Meters
1 Cm = 50 Mtrs







LEGEND

- No sand deposit
- Profile
- Bathghat
- Pump house
- Kavu
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Pandanad Panchayat
- Thiruvanvandur Panchayat
- Kadapra Panchayat
- Village Boundary

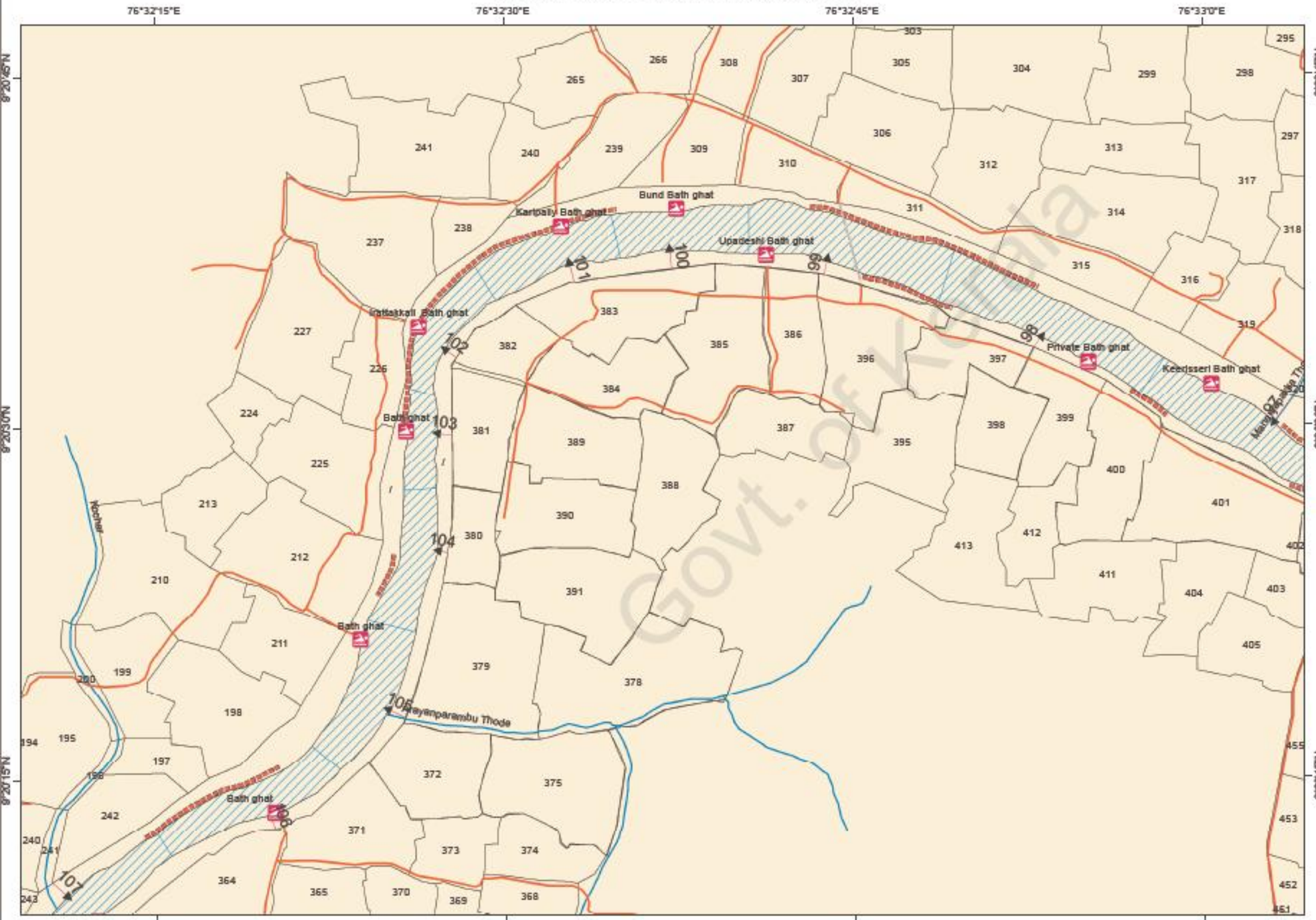
Govt of Kerala

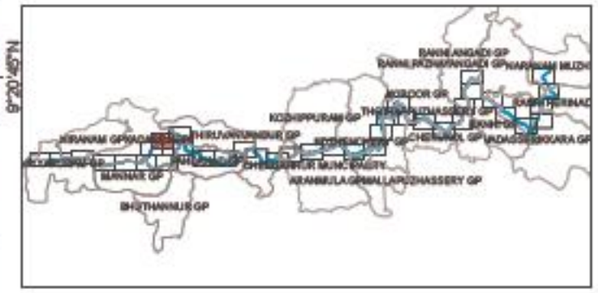
PAMBA RIVER, PATHANAMTHITTA DISTRICT

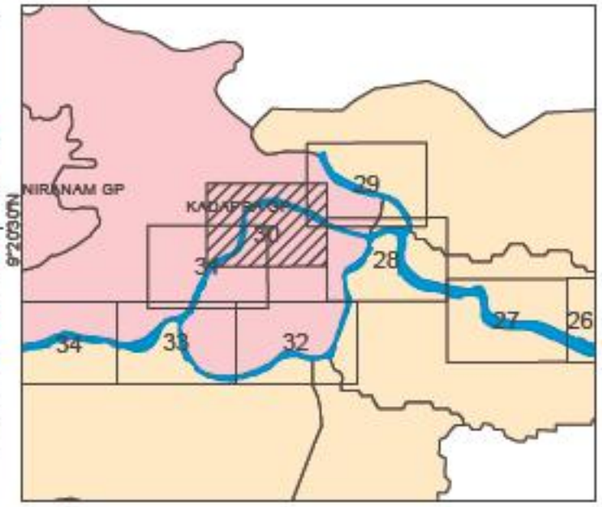
SAND VOLUME DISTRIBUTION MAP - 4.1.30

KADAPRA GRAMA PANCHAYAT

1 Cm = 50 Mtrs







LEGEND

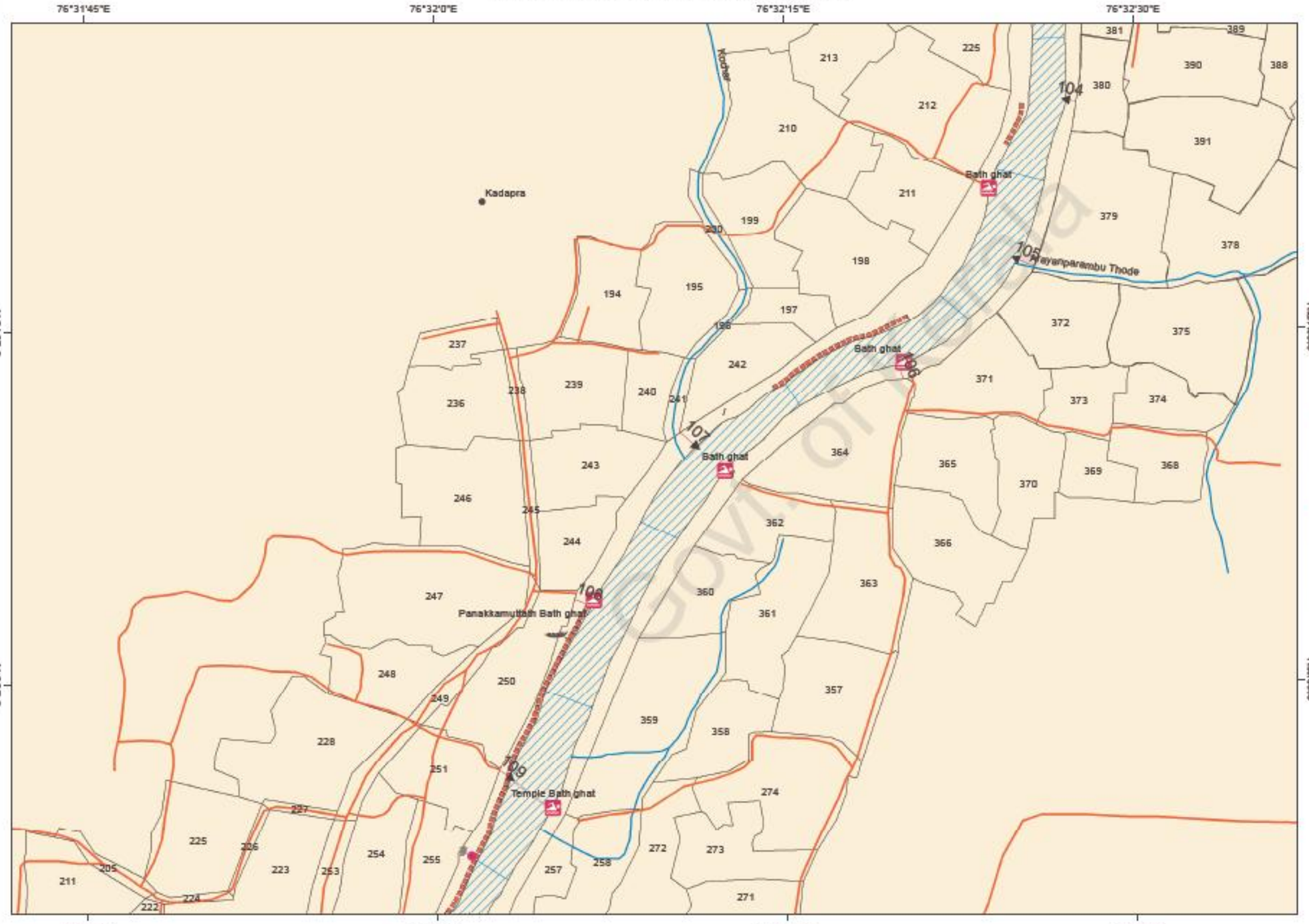
- No sand deposit
- Profile
- Bathghat
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Kadapra Panchayat
- Village Boundary

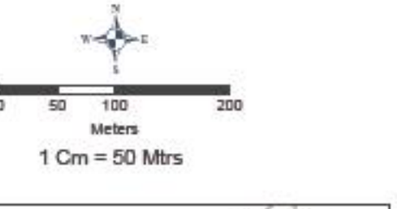
Govt. of Kerala

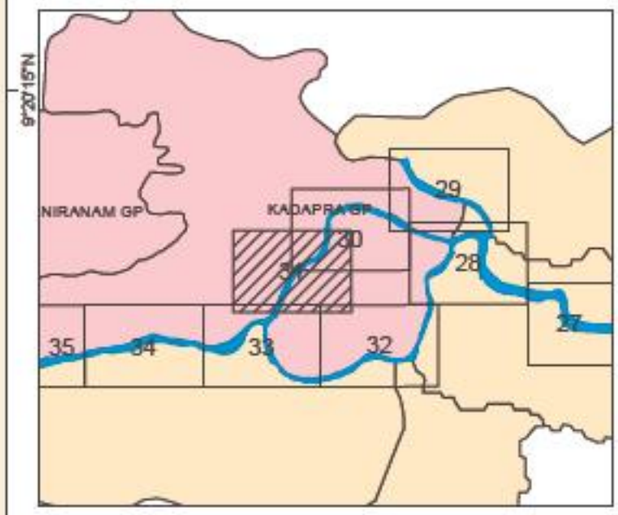
PAMBA RIVER, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.31

KADAPRA GRAMA PANCHAYAT







0 50 100 200
Meters
1 Cm = 50 Mtrs

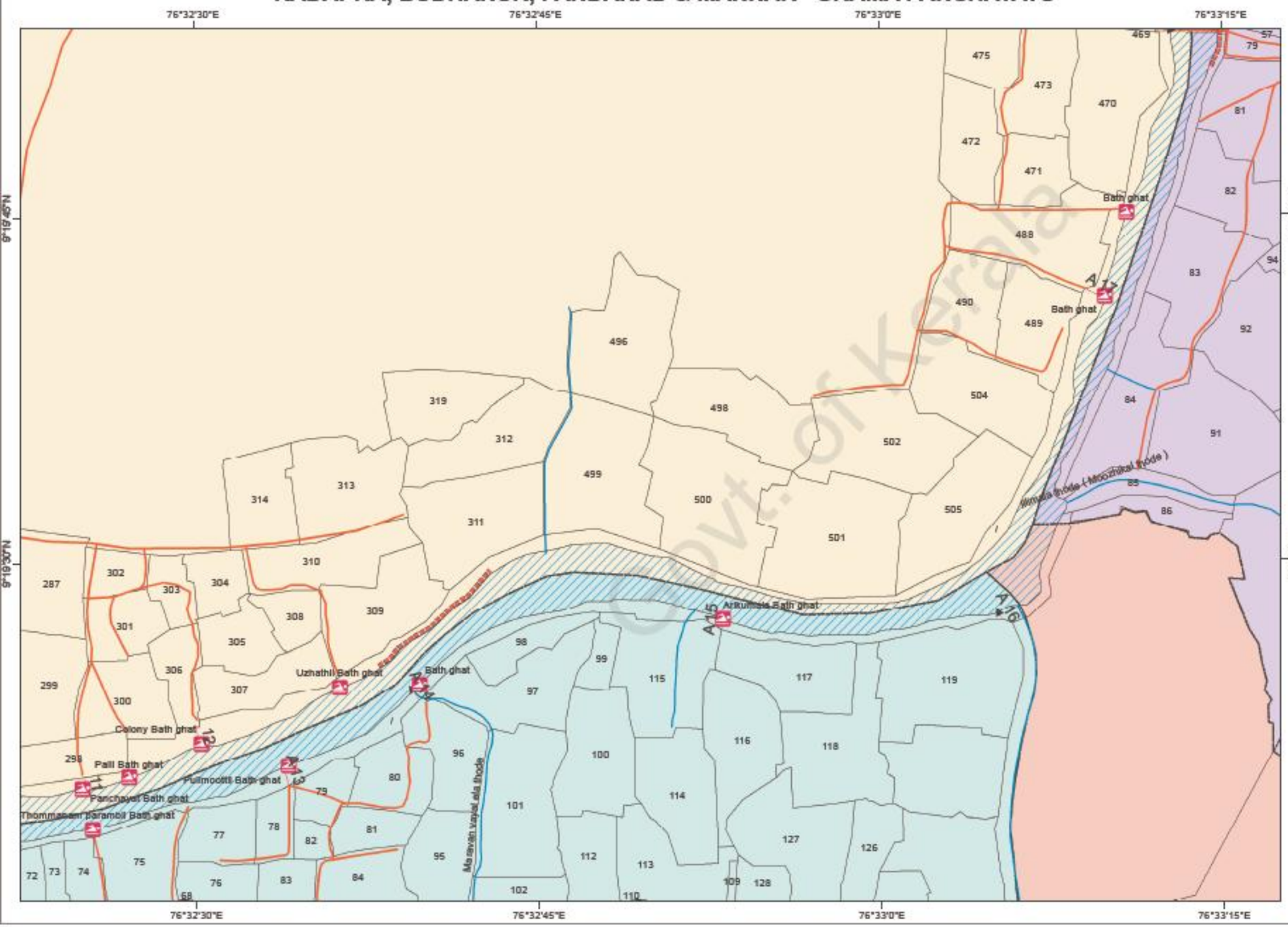
LEGEND

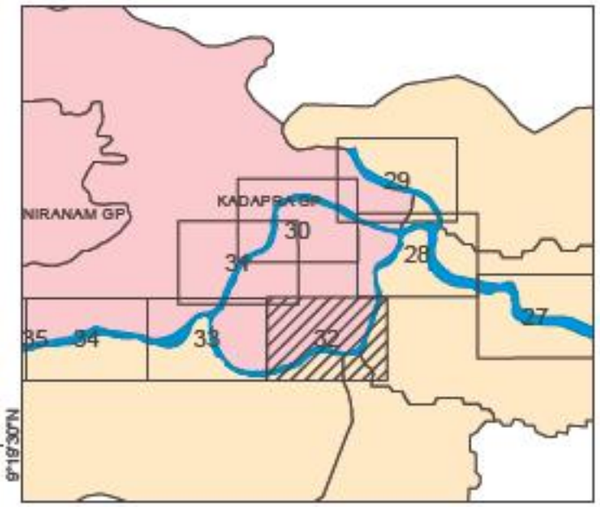
- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Kadapra Panchayat
- Village Boundary

PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.32

KADAPRA, BUDHANUR, PANDANAD & MANNAR GRAMA PANCHAYATS





LEGEND

- No sand deposit
- Profile
- Bathghat
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Kadapra Panchayat
- Pandanad panchayat
- Budhanur Panchayat
- Mannar Panchayat
- Village Boundary

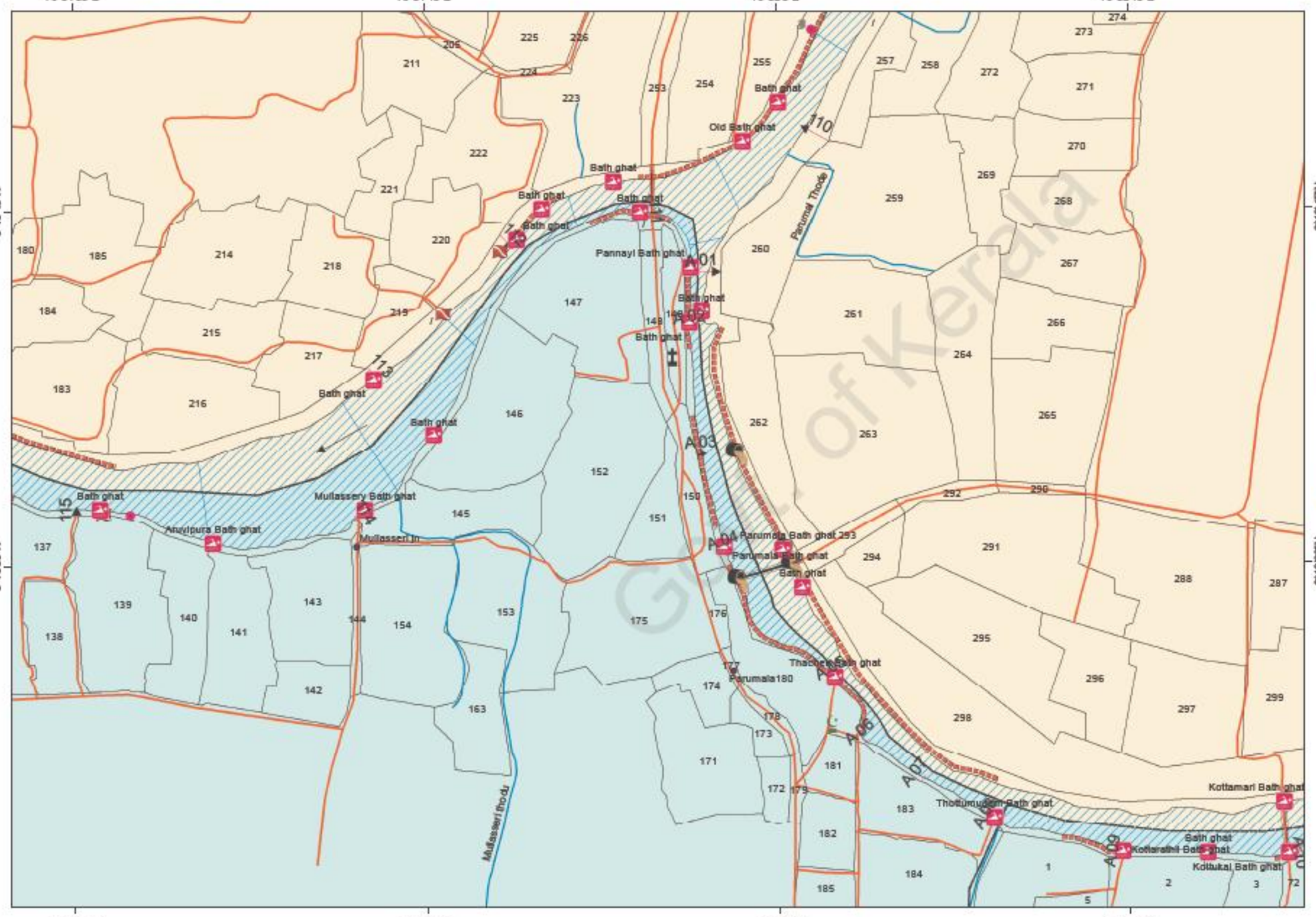
Govt. of Kerala

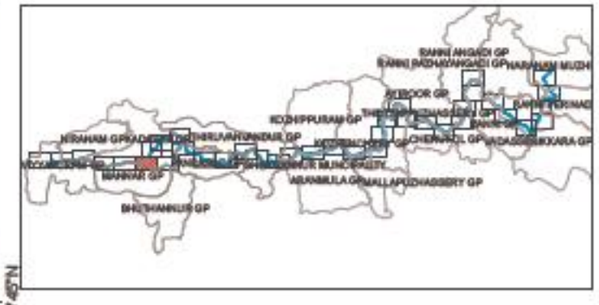
PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

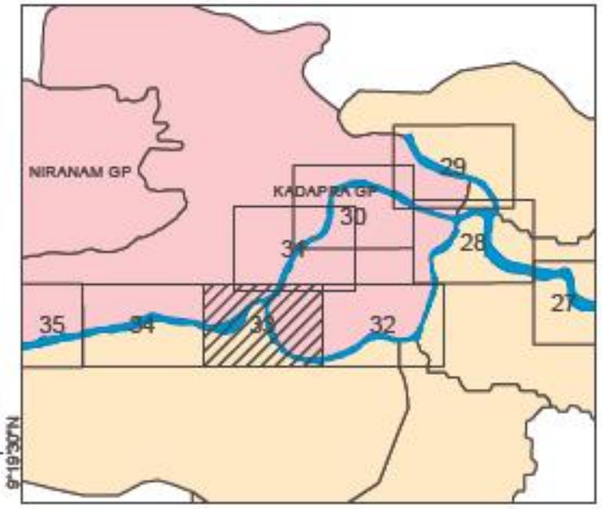
SAND VOLUME DISTRIBUTION MAP - 4.1.33

KADAPRA & MANNAR GRAMA PANCHAYATS

0 50 100 200
Meters
1 Cm = 50 Mtrs







LEGEND

- No sand deposit
- Profile
- Bathghat
- Water intake point
- Pump house
- waste water discharge
- Mosque
- Church
- Break water
- Bridge
- Protection wall
- Road
- Tributaries / Streams
- Kadapra Panchayat
- Mannar Panchayat
- Village Boundary

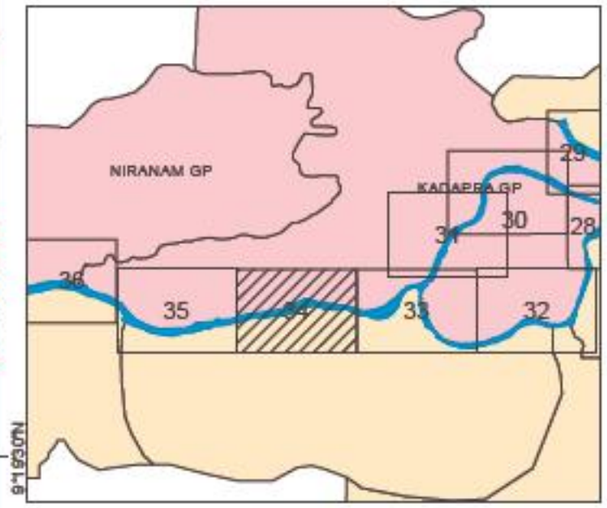
Government of Kerala

PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.34

KADAPRA & MANNAR GRAMA PANCHAYATS

0 50 100 200
Meters
1 Cm = 50 Mtrs



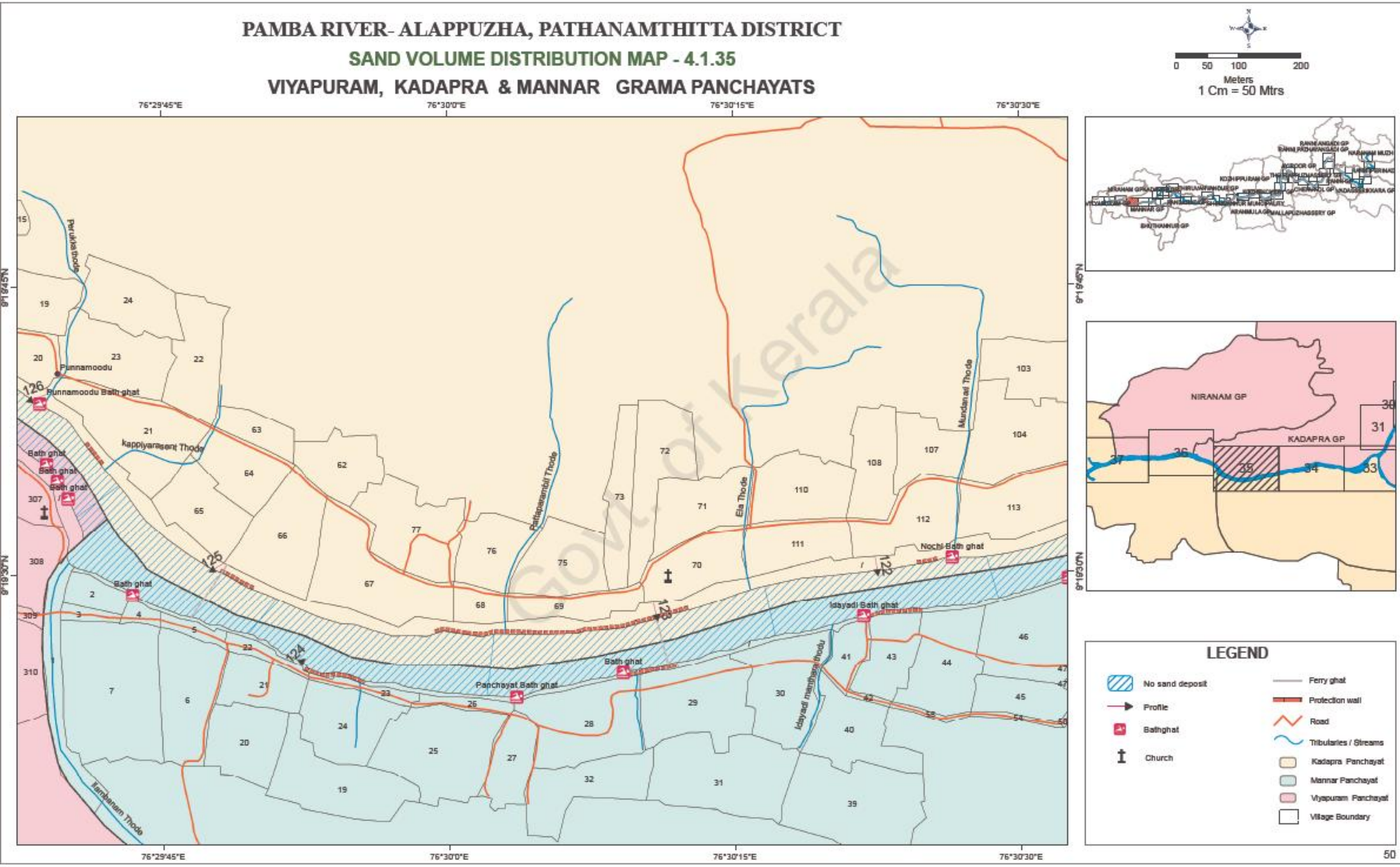
LEGEND

- No sand deposit
- Profile
- Bathghat
- Water intake point
- Church
- Vallapura
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Kadapra Panchayat
- Mannar Panchayat
- Village Boundary

PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.35

VIYAPURAM, KADAPRA & MANNAR GRAMA PANCHAYATS

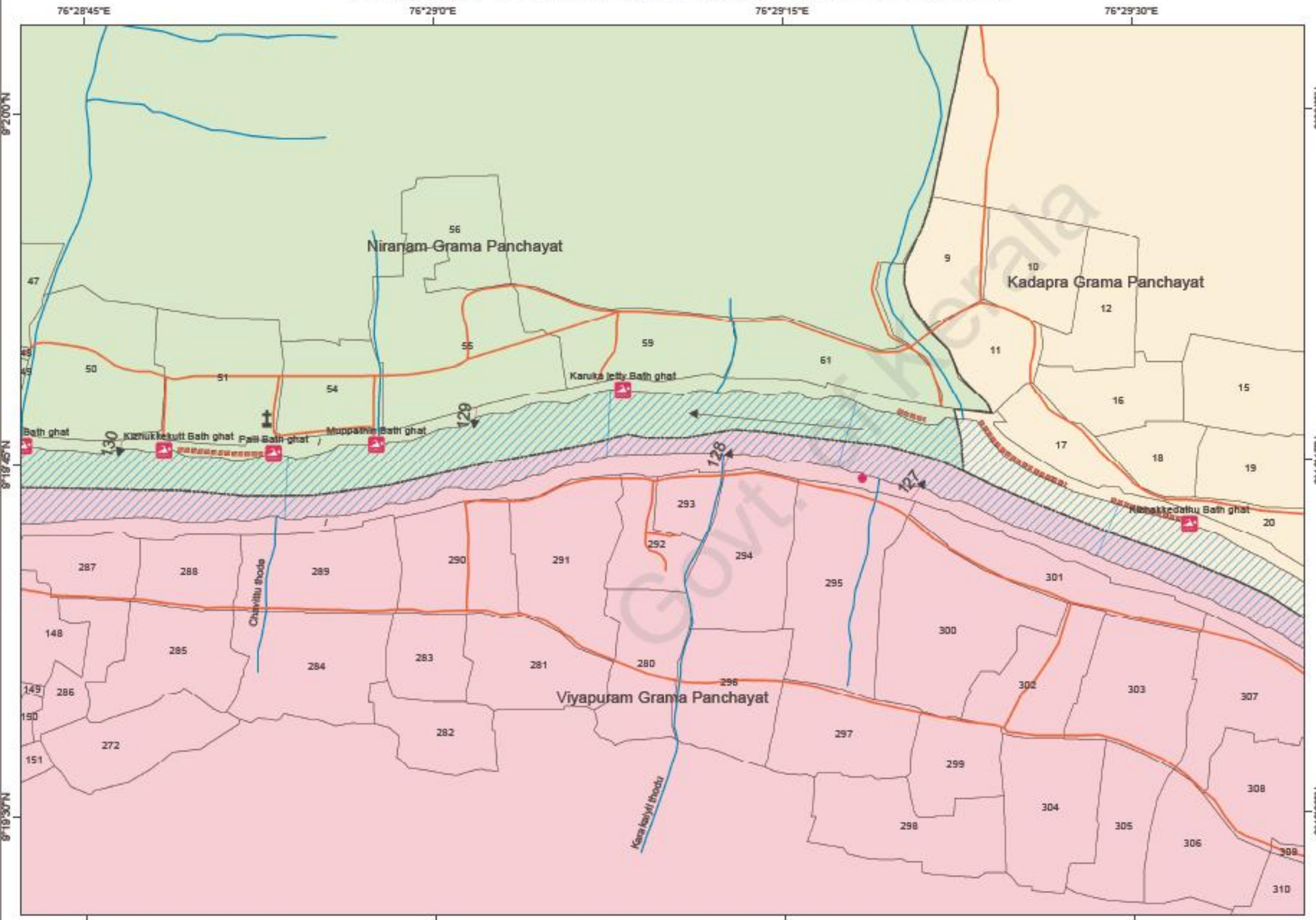


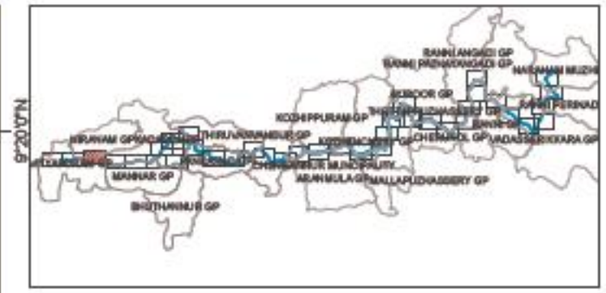
PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

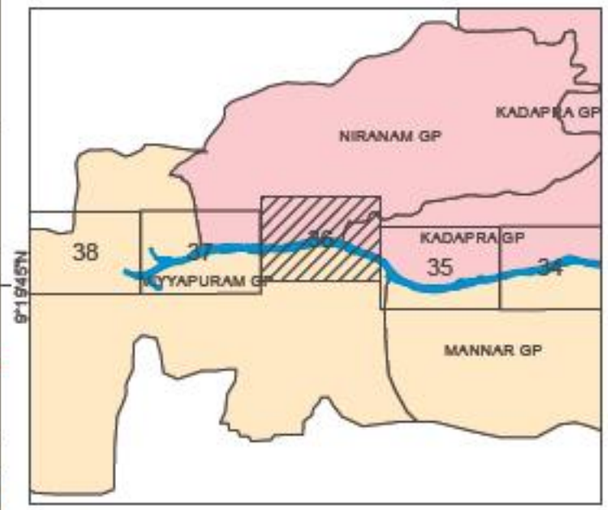
SAND VOLUME DISTRIBUTION MAP - 4.1.36

VIYAPURAM, KADAPRA & NIRANAM GRAMA PANCHAYATS

0 50 100 200
Meters
1 Cm = 50 Mtrs







LEGEND

- No sand deposit
- Profile
- Bathghat
- Water intake point
- Church
- Protection wall
- Road
- Tributaries / Streams
- Kadapra Panchayat
- Viyapuram Panchayat
- Niranam Panchayat
- Village Boundary

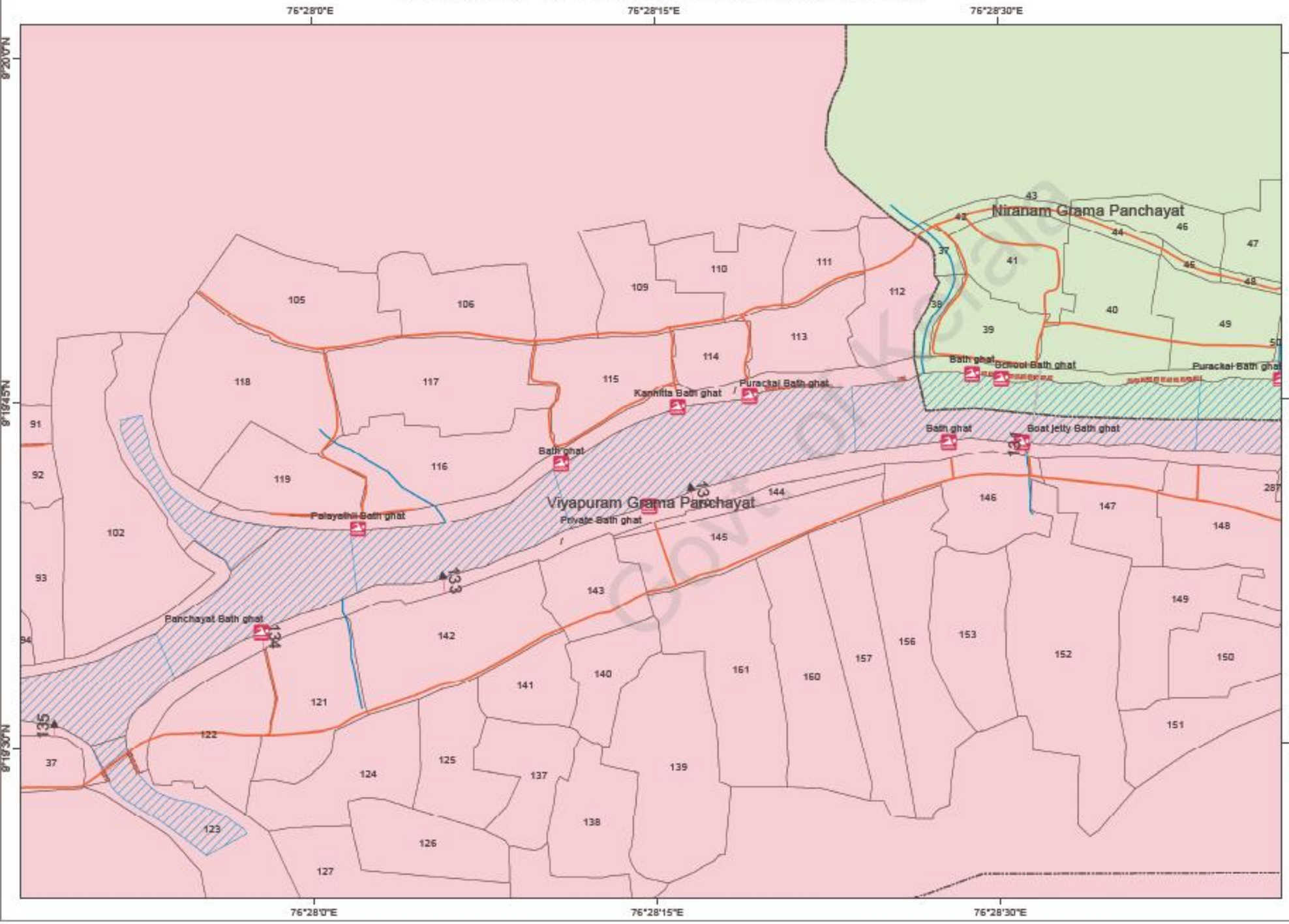
Govt. of Kerala

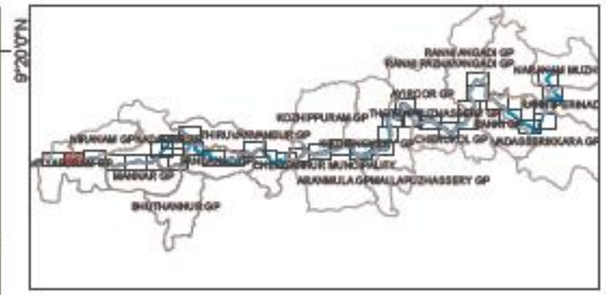
PAMBA RIVER- ALAPPUZHA, PATHANAMTHITTA DISTRICT

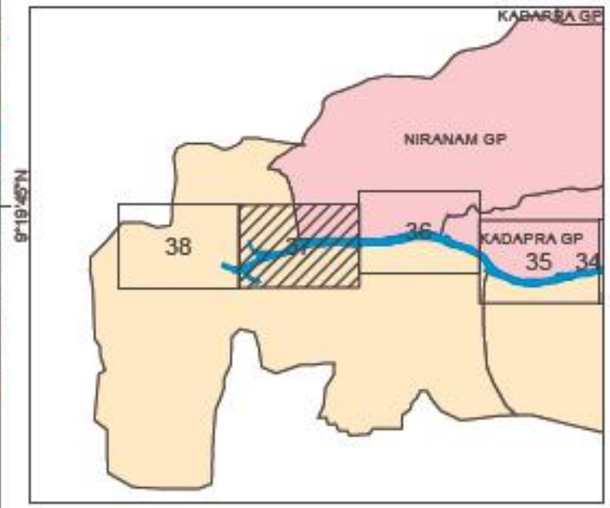
SAND VOLUME DISTRIBUTION MAP - 4.1.37

VIYAPURAM & NIRANAM GRAMA PANCHAYATS

0 50 100 200
Meters
1 Cm = 50 Mtrs







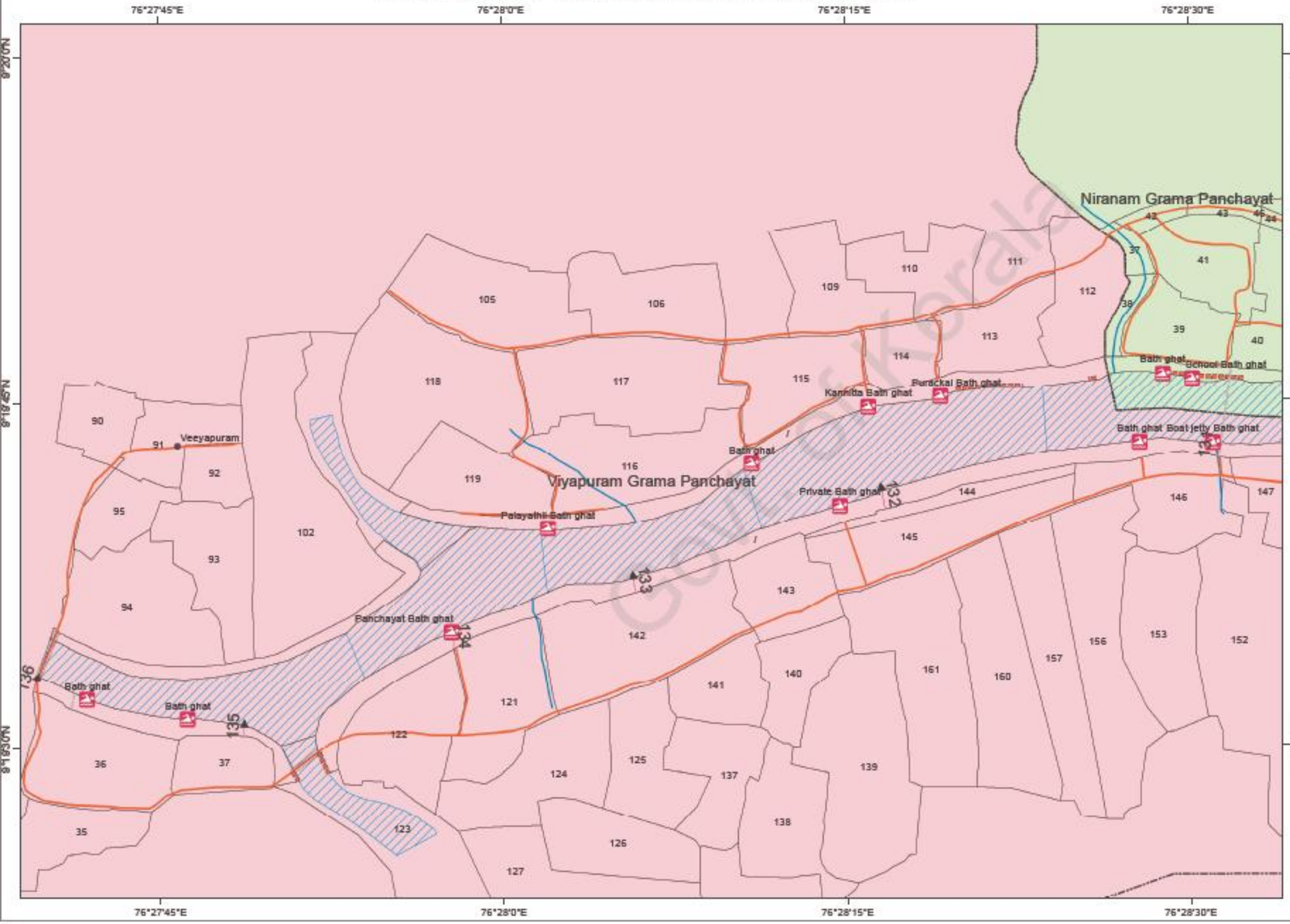
LEGEND

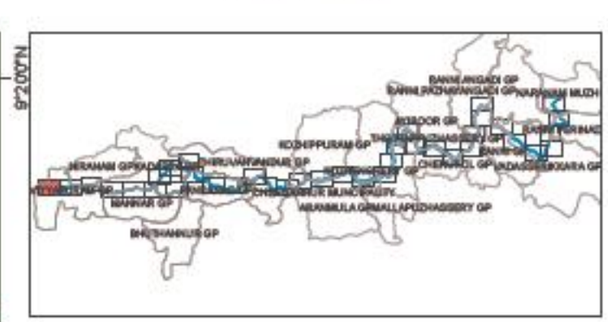
- No sand deposit
- Profile
- Bathghat
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Viyapuram Panchayat
- Niranam Panchayat
- Village Boundary

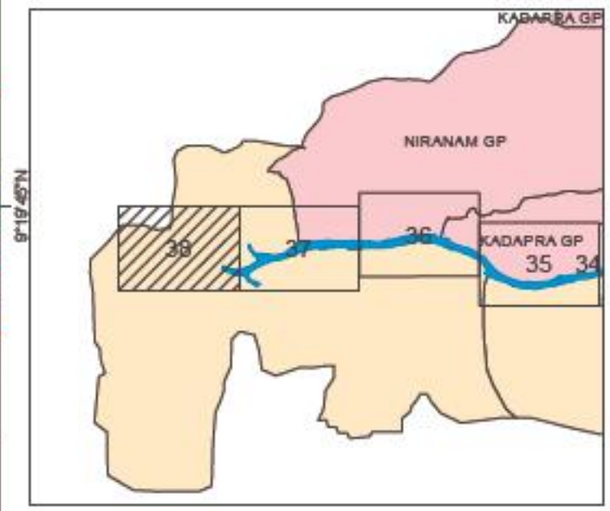
PAMBA RIVER, ALAPPUZHA DISTRICT

SAND VOLUME DISTRIBUTION MAP - 4.1.38

VIYAPURAM & NIRANAM GRAMA PANCHAYATS







LEGEND

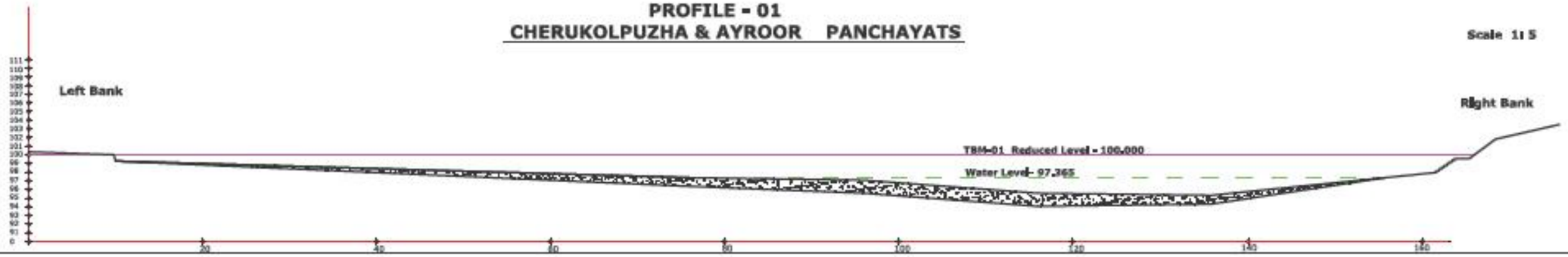
- No sand deposit
- Profile
- Bathghat
- Bridge
- Ferry ghat
- Protection wall
- Road
- Tributaries / Streams
- Viyapuram Panchayat
- Niranam Panchayat
- Village Boundary

Cross section of sand profile- Volume I

Govt. of Kerala

PROFILE - 01
CHERUKOLPUZHA & AYROOR PANCHAYATS

Scale 1: 5



FIELD BOOK

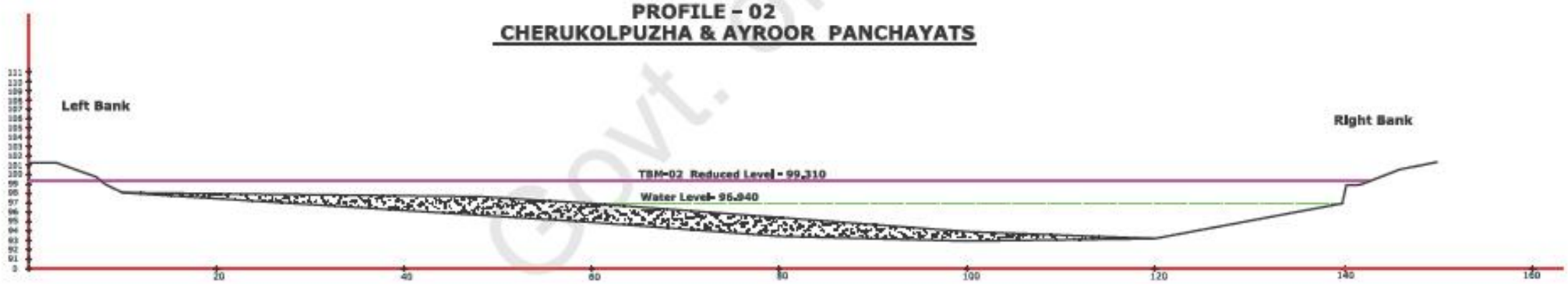
Sight To	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
TBM-1	0.210			100.210	100.000			TBM 1 at cherukolpuzha kadavu
P1		0.935			99.275			Right bank
P2		2.845			97.365		1	Right water level
P3		3.135			97.075		1.5	Water
P4		4.635			95.575		1.5	Water
P5		4.885			95.325		1.5	Water
P6		5.135			95.075		1	Water
P7		2.845			97.365			Left water level
P8		1.785			98.425			step
P9		0.445			99.765			Right bank
CP			2.085		98.125			Change point

Details

Cross Sectional Area Of Sand	:	123.00 M²
Cross Sectional Area Of Sand Above Waterlevel	:	21.66 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	:	85.12 M²
Cross Sectional Area Of Sand (cherukolpuzha)	:	3.39 M²
Cross Sectional Area Of Sand(Ayroor)	:	53.39 M²

TBM 01 Marked On Protection Wall (right Bank) Cherukolpuzha
TBM Cadastral Plot No: 75 (Ayroor Village)

PROFILE – 02
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

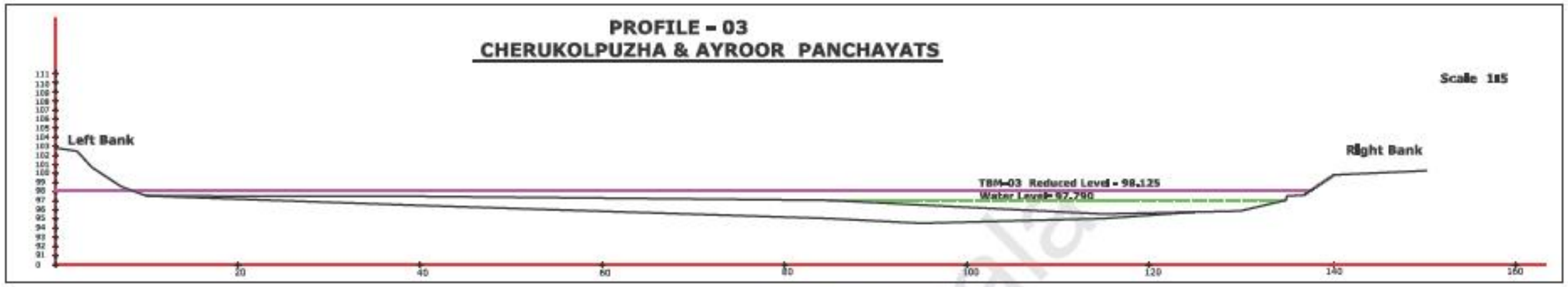
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.390			100.515	98.125			Change point
CP	1.460		2.285	99.690	98.230			Change point
P1		1.635			98.055		1	Left Bank
P2		2.750			96.940		2	Left Water level
P3		4.250			95.440		2	Water
P4		5.750			93.940		1	Water
P5		6.500			93.190			Water
P6		2.740			96.950			Right Water level
TBM-02		0.880			99.310			Marked on Right Bank Protection Bank
P7		1.695			97.995			Right Bank
CP			2.625		97.065			Change point

Details

Cross Sectional Area Of Sand	:	123.00 M²
Cross Sectional Area Of Sand Above Waterlevel	:	21.66 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	:	85.12 M²
Cross Sectional Area Of Sand (cherukolpuzha)	:	3.39 M²
Cross Sectional Area Of Sand(Ayroor)	:	53.39 M²

TBM 01 Marked On Protection Wall (right Bank) Cherukolpuzha
TBM Cadastral Plot No: 75 (Ayroor Village)

PROFILE - 03
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.950			99.015	97.065			Change point
P1		1.485			97.530		1	Sand
P2		1.525			97.490		2	Sand
P3		1.225			97.790		2	Left water level
P4		2.450			96.565		1	Water
P5		3.450			95.565		0.5	Water
P6		2.170			96.845			Water
P7		1.225			97.790			Right water level
TBM- 03		0.890			98.125			Marked on step (Right bank kadavu)
P9			1.395		97.620			Change point

Details

Cross Sectional Area Of Sand	: 129.62	M²
Cross Sectional Area Of Sand Above Waterlevel	: 19.79	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 102.03	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 60.91	M²
Cross Sectional Area Of Sand(Ayroor)	: 60.91	M²

TBM 03 Marked On Step (Right Bank)
TBM Cadastral Plot No: 83 (Ayroor Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

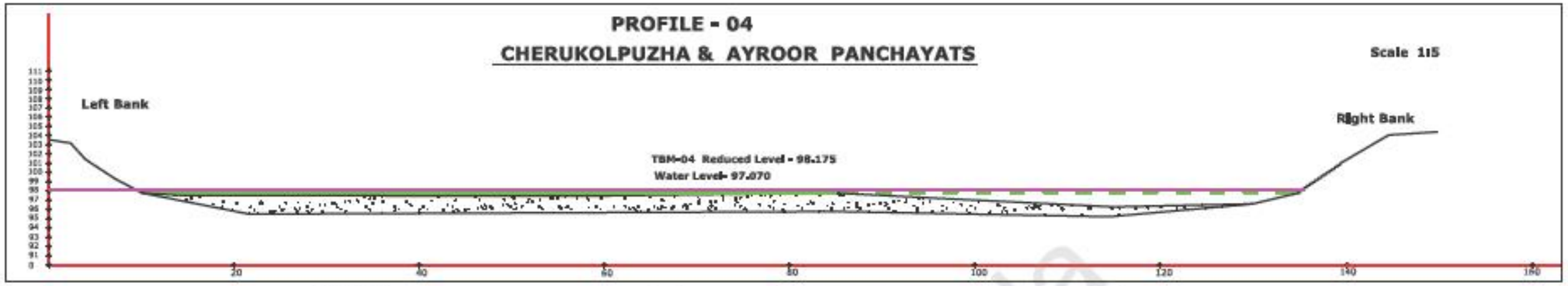
Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
1	150.00	150.00	150.00	75.00	150.00	123.00	18450.00	106.78	16017.000	21.66	3249.000	Cherukolpuzha	53.390	8008.500
	150.00	150.00	150.00	75.00								Ayroor	53.390	8008.500
2	150.00	150.00	150.00	75.00	150.00	141.48	21222.00	117.85	17677.500	29.71	4456.500	Cherukolpuzha	58.925	8838.750
	150.00	150.00	150.00	75.00								Ayroor	58.925	8838.750
3	150.00	150.00	150.00	75.00	150.00	129.62	19443.00	121.82	18273.000	19.79	2968.500	Cherukolpuzha	60.910	9136.500
	150.00	150.00	150.00	75.00								Ayroor	60.910	9136.500
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE - 04

CHERUKOLPUZHA & AYROOR PANCHAYATS

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.625			99.245	97.620			Change point
P1		2.175			97.070			Left water level
P2		3.755			95.490		2	Water
P3		3.755			95.490		2	Water
P4		3.605			95.640		2	Water
P5		3.755			95.490		2	Water
P6		3.605			95.640		1	Water
P7		2.175			97.070			Right water level
TBM-04		1.070			98.175			Marked on step (Right bank kadavu)
P9		0.325			98.920			step
CP		1.305			97.940			bank
CP			2.285		96.960			Change point

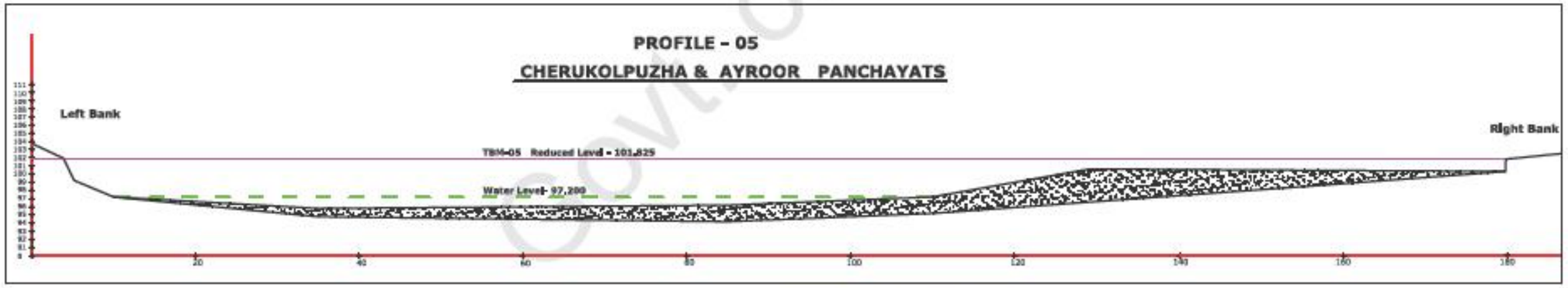
Details

Cross Sectional Area Of Sand	: 184.18	M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 173.24	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 86.62	M²
Cross Sectional Area Of Sand (Ayroor)	: 86.62	M²

TBM 04 Marked On 5th Step From Bottom (right Bank)
TBM Cadastral Plot No: 54 (Ayroor Village)

PROFILE - 05

CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	5.000			101.960	96.960			Change point
TBM-5		0.135			101.825			Right bank protection wall
P2		1.635			100.325		1	Right bed level
P3		2.045			99.915		3	Sand
P4		4.760			97.200		2.5	Right water level
P5		5.760			96.200		1	water
P6		3.160			98.800		1	water
P7		4.760			97.200			Left water level
CP		2.165			99.795			Left bank
			1.680		100.280			Change point

Details

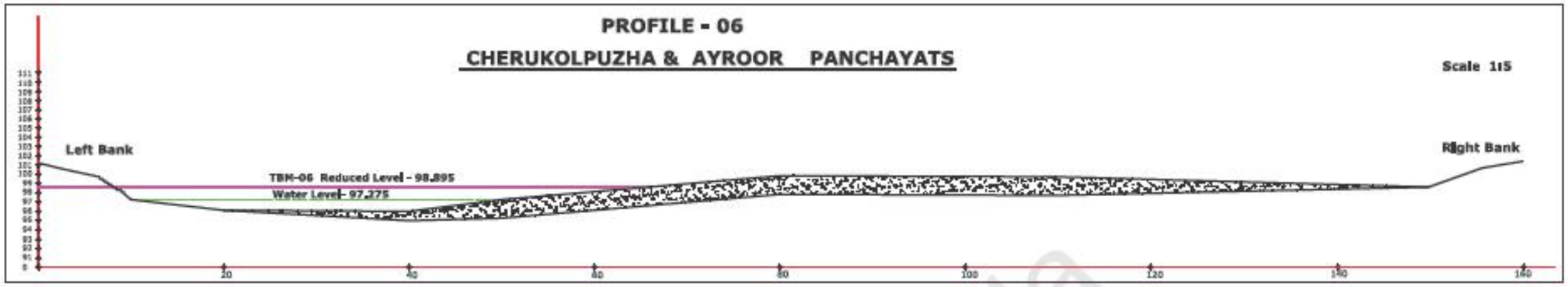
Cross Sectional Area Of Sand	: 298.98	M²
Cross Sectional Area Of Sand Above Waterlevel	: 133.74	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 116.91	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 125.33	M²
Cross Sectional Area Of Sand (Ayroor)	: 125.33	M²

TBM 04 Marked On Top Step Of Pumbhouse Kadavu (right Bank)
TBM Cadastral Plot No: 156 (Ayroor Village)

PROFILE - 06

CHERUKOLPUZHA & AYROOR PANCHAYATS

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.125			103.405	100.280			Change point
TBM-06		4.510			98.895			Marked on step (left bank)
P2		6.130			97.275			Left water level
P3		7.010			96.395		0.5	Water
P4		7.125			96.280		1	Water
P5		6.130			97.275		2	Right water level
P6		3.285			100.120		2	Sand
P7		3.395			100.010		2	Sand
P8		2.025			101.380			Right bank
CP			1.645		101.760			Change point

Details

Cross Sectional Area Of Sand	: 185.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: 136.70	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 48.30	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 92.5	M²
Cross Sectional Area Of Sand (Ayroor)	: 92.5	M²

TBM 06 Marked On 1st Step From Bottom (left Bank)
TBM Cadastral Plot No: 220 (Cherukolpuzha Village)

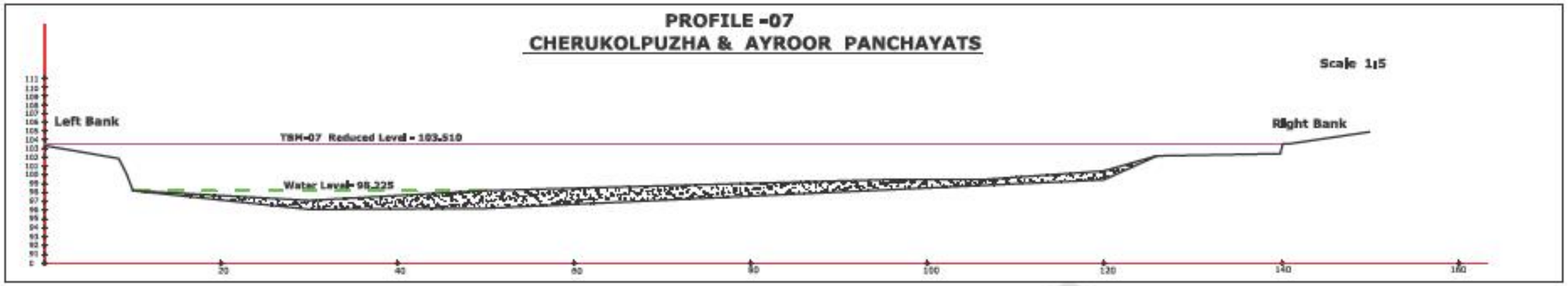
VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
4	150.00	150.00	150.00	75.00	131.25	184.18	24173.63	173.24	22737.75	0.00	0.000	Cherukolpuzha	0.000	Exceptional Area
	100.00	125.00	112.50	56.25								Ayroor	0.000	Exceptional Area
5	100.00	125.00	112.50	56.25	150.00	298.98	44847.00	250.65	37597.50	133.74	20061.000	Cherukolpuzha	0.000	Exceptional Area
	200.00	175.00	187.50	93.75								Ayroor	0.000	Exceptional Area
6	200.00	175.00	187.50	93.75	187.50	185.00	34687.50	185.00	34687.50	136.70	25631.250	Cherukolpuzha	0.000	Exceptional Area
	175.00	200.00	187.50	93.75								Ayroor	0.000	Exceptional Area

*SWL-Summer Water Level

Govt. of Kerala

PROFILE -07
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

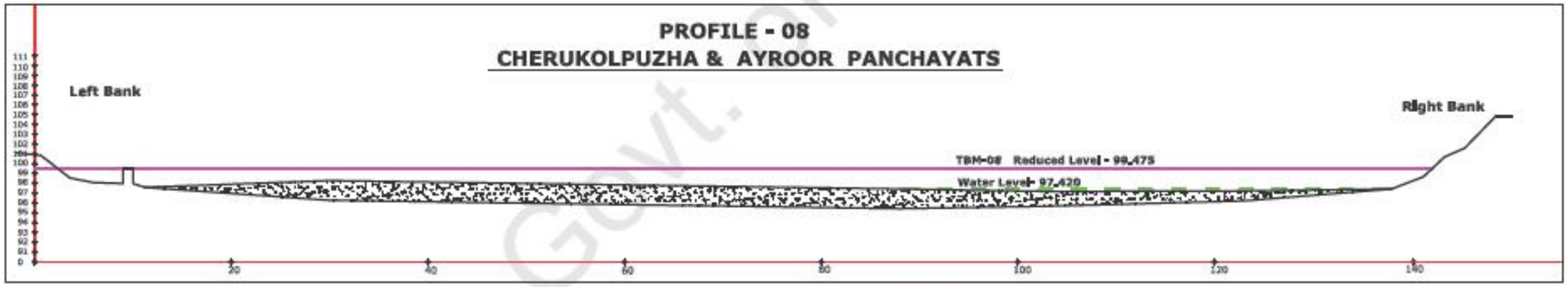
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.120			103.880	101.760			Change point
TBM-07		0.370			103.510			On protecton wall (Right bank)
P1		1.470			102.410			Right bed level
P2		3.430			100.450		1	20 m from Bench mark
P3		5.655			98.225		2	Right water level
P4		6.770			97.110		1	Water
P5		5.655			98.225			Left water level
P6		1.070			102.810			Left bank
CP			1.820		102.060			Change point

Details

Cross Sectional Area Of Sand	: 136.04	M²
Cross Sectional Area Of Sand Above Waterlevel	: 52.63	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 83.41	M²
Cross Sectional Area Of Sand (Cherukolpuzha)	: 68.02	M²
Cross Sectional Area Of Sand(Ayroor)	: 8.02	M²

TBM 07 Marked On Protection Wall Near Puthiyakavu Temple(Right Bank)
TBM Cadastral Plot No: 23 (Ayroor Village)

PROFILE - 08
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.820			104.880	102.060			Change point
TBM-8		5.405			99.475			Marked on wall (left bank)
P1		4.755			100.125			Left bank
P2		6.405			98.475			left bad level
P3		6.605			98.275		2	20 m from TBM
P4		7.460			97.420		2	Left water level
P5		7.710			97.170		1.5	Water
P6		7.670			97.210		1	Water
P7		7.460			97.420			Right water level
P8		4.655			100.225			Right bank
CP			1.870		103.010			Change point

Details

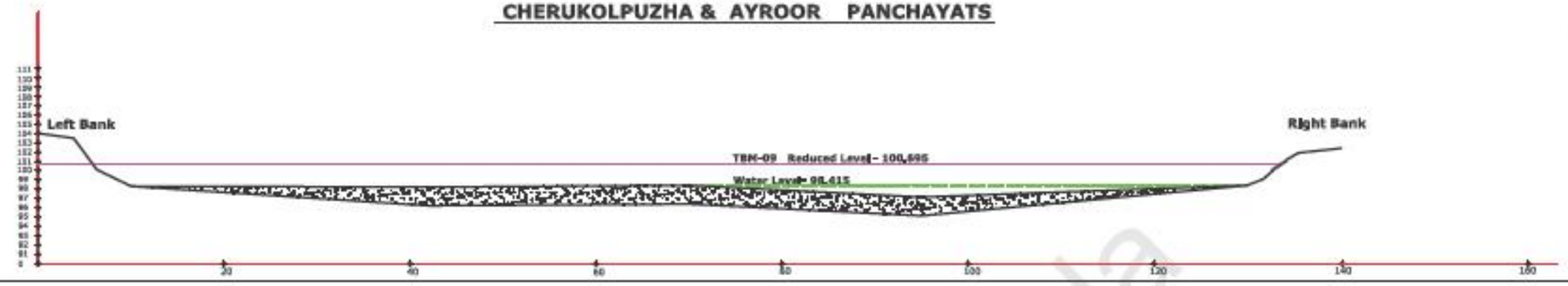
Cross Sectional Area Of Sand	: 193.54	M²
Cross Sectional Area Of Sand Above Waterlevel	: 34.14	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 159.40	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 96.77	M²
Cross Sectional Area Of Sand (Ayroor)	: 96.77	M²

TBM 08 Marked On Wall (Left Bank)
TBM Cadastral Plot No: 397/1 (Cherukolpuzha Village)

Govt. of Kerala

PROFILE – 09
CHERUKOLPUZHA & AYROOR PANCHAYATS

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.210			104.220	103.010			Change point
TBM-9		3.525			100.695			On step (Right bank)
P1		2.100			102.120			Right bank
P2		5.805			98.415			Right water level
P3		6.795			97.425		1	Water
P4		5.805			98.415		2	Left water level
P5		5.715			98.505		2	Sand
P6		5.630			98.590			Left bed level
P7		1.850			102.370			Left bank
CP			1.210		103.010			Change point

Details

Cross Sectional Area Of Sand	: 173.00 M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 148.73 M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 74.38 M²
Cross Sectional Area Of Sand(Ayroor)	: 74.38 M²

TBM 09 Marked On Step (Right Bank)
TBM Cadastral Plot No: 41/15 (Ayroor Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
7	175.00	200.00	187.50	93.75	156.25	136.04	21256.25	136.04	21256.25	52.63	8223.438	Cherukolpuzha	0.000	Exceptional Area
	125.00	125.00	125.00	62.50								Ayroor	0.000	Exceptional Area
8	125.00	125.00	125.00	62.50	143.75	193.54	27821.38	193.54	27821.38	34.14	4907.625	Cherukolpuzha	96.770	13910.688
	150.00	175.00	162.50	81.25								Ayroor	96.770	13910.688
9	150.00	175.00	162.50	81.25	156.25	173.00	27031.25	148.73	23239.06	0.00	0.000	Cherukolpuzha	74.365	11619.531
	150.00	150.00	150.00	75.00								Ayroor	74.365	11619.531
	*SWL-Summer Water Level													

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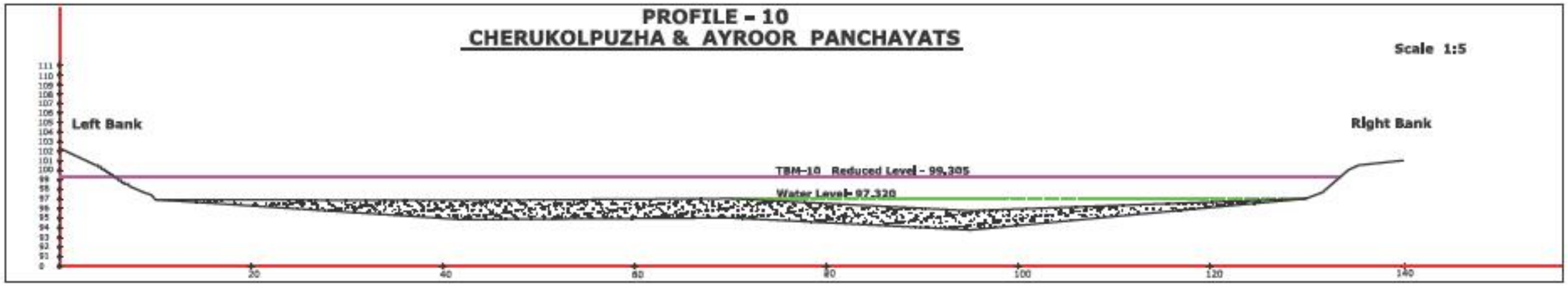
PROFILE - 10
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

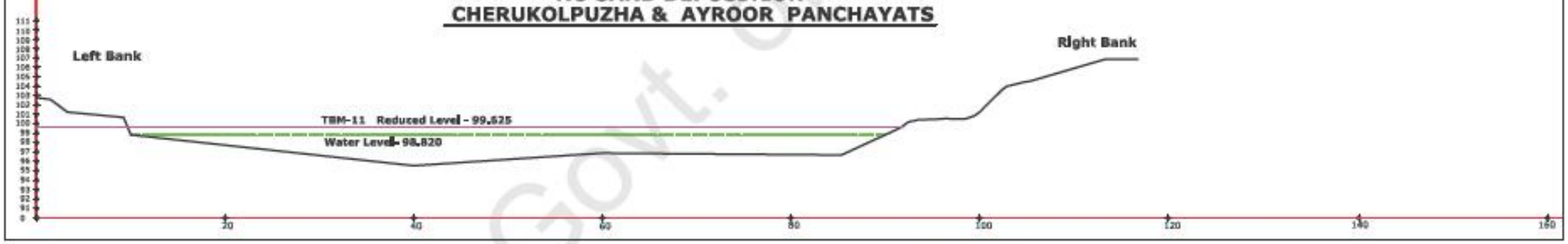
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.740			105.750	103.010			Change point
TBM-10		6.445			99.305			Marked on step (left bank temple kadavu)
P1		1.355			104.395			Left bank
P2		7.945			97.805			River bed level
P3		8.050			97.700		2	Sand
P4		8.430			97.320		2	Left water level
P5		8.885			96.865		1	Water
P6		8.890			96.860			Water
P7		8.430			97.320			Right water level
P8		7.470			98.280			Right bank
P9		6.060			99.690			
CP			4.360		101.390			Change point

Details

Cross Sectional Area Of Sand	: 173.00 M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 148.73 M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 74.38 M²
Cross Sectional Area Of Sand(Ayroor)	: 74.38 M²

TBM 10 Marked On Step (Left Bank Temple Kadavu)
TBM Cadastral Plot Nos (Ayroor Village)

PROFILE - 11
NO SAND DEPOSITION
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.320			103.710	101.390			Change point
TBM-11		4.085			99.625			Marked on rock (Right bank)
P1		3.000			100.710			Right bank
P2		4.890			98.820			Right water level
P3		7.895			95.815			Water
P4		6.555			97.155			Water
P5		4.890			98.820			Left water level
P6		3.445			100.265			
CP			4.450		99.260			Change point

TBM-11 Marked On Rock Left Bank Near Cherukol Panchayat
TBM Cadastral Plot No: 372/ (Cherukolpuzha Village)

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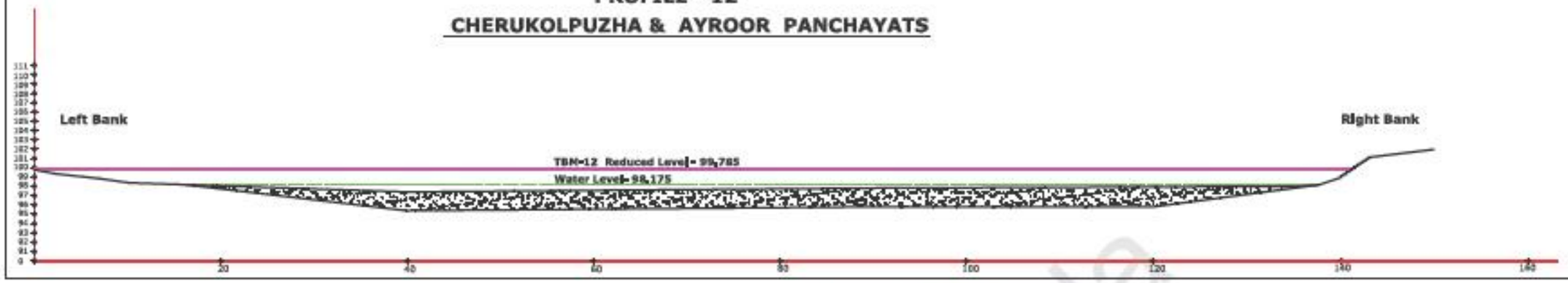
PROFILE - 12

CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.985			101.245	99.260			Change point
P1		3.070			98.175			Left water level
P2		2.850			98.395			Water
P3		3.855			97.390			Water
P4		3.440			97.805			water
P5		3.000			98.245			water
P6		3.070			98.175			Right water level
TBM-12		1.460			99.785			Marked on protection wall (Right bank)
P7		0.460			100.785			Right bank
CP			2.320		98.925			Change point

Details

Cross Sectional Area Of Sand	: 203.55 M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil
Cross Sectional Area Of Sand Up To 2m Below Waterlevel	: 160.43 M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 80.22 M²
Cross Sectional Area Of Sand(Ayroor)	: 80.22 M²

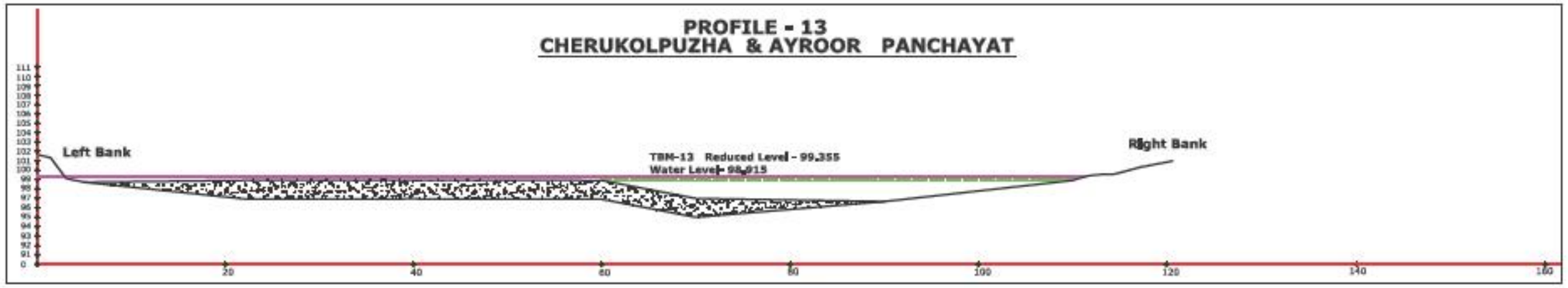
TBM 12 Marked On 6th Step From Bottom (Left Bank Kadavu))
TBM Cadastral Plot No: 13/2 (Ayroor Village

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
10	150.00	150.00	150.00	75.00	118.75	173.00	20543.75	148.73	17661.69	0.00	0.000	Cherukolpuzha	74.365	8830.844
	100.00	75.00	87.50	43.75								Ayroor	74.365	8830.844
11	100.00	75.00	87.50	43.75	93.75	0.00	0.00	0.00	0.00	0.00	0.000		0.000	0.000
	75.00	125.00	100.00	50.00									0.000	0.000
12	75.00	125.00	100.00	50.00	156.25	203.55	31804.69	160.43	25067.19	0.00	0.000	Cherukolpuzha	80.215	12533.594
	150.00	275.00	212.50	106.25								Ayroor	80.215	12533.594

*SWL-Summer Water Level

PROFILE - 13
CHERUKOLPUZHA & AYROOR PANCHAYAT



FIELD BOOK

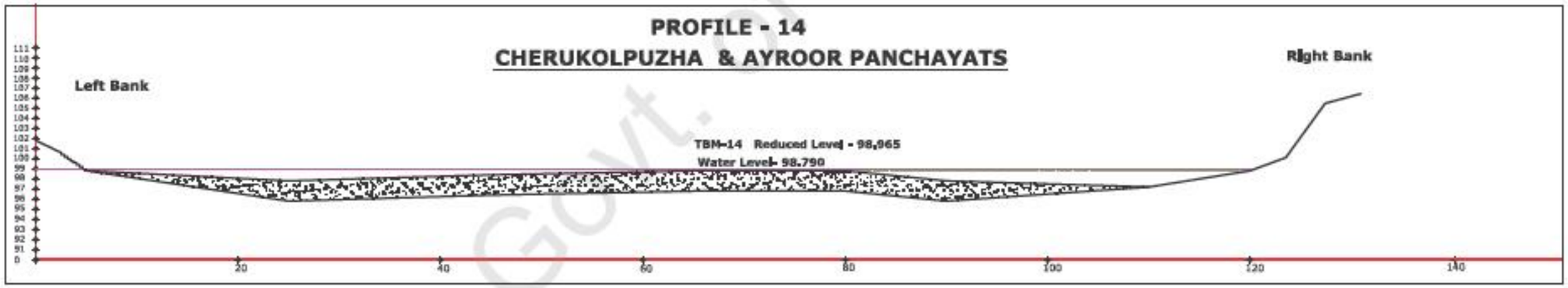
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.670			100.595	98.925			Change point
TBM-13		1.240			99.355			Marked on rock (Right bank)
P1		0.325			100.270			Right bank
P2		1.680			98.915			Right water level
P3		3.930			96.665		1	Water
P4		3.640			96.955		2	Water
P5		1.680			98.915		2	Left water level
P6		1.640			98.955		2	Sand
P7		1.670			98.925		2	Sand
P8		1.875			98.720			sand
CP			1.440		99.155			Change point

Details

Cross Sectional Area Of Sand	: 132.78	M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 103.37	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 51.69	M²
Cross Sectional Area Of Sand (Ayroor)	: 51.69	M²

TBM 13 Marked On Rock (Right Bank)
TBM Cadastral Plot No: 12/11(Ayroor Village)

PROFILE - 14
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

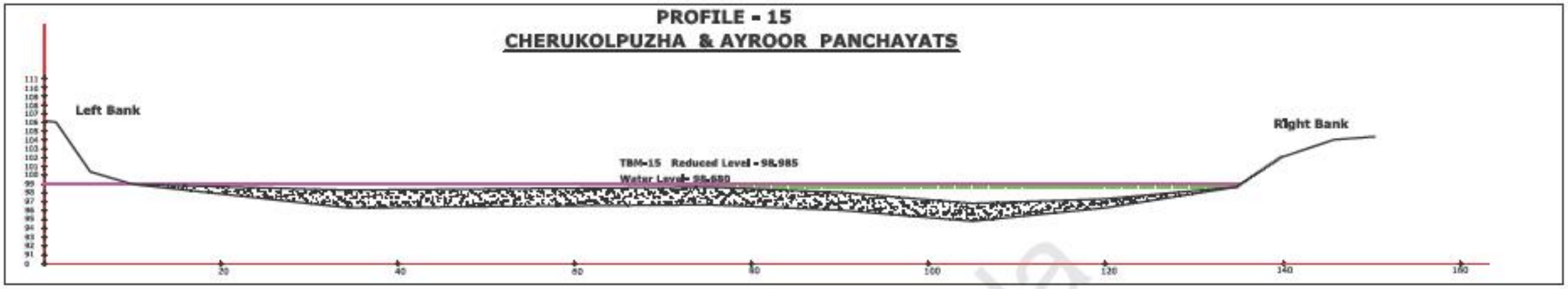
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.550			100.705	99.155			Change point
TBM-14		1.740			98.965			Marked on step (left bank private kadavu)
P1		1.910			98.795		0.3	Left bank bottom
P2		2.910			97.795		1	Sand
P3		2.315			98.390		2	Sand
P4		1.925			98.780		2	Sand
P5		1.705			99.000		2	sand
P6		1.915			98.790		2	left water level
P7		2.915			97.790		2	Water
P8		3.515			97.190		1	Water
P9		1.920			98.785			Right water level
CP			1.985		98.720			Change point

Details

Cross Sectional Area Of Sand	: 170.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 157.86	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 78.93	M²
Cross Sectional Area Of Sand (Ayroor)	: 78.93	M²

TBM14 Marked On 2nd Step From Bottom (left Bank Private Kadavu)
TBM Cadastral Plot No: 73/12(Cherukolpuzha Village)

PROFILE - 15
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.660			100.380	98.720			Change point
P1		1.260			99.120			step
TBM-15		1.395			98.985			Marked on step (Right bank kadavu)
P2		1.230			99.150			step
P3		1.700			98.680			Right water level
P4		3.055			97.325		1	Water
P5		3.555			96.825		2	Water
P6		2.305			98.075		2	Water
		1.700			98.680		2	Left water level
P7		2.055			98.325		2	sand
CP			0.975		99.405			Change point

Details

Cross Sectional Area Of Sand	: 195.42 M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil
Cross Sectional Area Of Sand Up To 2m Below Waterlevel	: 155.46 M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 77.73 M²
Cross Sectional Area Of Sand (Ayroor)	: 77.73 M²

TBM 15 Marked On Step (Right Bank Kadavu)
TBM Cadastral Plot No: 10/2 (Ayroor Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^3)		Panchayat wise Sand Availability (m^3)
13	150.00	275.00	212.50	106.25	175.00	132.78	23236.50	103.37	18089.75	0.00	0.000	Cherukolpuzha	51.685	9044.875
	125.00	150.00	137.50	68.75								Ayroor	51.685	9044.875
14	125.00	150.00	137.50	68.75	162.50	170.00	27625.00	157.86	25652.25	0.00	0.000	Cherukolpuzha	78.930	12826.125
	200.00	175.00	187.50	93.75								Ayroor	78.930	12826.125
15	200.00	175.00	187.50	93.75	175.00	195.42	34198.50	155.46	27205.50	0.00	0.000	Cherukolpuzha	77.730	13602.750
	175.00	150.00	162.50	81.25								Ayroor	77.730	13602.750

*SWL-Summer Water Level

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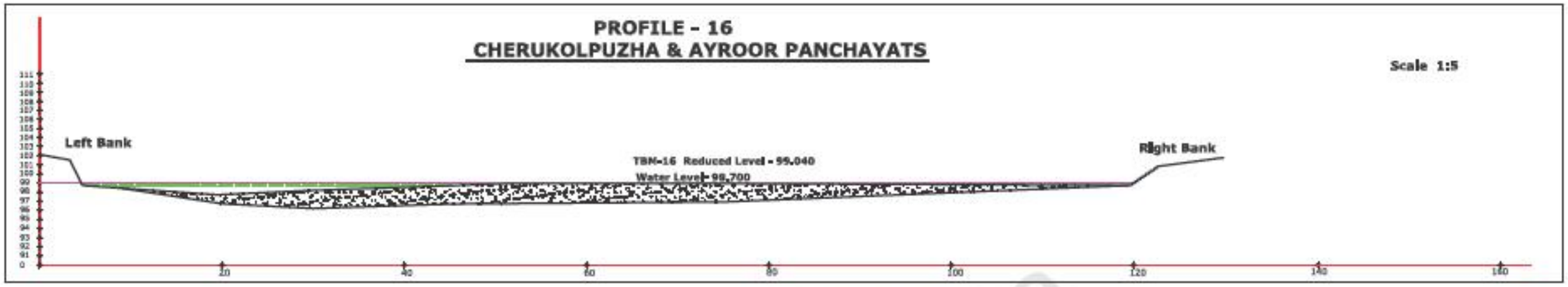
PROFILE - 16
CHERUKOLPUZHA & AYROOR PANCHAYATS

Scale 1:5



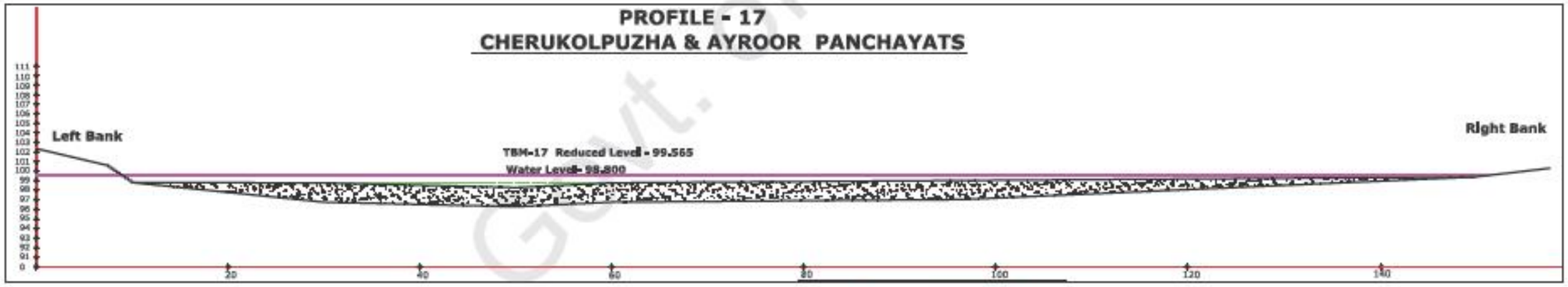
FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.865			101.270	99.405			Change point
CP	1.725		2.040	100.955	99.230			Change point
TBM-16		1.915			99.040			Marked on step ,Right bank
P1		1.380			99.575		2	sand
P2		1.265			99.690		2	sand
P3		2.255			98.700		2	Right water level
P4		1.445			99.510		1	Water
P5		1.670			99.285			Water
P6		2.255			98.700			Left water level
CP			1.675		99.280			Change point

Details

Cross Sectional Area Of Sand	: 156.08	M²
Cross Sectional Area Of Sand Above Waterlevel	: 12.59	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 139 .38	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 75.98	M²
Cross Sectional Area Of Sand (Ayroor)	: 75.98	M²

TBM 16 Marked On Step (Right Bank Kadavu)
TBM Cadastral Plot No: 4/8 (Ayroor Village)

PROFILE - 17
CHERUKOLPUZHA & AYROOR PANCHAYATS



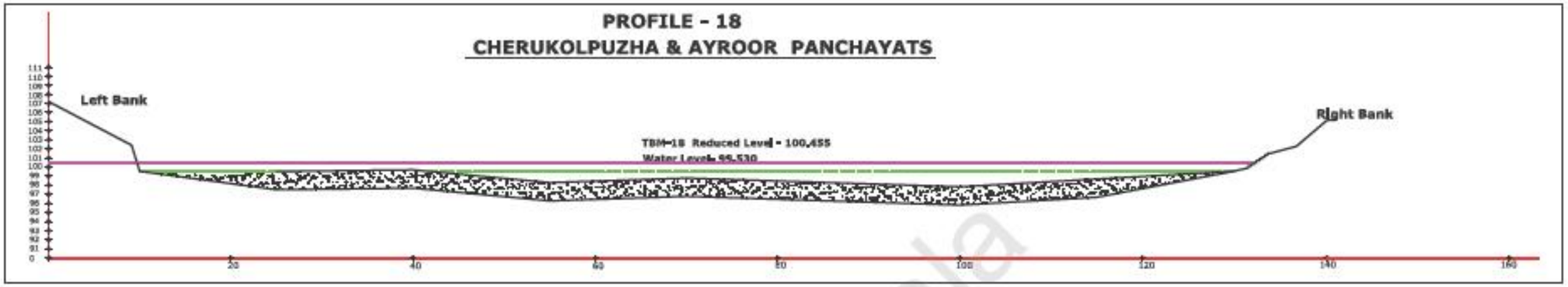
FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.660			100.380	98.720			Change point
P1		1.260			99.120			step
TBM-15		1.395			98.985			Marked on step (Right bank kadavu)
P2		1.230			99.150			step
P3		1.700			98.680			Right water level
P4		3.055			97.325		1	Water
P5		3.555			96.825		2	Water
P6		2.305			98.075		2	Water
		1.700			98.680		2	Left water level
P7		2.055			98.325		2	sand
CP			0.975		99.405			Change point

Details

Cross Sectional Area Of Sand	: 206.02	M²
Cross Sectional Area Of Sand Above Waterlevel	: 23.70	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 173.72	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 98.71	M²
Cross Sectional Area Of Sand (Ayroor)	: 98.71	M²

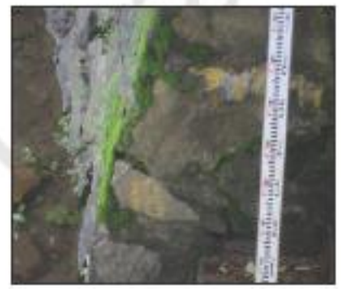
TBM 17 Marked On Step (Left Bank Kadavu)
TBM Cadastral Plot Nos (Cherukolpuzha Village)

PROFILE - 18
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.340			101.155	99.815			Change point
P1		1.625			99.530			Left water level
P2		1.650			99.505		2	Water
P3		1.470			99.685		2	Water
P4		2.875			98.280		2	Water
P5		3.225			97.930		2	Water
P6		2.375			98.780		2	Water
P7		3.875			97.280		2	Water
P8		1.625			99.530			Right water level
TBM-18		0.700			100.455			Marked on temple kadavu (Right bank)
CP			1.650		99.505			Change point



Details

Cross Sectional Area Of Sand	: 210.21 M²
Cross Sectional Area Of Sand Above Waterlevel	: 01.13 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 127.68 M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 64.40 M²
Cross Sectional Area Of Sand (Ayroor)	: 64.40 M²

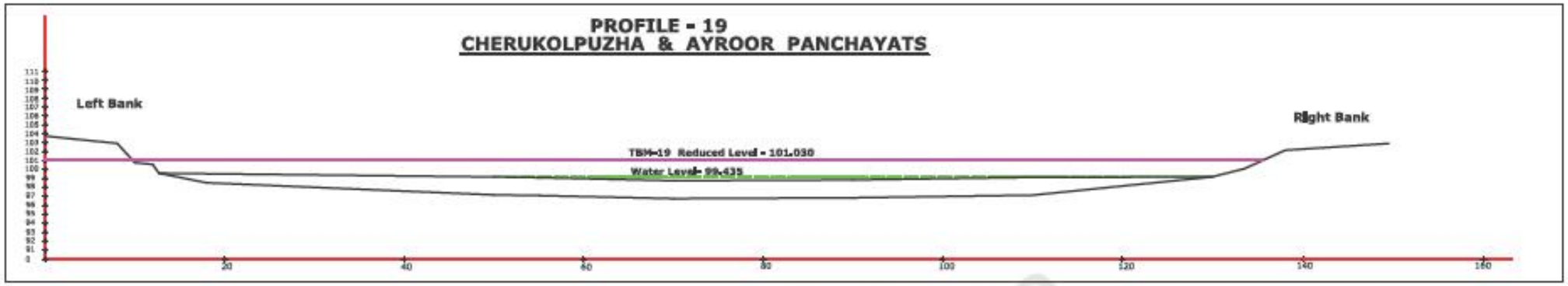
TBM 18 Marked On 2nd Step From Bottom (right Bank Temple Kadavu)
TBM Cadastral Plot Nos 6/7 (Ayroor Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^3)		Panchayat wise Sand Availability (m^3)
16	175.00	150.00	162.50	81.25	137.50	156.08	21461.00	151.97	20895.88	12.59	1731.125	Cherukolpuzha	75.985	10447.938
	125.00	100.00	112.50	56.25								Ayroor	75.985	10447.938
17	125.00	100.00	112.50	56.25	118.75	206.02	24464.88	197.42	23443.63	23.70	2814.375	Cherukolpuzha	98.710	11721.813
	100.00	150.00	125.00	62.50								Ayroor	98.710	11721.813
18	100.00	150.00	125.00	62.50	168.75	210.21	35472.94	128.81	21736.69	1.13	190.688	Cherukolpuzha	64.405	10868.344
	200.00	225.00	212.50	106.25								Ayroor	64.405	10868.344
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE - 19
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

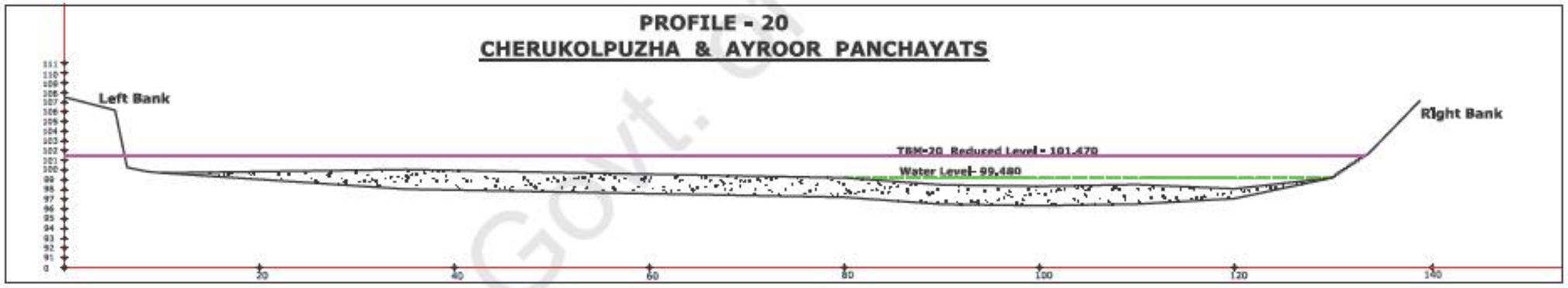
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.595			101.100	99.505			Change point
TBM-19		0.070			101.030			Marked on step, left bank
P1		1.250			99.850		1	Left bed level of river
P2		2.070			99.030		2	
P3		1.665			99.435		2	Left water level
P4		1.735			99.365		2	water
P5		2.085			99.015		2	water
P6		1.990			99.110		2	water
P7		1.700			99.400		2	water
P8		1.665			99.435			Right water level
CP			0.750		100.350			Change point

Details

Cross Sectional Area Of Sand	: 190.66	M²
Cross Sectional Area Of Sand Above Waterlevel	: 07.31	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 168.44	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 97.87	M²
Cross Sectional Area Of Sand (Ayroor)	: 97.87	M²

TBM 19 Marked On Step (Left Bank Kadavu)
TBM Cadastral Plot No: 10/14 (Cherukolpuzha Village)

PROFILE - 20
CHERUKOLPUZHA & AYROOR PANCHAYATS

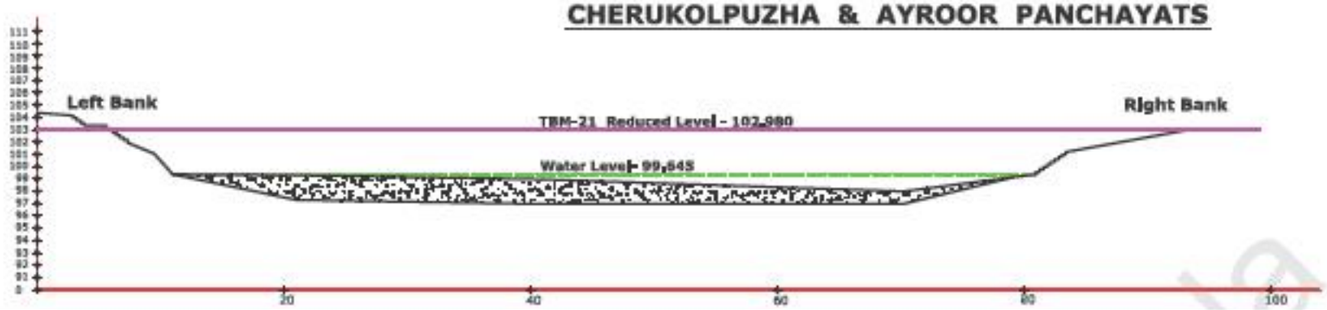


Details

Cross Sectional Area Of Sand	: 195.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: 33.80	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 137.74	M²
Cross Sectional Area Of Sand (cherukolpuzha)	: 85.77	M²
Cross Sectional Area Of Sand (Ayroor)	: 85.77	M²

TBM 20 Marked On Step (Right Bank Kadavu)
TBM Cadastral Plot No: 2/1 (Ayroor Village)

PROFILE - 21
CHERUKOLPUZHA & AYROOR PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	4.535			104.045	99.510			Change point
TBM-21	1.125		1.065	104.105	102.980			On step , left bank kadavu
P1		4.460			99.645			Left water level
P2		5.160			98.945		2	Water
P3		4.540			99.565		2	Water
P4		4.730			99.375		2	Water
P5		4.880			99.225		2	Water
P6		5.610			98.495		2	Water
P7		5.860			98.245		2	Water
P8		4.460			99.645			Right water level
P9		2.760			101.345			
CP			2.865		101.240			Change point

Details

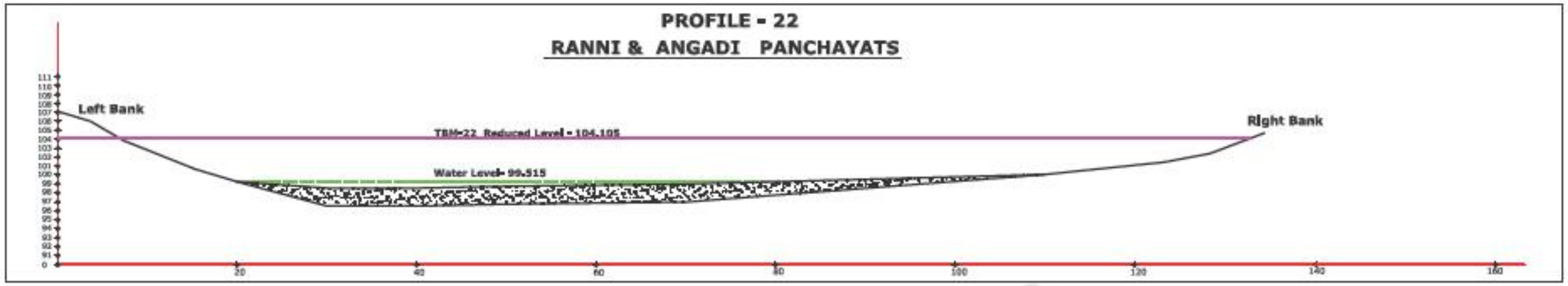
Cross Sectional Area Of Sand	: 98.33	M^2
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 81.08	M^2
Cross Sectional Area Of Sand (cherukolpuzha)	: 40.54	M^2
Cross Sectional Area Of Sand (Ayroor)	: 40.54	M^2

TBM 21 Marked On 7th Step From Bottom (left Bank)
TBM Cadastral Plot No: 389 (Cherukolpuzha Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
19	200.00	225.00	212.50	106.25	156.25	190.66	29790.63	175.75	27460.94	7.31	1142.188	Cherukolpuzha	87.875	13730.469
	100.00	100.00	100.00	50.00								Ayroor	87.875	13730.469
20	100.00	100.00	100.00	50.00	125.00	195.00	24375.00	171.54	21442.50	33.80	4225.000	Cherukolpuzha	85.770	10721.250
	150.00	150.00	150.00	75.00								Ayroor	85.770	10721.250
21	150.00	150.00	150.00	75.00	131.25	98.33	12905.81	81.08	10641.75	0.00	0.000	Cherukolpuzha	40.540	5320.875
	100.00	125.00	112.50	56.25								Ayroor	40.540	5320.875
	*SWL-Summer Water Level													

PROFILE - 22
RANNI & ANGADI PANCHAYATS



FIELD BOOK

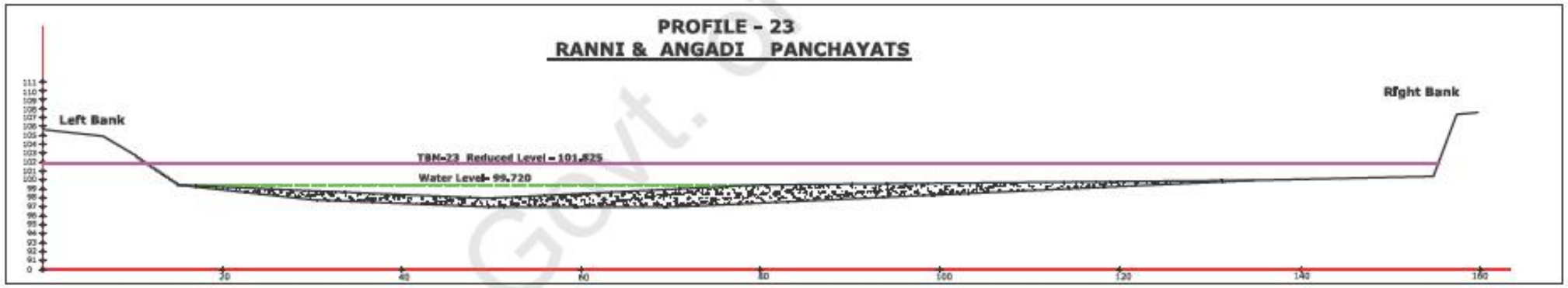
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.435			104.675	101.240			Change point
TBM-22		0.570			104.105			On step (thoppukadavu)
P1		1.625			103.050			bank
P2		5.160			99.515			Left water level
P3		5.860			98.815		2	Water
P4		5.870			98.805		2	Water
P5		5.660			99.015		2	Water
P6		5.420			99.255		1	Water
P7		5.160			99.515		0.5	Right water level
P8		4.350			100.325		0.5	sand
P9		0.560			104.115		0.3	sand
CP			4.130		100.545			Change point

Details

Cross Sectional Area Of Sand	: 129.85	M²
Cross Sectional Area Of Sand Above Waterlevel	: 07.88	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 99.92	M²
Cross Sectional Area Of Sand (Ranni)	: 53.9	M²
Cross Sectional Area Of Sand(Angadi)	: 53.9	M²

TBM 22 Marked On Step (Right Bank) Thoppukadavu
TBM Cadastral Plot No: 389 (Angadi Village)

PROFILE - 23
RANNI & ANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.510			102.055	100.545			Change point
CP	0.685		0.725	102.015	101.330			Change point
P1		1.570			100.445		0.3	sand
P2		1.350			100.665		0.4	sand
P3		1.790			100.225		0.5	sand
P4		2.295			99.720		0.5	Right water level
P5		2.965			99.050		2	Water
P6		0.930			101.085		1	Water
P7		2.295			99.720			Left water level
TBM-23		0.190			101.825			On step left bank kadavu
CP			1.895		100.120			Change point

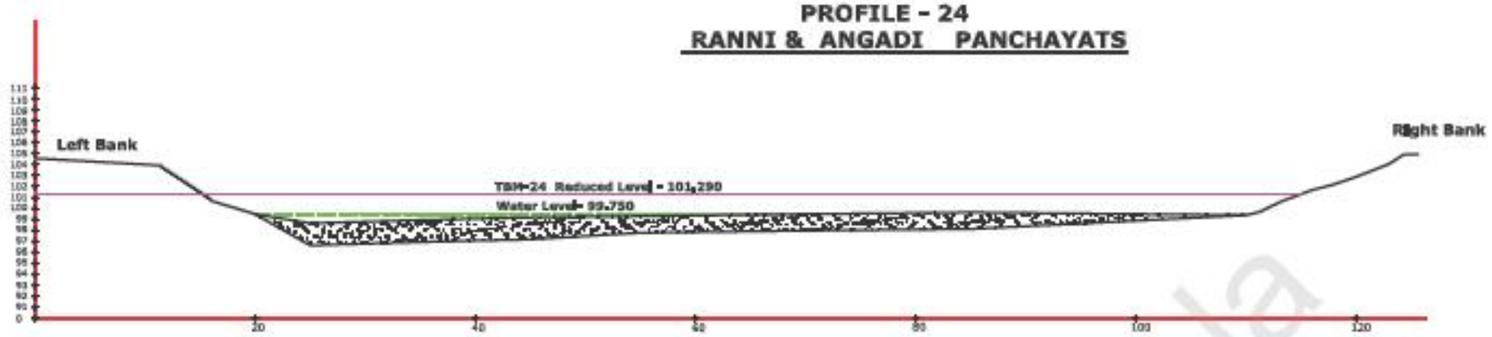
Details

Cross Sectional Area Of Sand	: 133.16	M²
Cross Sectional Area Of Sand Above Waterlevel	: 11.13	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 106.87	M²
Cross Sectional Area Of Sand (ranni)	: 59.00	M²
Cross Sectional Area Of Sand (angadi)	: 59.00	M²

TBM 23 Marked On 8th Step From Bottom (Left Bank)
TBM Cadastral Plot No: 443/4 (Ranni Village)

PROFILE - 24
RANNI & ANGADI PANCHAYATS

Scale 1:4



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.275			101.395	100.120			Change point
TBM-24		0.105			101.290			On step,left bank kadwu
P1		1.645			99.750			Left water level
P2		2.485			98.910		2	Water
P3		2.185			99.210		2	Water
P4		1.945			99.450		2	Water
P5		1.845			99.550		1.5	Water
P6		1.645			99.750		1.5	Right water level
P7		1.500			99.895		1.5	Sand
P8		1.745			99.650		1	Sand
CP			0.135		101.260			Change point

Details

Cross Sectional Area Of Sand	: 126.25	M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 113.77	M²
Cross Sectional Area Of Sand (ranni)	: 56.88	M²
Cross Sectional Area Of Sand (angadi)	: 56.88	M²

TBM 24 Marked On 4th Step From Bottom (Left Bank)
TBM Cadastral Plot No: 433/1 (Ranni Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^3)		Panchayat wise Sand Availability (m^3)
22	100.00	125.00	112.50	56.25	162.50	129.85	21100.63	107.80	17517.50	7.88	1280.500	Ranni	53.900	8758.750
	175.00	250.00	212.50	106.25								Angadi	53.900	8758.750
23	175.00	250.00	212.50	106.25	175.00	133.16	23303.00	118.00	20650.00	11.13	1947.750	Ranni	59.000	10325.000
	150.00	125.00	137.50	68.75								Angadi	59.000	10325.000
24	150.00	125.00	137.50	68.75	150.00	126.25	18937.50	113.77	17065.50	0.00	0.000	Ranni	56.885	8532.750
	125.00	200.00	162.50	81.25								Angadi	56.885	8532.750

*SWL-Summer Water Level

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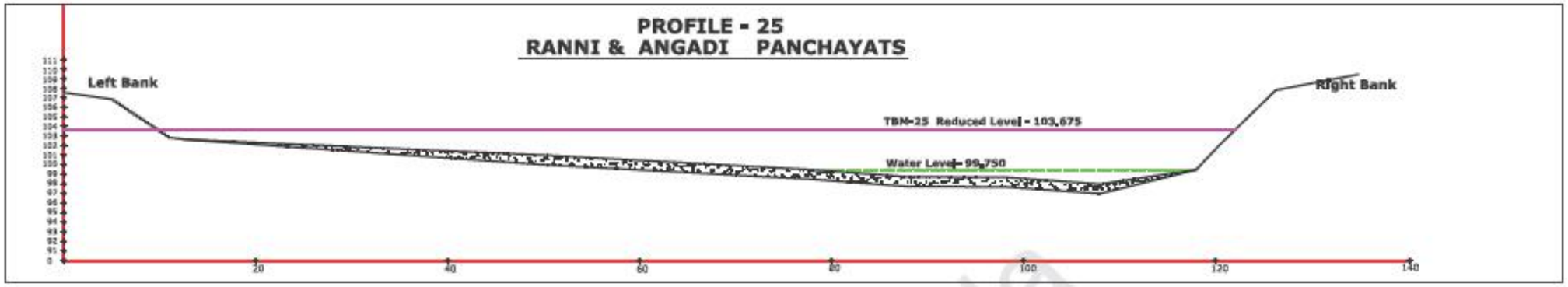
PROFILE - 25
RANNI & ANGADI PANCHAYATS



FIELD BOOK

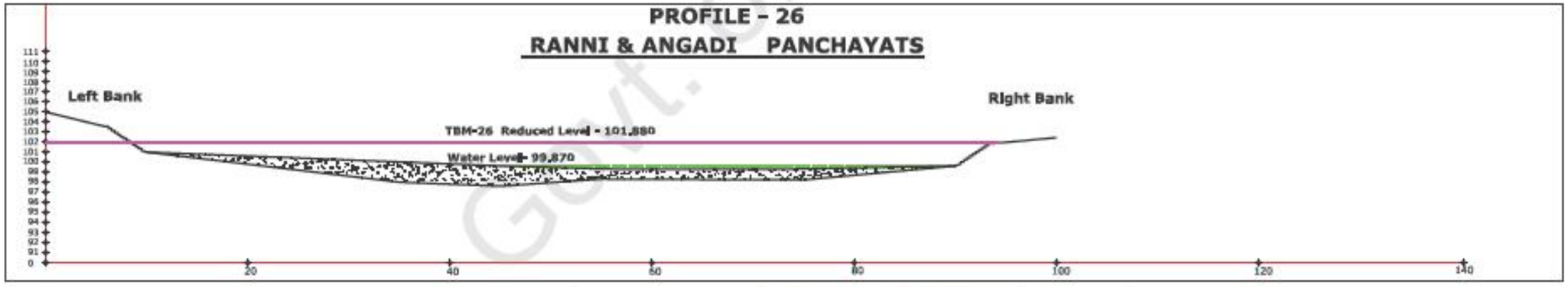
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.150			102.410	101.260			Change point
CP	3.015		1.590	103.835	100.820			Change point
TBM-25		0.160			103.675			On step of a kadavu, left bank
P1		0.920			102.915			
P2		2.565			101.270		1	Sand
P3		4.085			99.750		1	Left water level
P4		4.835			99.000		1	Water
P5		4.865			98.970		1	Water
P6		5.585			98.250		1	Water
P7		4.085			99.750			Right water level
CP			2.650		101.185			Change point

Details

Cross Sectional Area Of Sand	: 81.75	M²
Cross Sectional Area Of Sand Above Waterlevel	: 37.54	M²
Cross Sectional Area Of Sand Up To 2m From Water	: 41.97	M²
Cross Sectional Area Of Sand (Ranni)	: 39.76	M²
Cross Sectional Area Of Sand (Angadi)	: 39.76	M²

TBM 25 Marked On Step (Left Bank)
TBM Cadastral Plot No: 423/6 (Ranni Village)

PROFILE - 26
RANNI & ANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.365			101.550	101.185			Change point
CP	0.690		0.260	101.980	101.290			Change point
TBM-26		0.100			101.880			On step , left bank kadavu
P1		0.640			101.340			Sand
P2		1.715			100.265		2	Sand
P3		2.110			99.870		2	Left water level
P4		2.410			99.570		1	Water
P5		2.450			99.530		1	Water
P6		2.410			99.570		1	Water
P7		2.410			99.570			Water
P8		2.110			99.870			Right water level
P9		0.880			101.100			
CP			0.240		101.740			Change point

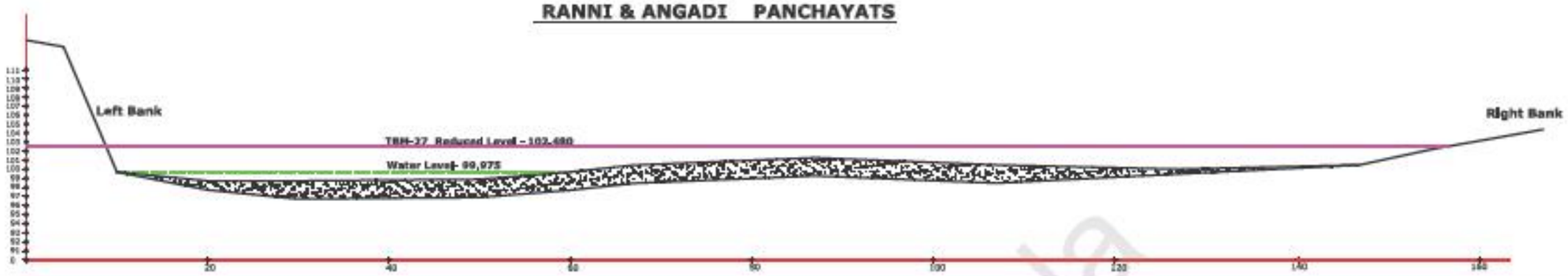
Details

Cross Sectional Area Of Sand	: 88.50	M²
Cross Sectional Area Of Sand Above Waterlevel	: 16.15	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 72.35	M²
Cross Sectional Area Of Sand (Ranni)	: 44.25	M²
Cross Sectional Area Of Sand (Angadi)	: 44.25	M²

TBM 26 Marked On Step (Left Bank)
TBM Cadastral Plot No: 423/8 (Ranni Village)

Govt. of Kerala

PROFILE - 27
RANNI & ANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.520			101.663	101.143			Change point
CP	2.800		3.310	100.853	100.153			Change point
TBM-27		0.555			102.480			On step right bank kadavu
P1		1.825			101.110			Bank
P2		2.150			100.285			Sand
P3		2.200			100.750			Sand
P4		1.480			101.545		2	Sand
P5		2.305			100.730		2	Sand
P6		3.060			99.975		2	Right water level
P7		3.820			99.215		2	Water
P8		3.890			99.285		2	Water
P9		4.040			99.535		2	Water
P10		4.040			99.535		1	Water
P11		3.060			99.975			Left water level
CP			1.525		101.510			Change point

Details

Cross Sectional Area Of Sand	: 204.70	M²
Cross Sectional Area Of Sand Above Waterlevel	: 65.04	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 112.56	M²
Cross Sectional Area Of Sand (ranni)	: 89.00	M²
Cross Sectional Area Of Sand (angadi)	: 89.00	M²

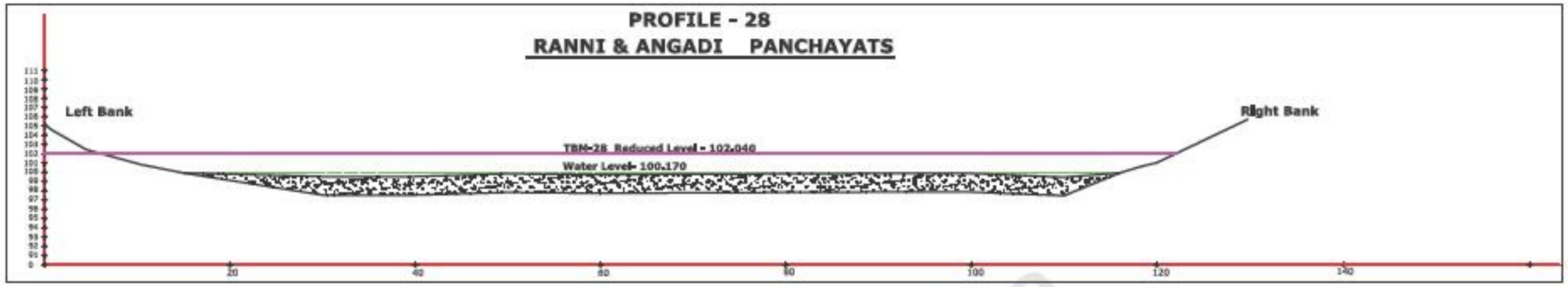
TBM 27 Marked On Step (Right Bank) Pullupurathu Kadavu
TBM Cadastral Plot No: 303 (Angadi Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
25	125.00	200.00	162.50	81.25	150.00	81.75	12262.50	79.51	11926.50	37.54	5631.000	Ranni	39.755	5963.250
	200.00	75.00	137.50	68.75								Angadi	39.755	5963.250
26	200.00	75.00	137.50	68.75	150.00	88.50	13275.00	88.50	13275.00	16.15	2422.500	Ranni	44.250	6637.500
	175.00	150.00	162.50	81.25								Angadi	44.250	6637.500
27	175.00	150.00	162.50	81.25	162.50	204.70	33263.75	178.00	28925.00	65.04	10569.000	Ranni	89.000	14462.500
	175.00	150.00	162.50	81.25								Angadi	89.000	14462.500
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE - 28
RANNI & ANGADI PANCHAYATS



FIELD BOOK

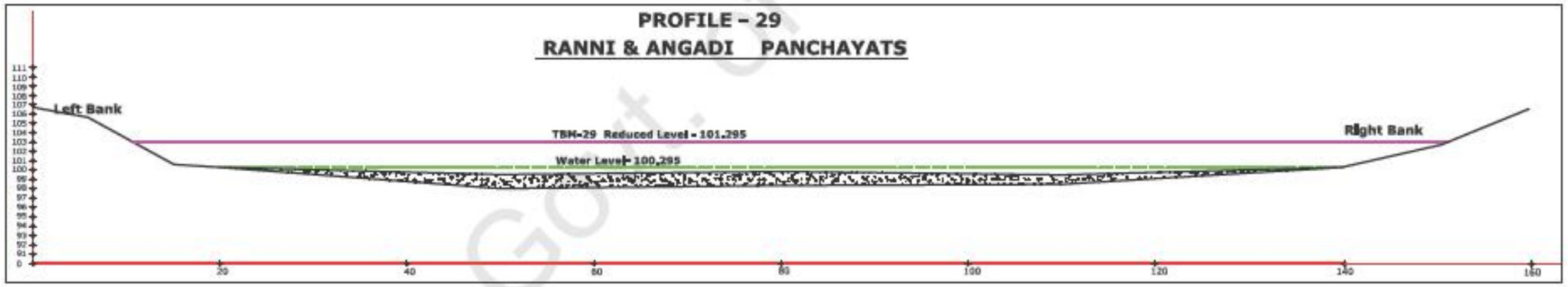
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.560			102.070	101.510			Change point
TBM-28		0.030			102.040			On rock, right bank
P1		1.900			100.170			Right water level
P2		2.350			99.720		2	Water
P3		1.950			100.120		2	Water
P4		1.930			100.140		2	Water
P5		2.080			99.990		2	Sand
P6		2.070			100.000		2	Water
P7		1.990			100.080		2	Sand
P8		2.280			99.790		2	Water
P9		1.900			100.170			Left water level
CP			1.640		100.430			Change point

Details

Cross Sectional Area Of Sand : 181.00 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 166.35 M²
Cross Sectional Area Of Sand (Ranni) : 83.18 M²
Cross Sectional Area Of Sand (Angadi) : 83.18 M²

TBM 28 Marked On Rock (Right Bank)
TBM Cadastral Plot No: 297 (Angadi Village)

PROFILE – 29
RANNI & ANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.785			103.215	100.430			Change point
P1		0.220			102.995			Right bank
P2		2.920			100.295			Right water level
TBM-29		1.920			101.295			Marked on well ,inside River
P4		3.730			99.485		1	Water
P5		3.365			99.850		2	Water
P7		3.690			99.525		1.5	Water
P8		2.920			100.295		1.5	Left water level
P9		2.625			100.590			Left bank
CP			1.975		101.240			Change point

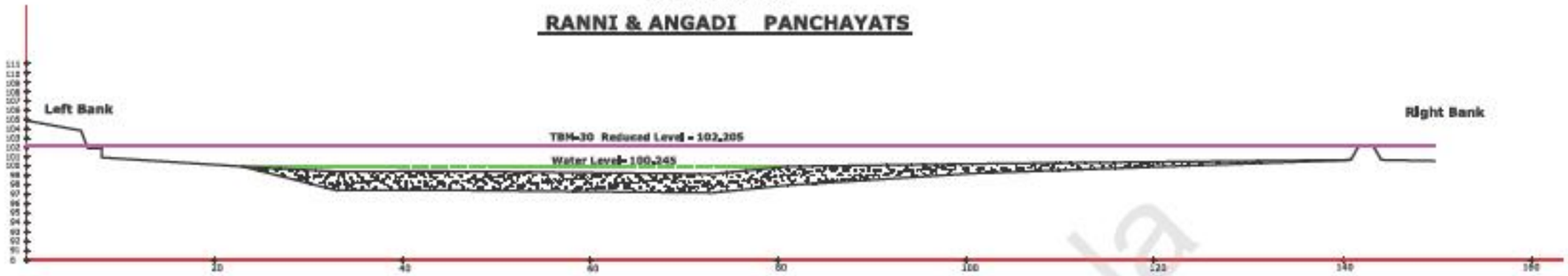
Details

Cross Sectional Area Of Sand : 120.90 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 116.15 M²
Cross Sectional Area Of Sand (ranni) : 58.07 M²
Cross Sectional Area Of Sand (angadi) : 58.07 M²

TBM 29 Marked On Well
TBM Cadastral Plot No: 272 (Angadi Village)

PROFILE - 30

RANNI & ANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.655			103.895	101.240			Change point
TBM-30		1.690			102.205			On step left bank kadavu
P1		2.650			100.245			Left water level
P2		4.190			99.705			Water
P3		4.150			99.745		2	Water
P4		4.230			99.665		2	Water
P5		4.350			99.545		2	Water
P6		4.450			99.445		2	Water
P7		2.650			100.245		2	Right water level
P8		3.370			100.525		1	Sand
P9		2.850			100.945			Bottom of check dam
P10		1.525			102.370			Top of check dam
CP			3.620		100.275			Change point

Details

Cross Sectional Area Of Sand	: 156.20	M²
Cross Sectional Area Of Sand Above Waterlevel	: 15.50	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 112.23	M²
Cross Sectional Area Of Sand (Ranni)	: 63.86	M²
Cross Sectional Area Of Sand (Angadi)	: 63.86	M²

TBM 30 Marked On 1st Step (Left Bank) Near Ranni Bridge)
TBM Cadastral Plot No; 434/4 (Ranni Village

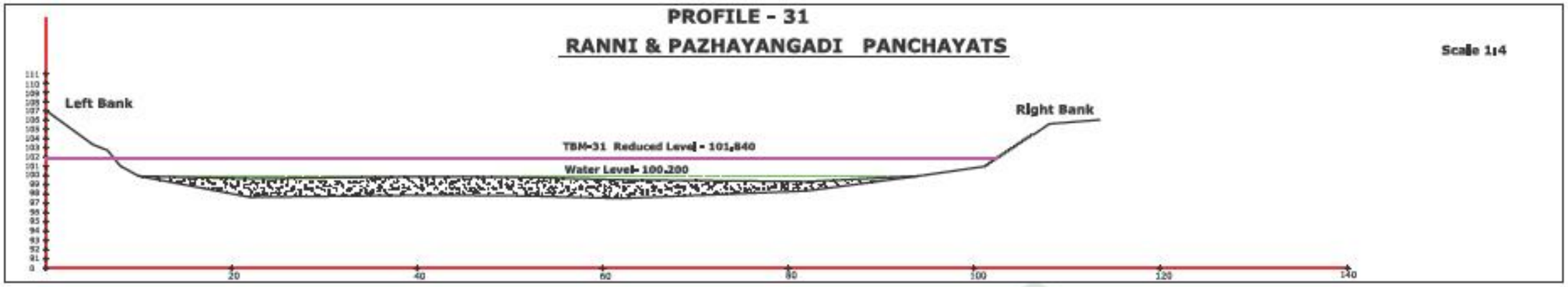
VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^3)		Panchayat wise Sand Availability (m^3)
28	175.00	150.00	162.50	81.25	187.50	181.00	33937.50	166.35	31190.63	0.00	0.000	Ranni	0.000	Exceptional Area
	200.00	225.00	212.50	106.25								Angadi	0.000	Exceptional Area
29	200.00	225.00	212.50	106.25	225.00	120.00	27000.00	116.15	26133.75	0.00	0.000	Ranni	0.000	Exceptional Area
	225.00	250.00	237.50	118.75								Angadi	0.000	Exceptional Area
30	225.00	250.00	237.50	118.75	175.00	156.20	27335.00	127.73	22352.75	15.50	2712.500	Ranni	0.000	Exceptional Area
	150.00	75.00	112.50	56.25								Angadi	0.000	Exceptional Area
	*SWL-Summer Water Level													

Govt. of Kerala

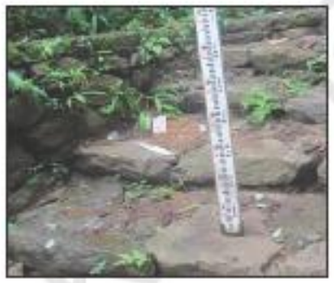
PROFILE - 31
RANNI & PAZHAYANGADI PANCHAYATS

Scale 1:4



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.605			101.880	100.275			Change point
TBM-31		0.040			101.840			On step, maramthottam kadavu
P1		1.680			100.200			Right water level
P2		2.280			99.600		1	Water
P3		2.090			99.790		2	Water
P4		1.830			100.050		2	Water
P5		1.730			100.150		2	Water
P6		1.960			99.920		2	Water
P7		1.680			100.200			Left water level
CP			0.900		100.980			Change point

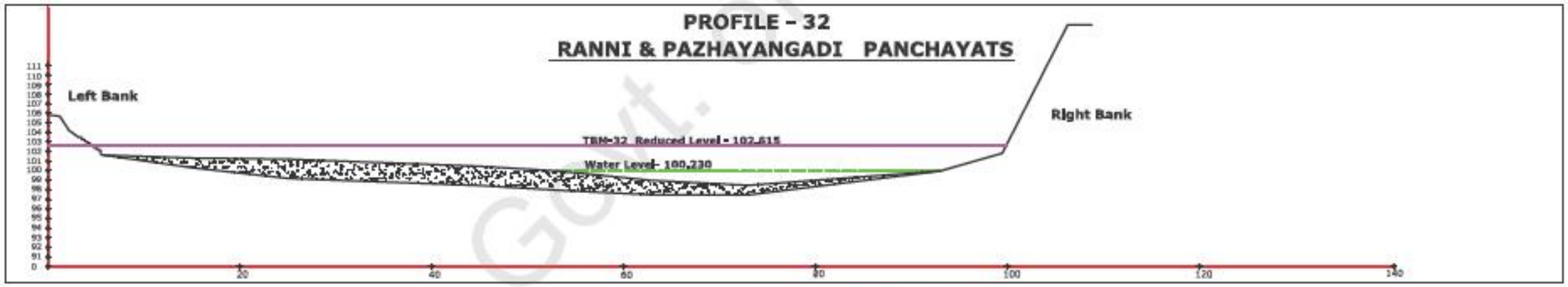


Details

Cross Sectional Area Of Sand	: 128.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 128.00	M²
Cross Sectional Area Of Sand (Ranni)	: 64.00	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 64.00	M²

TBM 31 Marked On Step (Right Bank) Maramthottam Kadavu
TBM Cadastral Plot No: 275 (Ranni Village)

PROFILE - 32
RANNI & PAZHAYANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.850			101.830	100.980			Change point
CP	1.700		0.670	102.860	101.160			Change point
TBM-32		0.245			102.615			On step , plachery kadavu
P1		1.290			101.570		0.5	Sand
P2		1.410			101.450		1	Sand
P3		2.150			100.710		2	Sand
P4		2.630			100.230		2	Left water level
P5		3.630			99.230		2	Water
P6		4.130			98.730		1	Water
P7		2.630			100.230			Right water level
CP			2.150		100.710			Change point

Details

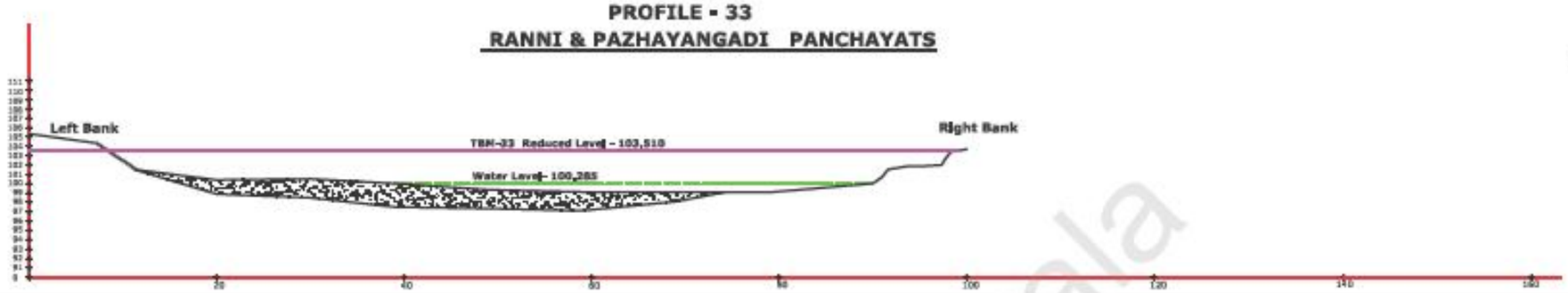
Cross Sectional Area Of Sand	: 156.20	M²
Cross Sectional Area Of Sand Above Waterlevel	: 15.50	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 112.23	M²
Cross Sectional Area Of Sand (Ranni)	: 63.86	M²
Cross Sectional Area Of Sand (Angadi)	: 63.86	M²

TBM 30 Marked On 1st Step (Left Bank) Near Ranni Bridge)
TBM Cadastral Plot No: 434/4 (Ranni Village

PROFILE - 33

RANNI & PAZHAYANGADI PANCHAYATS

Scale 1:4



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.915			103.625	100.710			Change point
TBM-33		0.115			103.510			On step , temple kadavu
P1		1.575			102.050			bottom step of kadavu
P2		2.960			100.665		1.5	Sand
P3		2.850			100.775		2	Sand
P4		3.340			100.285		2.5	Left water level
P5		4.010			99.615		2	Water
P6		4.240			99.385		2	Water
P7		4.260			99.365		1	Water
P8		4.280			99.345			Water
P9		4.275			99.350			Water
P10		3.340			100.285			Right water level
CP			1.305		102.320			Change point

Details

Cross Sectional Area Of Sand	: 104.38	M²
Cross Sectional Area Of Sand Above Waterlevel	: 31.00	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 74.41	M²
Cross Sectional Area Of Sand (ranni)	: 42.70	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 42.70	M²

TBM 33 Marked On 4th Step Step From Bottom (Left Bank) Sastham Devi Temple Kadavu
TBM Cadastral Plot No: 470/10 (Ranni Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

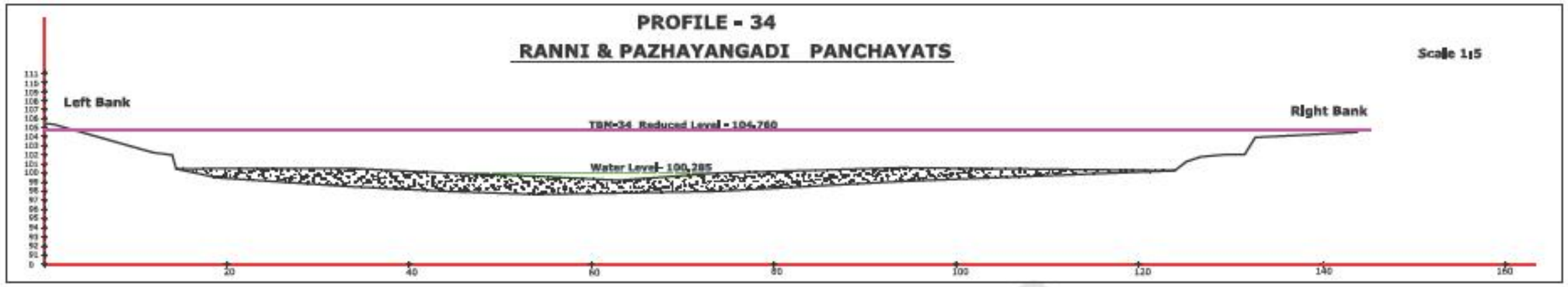
Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
31	150.00	75.00	112.50	56.25	137.50	128.00	17600.00	128.00	17600.00	0.00	0.000	Ranni	0.000	Exceptional Area
	175.00	150.00	162.50	81.25								Angadi	0.000	Exceptional Area
32	175.00	150.00	162.50	81.25	175.00	115.59	20228.25	107.09	18740.75	35.79	6263.250	Ranni	0.000	Exceptional Area
	200.00	175.00	187.50	93.75								Angadi	0.000	Exceptional Area
33	200.00	175.00	187.50	93.75	181.25	104.38	18918.88	85.41	15480.56	11.00	1993.750	Ranni	42.705	7740.281
	225.00	125.00	175.00	87.50								Angadi	42.705	7740.281
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE - 34

RANNI & PAZHAYANGADI PANCHAYATS

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.000			105.320	102.320			Change point
TBM-34		0.560			104.760			On step , left bank
P1		3.065			102.255			
P2		4.580			100.740		1	Sand
P3		4.550			100.770		2	Sand
P4		5.035			100.285		2	Left water level
P5		5.385			99.935		2	Water
P6		5.035			100.285		2	Right water level
P7		4.450			100.870		1.5	Sand
P8		4.770			100.550		0.5	Sand
CP			4.640		100.680			Change point

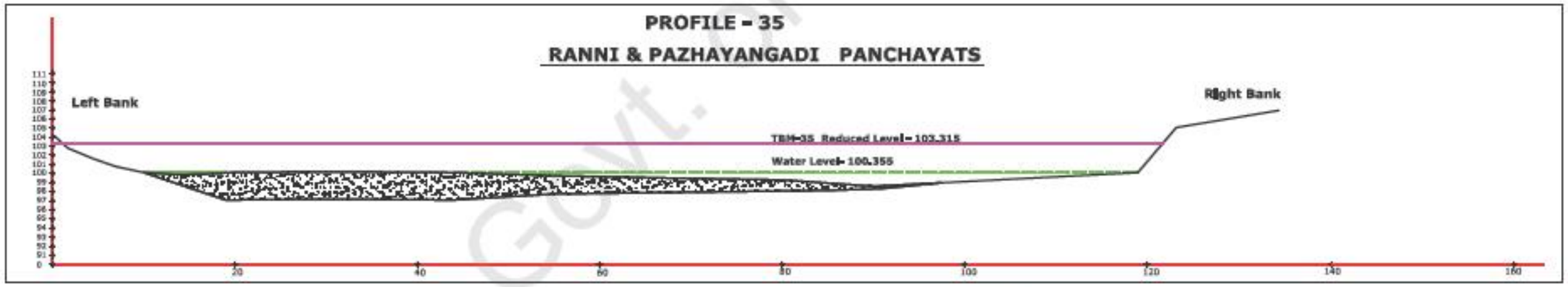
Details

Cross Sectional Area Of Sand	: 156.22	M²
Cross Sectional Area Of Sand Above Waterlevel	: 29.07	M²
Cross Sectional Area Of Sand Up To 2m From Waterleve	: 102.19	M²
Cross Sectional Area Of Sand (ranni)	: 65.63	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 65.63	M²

TBM 34 Marked On 8th Step From Top (Left Bank) Pandapurath Kadavu
TBM Cadastral Plot No: 472/8 (Ranni Village)

PROFILE - 35

RANNI & PAZHAYANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.325			104.005	100.680			Change point
TBM-35		0.690			103.315			On step , left bank
CP	1.525		3.380	102.150	100.625			Change point
P1		1.795			100.355			Left water level
P2		1.800			100.350		3	Water
P3		1.695			100.455		3	Water
P4		1.785			100.365		3	Water
P5		2.135			100.015		2	Water
P6		2.445			99.705			Water
P7		2.595			99.555			Water
P8		3.295			98.855			Water
P9		1.795			100.355			Right water level
CP			0.700		101.450			Change point

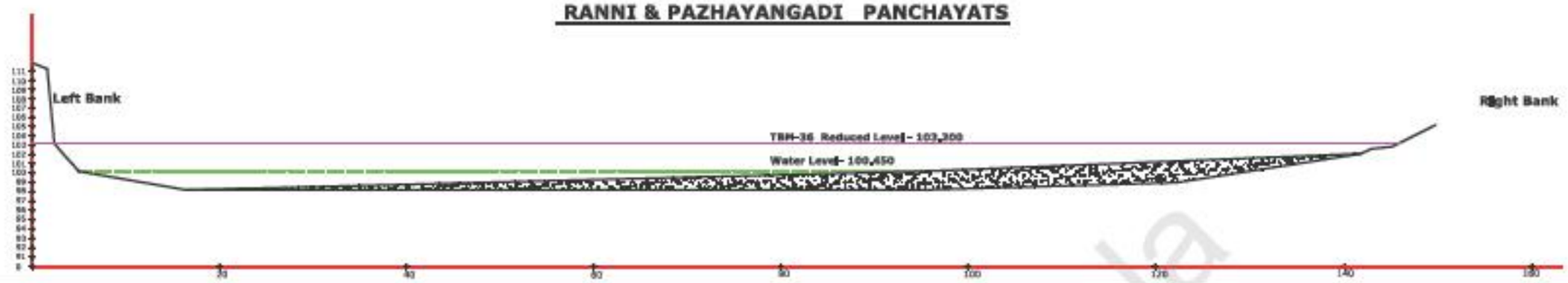
Details

Cross Sectional Area Of Sand	: 163.61	M²
Cross Sectional Area Of Sand Above Waterlevel	: Nil	
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 126.56	M²
Cross Sectional Area Of Sand (ranni)	: 63.28	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 63.28	M²

TBM 35 Marked On 7th Step From Bottom (Left Bank)
TBM Cadastral Plot No: 473/1b (Ranni Village)

PROFILE - 36
RANNI & PAZHAYANGADI PANCHAYATS

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.960			105.410	101.450			Change point
TBM-36		2.210			103.200			Left bank rock
P1		4.960			100.450			Left water level
P2		5.100			100.310		2	Water
P3		5.250			100.160		2	Water
P4		4.960			100.450		2	Right water level
P6		3.070			102.340			Sand
P7		0.430			104.980			Right bank
CP			3.795		101.615			Change point

Details

Cross Sectional Area Of Sand	: 158.81	M²
Cross Sectional Area Of Sand Above Waterlevel	: 33.01	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 125.80	M²
Cross Sectional Area Of Sand (ranni)	: 79.40	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 79.40	M²

TBM 36 Marked On Rock (Left Bank)
TBM Cadastral Plot No: 474/6 (Ranni Village)

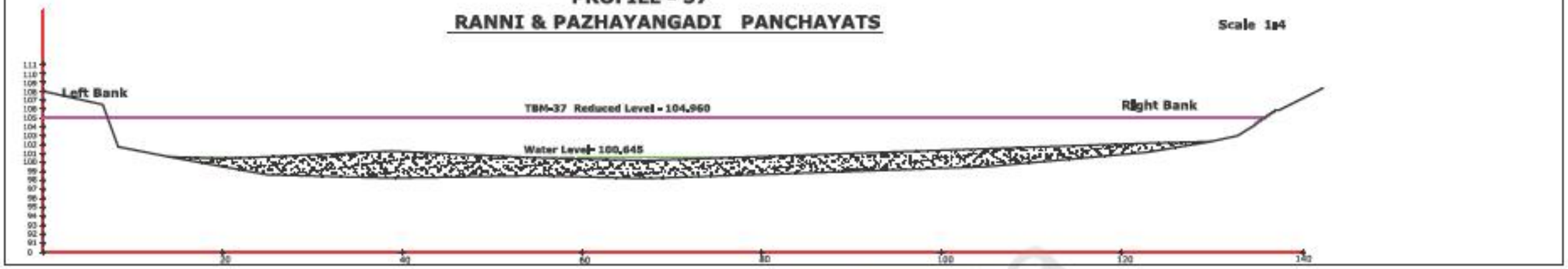
VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
34	225.00	125.00	175.00	87.50	162.50	156.22	25385.75	131.26	21329.75	29.07	4723.875	Ranni	65.630	10664.875
	125.00	175.00	150.00	75.00								Pazhayangadi	65.630	10664.875
35	125.00	175.00	150.00	75.00	137.50	163.61	22496.38	126.56	17402.00	0.00	0.000	Ranni	63.280	8701.000
	125.00	125.00	125.00	62.50								Pazhayangadi	63.280	8701.000
36	125.00	125.00	125.00	62.50	137.50	158.81	21836.38	158.81	21836.38	33.01	4538.875	Ranni	79.405	10918.188
	125.00	175.00	150.00	75.00								Pazhayangadi	79.405	10918.188

*SWL-Summer Water Level

PROFILE - 37
RANNI & PAZHAYANGADI PANCHAYATS

Scale 1:4



FIELD BOOK

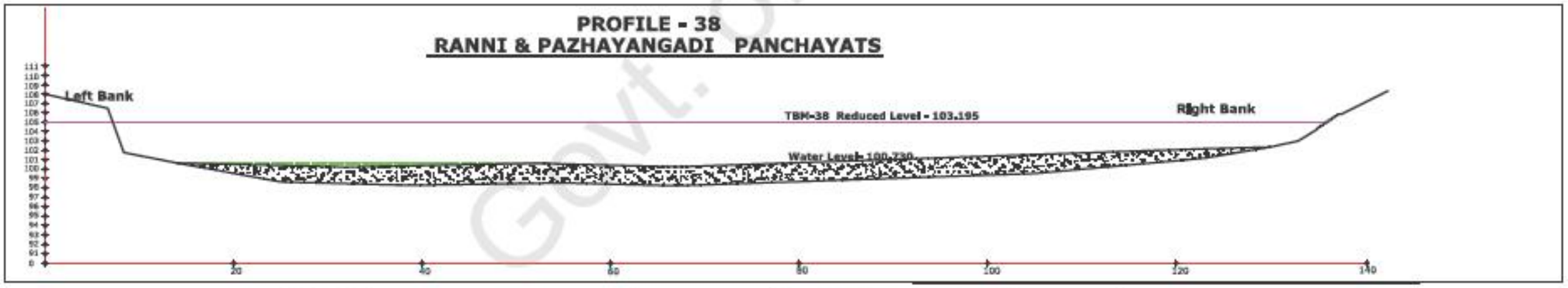
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.660			105.275	101.615			Change point
TBM-37		0.315			104.960			On step of kadavu, right bank
P1		2.940			102.335			Sand
P2		3.115			102.160		1	Sand
P3		4.630			100.645		2	Right water level
P4		5.030			100.245		2	Water
P5		4.740			100.535		2	Water
P6		5.740			99.535		2	Water
P7		4.000			101.275		2	Water
P8		4.000			101.275			Water
P9		4.630			100.645			Left water level
CP			4.050		101.225			Change point

Details

Cross Sectional Area Of Sand	: 215.44	M²
Cross Sectional Area Of Sand Above Waterlavel	: 44.4	M²
Cross Sectional Area Of Sand Up To 2m From Waterlavel	: 160.03	M²
Cross Sectional Area Of Sand (ranni)	: 102.22	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 102.22	M²

TBM 39 Marked On 2nd Step Of Kadavu From Bottom (right Bank)
TBM Cadastral Plot No: 456 (Pazhayangadi Village)

PROFILE - 38
RANNI & PAZHAYANGADI PANCHAYATS



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.015			103.240	101.225			Change point
TBM-38		0.045			103.195			On step, left bank private kadavu
P1		2.510			100.730			Left water level
P2		3.190			100.050		2	Water
P3		3.050			100.190		2	Water
P4		2.910			100.330		2	Water
P5		2.510			100.730		2	Water
P6		1.630			101.610		2	Sand
P7		2.510			100.730		2	Water
P8		2.920			100.320			Water
P9		2.510			100.730			Right water level
CP			2.225		101.015			Change point

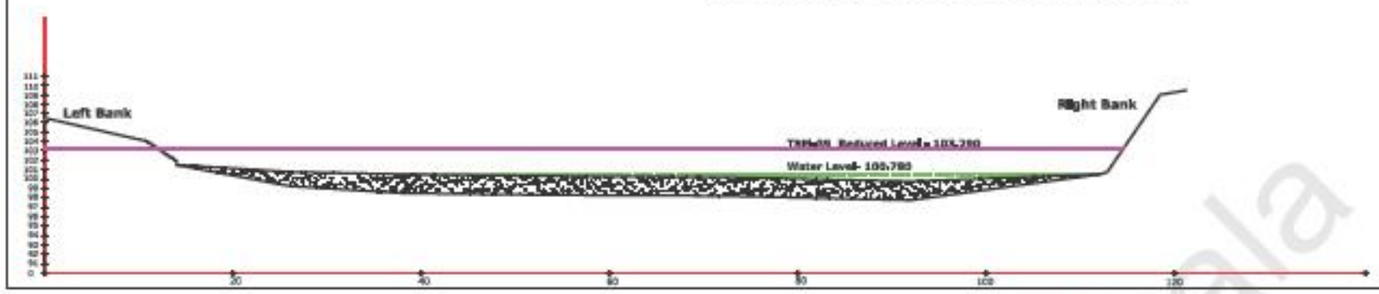
Details

Cross Sectional Area Of Sand	: 199.40	M²
Cross Sectional Area Of Sand Above Waterlevel	: 35.36	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 151.98	M²
Cross Sectional Area Of Sand (Ranni)	: 93.67	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 93.67	M²

TBM 38 Marked On 5th Step Of Kadavu (Left Bank)
TBM Cadastral Plot No: 636/4 (Ranni Village)

PROFILE - 39
RANNI & PAZHAYANGADI PANCHAYATS

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.950			103.965	101.015			Change point
TBM-39		0.675			103.290			On step ,left bank private kadavu
P1		2.185			101.780			
P2		2.930			101.035		1.5	
P3		3.185			100.780		2	Left water level
P4		3.395			100.570		2	Water
P5		3.485			100.480		2	Water
P6		3.935			100.030		2	Water
P7		3.185			100.780			Right water level
CP			2.300		101.665			Change point

Details

Cross Sectional Area Of Sand	: 158.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: 06.39	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 132.70	M²
Cross Sectional Area Of Sand (ranni)	: 69.59	M²
Cross Sectional Area Of Sand(Pazhayangadi)	: 69.59	M²

TBM 39 Marked On Step Of Kadavu (Left Bank) Madathum Kadavu
TBM Cadastral Plot No: 536/6 (Ranni Village)

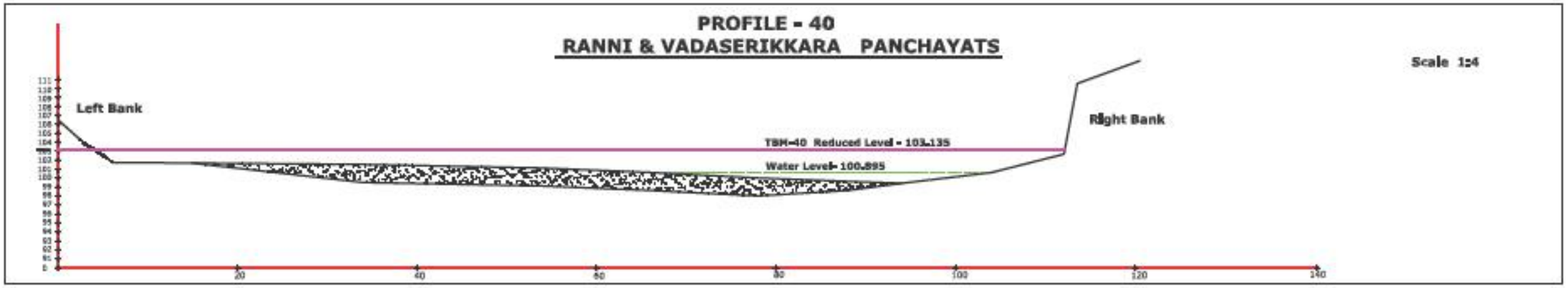
VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
37	125.00	175.00	150.00	75.00	143.75	215.44	30969.50	204.43	29386.81	44.40	6382.500	Ranni	102.215	14693.406
	150.00	125.00	137.50	68.75								Pazhayangadi	102.215	14693.406
38	150.00	125.00	137.50	68.75	137.50	199.40	27417.50	187.34	25759.25	35.36	4862.000	Ranni	93.670	12879.625
	125.00	150.00	137.50	68.75								Pazhayangadi	93.670	12879.625
39	125.00	150.00	137.50	68.75	143.75	158.00	22712.50	139.18	20007.13	6.39	918.563	Ranni	69.590	10003.563
	150.00	150.00	150.00	75.00								Pazhayangadi	69.590	10003.563

*SWL-Summer Water Level

Govt. of Kerala

PROFILE - 40
RANNI & VADASERIKKARA PANCHAYATS



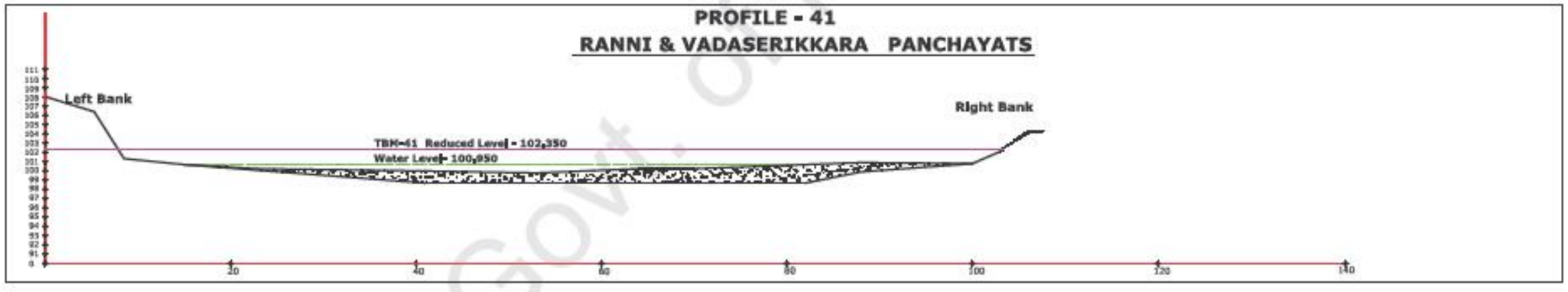
FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.145			103.810	101.665			Change point
TBM-40		0.675			103.135			On step, left bank kadavu
P1		1.790			102.020			
P2		2.020			101.790		2	Sand
P3		2.420			101.390		2	Sand
P4		2.915			100.895		2	Left water level
P5		3.525			100.285		2	Water
P6		3.915			99.895		1	Water
P7		4.115			99.695			Water
P8		2.915			100.895			Right water level
CP			2.530		101.280			Change point

Details

Cross Sectional Area Of Sand	: 125.06	M²
Cross Sectional Area Of Sand Above Waterlevel	: 30.54	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 87.81	M²
Cross Sectional Area Of Sand (ranni)	: 59.18	M²
Cross Sectional Area Of Sand(Vadaserikkara)	: 59.18	M²

TBM 40 Marked On 4th Step Of Kadavu (Left Bank)
TBM Cadastral Plot No: 536/4 (Ranni Village)

PROFILE - 41
RANNI & VADASERIKKARA PANCHAYATS



FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.685			102.965	101.280			Change point
TBM-41		0.615			102.350			On step ,right side private kadavu
P1		1.910			101.055			Sand
P2		1.810			101.155		1	Sand
P3		2.015			100.950		2	Right water level
P4		2.465			100.500		2	Water
P5		2.925			100.040		2	Water
P6		2.715			100.250		2	Water
P7		2.466			100.499		2	Water
P8		2.015			100.950			Left water level
CP			1.515		101.450			Change point

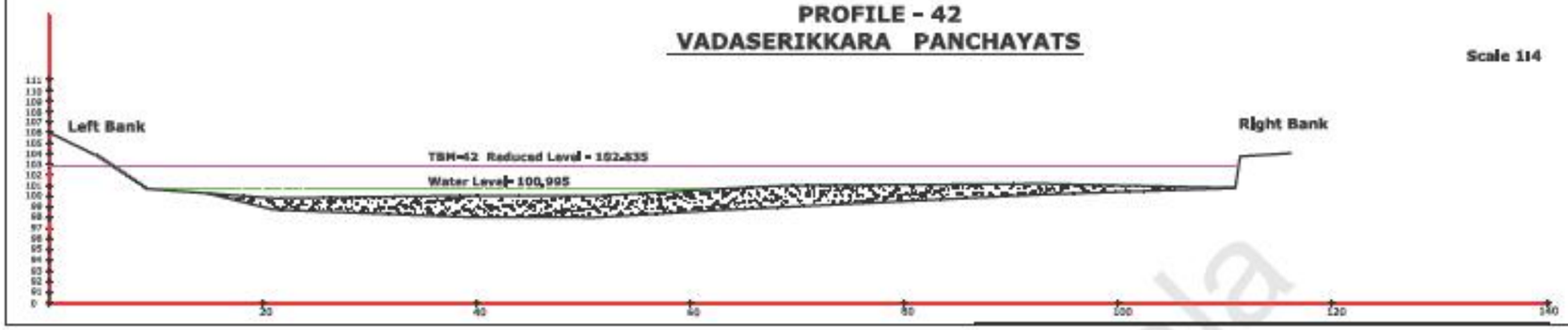
Details

Cross Sectional Area Of Sand	: 88.30	M²
Cross Sectional Area Of Sand Above Waterlevel	: 02.38	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 77.92	M²
Cross Sectional Area Of Sand (ranni)	: 40.15	M²
Cross Sectional Area Of Sand (vadaserikkara)	: 40.15	M²

TBM 41 Marked On 1st Step Of Kadavu (Right Bank)
TBM Cadastral Plot No: 56 (Vadaserikkara Village)

PROFILE - 42
VADASERIKKARA PANCHAYATS

Scale 1:4



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.675			103.125	101.450			Change point
TBM-42		0.290			102.835			On step ,left bank private kadavu
P1		2.130			100.995			Left water level
P2		3.030			100.095		1	Water
P3		2.790			100.335		1	Water
P4		2.830			100.295		2	Water
P5		2.130			100.995		2	Right water level
P6		1.845			101.280		1	Sand
P7		1.675			101.450		1	Sand
P8		2.075			101.050			
CP			1.940		101.185			Change point

Details

Cross Sectional Area Of Sand : 135.96 M²
Cross Sectional Area Of Sand Above Waterlevel : 14.28 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 117.90 M²

TBM 42 Marked On 5th Step Of Private Kadavu
TBM Cadastral Plot No: 543/12 (Vadaserikkara Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
40	150.00	150.00	150.00	75.00	125.00	125.06	15632.50	118.35	14793.75	30.54	3817.500	Ranni	59.175	7396.875
	75.00	125.00	100.00	50.00								Vadaserikkara	59.175	7396.875
41	75.00	125.00	100.00	50.00	112.50	88.30	9933.75	80.30	9033.75	2.38	267.750	Ranni	40.150	4516.875
	125.00	125.00	125.00	62.50								Vadaserikkara	40.150	4516.875
42	125.00	125.00	125.00	62.50	131.25	135.96	17844.75	132.18	17348.63	14.28	1874.250	Vadaserikkara	132.180	17348.630
	125.00	150.00	137.50	68.75										
	*SWL-Summer Water Level													

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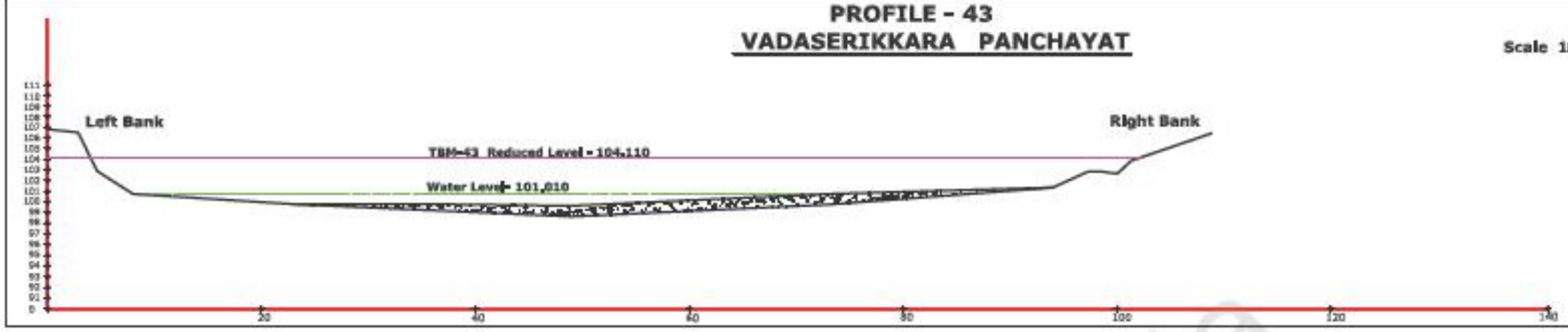
PROFILE - 43
VADASERIKKARA PANCHAYAT

Scale 1:4



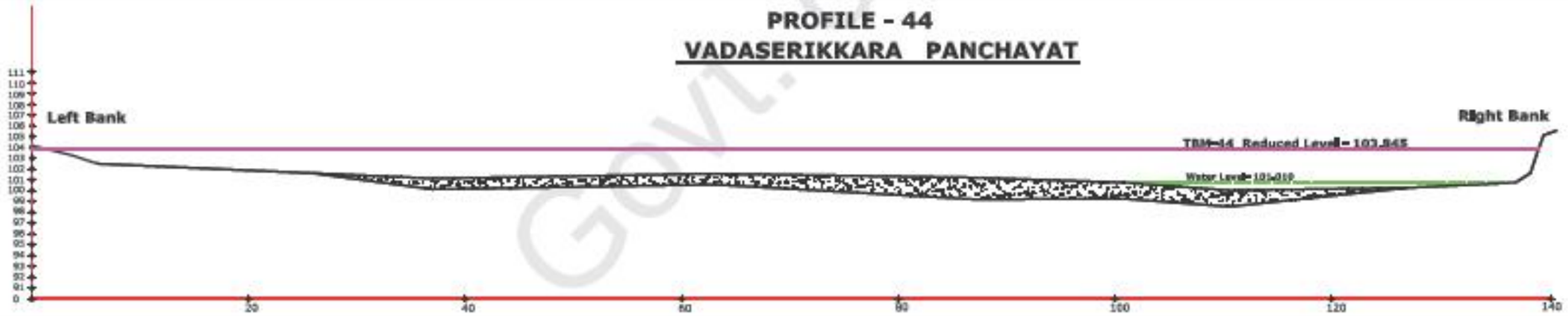
FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	4.145			105.330	101.185			Change point
TBM-43		1.220			104.110			On rock ,right bank
P1		3.725			101.605			
P2		4.320			101.010			Right water level
P3		4.990			100.340		1	Water
P4		5.290			100.040		2	Water
P5		5.430			99.900		2	Water
P6		5.270			100.060			Water
P7		4.320			101.010			Left water level
CP			3.785		101.545			Change point

Details

Cross Sectional Area Of Sand : 48.36 M²
Cross Sectional Area Of Sand Above Waterlevel : 03.79 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 44.57 M²

TBM 43 Marked On Rock Right Bank
TBM Cadastral Plot No: 60 (Vadaserikkara Village)

PROFILE - 44
VADASERIKKARA PANCHAYAT



FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.465			104.010	101.545			Change point
TBM-44		0.165			103.845			On protection wall (right bank)
P1		3.000			101.010			Right water level
P2		3.480			100.530		1.5	Water
P3		3.685			100.325		1.5	Water
P4		3.000			101.010		1.5	Left water level
P5		2.540			101.470		2	Sand
P6		2.180			101.830		1	Sand
P7		2.625			101.385		1	Sand
P8		1.255			102.755			
CP			2.655		101.355			Change point

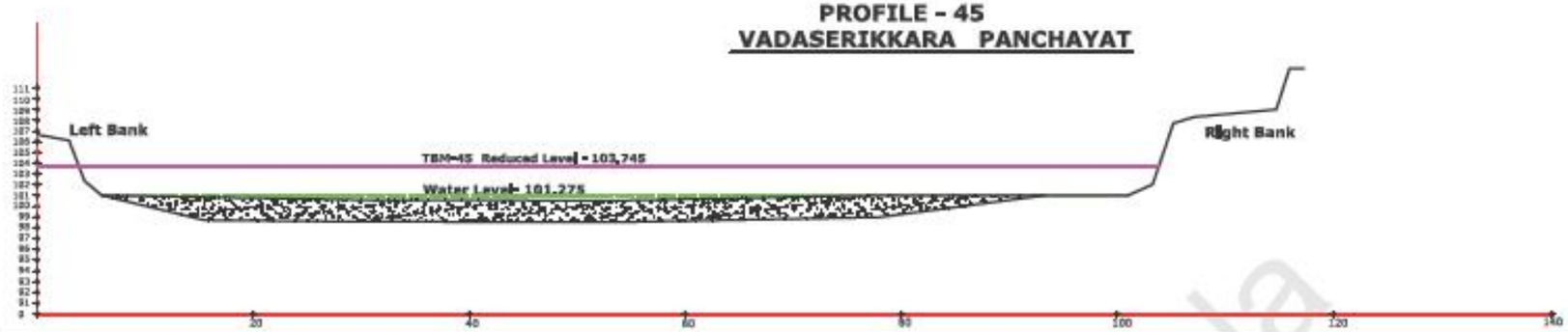
Details

Cross Sectional Area Of Sand : 118.67 M²
Cross Sectional Area Of Sand Above Waterlevel : 38.17 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 71.04 M²

TBM 44 Marked On Protection Wall Right Bank
TBM Cadastral Plot No: 61 (Vadaserikkara Village)

PROFILE - 45
VADASERIKKARA PANCHAYAT

Scale 1:4



FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.820			104.175	101.355			Change point
TBM-45		0.430			103.745			Left bank rock
P1		2.900			101.275			Left water level
P2		3.080			101.095		2	Water
P3		3.330			100.845		2	Water
P4		3.550			100.625		2	Water
P5		3.380			100.795		2	Water
P6		3.210			100.965		2	Water
P7		2.905			101.270		2	Water
P8		3.140			101.035		2	Water
P9		2.900			101.275		2	Right water level
CP			2.400		101.775			Change point

Details

Cross Sectional Area Of Sand : 151.60 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 129.21 M²

TBM 45 Marked On Rock at Left Bank
TBM Cadastral Plot No: 244 (Vadaserikkara Village)

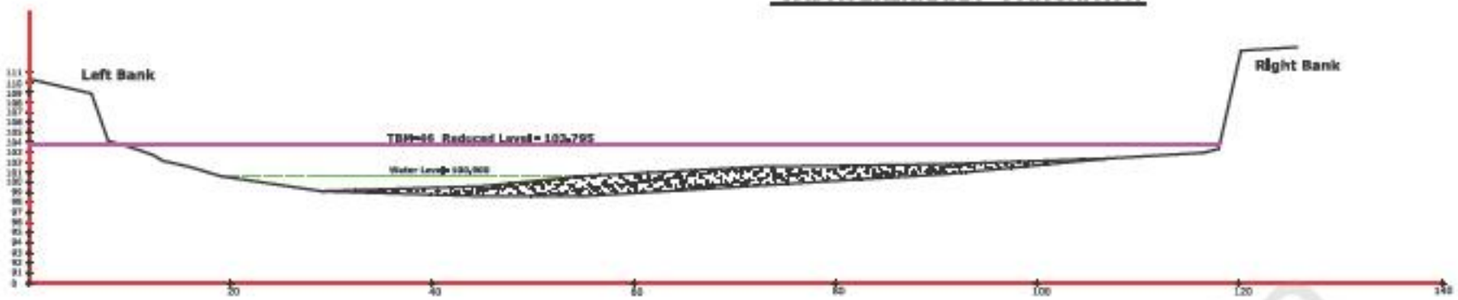
VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
43	125.00	150.00	137.50	68.75	156.25	48.36	7556.25	48.36	7556.25	3.79	592.188	Vadaserikkara	48.360	7556.250
	200.00	150.00	175.00	87.50										
44	200.00	150.00	175.00	87.50	150.00	118.67	17800.50	109.21	16381.50	38.17	5725.500	Vadaserikkara	109.210	16381.500
	100.00	150.00	125.00	62.50										
45	100.00	150.00	125.00	62.50	112.50	151.60	17055.00	129.21	14536.13	0.00	0.000	Vadaserikkara	129.210	14536.130
	100.00	100.00	100.00	50.00										
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE - 46
VADASERIKKARA PANCHAYAT

Scale 1:5



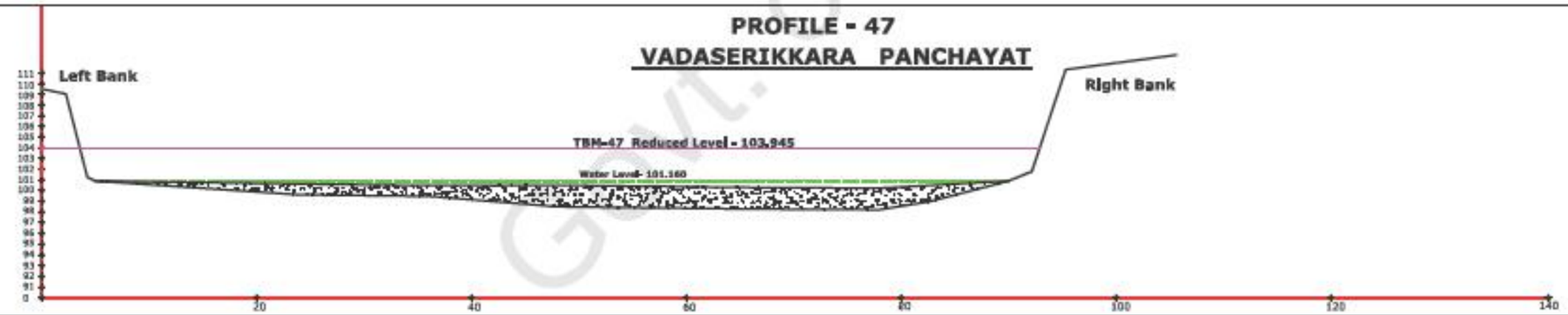
FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.540			104.315	101.775			Change point
P1		1.095			103.220			
P2		1.665			102.650			Sand
P3		2.220			102.095		1	Sand
P4		3.415			100.900		2	Right water level
P5		4.415			99.900		1	water
P6		4.915			99.400		1	water
P7		3.415			100.900			Left water level
TBM-46		0.520			103.795			On rock ,left bank
CP			3.305		101.010			Change point

Details

Cross Sectional Area Of Sand : 91.36 M²
Cross Sectional Area Of Sand Above Waterlevel : 35.55 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 55.81 M²

TBM 46 Marked On Rock At Left Bank
TBM Cadastral Plot No: 244 (Vadaserikkara Village)

PROFILE - 47
VADASERIKKARA PANCHAYAT



FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.640			104.650	101.010			Change point
P1		3.490			101.160			Left water level
P2		3.770			100.880		1	Water
P3		3.910			100.740		1	Water
P4		3.880			100.770		2	Water
P5		3.960			100.690		2	Water
P6		4.090			100.560		2	Water
P7		4.160			100.490		2	Water
P8		3.490			101.160			Right water level
TBM-47		0.705			103.945			On rock
CP			3.180		101.470			Change point

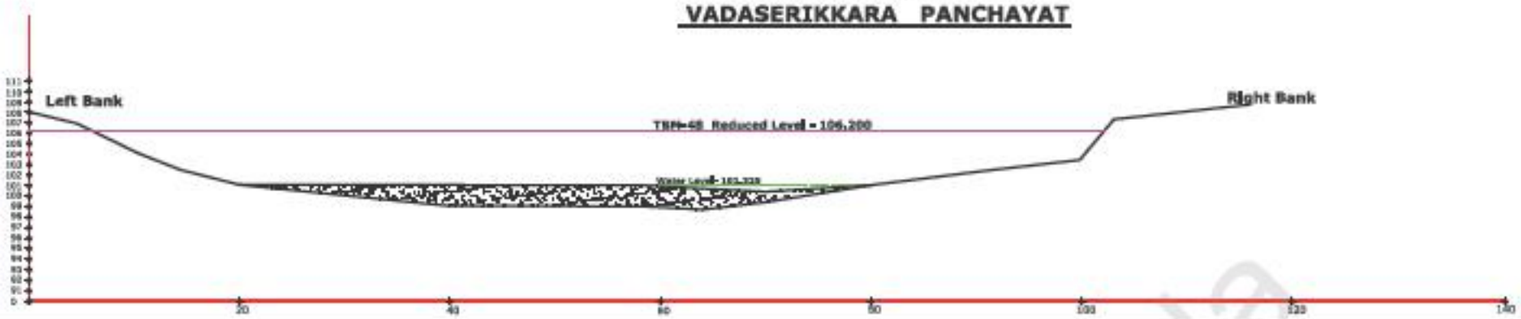
Details

Cross Sectional Area Of Sand : 82.00 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 82.00 M²

TBM 47 Marked On Rock At Right Bank
TBM Cadastral Plot No: 84 (Vadaserikkara Village)

PROFILE – 48
VADASERIKKARA PANCHAYAT

Scale 1:5



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	4.740			106.210	101.470			Change point
TBM-48		0.010			106.200			On rock ,Right bank
P1		4.860			101.350			sand
P2		4.620			101.590		2	sand
P3		4.885			101.325		2	Left water level
P4		5.215			100.995		2	Water
P5		5.515			100.695		1	Water
P6		4.860			101.350			Right water level
P7		3.460			102.750			bank
CP			4.580		101.630			Change point

Details

Cross Sectional Area Of Sand : 82.00 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 82.00 M²

TBM 48 Marked On Rock At Right Bank
TBM Cadastral Plot No: 85 (Vadaserikkara Village)

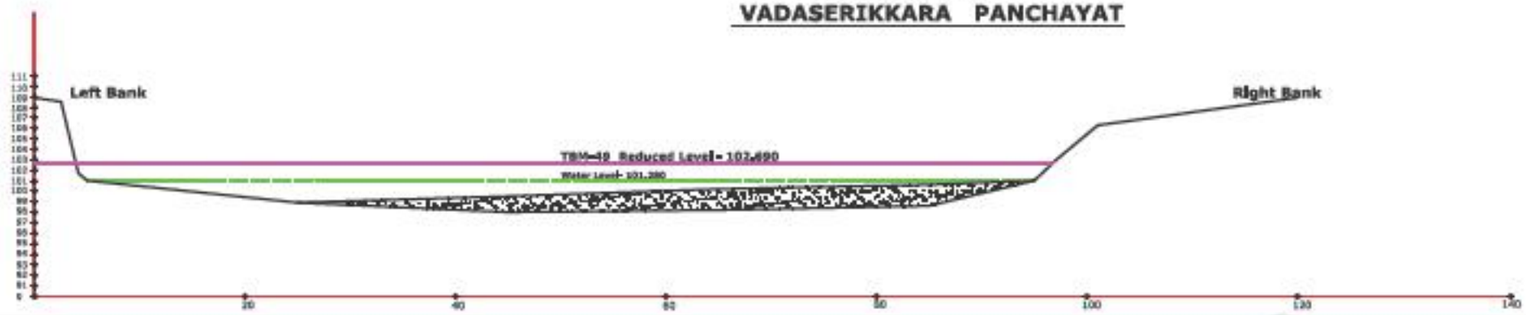
VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
46	100.00	100.00	100.00	50.00	112.50	91.36	10278.00	91.36	10278.00	35.55	3999.375	Vadaserikkara	91.360	10278.000
	125.00	125.00	125.00	62.50										
47	125.00	125.00	125.00	62.50	112.50	82.00	9225.00	82.00	9225.00	0.00	0.000	Vadaserikkara	82.000	9225.000
	100.00	100.00	100.00	50.00										
48	100.00	100.00	100.00	50.00	106.25	82.00	8712.50	82.00	8712.50	0.00	0.000	Vadaserikkara	82.000	8712.500
	125.00	100.00	112.50	56.25										
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE - 49
VADASERIKKARA PANCHAYAT

Scale 1:5



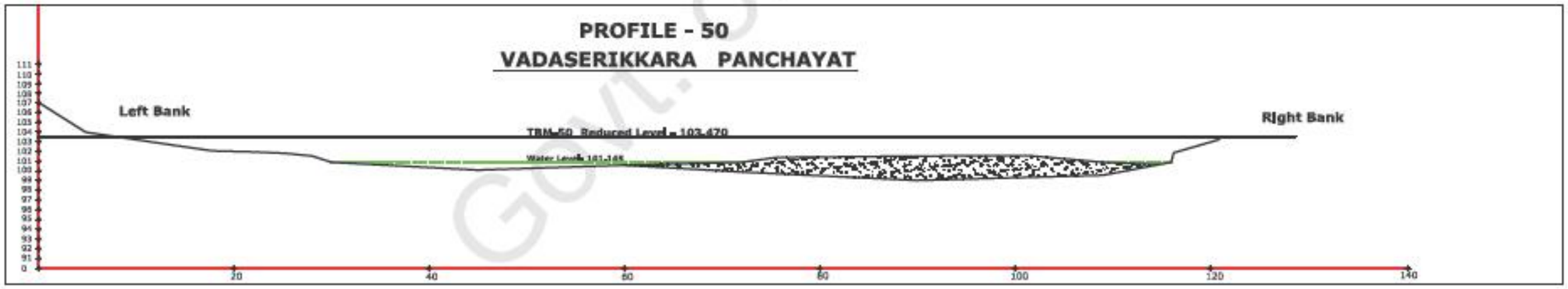
FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.280			103.910	101.630			Change point
CP	1.595		2.545	102.960	101.365			Change point
TBM-49		0.270			102.690			On rock ,left bank
P1		1.680			101.280			Left water level
P2		3.780			99.180		0.5	Water
P3		3.180			99.780		1	Water
P4		2.480			100.480		1	Water
P5		2.080			100.880		2	Water
P6		1.680			101.280			Right water level
CP			1.470		101.490			Change point

Details

Cross Sectional Area Of Sand : 100.00 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 58.83 M²

TBM 49 Marked On Rock At Left Bank
TBM Cadastral Plot Nos 261 (Vadaserikkara Village)

PROFILE - 50
VADASERIKKARA PANCHAYAT



FIELD BOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.060			103.550	101.490			Change point
TBM-50	0.125		0.080	103.595	103.470			On rock left bank bathingkadavu
P1		2.450			101.145			Right water level
P2		3.250			100.345			Water
P3		2.750			100.845			Water
P4		2.650			100.945			Water
P5		2.450			101.145			Left water level
P6		2.450			101.145		2	Sand
P7		1.820			101.775		2	Sand
P8		2.375			101.220		2	
CP			2.025		101.570			Change point

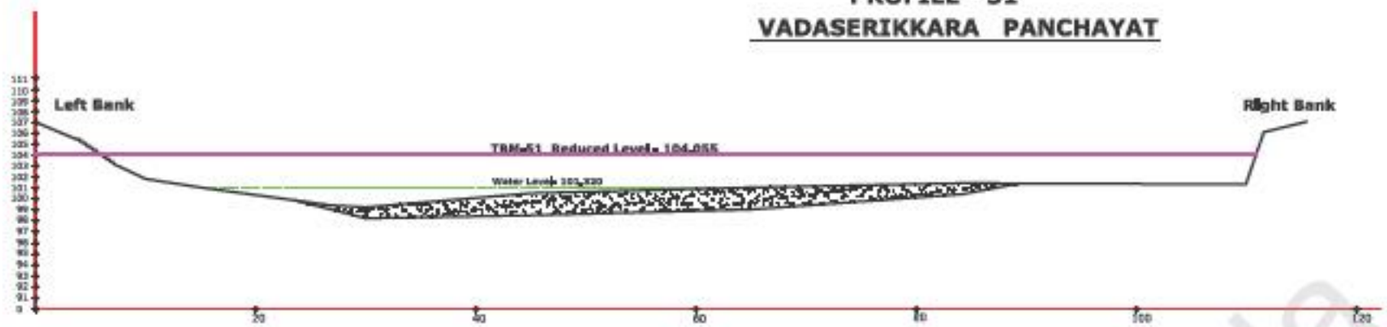
Details

Cross Sectional Area Of Sand : 85.00 M²
Cross Sectional Area Of Sand Above Waterlevel : 18.90 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 66.10 M²

TBM 50 Marked On Rock At Right Bank
TBM Cadastral Plot No: 94 (Vadaserikkara Village)

PROFILE - 51
VADASERIKKARA PANCHAYAT

Scale 1:4



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.835			104.405	101.570			Change point
TBM-51		0.350			104.055			Left bank kadavu(kidangumoozhi)
P1		1.425			102.980		1	sand
P2		2.700			101.705		2	Sand
P3		3.085			101.320		2	Right water level
P4		3.615			100.790		2	Water
P5		4.885			99.520		1	Water
P6		3.085			101.320			Left water level
P7		1.500			102.905			bank
CP			2.465		101.940			Change point

Details

Cross Sectional Area Of Sand	: 96.63	M^2
Cross Sectional Area Of Sand Above Waterlevel	: 5.26	M^2
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 74.82	M^2

TBM 51 Marked On Step At Kidangummoozhi Kadavu
TBM Cadastral Plot No: 267 (Vadaserikkara Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
49	125.00	100.00	112.50	56.25	137.50	100.00	13750.00	58.83	8089.13	0.00	0.000	Vadaserikkara	58.830	8089.130
	150.00	175.00	162.50	81.25										
50	150.00	175.00	162.50	81.25	143.75	85.00	12218.75	85.00	12218.75	18.90	2716.880	Vadaserikkara	85.000	12218.750
	125.00	125.00	125.00	62.50										
51	125.00	125.00	125.00	62.50	125.00	96.63	12078.75	80.08	10010.00	5.26	657.500	Vadaserikkara	80.080	10010.000
	100.00	150.00	125.00	62.50										
	*SWL-Summer Water Level													

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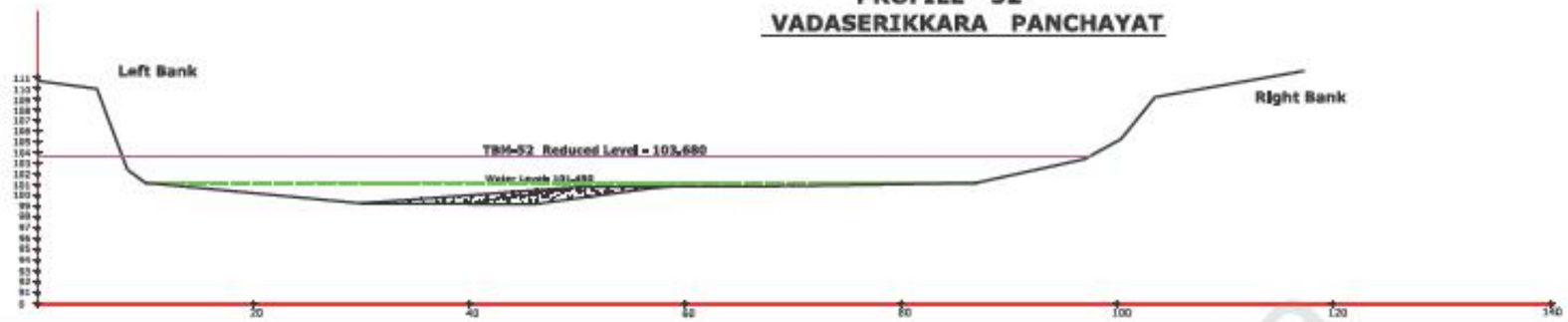
PROFILE - 52
VADASERIKKARA PANCHAYAT

Scale 1:5



FIELD BOOK

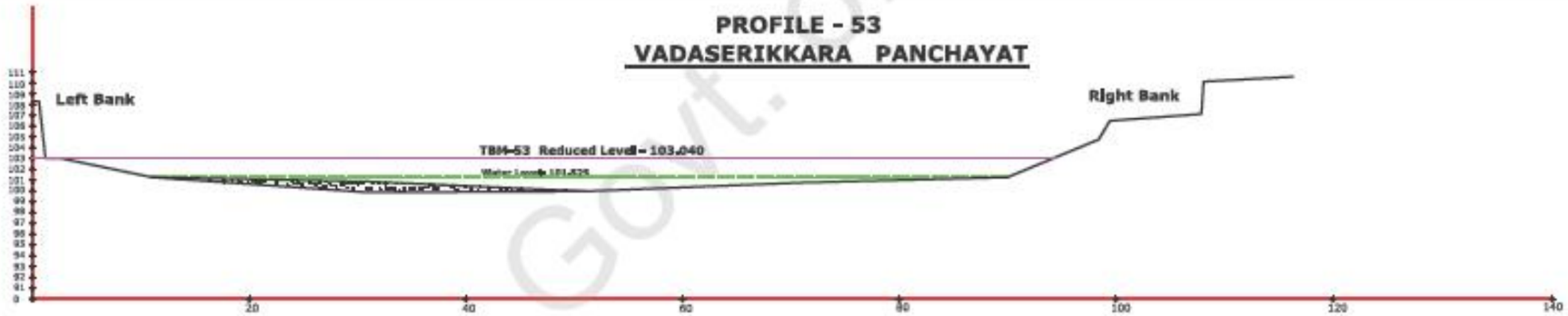
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.780			103.720	101.940			Change point
TBM-52		0.040			103.680			On rock , right bank
P1		2.230			101.490			Right water level
P2		2.530			101.190			Water
P3		2.630			101.090		1	Water
P4		4.130			99.590			Water
P5		2.230			101.490			Left water level
CP			1.920		101.800			Change point

Details

Cross Sectional Area Of Sand : 19.05 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 19.05 M²

TBM 52 Marked On Rock At Right Bank
TBM Cadastral Plot No: 97 (Vadaserikkara Village)

PROFILE - 53
VADASERIKKARA PANCHAYAT



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.415			103.215	101.800			Change point
TBM-53		0.175			103.040			On rock, left bank
P1		1.690			101.525			Left water level
P2		2.090			101.125		1	Water
P3		2.990			100.225			Water
P4		2.190			101.025			Water
P5		1.690			101.525			Right water level
CP			1.615		101.600			Change point

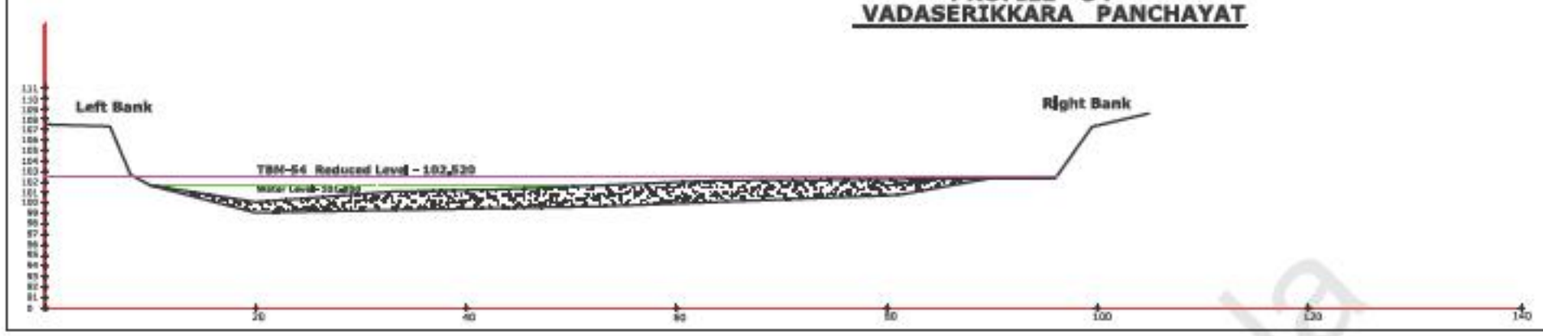
Details

Cross Sectional Area Of Sand : 20.00 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 20.00 M²

TBM 53 Marked On Rock At Left Bank
TBM Cadastral Plot No: 281 (Vadaserikkara Village)

PROFILE - 54
VADASERIKKARA PANCHAYAT

Scale 1:4



FIELD BOOK

Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.725			103.325	101.600			Change point
CP	1.510		0.870	103.965	102.455			Change point
P1		1.340			102.625			
P2		1.565			102.400			Sand
P3		2.015			101.950			Right water level
P4		2.415			101.550		2	Water
P5		2.615			101.350		2	Water
P6		3.615			100.350		1	Water
P7		2.015			101.950			Left water level
TBM-54		1.445			102.520			On rock ,left bank
CP			2.000		101.965			Change point

Details

Cross Sectional Area Of Sand	: 119.29	M²
Cross Sectional Area Of Sand Above Waterlevel	: 15.21	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 103.08	M²

TBM 54 Marked On Rock At Left Bank
TBM Cadastral Plot No: 282 (Vadaserikkara Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
52	100.00	150.00	125.00	62.50	125.00	19.05	2381.25	19.05	2381.25	0.00	0.000	Vadaserikkara	19.050	2381.250
	150.00	100.00	125.00	62.50										
53	150.00	100.00	125.00	62.50	143.75	20.00	2875.00	20.00	2875.00	0.00	0.000	Vadaserikkara	20.000	2875.000
	150.00	175.00	162.50	81.25										
54	150.00	175.00	162.50	81.25	150.00	118.29	17743.50	118.29	17743.50	15.21	2281.500	Vadaserikkara	118.290	17743.500
	150.00	125.00	137.50	68.75										
	*SWL-Summer Water Level													

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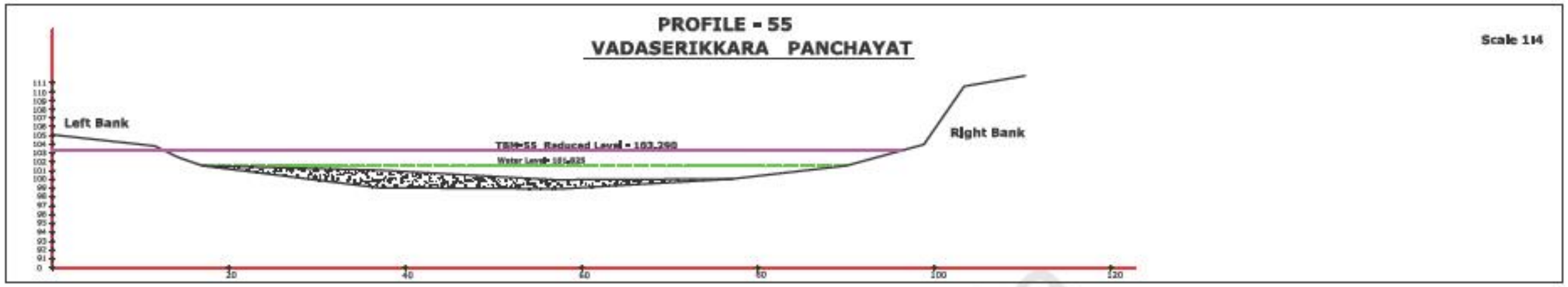
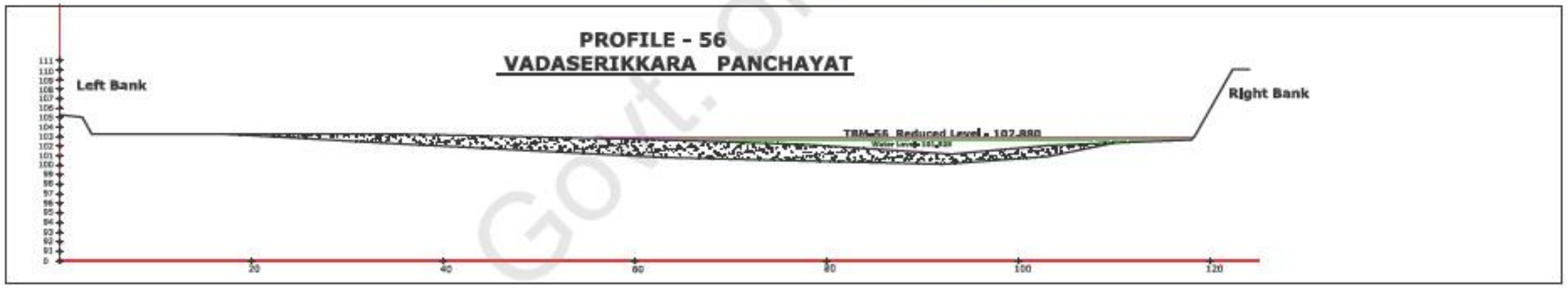


DETAILS OF CROSS SECTION -PROFILE 55								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.670			103.635	101.965			Change point
TBM-55		0.345			103.290			On rock (Right bank)
P1		1.810			101.825			Right water level
P2		3.310			100.325			Water
P3		3.410			100.225		1	Water
P4		2.310			101.325		2	Water
P5		1.810			101.825			Left water level
CP			0.775		102.860			Change point

Details

Cross Sectional Area Of Sand : 60.73 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 60.73 M²

TBM 55 Marked On Rock At Right Bank
TBM Cadastral Plot No: 215 (Vadaserikkara Village)

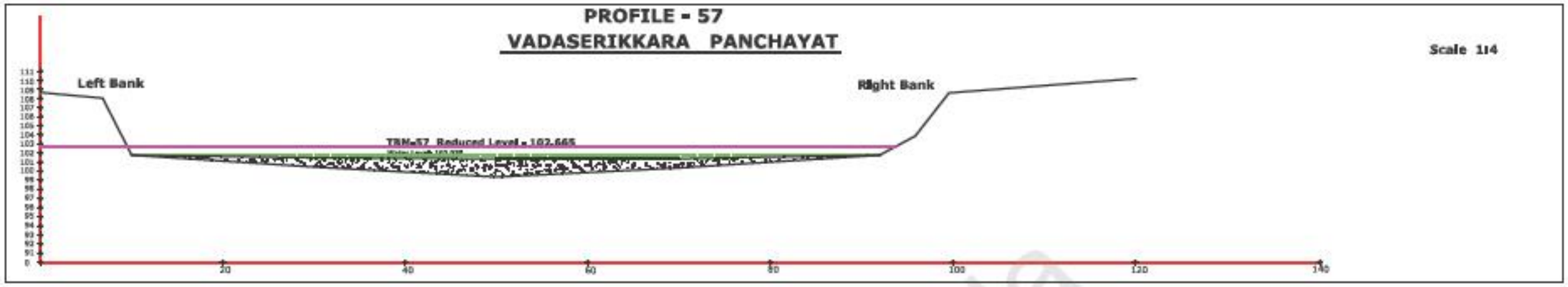


DETAILS OF CROSS SECTION -PROFILE 56								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.750			103.610	102.860			Change point
P1		0.080			103.530			Sand layer edge
P2		1.685			101.925		2	Left water level
P3		1.185			102.425		1.5	Water
P4		2.185			101.425		1	Water
P5		1.285			102.325		1.5	Water
P6		1.685			101.925			Right water level
TBM-56		0.730			102.880			Right bank rock ,near kadavu
CP			1.435		102.175			Change point

Details

Cross Sectional Area Of Sand : 110.34 M²
Cross Sectional Area Of Sand Above Waterlevel : 15.84 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 86.60 M²

TBM 56 Marked On Rock At Right Bank Private Kadavu
TBM Cadastral Plot No: 226 (Vadaserikkara Village)



DETAILS OF CROSS SECTION -PROFILE 57								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.630			104.805	102.175			Change point
TBM-57		2.140			102.665			Left bank rock, near private kadavu
P1		2.770			102.035			Left water level
P2		3.070			101.735		1	Water
P3		3.170			101.635		2	Water
P4		3.170			101.635		1	Water
P5		2.770			102.035			Right water level
CP			2.140		102.665			Change point

Details

Cross Sectional Area Of Sand : 81.00 M²
Cross Sectional Area Of Sand Above Waterlevel : Nil
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 81.00 M²

TBM 57 Marked On Rock At Left Bank
TBM Cadastral Plot No: 288 (Vadaserikkara Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS														
Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
55	150.00	125.00	137.50	68.75	125.00	60.73	7591.25	60.73	7591.25	0.00	0.000	Vadaserikkara	60.730	7591.250
	125.00	100.00	112.50	56.25										
56	125.00	100.00	112.50	56.25	93.75	110.54	10363.13	102.44	9603.75	15.84	1485.000	Vadaserikkara	0.000	Exceptional Area
	75.00	75.00	75.00	37.50										
57	75.00	75.00	75.00	37.50	112.50	81.00	9112.50	81.00	9112.50	0.00	0.000	Vadaserikkara	0.000	Exceptional Area
	125.00	125.00	150.00	75.00										
	*SWL-Summer Water Level													

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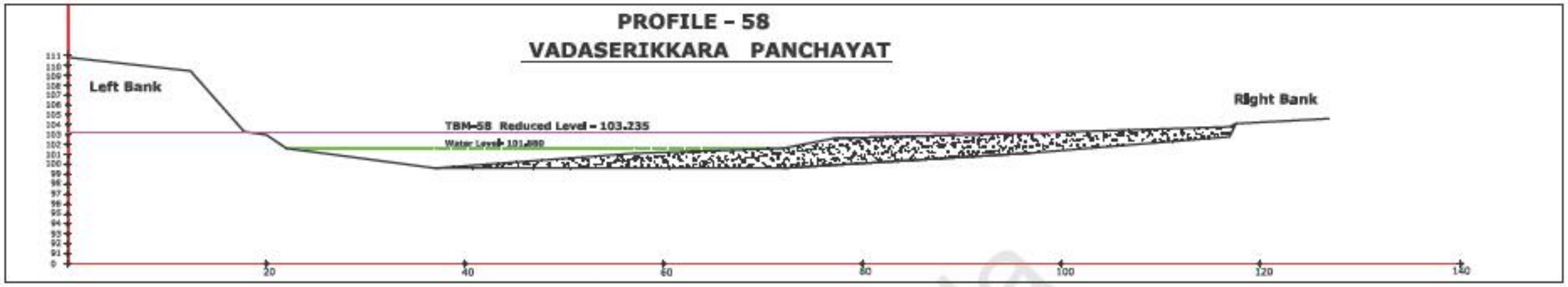
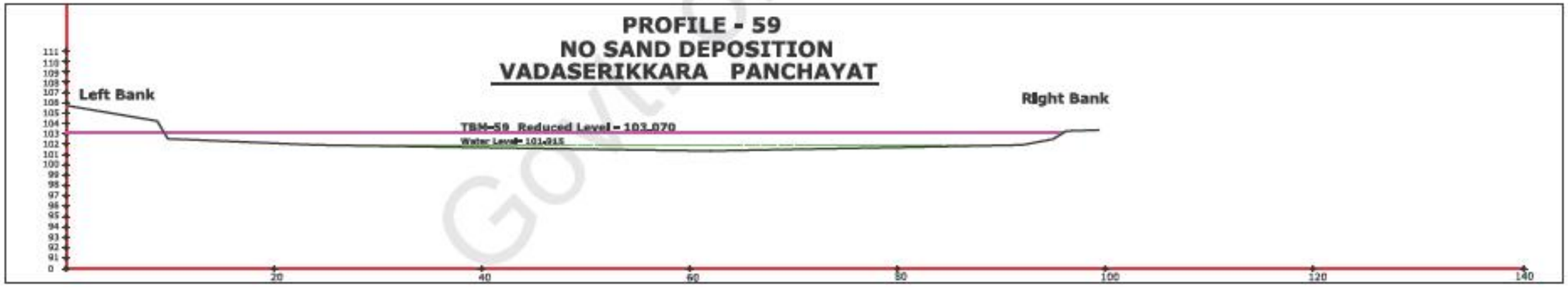


FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.860			105.525	102.665			Change point
TBM-58		2.290			103.235			Left bank rock, near private kadavu
P1		3.645			101.880			Left water level
P2		5.645			99.880			Water
P3		4.145			101.380			Water
P4		4.045			101.480			Water
P5		3.645			101.880			Right water level
P6		2.110			103.415		2	Sand
P7		1.480			104.045		2	Sand
P8		1.000			104.525		1	Sand layer edge
CP			2.290		103.235			Change point

Details

Cross Sectional Area Of Sand	: 130.04	M²
Cross Sectional Area Of Sand Above Waterlevel	: 56.65	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 130.04	M²

TBM 58 Marked On Rock At Private Kadavu
TBM Cadastral Plot No: 228 (Vadaserikkara Village)

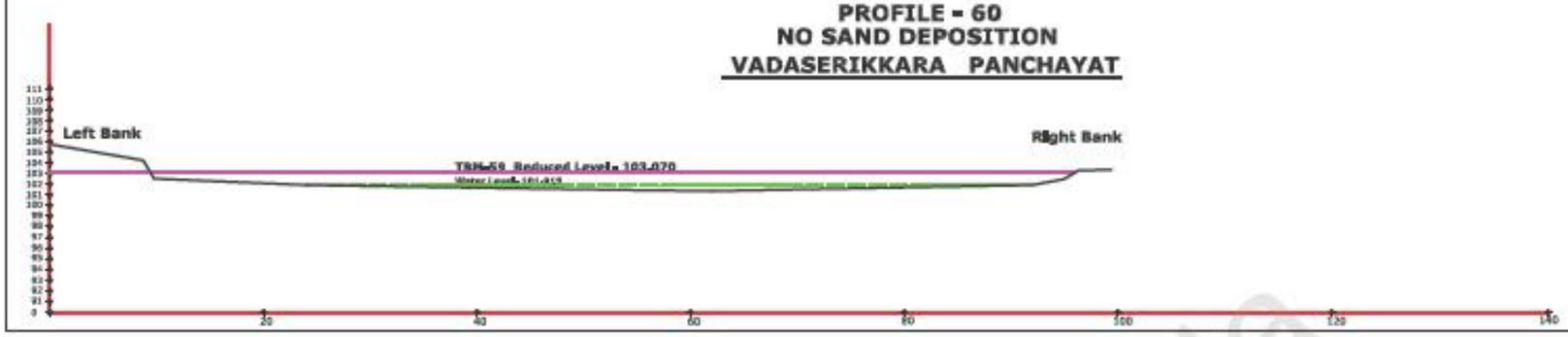


FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.320			103.555	103.235			Change point
CP	1.615		1.360	103.810	102.195			Change point
TBM-59		0.740			103.070			Marked on rock (Right bank)
P1		1.895			101.915			Right water level
P2		2.095			101.715			Water
P3		2.195			101.615			Water
P4		1.895			101.915			Left water level
P5		1.330			102.480			Left Bank
CP			1.615		102.195			Change point

TBM-59 Marked On Rock ,right Bank
TBM-cadastral Plot No : 230 (Vadaserikkara Village)

PROFILE - 60
NO SAND DEPOSITION
VADASERIKKARA PANCHAYAT

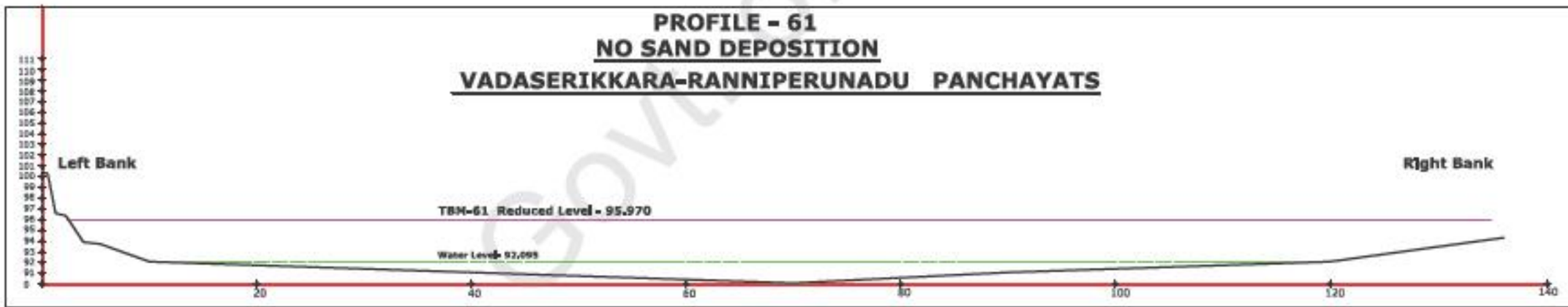
Scale 1:4



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.320			103.555	103.235			Change point
CP	1.615		1.360	103.810	102.195			Change point
TBM-59		0.740			103.070			Marked on rock (Right bank)
P1		1.895			101.915			Right water level
P2		2.095			101.715			Water
P3		2.195			101.615			Water
P4		1.895			101.915			Left water level
P5		1.330			102.480			Left Bank
CP			1.615		102.195			Change point

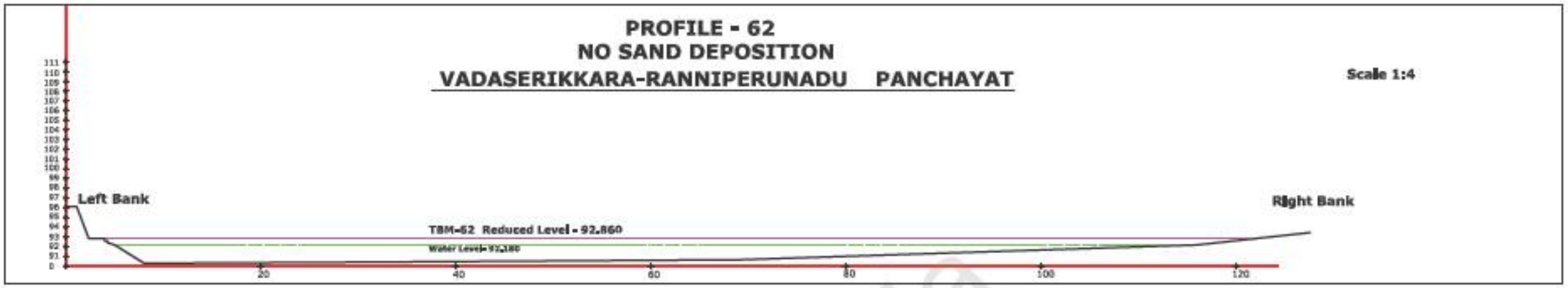
TBM-60 Marked Below Vadaserikkara Bridge
TBM-cadastral Plot No : 80 (Vadaserikkara village)

PROFILE - 61
NO SAND DEPOSITION
VADASERIKKARA-RANNIPERUNADU PANCHAYATS



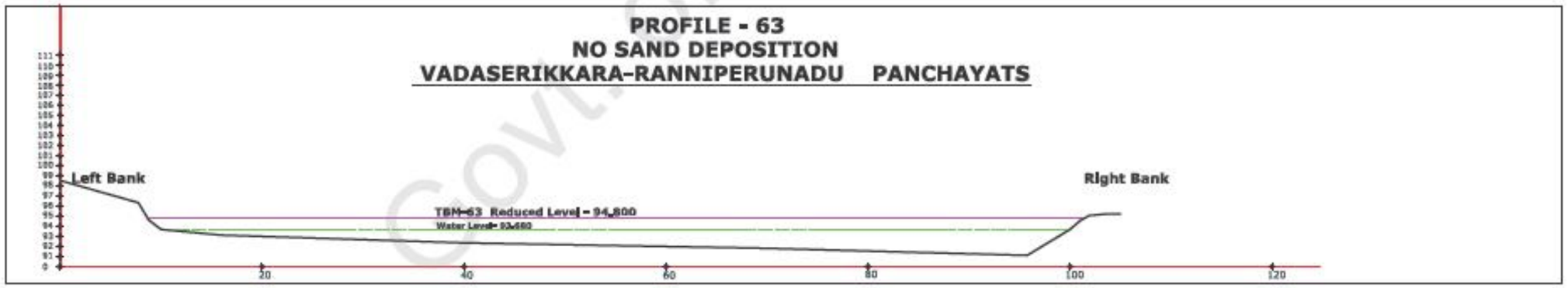
FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
TBM-60	0.050			100.050	100.000			Marked below vadaserikkara bridge
CP	1.550		5.310	96.290	94.740			Change point
CP	2.250		2.450	96.090	93.840			Change point
TBM-61		0.120			95.970			Marked on left bank protection wall
P1		3.995			92.095			Left water level
P2		4.995			91.095			Water
P3		5.995			90.095			Water
P4		6.995			89.095			Water
P5		3.995			92.095			Right water level
CP			2.220		93.870			Change point

TBM-61 Marked On Protection Wall ,left Bank
TBM-cadastral Plot No : 197 (Vadaserikkara Village)



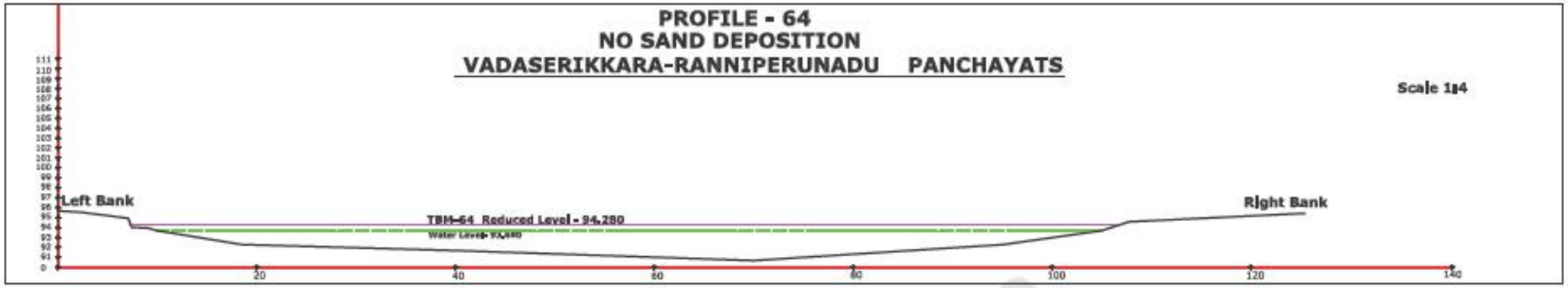
FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.055		2.220	93.925	93.870			Change point
TBM-62		1.065			92.860			Marked on step(left bank private kadavu)
P1		1.745			92.180			Left water level
P2		5.245			88.680			water
P3		4.285			89.640			water
P4		1.745			92.180			Right water level
CP			0.100		93.825			Change point

TBM-62 Marked On 3rd Step Private Kadavu,left Bank
TBM-cadastral Plot No : 56(Vadaserikkara Village)

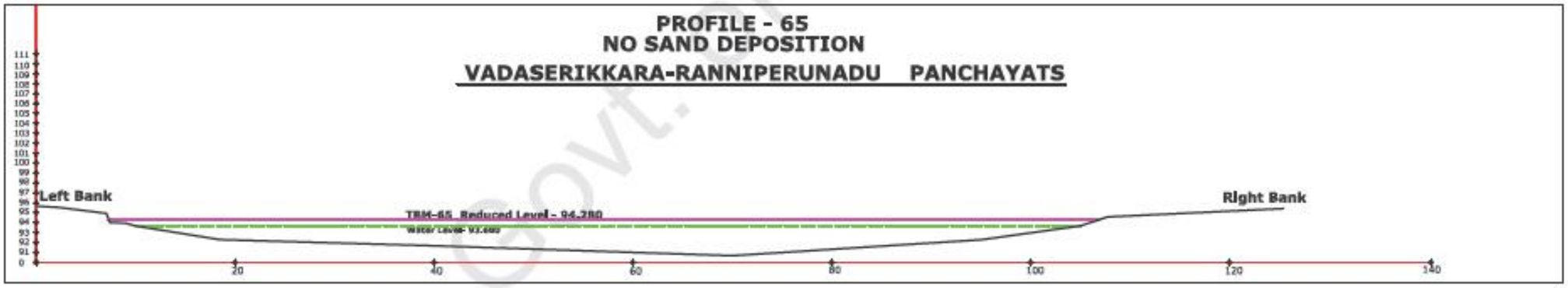


FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.865		0.100	95.690	93.825			Change point
TBM-63		0.890			94.800			Marked on private kadavu
P1		2.010			93.680			Right water level
P2		2.890			92.800			water
P3		3.100			92.590			water
P4		3.500			92.190			water
P5		2.010			93.680			Left water level
CP			2.010		93.680			Change point

TBM-63 Marked On Step Private Kadavu,right Bank
TBM-cadastral Plot No : 55 (Ranni-Perunadu village)



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.220		2.010	95.900	93.680			Change point
TBM-64,65		1.620			94.280			Marked on protection wall (left bank)
P1		2.220			93.680			Left water level
P2		4.220			91.680			water
P3		5.220			90.680			water
P4		3.100			92.800			water
P5		2.220			93.680			Right water level
CP			2.220		93.680			Change point



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.220		2.010	95.900	93.680			Change point
TBM-64,65		1.620			94.280			Marked on protection wall (left bank)
P1		2.220			93.680			Left water level
P2		4.220			91.680			water
P3		5.220			90.680			water
P4		3.100			92.800			water
P5		2.220			93.680			Right water level
CP			2.220		93.680			Change point

TBM- 64 & 65 Marked On Protection Wall ,left Bank
TBM-cadastral Plot No :(Vadaserikkara village)

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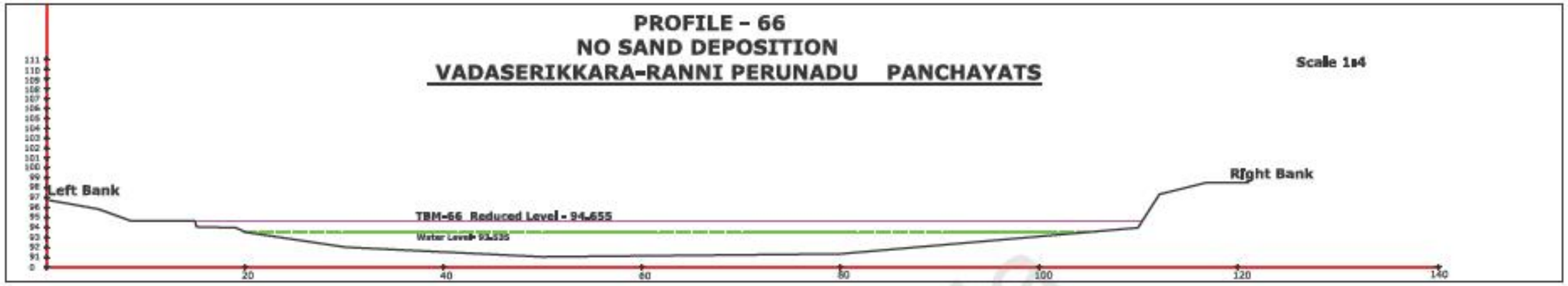
PROFILE – 66
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS

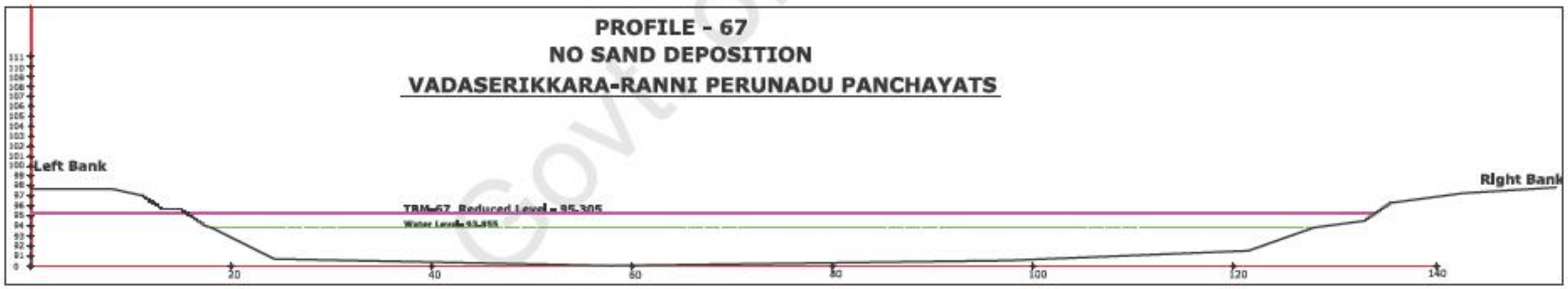
Scale 1:4



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.865		2.220	95.545	93.680			Change point
TBM-66		0.890			94.655			Marked on well (left bank)
P1		2.010			93.535			Right water level
P2		4.200			91.345			Water
P3		4.500			91.045			Water
P4		2.010			93.535			left water level
CP			0.890		94.655			Change point

TBM-66 Marked On Private Well, Left Bank
TBM-cadastral Plot No : (Vadaserikkara village)

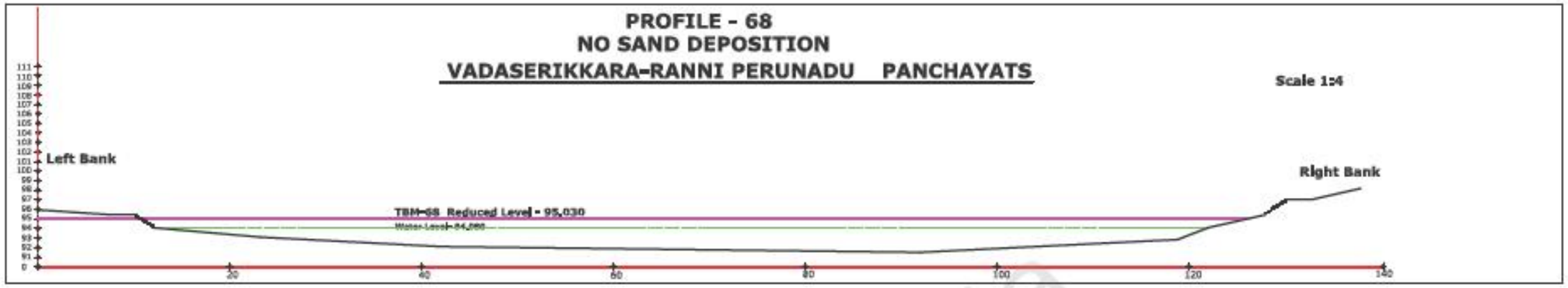
PROFILE - 67
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.935		0.890	95.590	94.655			Change point
CP	2.300		1.725	95.965	93.865			Change point
TBM-67		0.660			95.305			Marked on 6th step (madamon kadavu)
P2		2.110			93.855			left water level
P3		6.110			89.855			water
P4		5.900			90.065			water
P5		2.110			93.855			Right water level
CP			1.165		94.800			Change point

TBM-67 Marked On 6th Step From Bottom ,madamon Kadavu
TBM-cadastral Plot No : (Vadaserikkara village)

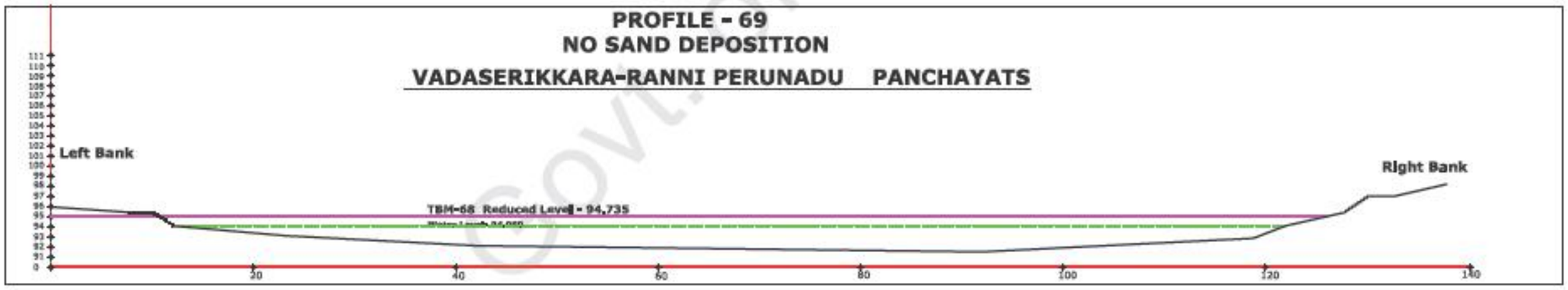
PROFILE - 68
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.290		1.565	95.090	94.800			Change point
CP	1.110		2.210	95.080	94.870			Change point
CP	1.460		1.400	95.040	94.580			Change point
CP	1.470		1.395	95.015	94.545			Change point
TBM-68		1.585			95.030			Marked on step (kadathathu kadavu) left b
P1		2.590			94.090			left water level
P2		4.160			92.111			water
P3		5.160			91.511			water
P4		2.590			94.090			right water level
CP			2.555		94.250			Change point

TBM-68 Marked On 5th Step,left Bank Kadathu kadavu
TBM-cadastral plot no : (Vadaserikkara village)

PROFILE - 69
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS

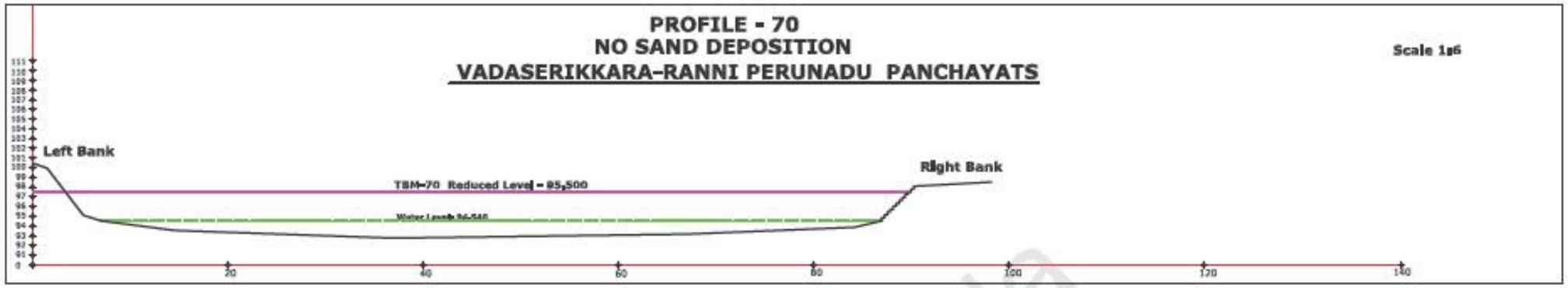


FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.630		2.535	96.710	94.080			Change point
TBM-69		1.975			94.735			Marked on kadavu
P1		2.630			94.080			Right water level
P2		6.100			90.610			water
P3		6.850			89.860			water
P4		2.630			94.080			left water level
CP			2.240		94.470			Change point

TBM-69 Marked On Rock,right Bank
TBM-Cadastral Plot No : (Ranni-perunadu Village)

PROFILE - 70
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS

Scale 1:6



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	3.200		2.240	97.670	94.470			Change point
TBM-70		0.170			97.500			Marked on right bank 6th step
P1		3.130			94.540			Right water level
P2		4.500			93.170			water
P3		4.900			92.770			water
P4		3.130			94.540			left water level
CP			2.720		94.950			Change point

TBM-70 Marked On 7th Step From Top,right Bank Public Kadavu
TBM-Cadastral Plot No : (Ranni-perunadu Village)

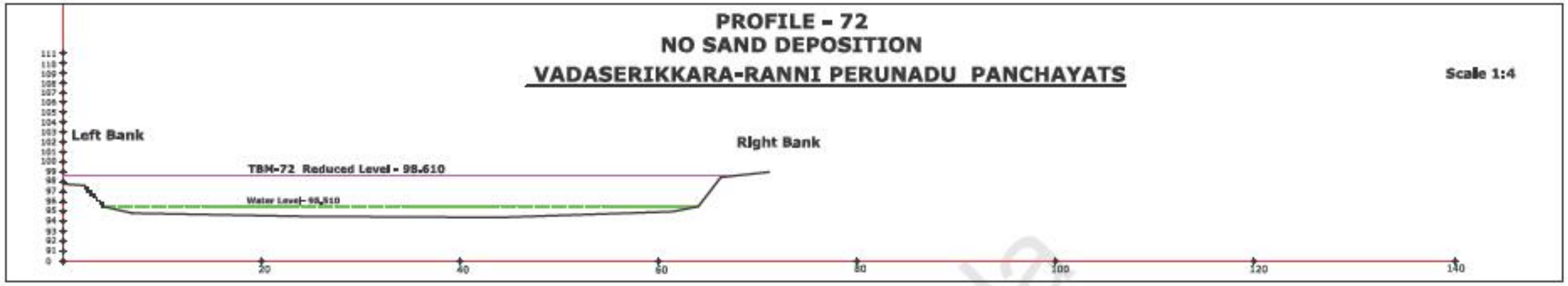
PROFILE - 71
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS

FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.120		2.720	97.070	94.950			Change point
CP	2.720		0.420	94.370	94.650			Change point
CP	0.020		0.600	94.790	94.770			Change point
TBM-71		0.970			97.960			Marked on 11th step of panchayat kadavu (left bank)
P1		3.550			94.410			left water level
P2		5.510			92.390			Water
P3		5.510			92.390			Water
P4		5.260			92.640			Water
P5		3.550			94.410			Right water level
CP			2.410		94.570			Change point

TBM-71 Marked On 6th From Bottom Step Left Bank Public Kadavu
TBM-cadastral Plot No : (Vadaserikkara village)

PROFILE - 72
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS

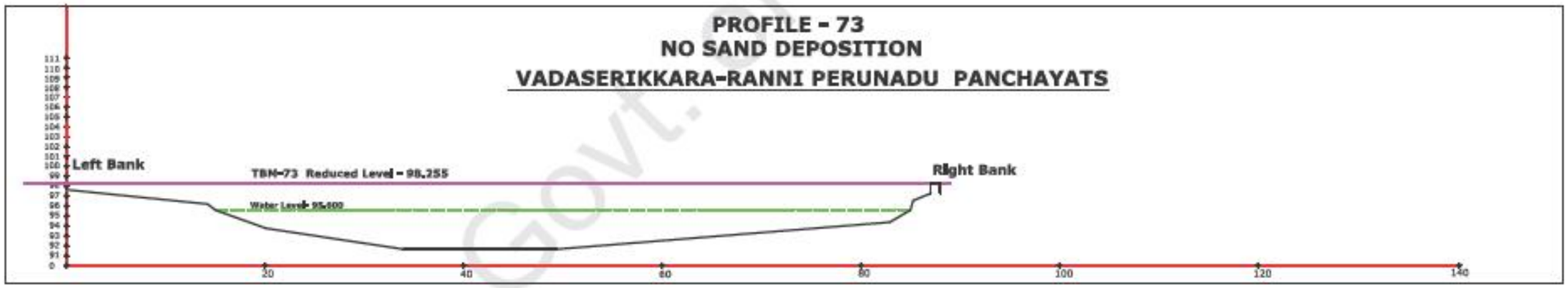
Scale 1:4



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.750		3.421	99.089	96.375			Change point
CP	0.410		0.490	99.089	97.680			Change point
CP	2.900		0.580	100.410	97.500			Change point
CP	1.840		1.790	100.450	98.610			Change point
TBM-72		1.840			98.610			Marked on bridge (Left bank)
P1		4.940			95.510			left water level
P2		5.940			94.510			Water
P3		6.150			94.400			Water
P4		4.940			95.510			Right water level
CP			1.350		97.300			Change point

TBM-72 Marked On Bridge, Left Bank
TBM-cadastral Plot No : (Vadaserikkara village)

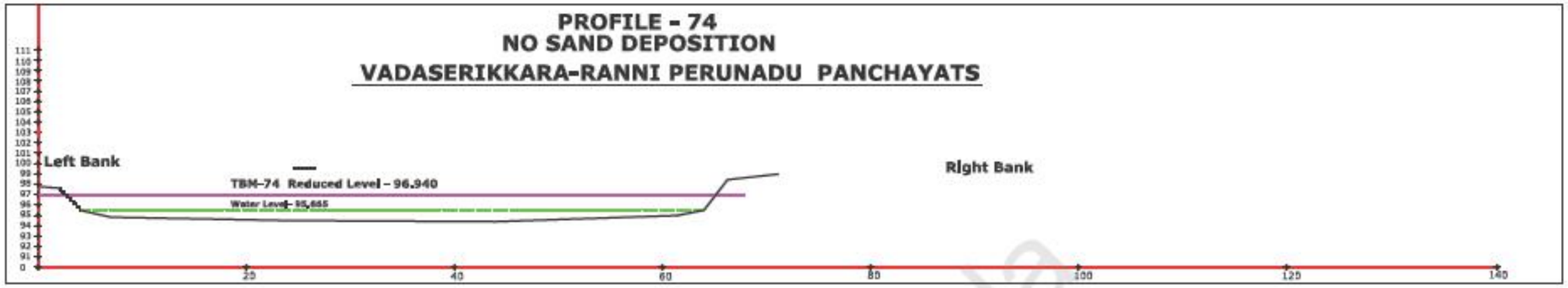
PROFILE - 73
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	1.050		2.750	98.750	97.700			Change point
TBM-73		0.495			98.255			Marked on right bank well
P1		3.150			95.600			Right water level
P2		5.200			93.550			Water
P3		5.750			93.000			Water
P5		3.150			95.600			left water level
CP			0.900		97.850			Change point

TBM-73 Marked On Well,right Bank
TBM-cadastral Plot No : (Vadaserikkara village)

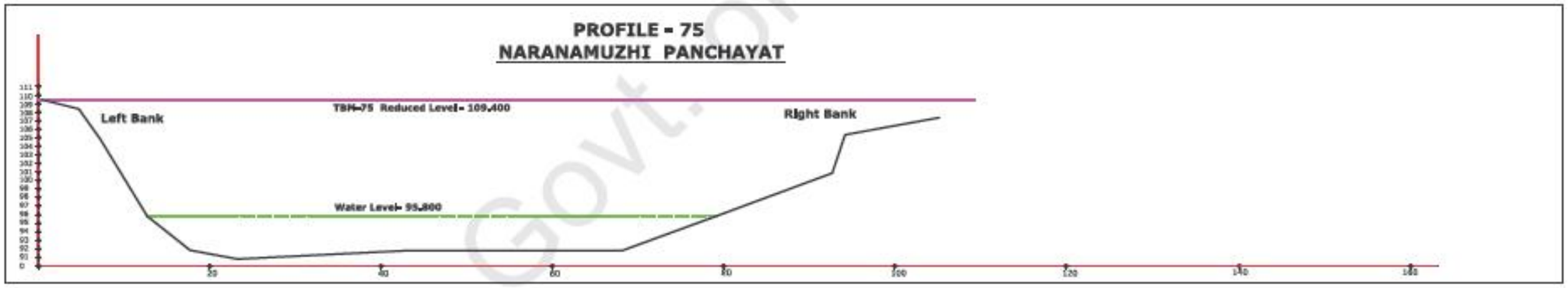
PROFILE - 74
NO SAND DEPOSITION
VADASERIKKARA-RANNI PERUNADU PANCHAYATS



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.100		0.930	99.950	97.850			Change point
CP	0.610		1.680	98.880	98.270			Change point
CP	1.550		2.840	97.390	96.040			Change point
TBM-74		0.650			96.940			Marked on 6th step of kadavu (Left bank)
P1		1.925			95.665			left water level
P2		2.925			94.665			Water
P3		3.150			94.440			Water
P4		1.925			95.665			Right water level
CP			0.535		97.055			Change point

TBM-74 Marked On Left Bank Public Kadavu
TBM-cadastral Plot No : (Athikkayam village)

PROFILE - 75
NARANAMUZHI PANCHAYAT

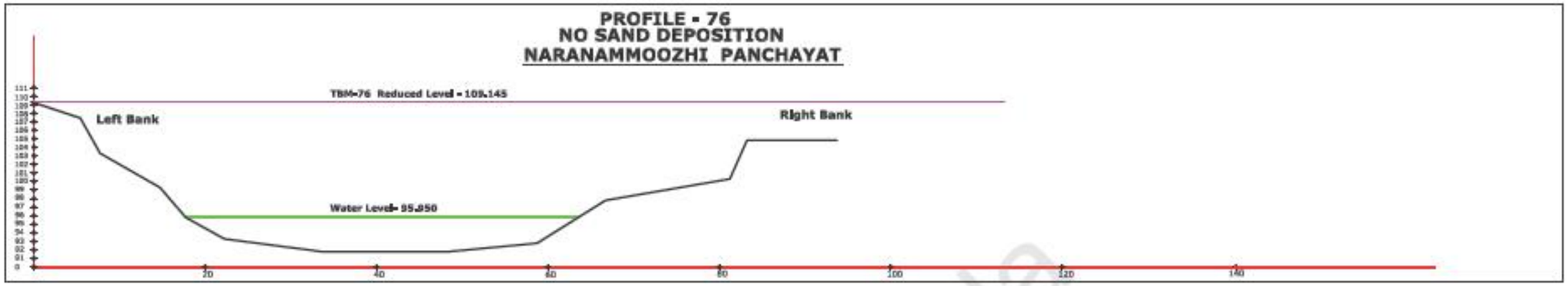


FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	5.500		0.930	107.830	97.280			Change point
CP	5.060		0.900	103.205	102.145			Change point
CP	4.870		0.490	109.585	104.715			Change point
CP	3.375		0.310	112.850	109.475			Change point
CP	1.980		4.990	109.840	107.860			Change point
TBM-75		0.940			108.400			On borewell pump near left bank road
P1		13.110			95.800			Left water level
P2		13.110			95.800			Water
P3		13.110			95.800			Water
P4		13.110			95.800			Right water level
CP			1.625		109.515			Change point

TBM-75 Marked On Left Bank Hand Pump
TBM-cadastral Plot No : (Athikkayam village)

Govt. of Kerala

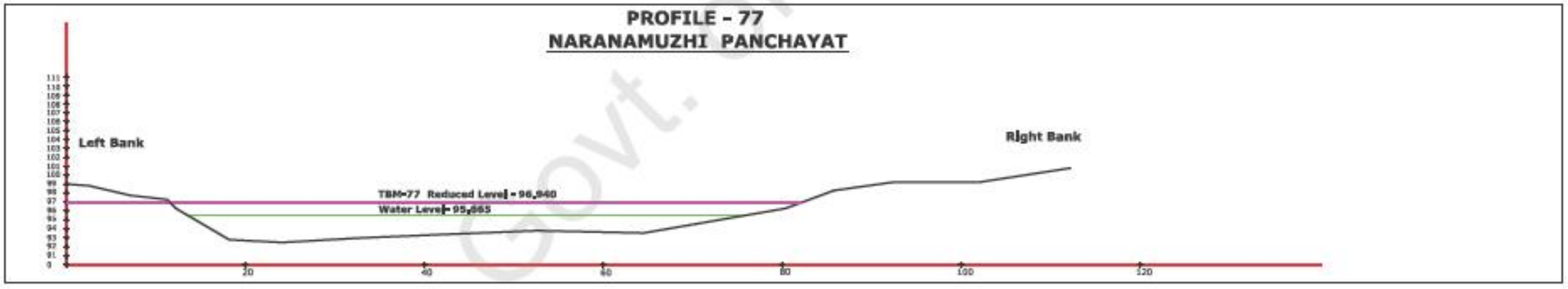
PROFILE - 76
NO SAND DEPOSITION
NARANAMMOOZHI PANCHAYAT



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.200		1.625	110.595	108.395			Change point
TBM-76		1.450			109.145			Marked on step near a private gate
P1		14.645			95.950			left water level
P2		16.100			94.495			water
P3		16.550			94.045			water
P4		14.645			95.950			right water level
CP			0.680		109.915			Change point

TBM-76 Marked on step
TBM-Cadastral Plot No : (Athikkayam village)

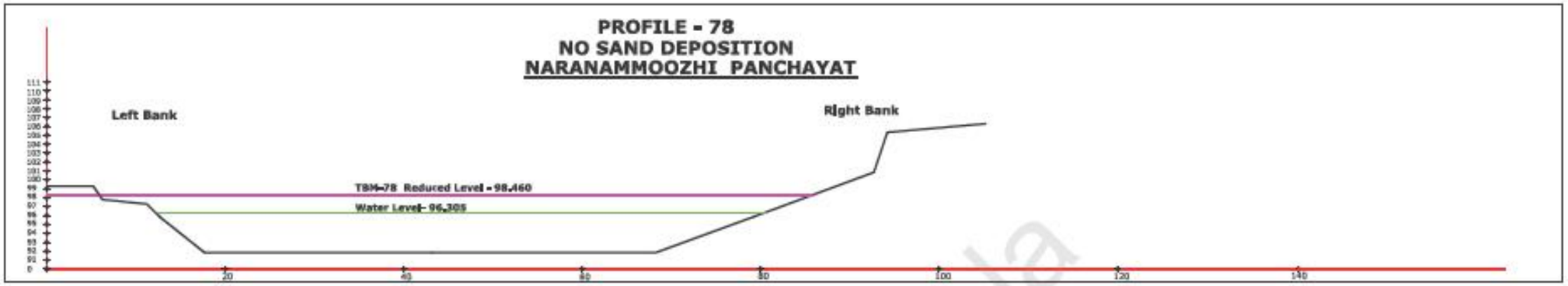
PROFILE - 77
NARANAMUZHI PANCHAYAT



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	2.100		0.900	99.950	97.850			Change point
CP	0.610		1.680	98.880	98.270			Change point
CP	1.550		2.840	97.590	96.040			Change point
TBM-77		0.650			96.940			Marked on Right bank kadavu
P1		1.925			95.665			left water level
P2		2.925			94.665			Water
P3		3.150			94.440			Water
P4		1.925			95.665			Right water level
CP			0.535		97.055			Change point

TBM-77 Marked on right bank bathing kadavu
TBM Cadastral plot No: (Athikayam village)

Govt. of Kerala



FIELDBOOK								
Sight to	BS	IS	FS	HC	Reduced Level	Angle	Thickness of Sand in m	Remarks
CP	0.900		0.600	110.300	109.415			Change point
CP	1.510		2.150	110.240	108.735			Change point
CP	0.180		4.475	101.950	101.770			Change point
CP	1.610		5.850	101.680	100.070			Change point
P1		3.225			98.460			Marked on kadavu
P2		5.850			96.305			Sub water level
P3		7.850			94.305			Water
P4		7.910			94.245			Water
P5		5.850			96.305			Left water level
CP			8.210					Change point

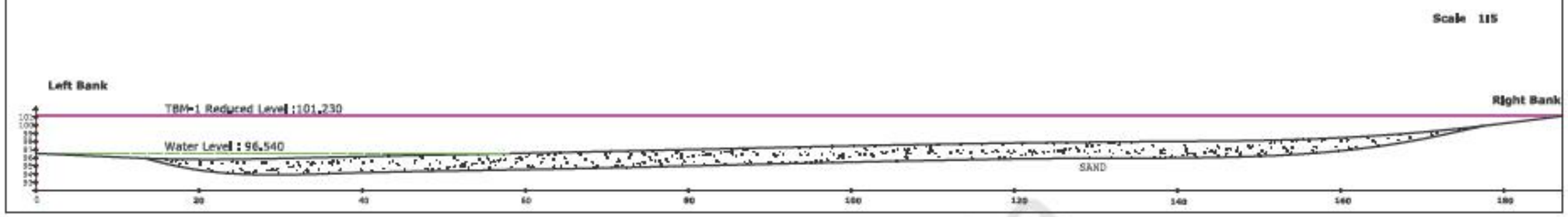
TBM-78 Marked on Left bank kadavu
TBM-Cadastral Plot No : (Athikkayam village)

Govt. of Kerala

Cross section of sand profile- Volume II

Govt. of Kerala

PROFILE – 01
KOZHANCHERY & AYROOR PANCHAYATS



FIELD BOOK

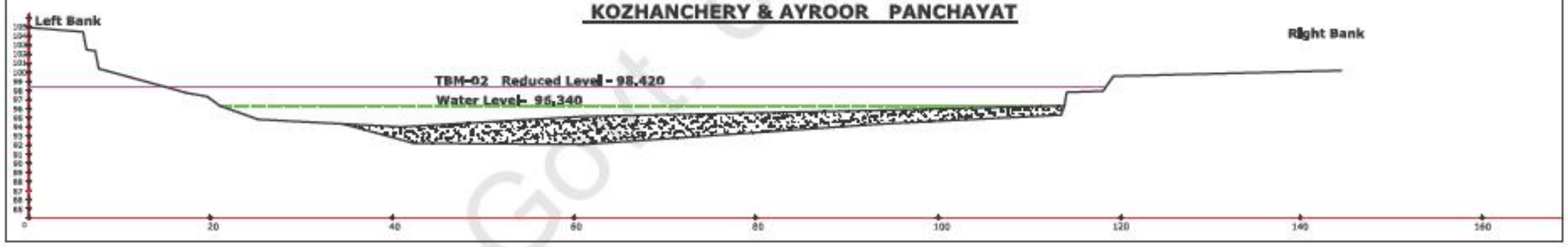
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
TBM O	0.285			100.285	100.000			Cherukolpuzha Kadavu
CP	3.195		1.580	101.900	98.705			Change Point
TBM 1		0.670			101.230			Right bank Road
P1		2.915			98.985		1 m	Sand
P2		3.940			97.960		2 m	Sand
P3		5.360			96.540		2 m	Right Side Water level
P4		5.760			96.140		2 m	Water- Sand 2m Depth
P5		6.060			95.840		1 m	Water- Sand 1m Depth
P6		5.360			96.540			Left side Water level
P7		2.850			99.250			River Bank
P8			4.125		97.775			Change Point

Details

Cross Sectional Area Of Sand	: 295.93	M²
Cross Sectional Area Of Sand Above Waterlevel	: 118.24	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 166.68	M²
Cross Sectional Area Of Sand (Kozhanchery Village)	: 83.34	M²
Cross Sectional Area Of Sand (Ayroor Village)	: 83.34	M²

TBM 1 Marked On Road At Right Bank (near Hindu Convention Ground)
TBM Cadastral Plot No: 326/15 (Ayroor Village)

PROFILE - 02
KOZHANCHERY & AYROOR PANCHAYAT



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.800			98.575	97.775			Change Point
TBM 2		0.155			98.420			Left side rock,Near Bridge
P1		0.445			98.130			Rock
P2		2.235			96.340			Left side Water level
P3		4.575			94.000		1.5	Water
P4		3.425			95.150		3	Water
P5		2.735			95.840		2	Water
P6		2.235			96.340		1	Right Side Water level
P7		1.235			97.340			
P8			1.980		96.595			Change Point

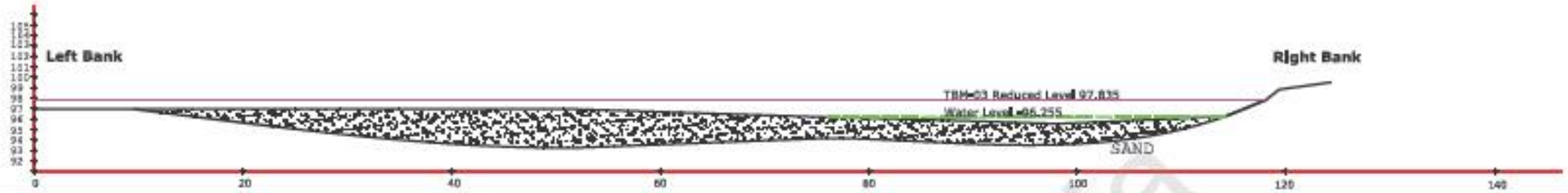
Details

Cross Sectional Area Of Sand	: 153.44	M²
Cross Sectional Area Of Sand Within 2m From Waterlevel	: 68.65	M²
Cross Sectional Area Of Sand (Kozhanchery Village)	: 34.33	M²
Cross Sectional Area Of Sand (Ayroor Village)	: 34.33	M²

TBM 2 Marked On Rock Near Cherukolpuzha Bridge (left Bank)
TBM Cadastral Plot No : 525/14 (kozhenchery Village)

PROFILE - 03
KOZHANCHERY & AYROOR PANCHAYATS

Scale 1: 5



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.380			98.975	96.595			Change Point
CP	1.325		1.935	98.965	97.040			Change Point
TBM-3		0.530			97.835			Right side Kadavu,3rd Step
P1		2.110			96.255		4	Right Side Water level
P2		2.810			95.555		2	Water
P3		2.490			95.875		2	Water
P4		2.185			96.180		2	Water
P5		2.110			96.255		2.5	Left side Water level
P6		1.420			96.945		2	Sand
CP	.		0.510		97.855			Change Point

Details

Cross Sectional Area Of Sand	: 236.27	M²
Cross Sectional Area Of Sand Above Waterlevel	: 39.22	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 197.05	M²
Cross Sectional Area Of Sand (kozhanchery)	: 98.53	M²
Cross Sectional Area Of Sand (Ayroor)	: 98.53	M²

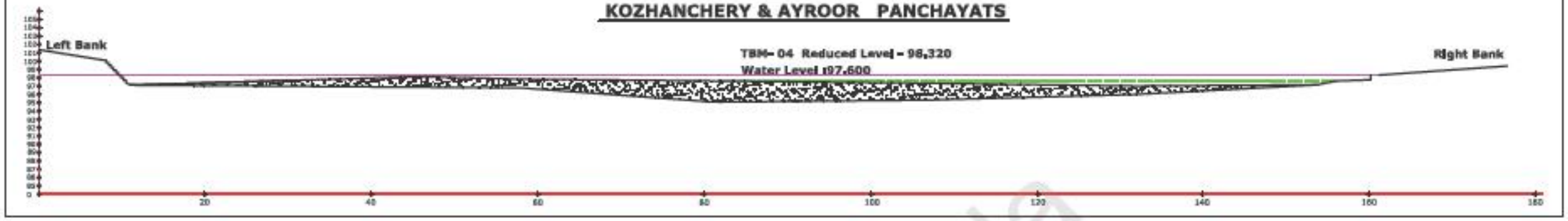
TBM 3 On Step Right Bank Bathing Kadavu
TBM Cadastral Plot Nos 337/1 (Ayroor Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
1	300.00	150.00	225.00	112.50	231.25	295.93	68433.81	284.92	65887.75	118.24	27343.00	Kozhenchery	0.000	Exceptional Area
	225.00	250.00	237.50	118.75								Ayroor	0.000	Exceptional Area
2	225.00	250.00	237.50	118.75	209.25	153.44	32107.32	68.65	14365.01	0.00	0.00	Kozhenchery	0.000	Exceptional Area
	162.00	200.00	181.00	90.50								Ayroor	0.000	Exceptional Area
3	162.00	200.00	181.00	90.50	178.00	236.27	42056.06	236.27	42056.06	39.22	6981.160	Kozhenchery	0.000	Exceptional Area
	200.00	150.00	175.00	87.50								Ayroor	0.000	Exceptional Area
	*SWL-Summer Water Level													

PROFILE - 04

KOZHANCHERY & AYROOR PANCHAYATS



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Sand in m	Remarks
CP	0.975			98.830	97.855			Change Point
TBM-4		0.510			98.320			Right side Protectionwall
P1		1.230			97.600			Right Side Water level
P2		1.830			97.000		1	Water
P3		1.490			97.340		2	Water
P4		1.230			97.600		2.5	Left side Water level
P5		1.000			97.830		2	Sand
P6		0.700			98.130		1	sand
P7		1.720			97.110		0.5	sand
CP			1.680		97.150			sand surface edge

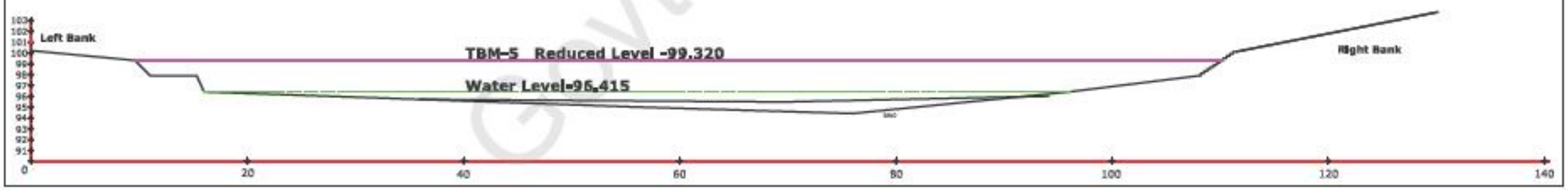
Details

Cross Sectional Area Of Sand	: 185.07 M²
Cross Sectional Area Of Sand Above Waterlevel	: 12.18 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 171.23 M²
Cross Sectional Area Of Sand (kozhanchery)	: 85.62 M²
Cross Sectional Area Of Sand (Ayroor)	: 85.62 M²

TBM 4 Marked On Protection Wall At Right Bank (near Quary)
TBM Cadastral Plot No: 350/3 (Ayroor Village)

PROFILE - 05

KOZHANCHERY & AYROOR PANCHAYATS



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.620			99.770	97.150			Change Point
TBM 5		0.450			99.320			Rightside kadavu(5th step)
P1		3.355			96.415			Right Side Water level
P2		3.855			95.915		0.5	Water
P3		3.755			96.015		1.5	Water
P4		4.055			95.715		0.3	Water
P5		3.355			96.415			Left side Water level
CP			1.800		97.970			Change Point

Details

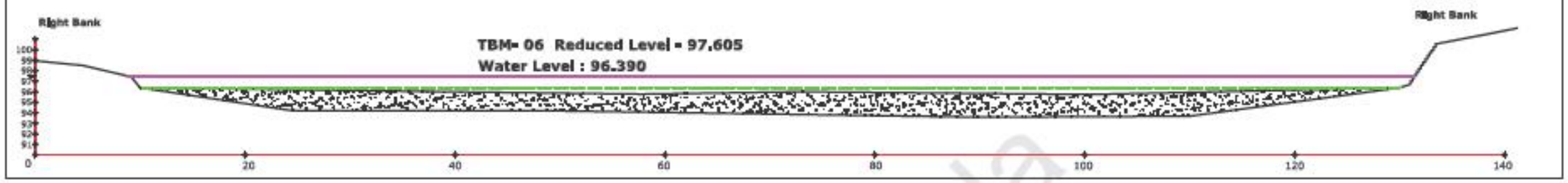
Cross Sectional Area Of Sand	: 50.00 M²
Cross Sectional Area Of Sand (kozhanchery)	: 25.00 M²
Cross Sectional Area Of Sand (Ayroor)	: 25.00 M²

TBM 5 Marked On 6th Step Of A Bathing Kadavu From Bottom
TBM Cadastral Plot No: 351/1 (Ayroor Village)

PROFILE - 06

KOZHANCHERY & AYROOR PANCHAYATS

Scale 1:4



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.940			98.910	97.970			Change Point
TBM 6		1.305			97.605			(manackkal kadavu)
P1		2.520			96.390		0.5	Left side Water level
P2		2.720			96.190		2	Water
P3		2.820			96.090		2.5	Water
P4		2.720			96.190		2	Water
P5		2.520			96.390		0.3	Right Side Water level
			1.470		97.440			Change Point

Details

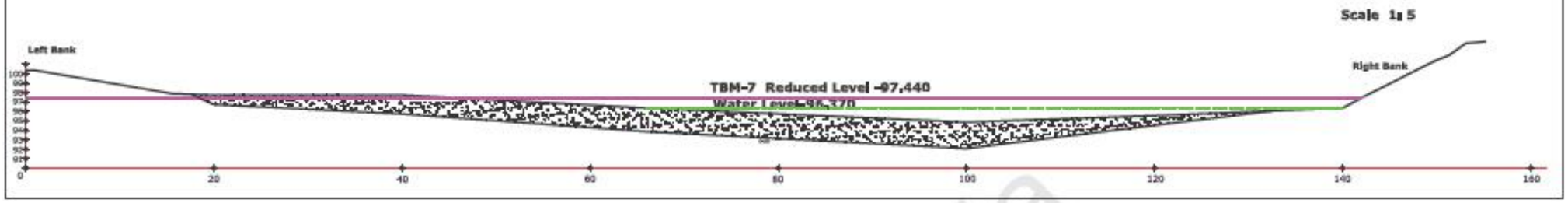
Cross Sectional Area Of Sand	: 208.33 M^2
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 166.36 M^2
Cross Sectional Area Of Sand (kozhenchery)	: 83.18 M^2
Cross Sectional Area Of Sand (Ayroor)	: 83.18 M^2

TBM 6 Marked On Step (Manakkal Kadavu)
TBM Cadastral Plot No: 355/6 (kozhenchery Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
4	200.00	150.00	175.00	87.50	172.00	185.07	31832.04	183.41	31546.52	12.18	2094.960	Kozhenchery	91.705	15773.260
	200.00	137.50	169.00	84.50								Ayroor	91.705	15773.260
5	200.00	137.50	169.00	84.50	140.75	50.00	7037.50	50.00	7037.50	0.00	0.000	Kozhenchery	25.000	3518.750
	125.00	100.00	112.50	56.25								Ayroor	25.000	3518.750
6	125.00	100.00	112.50	56.25	118.75	208.33	24739.19	166.36	19755.25	0.00	0.000	Kozhenchery	83.180	9877.625
	125.00	125.00	125.00	62.50								Ayroor	83.180	9877.625
	*SWL-Summer Water Level													

PROFILE - 07
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



FIELD BOOK

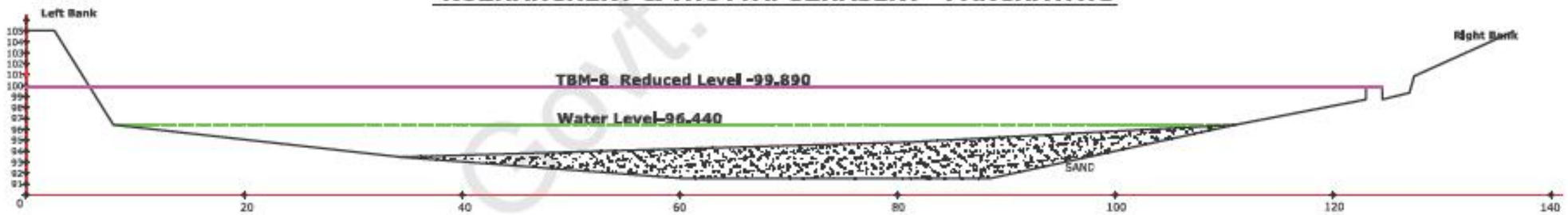
Sight To	BS	IS	FS	HC	RL	Angle	kness of Sand	Remarks
TBM 7	1.700			99.140	97.440			Right side kadavu (Vallakadavu)
P1		2.770			96.370			Right Side Water level
P2		3.570			95.570		1	Water
P3		4.270			94.870		3	Water
P4		2.770			96.370		2	Left side Water level
P5		1.395			97.745		2	Left bed level
CP			0.400		98.740			

Details

Cross Sectional Area Of Sand	: 216.54	M²
Cross Sectional Area Of Sand Above Waterlevel	: 45.16	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 146.09	M²
Cross Sectional Area Of Sand (kozhenchery)	: 73.45	M²
Cross Sectional Area Of Sand(Thottapuzhassery)	: 73.45	M²

TBM 7 On Road Near Pumbhouse
TBM Cadastral Plot No: 355/11 (Thottapuzhassery Village)

PROFILE - 08
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



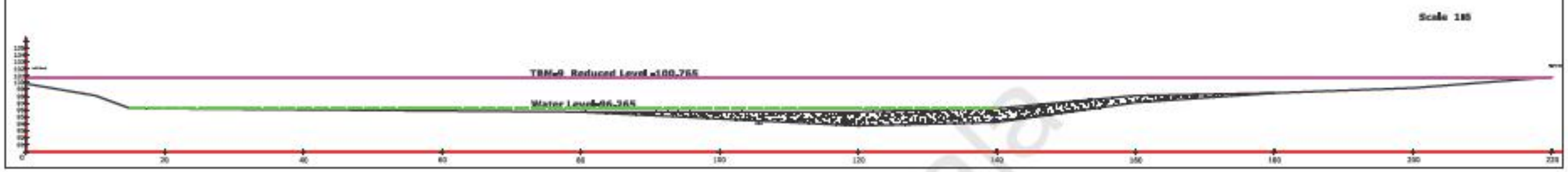
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	1.750			100.490	98.740			
TBM 8		0.600			99.890			Right side well(top)
P1		1.760			98.730			Bottom of Well Neck
P2		4.080			96.410		1	Right Water Level
P3		5.250			95.240		3	Water
P4		6.250			94.240		1	Water
P5		4.080			96.410			Left water Level
CP			2.475		98.015			Change Point

Details

Cross Sectional Area Of Sand	: 166.34	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 29.96	M²
Cross Sectional Area Of Sand (kozhenchery)	: 14.98	M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 14.98	M²

TBM 8 On Well Right Bank Near Private Bathing Kadavu
TBM Cadastral Plot No: 273/12 (Thottapuzhasery Village)

PROFILE - 09
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	3.000			101.015	98.015			Change Point
TBM-9		0.250			100.765			Right side Road
P1		1.800			99.215			20m From Bench Mark
P2		2.525			98.490			40m From Bench Mark
P3		2.900			98.115		1	60m From Bench Mark
P4		4.750			96.265		2	Right Water Level
P5		5.250			95.765		2	water
P6		5.250			95.765		1	water
P7		4.750			96.265			Left water Level
CP			2.875		98.140			Change Point

Details

Cross Sectional Area Of Sand	:	120.00 M²
Cross Sectional Area Of Sand Above Waterlevel	:	25.96 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	:	112.50 M²
Cross Sectional Area Of Sand (kozhenchery)	:	56.25 M²
Cross Sectional Area Of Sand (Thottapuzhasery)	:	56.25 M²

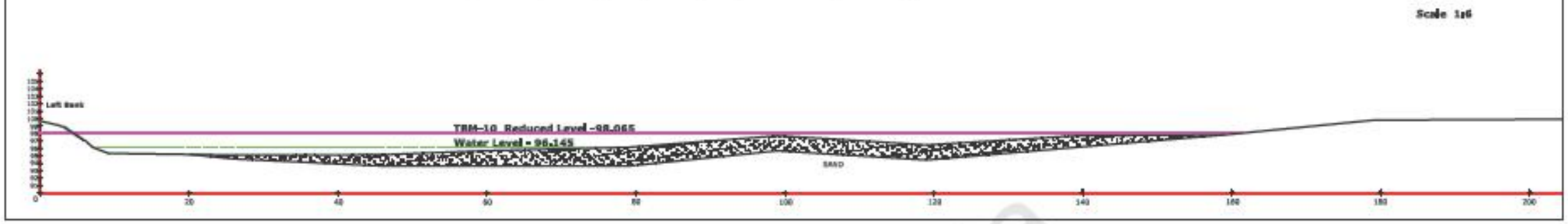
TBM 9 On Right Bank Road
TBM Cadastral Plot No: 274/14 (Thottapuzhasery Village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
7	125.00	125.00	125.00	62.50	137.50	216.54	29774.25	191.25	26296.88	45.16	6209.500	Kozhenchery	95.625	13148.438
	175.00	125.00	150.00	75.00								Thottapuzhasery	95.625	13148.438
8	175.00	125.00	150.00	75.00	165.63	166.34	27550.06	29.96	4962.13	0.00	0.000	Kozhenchery	14.980	2481.063
	162.50	200.00	181.25	90.63								Thottapuzhasery	14.980	2481.063
9	162.50	200.00	181.25	90.63	150.00	120.00	18000.00	112.50	16875.00	25.96	3894.000	Kozhenchery	56.250	8437.500
	75.00	162.50	118.75	59.38								Thottapuzhasery	56.250	8437.500
	*SWL-Summer Water Level													

Govt. of Kerala

PROFILE – 10
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



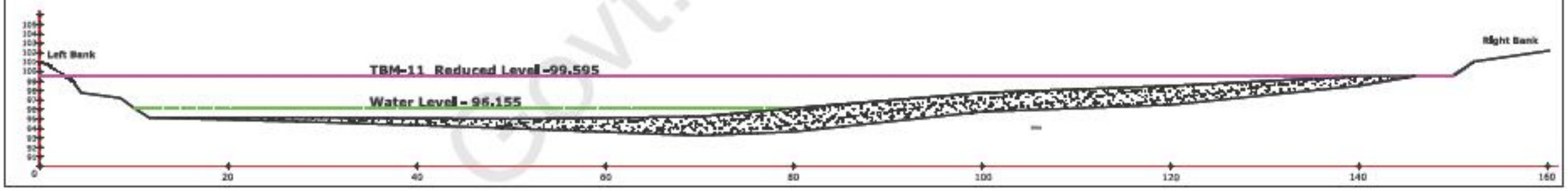
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	1.910			99.950	98.140			
	2.985		2.950	99.945	97.000			
TBM-10		1.900			98.065			Left side kadavu
P1		3.820			96.145			Left water level
P2		4.070			95.895		0.5	water
P3		4.020			95.145		1.5	water
P4		4.310			95.605		2	water
P5		3.910			96.145		2.5	Right water level
P6		2.280			97.685		2	sand
P7		3.510			96.455		2	sand
P8		2.350			97.610		1	sand
P9		2.140			97.820		0.2	80 m From Right Water Level
P10		0.180			98.780			100 m From Right Water Level
P11		0.010			98.950			140 m From Right Water Level
CP			0.430		98.510			

Details

Cross Sectional Area Of Sand	: 225.46	M²
Cross Sectional Area Of Sand Above Waterlevel	: 68.20	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 205.28	M³
Cross Sectional Area Of Sand (kozhenchery)	: 102.63	M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 102.63	M²

TBM-10 On Private Bathing Kadavu (left Bank) 1st Step
TBM Cadastral Plot No: 385/1 (kozhenchery Village)

PROFILE - 11
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	0.250			99.765	99.515			Change Point
TBM-11		0.170			99.595			Left side Kadavu
P1		3.610			96.155			Left Water Level
P2		4.610			95.155			Water
P3		4.760			95.005		1	Water
P4		4.520			95.245		2	Water
P5		3.610			96.155		2.5	Right Water Level
P6		1.990			97.775		2	sand
P7		1.260			98.505		2	sand
P8		0.245			99.520		1	sand
CP			0.170		99.595			Change Point

Details

Cross Sectional Area Of Sand	: 190.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: 87.12	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 170.82	M³
Cross Sectional Area Of Sand (kozhenchery)	: 85.41	M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 85.41	M²

TBM 11 On Keezhukara Kadathu Kadavu (left Bank)
TBM Cadastral Plot No: 364/1 (kozhenchery Village)

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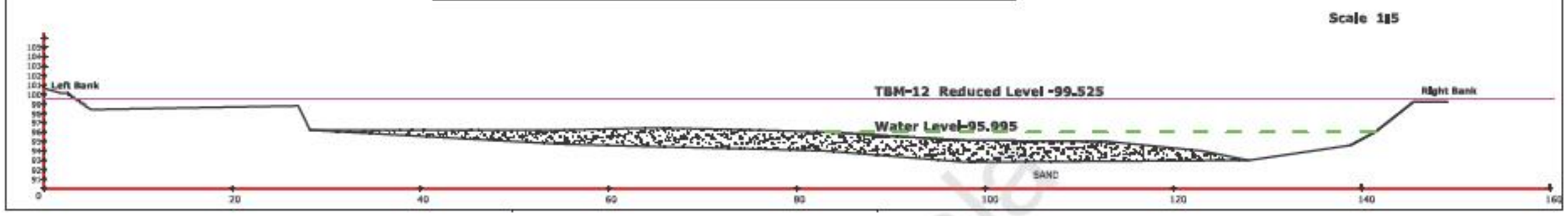
PROFILE - 12
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	0.110			99.705	99.595			Change Point
	0.125		1.285	98.545	98.420			Change Point
	3.775		1.865	100.455	96.680			Change Point
TBM-12		0.930			99.525			TBM -Left side Kadavu
P1		2.070			98.385			Latrite Soil
P2		1.670			98.785			Latrite Soil
P3		4.245			96.210		1.5	sand
P4		1.670			98.785		2	sand
P5		4.245			96.210		2	sand
P6		4.015			96.440		2	sand
P7		4.225			96.230		2	sand
P8		4.460			95.995		2	Left water Level
P9		5.360			95.095		2	water
P10		5.460			94.995		2	water

Details

Cross Sectional Area Of Sand	: 157.22	M²
Cross Sectional Area Of Sand Above Waterlevel	: 12.98	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 117.74	M²
Cross Sectional Area Of Sand (kozhenchery)	: 58.87	M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 58.87	M²

TBM-12 On Side Wall Of Private Kadavu (left Bank)
TBM Cadastral Plot No: 362/19

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m^2)	Volume of sand (m^3)	Area of cross section within 2m below SWL (m^2)	Vol. of sand within 2m below SWL (m^3)	Area of cross section above SWL (m^2)	Vol. of sand above SWL (m^3)	Panchayat wise Sand Availability (Minable) (m^2)		Panchayat wise Sand Availability (m^3)
10	75.00	162.50	118.75	59.50	112.75	225.46	25420.62	205.26	23143.07	68.20	7689.550	Kozhenchery	102.630	11571.533
	75.00	137.50	106.25	53.25								Thottapuzhasery	102.630	11571.533
11	75.00	137.50	106.25	53.25	115.50	190.00	21945.00	170.82	19729.71	87.12	10062.360	Kozhenchery	85.410	9864.855
	125.00	125.00	125.00	62.25								Thottapuzhasery	85.410	9864.855
12	125.00	125.00	125.00	62.25	146.75	157.22	23072.04	130.72	19183.16	12.98	1904.815	Kozhenchery	65.360	9591.580
	187.50	150.00	168.75	84.50								Thottapuzhaseri	65.360	9591.580
	*SWL-Summer Water Level													

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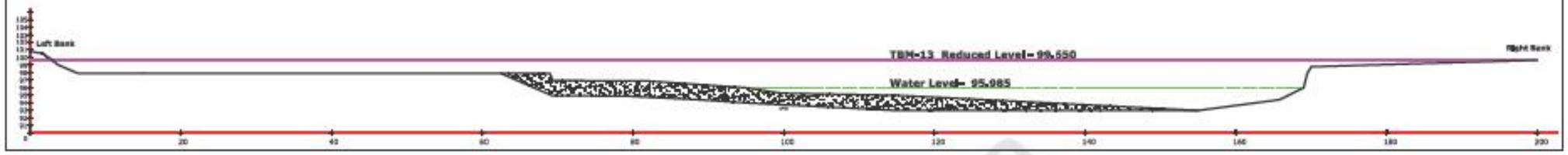
PROFILE - 13
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS

Scale 1;6



FIELD BOOK

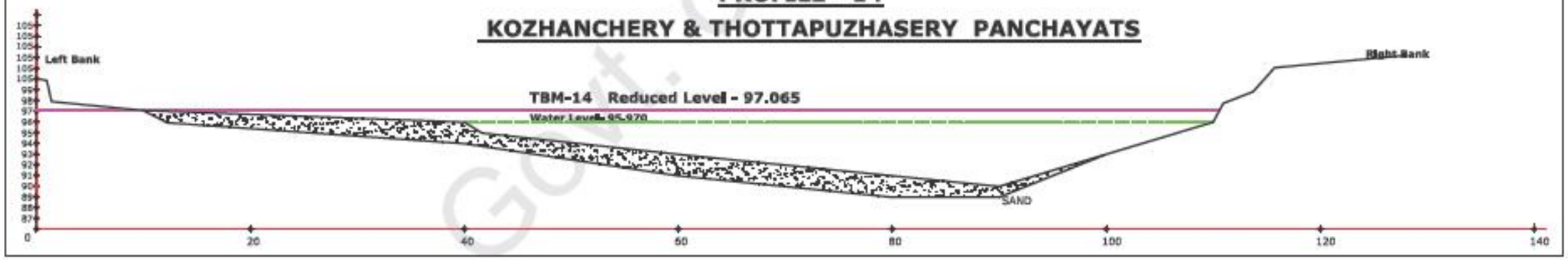
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	2.940			99.795	96.855			
TBM-13		0.145			99.650			Left side Kadavu
P1		1.850			97.945			Alluvial soil
P2		2.860			96.935		2	sand
P3		2.900			96.895		2	sand
P4		3.810			95.985		2	Left Water Level
P5		4.810			94.985		1	water
P6		5.810			93.985		0.5	water
P7		6.810			92.985			water
P8		3.810			95.985			Right Water Level
CP			2.750		97.045			

Details

Cross Sectional Area Of Sand : 137.16 M²
Cross Sectional Area Of Sand Above Waterlevel : 26.34 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 97.16 M²
Cross Sectional Area Of Sand (kozhenchery) : 48.58 M²
Cross Sectional Area Of Sand (Thottapuzhasery) : 48.58 M²

TBM-13 On Left Bank Private Kadavu 1st Step
TBM Cadastral Plot No : 362/3 (kozhenchery Village)

PROFILE - 14
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



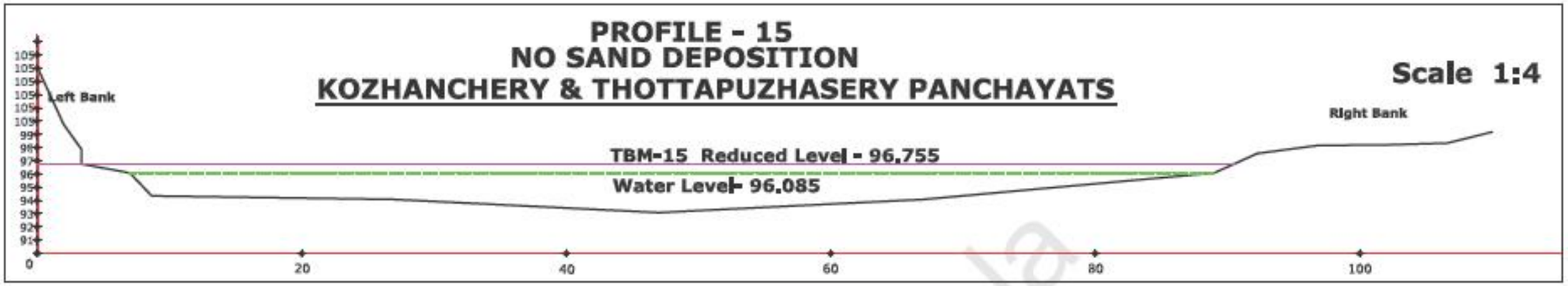
FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	0.700			97.745	97.045			Change Point
TBM-14		0.680			97.065			TBM-Right side Rock
P1		1.775			95.970			Right water level
P2		7.775			89.970		1	Water
P3		6.775			90.970		2	Water
P4		4.775			92.970		2	Water
P5		1.775			95.970		2	Left water Level
CP			0.575		97.170			Change Point

Details

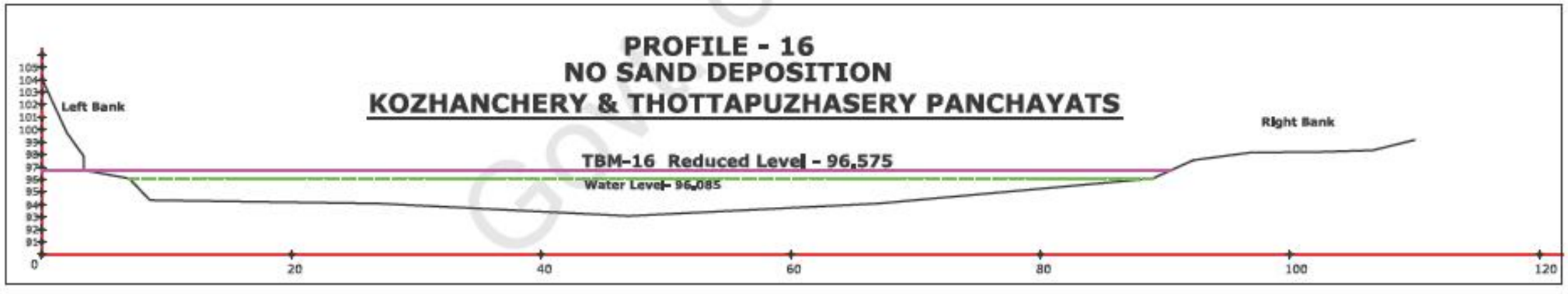
Cross Sectional Area Of Sand : 136.03 M²
Cross Sectional Area Of Sand Above Waterlevel : 15.97 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel : 52.71 M²
Cross Sectional Area Of Sand (Kozhanchery Village) : 26.36 M²
Cross Sectional Area Of Sand (Ayroor Village) : 26.36 M²

TBM-14 On Rock Near Pumbhouse (right Bank)
TBM Cadastral Plot No : 195/1 (Thottapuzhasery Village)



PROFILE-15								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	3.490			100.660	97.170			Change Point
	0.405		2.150	98.915	98.510			Change Point
TBM-15		2.160			96.755			Right side Rock
P1		2.830			96.085			Right water level
P2		4.830			94.085			water
P3		5.830			93.085			water
P4		4.830			94.085			water
P5		2.830			96.085			Left water Level
CP			1.900		97.015			Change Point

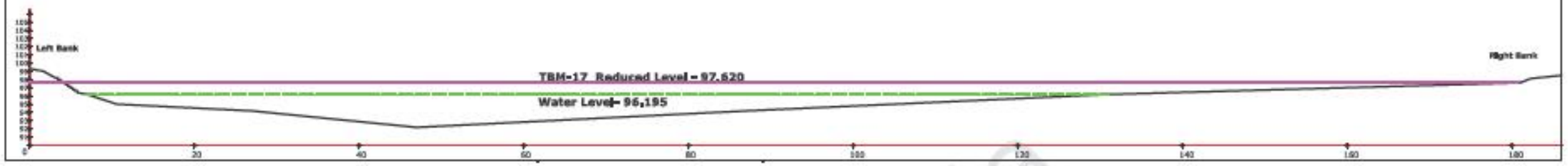
TBM-15 On Rock (Right Bank)
TBM Cadastral Plot No: 194/2 (Thottapuzhasery Village)



PROFILE-16								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.260			100.275	97.015			Change Point
P1		4.190			96.085			Right side Rock
P2		5.910			94.365			water
P3		6.910			93.365			water
P4		5.190			95.085			water
P5		4.190			96.085			Left water Level
CP			3.700		96.575			Change Point

PROFILE - 17
NO SAND DEPOSITION
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS

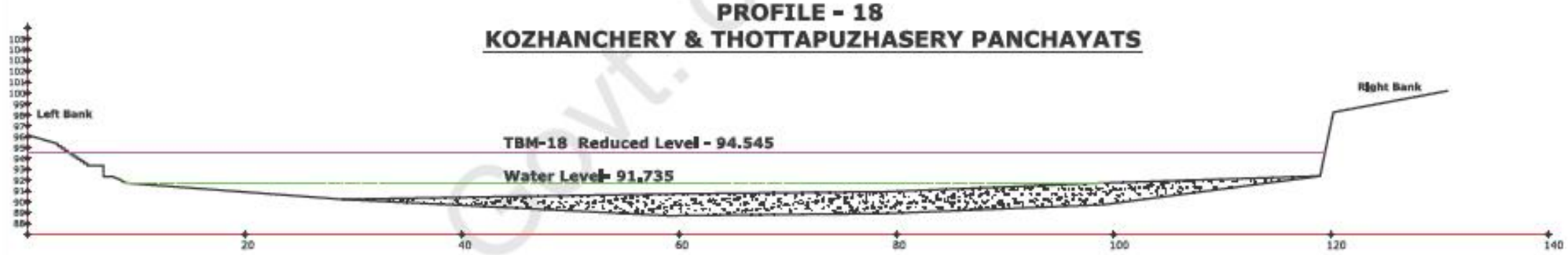
Scale 1:5



PROFILE-17								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.400			97.975	96.575			Change Point
TBM-17		0.355			97.620			Left Side kadavu
P1		1.780			96.195			Left water Level
P2		3.780			94.195			water
P3		5.780			92.195			water
P4		3.780			94.195			water
P5		1.780			96.195			Right Water Level
P6		7.780			90.195			Right Bank
CP			1.780		96.195			Change Point

TBM- 16 & 17 On Step Of Bathing Kadavu (left Bank)
TBM Cadastral Plot No: 349/9 (kozhenchery Village)

PROFILE - 18
KOZHANCHERY & THOTTAPUZHASERY PANCHAYATS



PROFILE-18								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.900			98.095	96.195			Change Point
TBM-18	1.545		3.550	96.090	94.545			Left Side Kadavu
P1		4.355			91.735			Left water Level
P2		5.855			90.235			water
P3		5.355			90.735			water
P4		5.155			90.935			water
P5		4.355			91.735			Right Water Level
CP			4.850		91.240			Change Point

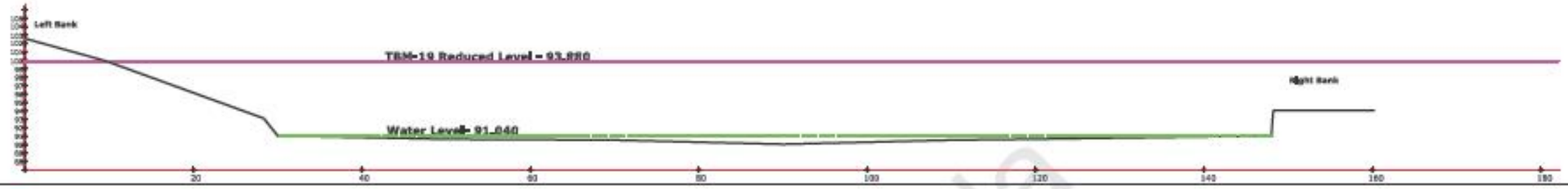
Details

Cross Sectional Area Of Sand	: 130	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 94	M²
Cross Sectional Area Of Sand (kozhanchery)	: 47	M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 47	M²

TBM-18 On Retaling Wall Of Arattu Kadavu (Left Bank)
TBM Cadastral Plot No: 339/15 (kozhenchery Village)

PROFILE - 19
NO SAND DEPOSITION
KOZHENCHERY & THOTTAPUZHASERY PANCHAYATS

Scale 1:5



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.330			94.550	91.240			Change Point
CP	3.590		3.000	95.140	91.550			Change Point
TBM-19		1.260			93.880			Left Side Kadavu
P1		4.100			91.040			Left water Level
P2		4.500			90.640			water
P3		4.600			90.540			water
P4		5.100			90.040			water
P5		4.600			90.540			water
P6		5.100			90.040			water
P7		4.600			90.540			water
P8		4.100			91.040			Right Water Level
P9		7.100			88.040			Right Bank
CP			2.050		93.090			Change Point

TBM-19 On Side Wall Of Kadavu Nearkozhenchery Market
TBM Cadastral Plot No: 281/2(kozhenchery Village)

PROFILE - 20
NO SAND DEPOSITION
KOZHENCHERY & THOTTAPUZHASERY PANCHAYATS

FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	3.520			96.610	93.090			
TBM-20		1.615			94.995			Left Side Kadavu (Maramon)
P1		4.200			92.410			Convention Ground
P2		5.520			91.090			Left water Level
P3		7.920			88.690			water
P4		8.620			87.990			water
P5		5.520			91.090			Right Water Level
P6		2.725			93.885			Right Bank
CP			1.200		95.410			Change Point

TBM-20 On A Kadavu Near Maramon Convention Ground
TBM Cadastral Plot No: 280/11 (kozhenchery Village)

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PROFILE - 21
NO SAND DEPOSITION
KOZHENCHERY & THOTTAPUZHASERY PANCHAYATS

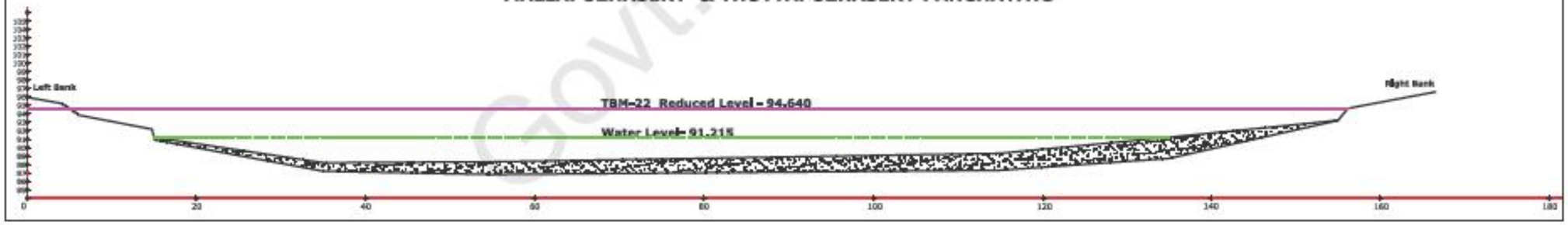
Scale 1:6

FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	1.760			97.170	95.410			Change Point
TBM-21		0.125			97.045			Left Side Kadavu (Maramon)
P1		2.550			94.620			Convention Ground
P2		5.000			92.170			Convention Ground
P3		6.100			91.070			Left water Level
P4		8.000			89.170			Water
P5		9.000			88.170			Water
P6		6.100			91.070			Right Water Level
CP			2.010		95.160			Change Point

TBM-21 On A Side Wall Of Private Kadavu Near Maramon Convention Ground
TBM Cadastral Plot No: 276/8 (kozhenchery Village)

PROFILE - 22
MALLAPUZHASERY & THOTTAPUZHASERY PANCHAYATS



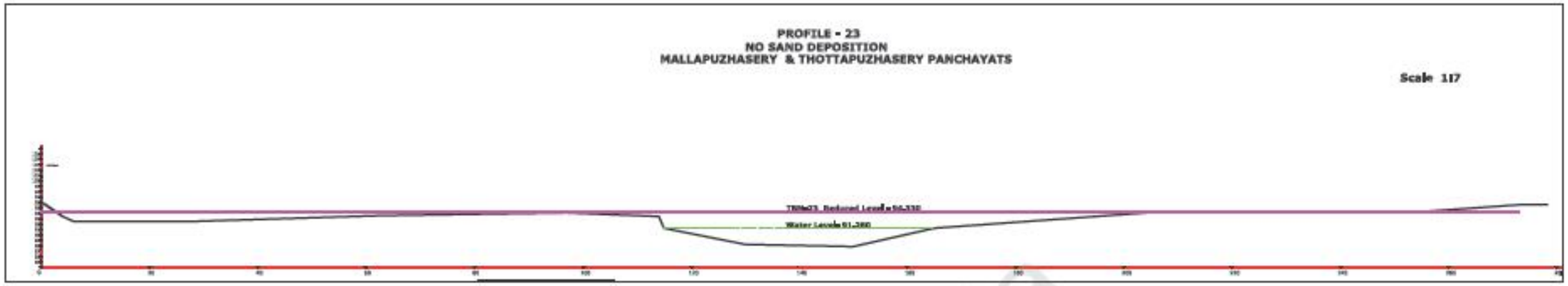
FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.295			96.455	95.160			Change Point
CP	4.440		5.250	95.645	91.205			Change Point
TBM-22		1.005			94.640			Left Side Kadavu(Marathur)
P1		2.450			93.195			3 m from Bench Mark
P2		4.430			91.215		0.3	Left water Level
P3		7.440			88.205		1.0	water
P4		7.330			88.315		1.5	water
P5		6.330			89.315		2.0	water
P6		4.430			91.215		1.0	Right Water Level
CP			1.005		94.640			Change Point

Details

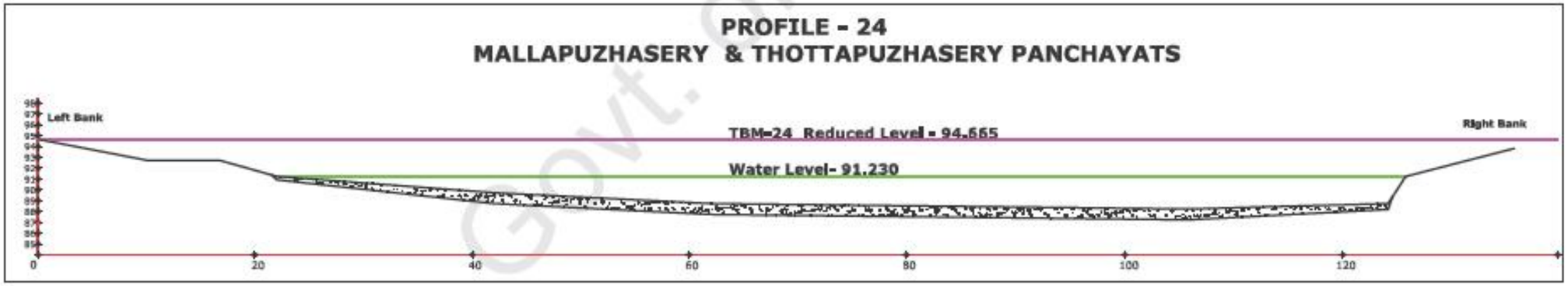
Cross Sectional Area Of Sand	: 213.00	M²
Cross Sectional Area Of Sand Above Waterlevel	: 11.14	M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 51.24	M²
Cross Sectional Area Of Sand (mallapuzhassery)	: 25.62	M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 25.62	M²

TBM-22 On Marathur Kadatukadavu (left Bank) 3rd Step
TBM Cadastral Plot No: 271/13 (mallapuzhasery Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.925			95.585	94.660			Change Point
CP	1.500		1.125	95.940	94.440			Change Point
TBM-23		1.630			94.330			Left Side kadavu(Shankaran Thundiyil)
P1		2.355			93.585			Depositional bank
P2		3.465			92.475			Depositional bank
P3		2.050			93.890			Depositional bank
P4		1.840			94.100			Depositional bank
P5		2.520			93.420			Depositional bank
P6		4.680			91.260			Left water Level
P7		7.680			88.260			water
P8		8.080			87.860			water
P9		4.680			91.260			Right Water Level
CP			3.050		92.090			Change Point

TBM-23 On 4th Step 'sankaran Thundiyil 'kadavu (left Bank)
TBM Cadastral Plot No: 271/4 (mallapuzhasery Village)



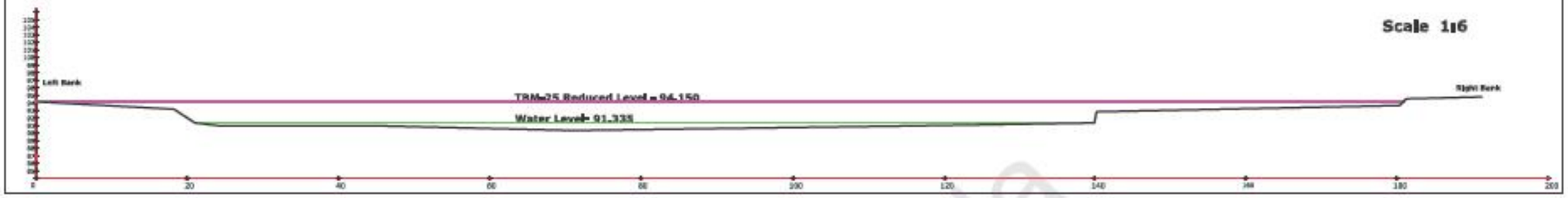
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	2.700			94.790	92.090			Change Point
TBM-24		0.125			94.665			Left Side kadavu(Parapuzha)
P1		2.060			92.730			10 m From TBM
P2		3.560			91.230		1	Left water Level
P3		5.060			89.730		1	water
P4		6.060			88.730			water
P5		6.560			88.230			water
P6		3.560			91.230			Right Water Level
P7		0.970			93.820			Right Bank
CP			0.125		94.665			Change Point

Details

Cross Sectional Area Of Sand	:	91.33 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	:	14.43 M²
Cross Sectional Area Of Sand (mallapuzhasery)	:	41.07 M²
Cross Sectional Area Of Sand (Thottapuzhasery)	:	50.26 M²

TBM-24 On Parapuzha Kadathu Kadavu (left Bank) 1st Step
TBM Cadastral Plot No : 289/1 (mallapuzhasery Village)

PROFILE - 25
NO SAND DEPOSITION
MALLAPUZHASERY & THOTTAPUZHASERY PANCHAYATS

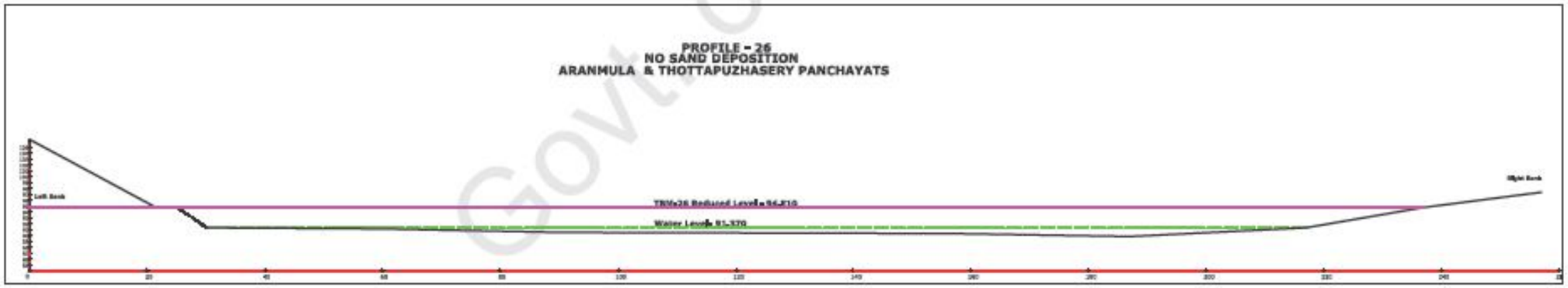


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.175			94.840	94.665			Change Point
CP	3.470		1.680	96.630	93.160			Change Point
TBM-25		2.480			94.150			Left Side Kadavu
P1		3.470			93.160			
P2		5.295			91.335			Left water Level
P3		5.695			90.935			Water
P4		6.295			90.335			Water
P5		5.895			90.735			water
P6		5.295			91.335			Right Water Level
P7		1.600			95.030			Right Bank
CP			1.810		94.820			Change Point

TBM-25 On Vallapura Kadavu Near Krishnan Kovil (left Bank)
TBM Cadastral Plot No : 266/27 (mallapuzhasery Village)

PROFILE - 26
NO SAND DEPOSITION
ARANMULA & THOTTAPUZHASERY PANCHAYATS



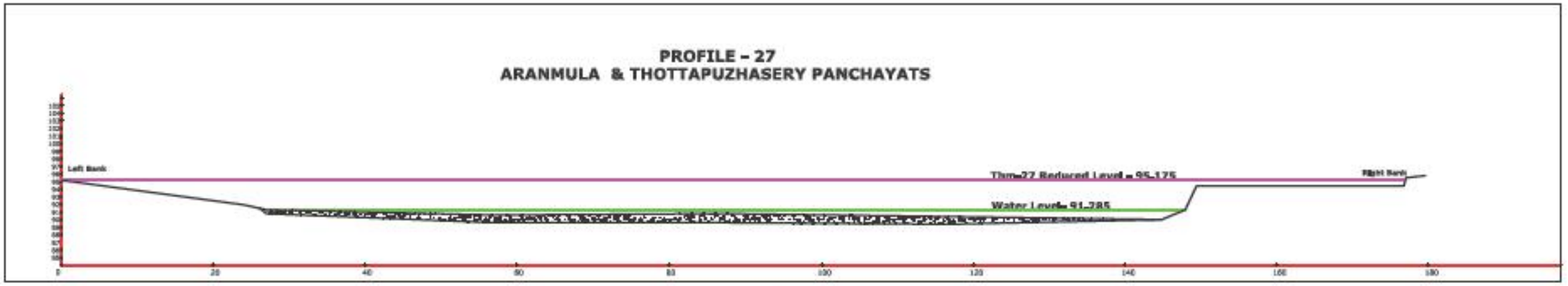
FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.560			95.380	94.820			Change Point
TBM-26		0.570			94.810			Right side kadavu (opposite Aranmula Temple Kadavu)
P1		4.010			91.370			Right Water Level
P2		5.510			89.870			water
P3		5.010			90.370			water
P4		4.810			90.570			water
P5		4.210			91.170			water
P6		4.010			91.370			Left water Level
P7		3.000			92.380			Temple Kadavu
CP			0.830		94.550			Change Point

TBM-26 On Kadavu Opposit Aranmula Parthasarathy TempleRright Bank)
TBM Cadastral Plot No : 38/11 (Thottapuzhasery Village)

Govt. of

PROFILE – 27
ARANMULA & THOTTAPUZHASERY PANCHAYATS



DETAILS OF CROSS SECTION - PROFILE 27							
Sight Te	BS	IS	FS	HC	RL	of	Remarks
CP	1.770			96.320	94.550		Change Point
TBM-27		1.145			95.175		Left Side Sathra Kadavu
P1		4.370			91.950		24 m From TBM
P2		5.035			91.285	0.5	Left water Level
P3		5.735			90.585	1.0	water
P4		5.535			90.785	1.2	water
P5		5.935			90.385	1.0	water
P6		5.035			91.285		Right Water Level
P7		1.830			94.490		Depositional Bank
P8		0.830			95.490		Right Bank
CP			1.145		95.175		Change Point

Details

Cross Sectional Area Of Sand	: 102.66 M²
Cross Sectional Area Of Sand Up To 2m From Waterlevel	: 102.66 M²
Cross Sectional Area Of Sand (Aranmula)	: 59.29 M²
Cross Sectional Area Of Sand (Thottapuzhasery)	: 47.37 M²

TBM-27 On Sathra Kadavu (left Bank)
TBM-Cadastral plot Nos 29/1 (Aranmula village)

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m²)	Volume of sand (m³)	Area of cross section within 2m below SWL (m²)	Vol. of sand within 2m below SWL (m³)	Area of cross section above SWL (m²)	Vol. of sand above SWL (m³)	Panchayat wise Sand Availability (Minable) (m³)		Panchayat wise Sand Availability (m³)
13	187.50	150.00	168.75	84.38	171.88	137.16	23575.06	123.50	21226.56	26.34	4527.188	Kozhenchery	61.750	10613.281
	275.00	75.00	175.00	87.50								Thottapuzhasery	61.750	10613.281
14	275.00	75.00	175.00	87.50	150.00	136.03	20404.50	68.68	10302.00	15.97	2395.500	Kozhenchery	34.340	5151.000
	125.00	125.00	125.00	62.50								Thottapuzhasery	34.340	5151.000
*SWL-Summer Water Level														

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

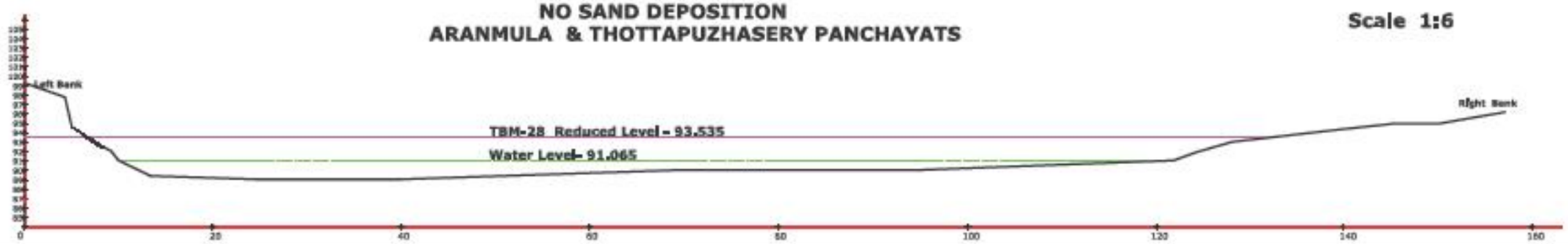
Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m²)	Volume of sand (m³)	Area of cross section within 2m below SWL (m²)	Vol. of sand within 2m below SWL (m³)	Area of cross section above SWL (m²)	Vol. of sand above SWL (m³)	Panchayat wise Sand Availability (Minable) (m³)		Panchayat wise Sand Availability (m³)
18	239.00	194.50	217.00	108.50	215.00	130.00	27950.00	94.00	20210.00	0.00	0.000	Kozhenchery	0.000	Exceptional Area
	261.50	164.00	213.00	106.50								Thottapuzhassery	0.000	Exceptional Area
22	198.00	153.00	175.50	87.75	162.75	213.00	34665.75	62.38	10152.35	11.14	1813.035	Mallapuzhassery	31.190	5076.173
	142.00	158.00	150.00	75.00								Thottapuzhassery	31.190	5076.173
*SWL-Summer Water Level														

VOLUME OF SAND AVAILABLE IN THREE CROSS SECTIONS

Profile no	Length of right bank (L1)	Length of left bank (L2)	Average length of bank L=(L1+L2)/2	Zone of influence L/2	Total zone of influence	Area of cross section (m²)	Volume of sand (m³)	Area of cross section within 2m below SWL (m²)	Vol. of sand within 2m below SWL (m³)	Area of cross section above SWL (m²)	Vol. of sand above SWL (m³)	Panchayat wise Sand Availability (Minable) (m³)		Panchayat wise Sand Availability (m³)
24	186.00	210.00	198.00	99.00	181.50	91.33	16576.40	14.43	2619.05	0.00	0.000	Mallapuzhassery	7.215	1309.52
	181.00	149.00	165.00	82.50								Thottapuzhassery	7.215	1309.52
27	141.00	234.00	187.50	93.75	220.25	102.66	22610.87	102.66	22610.87	0.00	0.000	Aranmula	51.330	11305.43
	277.00	229.00	253.00	126.50								Thottapuzhassery	51.330	11305.43
*SWL-Summer Water Level														

PROFILE - 28
NO SAND DEPOSITION
ARANMULA & THOTTAPUZHASERY PANCHAYATS

Scale 1:6

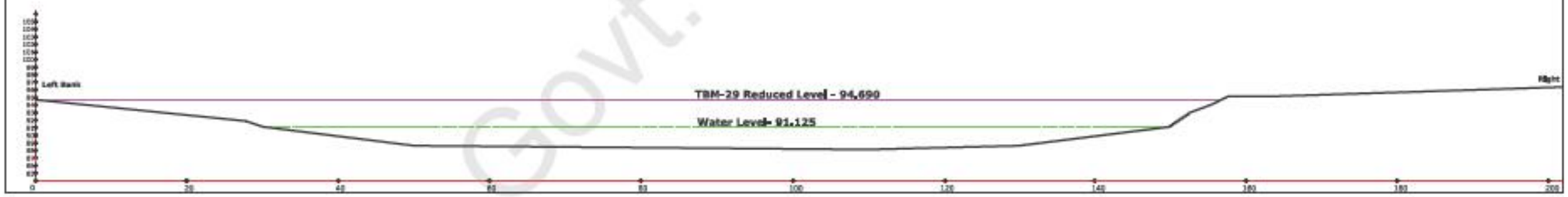


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.300			95.475	95.175			Change Point
CP	2.640		4.260	93.855	91.215			Change Point
TBM-28		0.320			93.535			Left Side kadavu
P1		2.790			91.065			Left water Level
P2		4.790			89.065			water
P3		3.790			90.065			water
CP		2.790			91.065			Right Water Level
			0.420		93.435			Change Point

TBM-28 On Step Private Kadavu Near 'mla' Kadavu
TBM Cadastral Plot No : 80/1 (Aranmula Village)

PROFILE - 29
NO SAND DEPOSITION
ARANMULA & THOTTAPUZHASERY PANCHAYATS

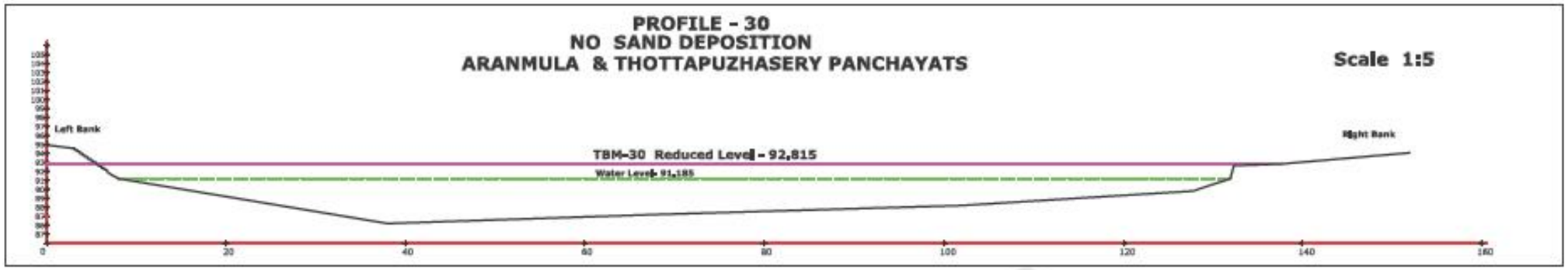


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	3.390			96.825	93.435			Change Point
TBM-29		2.135			94.690			Left Side Vallapura Kadavu
P1		4.490			92.335			
P2		5.700			91.125			Left water Level
P3		8.200			88.625			Water
P4		8.700			88.125			Water
P5		7.200			89.625			Water
P6		5.700			91.125			Right Water Level
P7		1.000			95.825			Right Bank
CP			2.650		94.175			Change Point

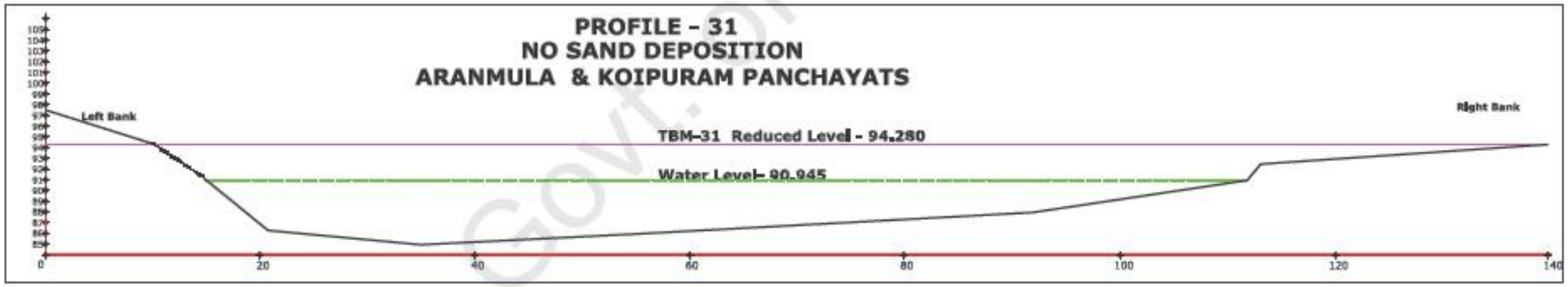
TBM-29 On Vallapura Kadavu (left Bank)
TBM Cadastral Plot No : 133/21 (Aranmula Village)

Govt. of Kerala



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	1.325			95.500	94.175			Change Point
TBM-30		2.685			92.815			Left Side kadathu Kadavu
P1		4.315			91.185			Left water Level
P2		9.315			86.185			water
P3		8.315			87.185			water
P4		7.315			88.185			water
P5		4.315			91.185			Right Water Level
			2.685		92.815			Change Point

TBM-30 On Kozhipalam Kadathu Kadavu,6th Step From Top
TBM Cadastral Plot No : 172/1(Aranmula Village)

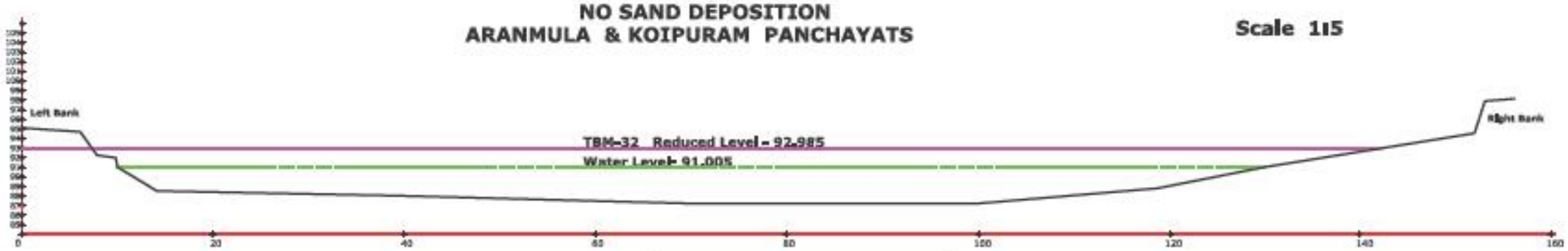


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.095			95.910	92.815			Change Point
CP	0.020		0.470	95.460	95.440			Change Point
TBM-31		1.180			94.280			Left Side Private Kadavu
P1		4.515			90.945			Left water Level
P2		10.515			84.945			water
P3		9.515			85.945			water
P4		7.515			87.945			water
P5		4.515			90.945			Right Water Level
P6		0.300			95.160			Right Bank
CP			1.180		94.280			Change Point

TBM-31 On A Private Kadavu Side Wall (left Bank)
TBM Cadastral Plot No : 172/8 (Aranmula Village)

PROFILE - 32
NO SAND DEPOSITION
ARANMULA & KOIPURAM PANCHAYATS

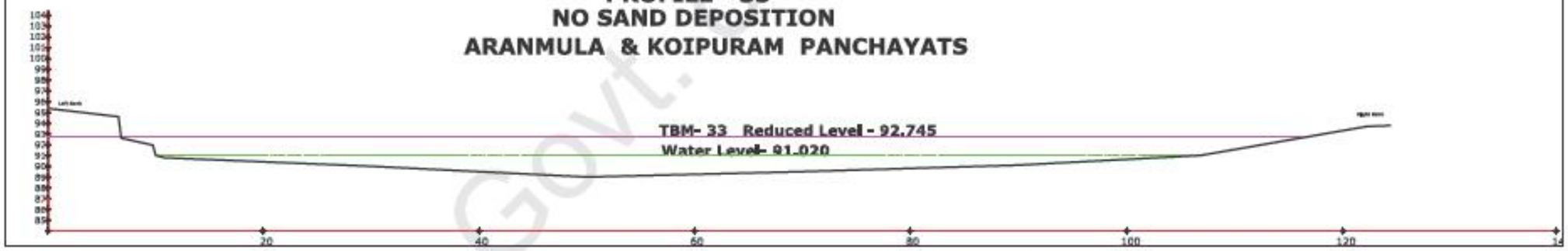
Scale 1:5



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.125			95.405	94.280			Change Point
CP	3.100		2.900	95.605	92.505			Change Point
P1		1.920			93.685			Bank
P2		4.600			91.005			Right Water Level
P3		8.400			87.205			water
P4		8.400			87.205			water
P5		7.600			88.005			water
P6		4.600			91.005			Left water Level
TBM-32		2.620			92.985			Right Side Kadavu
CP			2.620		92.985			Change Point

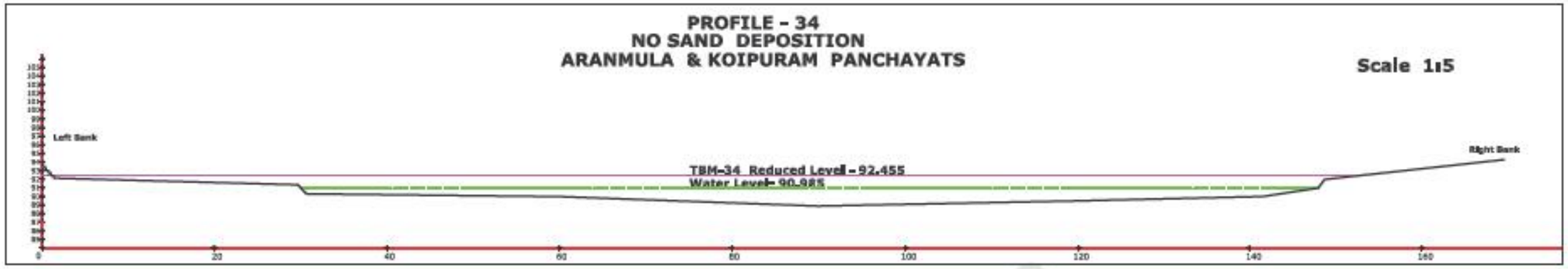
TBM-32 Marked On Step,right Bank Private Kadavu (Right Bank)
TBM Cadastral Plot No : 15/7(koipuram Village)

PROFILE - 33
NO SAND DEPOSITION
ARANMULA & KOIPURAM PANCHAYATS



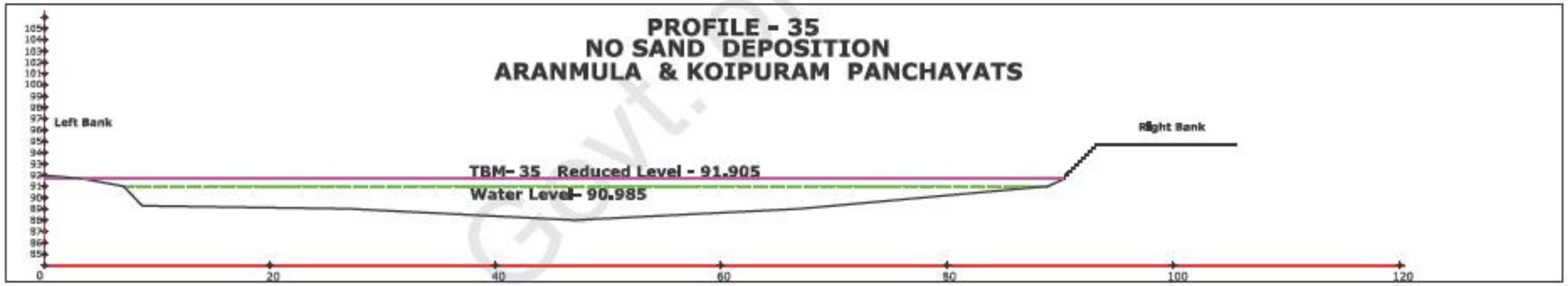
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.570			95.555	92.985			Change Point
CP	0.620		1.870	94.305	93.685			Change Point
CP	1.565		1.365	94.505	92.940			Change Point
TBM-33		1.760			92.745			Right Side Kadavu
P1		3.485			91.020			Right Water Level
P2		4.185			90.320			water
P3		4.385			90.120			water
P4		4.485			90.020			water
P5		4.985			89.520			water
P6		5.485			89.020			water
P7		4.485			90.020			water
P8		4.285			90.220			water
P9		3.485			91.020			Left water Level
CP			3.070		91.435			Change Point

TBM-33 Marked On 7th Step,right Bank Public Kadavu (Right Bank)
TBM Cadastral Plot No : 14/2 (koipuram Village)



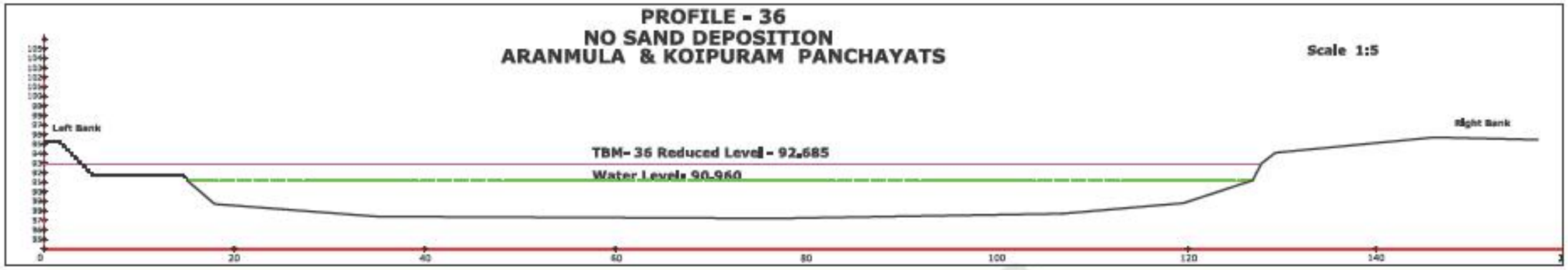
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.640			93.075	91.435			Change Point
TBM-34		0.620			92.455			Right Side Rock
P1		2.090			90.985			Right Water Level
P2		2.990			90.085			water
P3		3.590			89.485			water
P4		3.890			89.185			water
P5		4.190			88.885			water
P6		3.990			89.085			water
P7		3.090			89.985			water
P8		2.990			90.085			water
P9		2.090			90.985			Left water Level
CP			1.800		91.275			Change Point

TBM-34 On Rock (Right Bank)
TBM Cadastral Plot No : 14/2 (kolpuram Village)



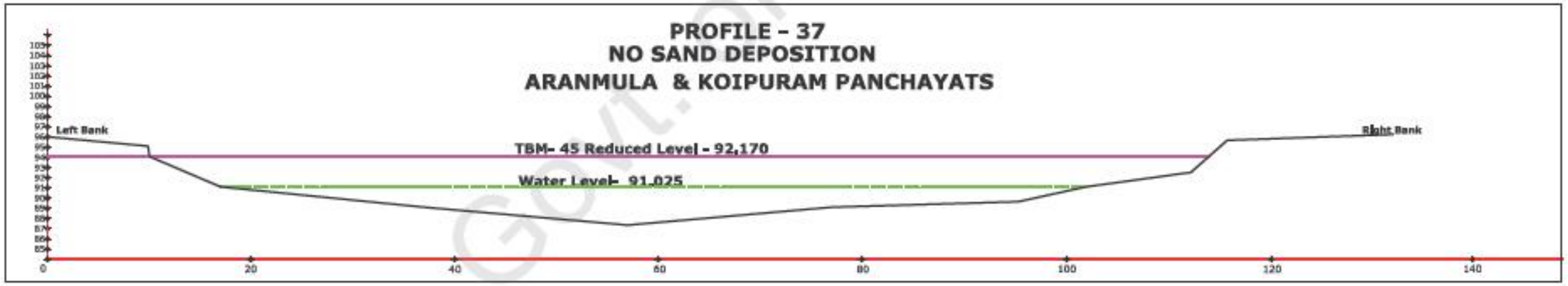
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
	2.620			93.895	91.275			Change Point
TBM-35		1.990			91.905			Right Side Kadavu
P1		2.910			90.985			Right Water Level
P2		3.810			90.085			water
P3		1.010			92.885			water
P4		5.910			87.985			water
P5		3.910			89.985			water
P6		3.900			89.995			water
P7		2.910			90.985			Left water Level
CP			2.230		91.665			Change Point

TBM-35 Marked On Right Bank Bathing Kadavu
TBM Cadastral Plot No : 13/13 (Kolpuram Village)



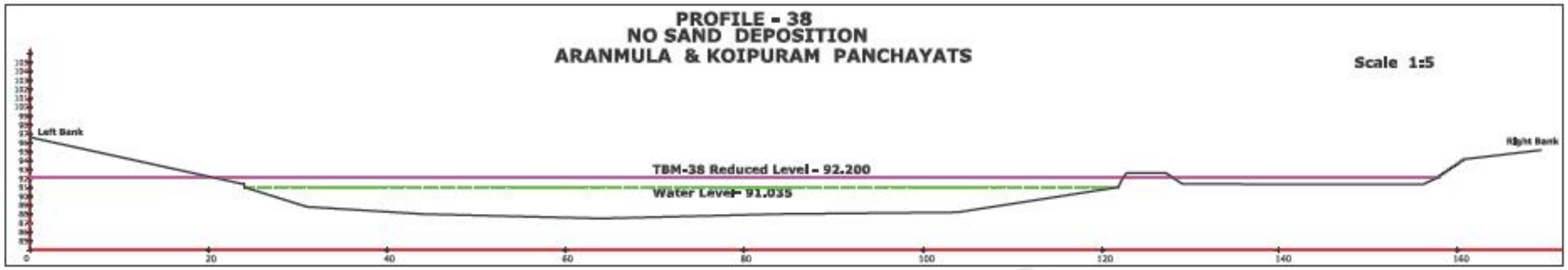
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.090			93.755	91.665			Change Point
TBM-36		1.070			92.685			Left side (mulluveli kadavu)
P1		2.795			90.960			Left water Level
P2		3.695			90.060			water
P3		6.795			86.960			water
P4		6.695			87.060			water
P5		3.795			89.960			water
P6		2.795			90.960			Right Water Level
CP			2.410		91.345			Change Point

TBM- 36 On Step,mulluvellkadavu
TBM Cadastral Plot No : 319/13 (Aranmula Village)



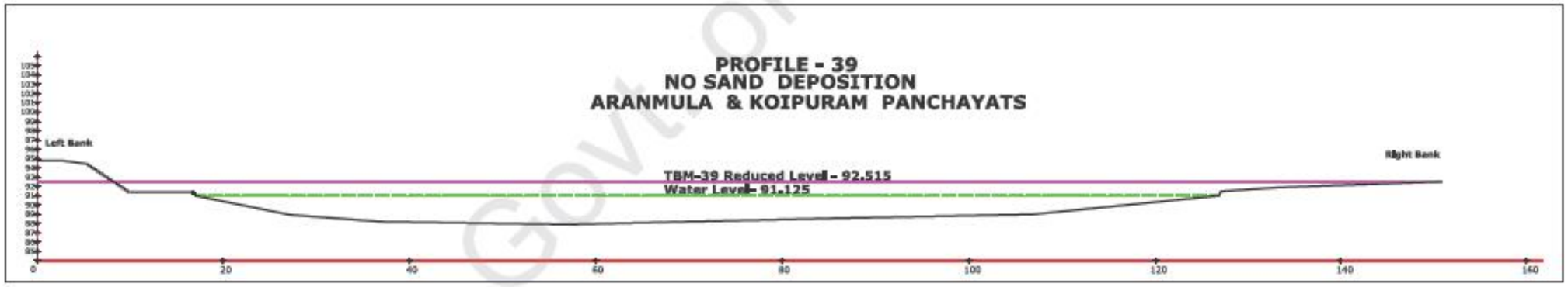
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.500			92.845	91.345			Change Point
TBM-37		0.675			92.170			Left side pumbhouse kadavu
P1		1.820			91.025			Left water Level
P2		2.720			90.125			water
P3		3.820			89.025			water
P4		3.320			89.525			water
P5		2.320			90.525			water
P6		1.820			91.025			Right Water Level
CP			0.230		92.615			Change Point

TBM- 37 On Left Bank Pumbhouse Kadavu
TBM Cadastral Plot No : 320/7 (Aranmula Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.640			93.255	92.615			Change Point
TBM-38		1.055			92.200			Left side (madathil kadavu)
P1		2.220			91.035			Left water Level
P2		5.220			88.035			water
P3		5.720			87.535			water
P4		5.220			88.035			water
P5		5.020			88.235			water
P6		2.220			91.035			Right Water Level
P7		0.620			92.635			Depositional Bank
CP			1.055		92.200			Change Point

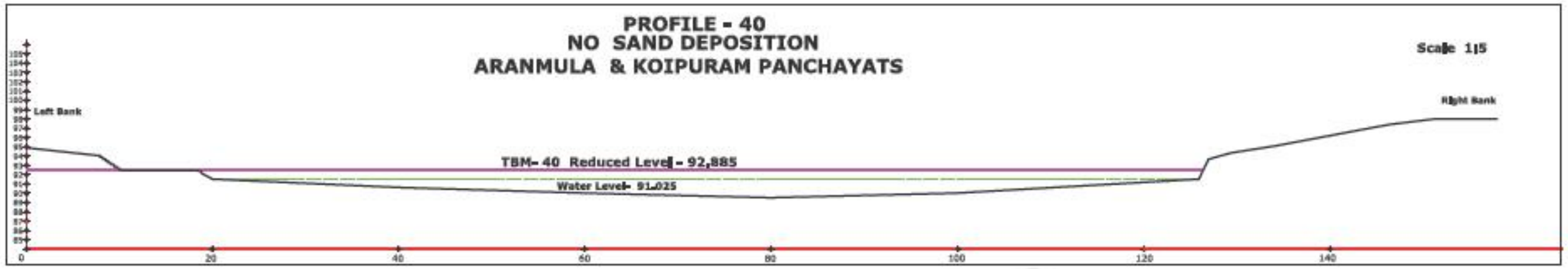
TBM-38 On Road To Madathil Kadavu (left Bank)
TBM Cadastral Plot No : 378/22 (Aranmula village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.515			94.715	92.200			Change Point
CP	2.350		0.600	96.465	94.115			Change Point
CP	1.605		4.965	93.105	91.500			Change Point
TBM-39		0.590			92.515			Left side kadavu(near Ashramam)
P1		2.100			91.005			Left water Level
P2		4.900			88.205			water
P3		5.200			87.905			water
P4		4.500			88.605			water
P5		4.100			89.005			water
P6		2.100			91.005			Right Water Level
CP			1.900		91.205			Change Point

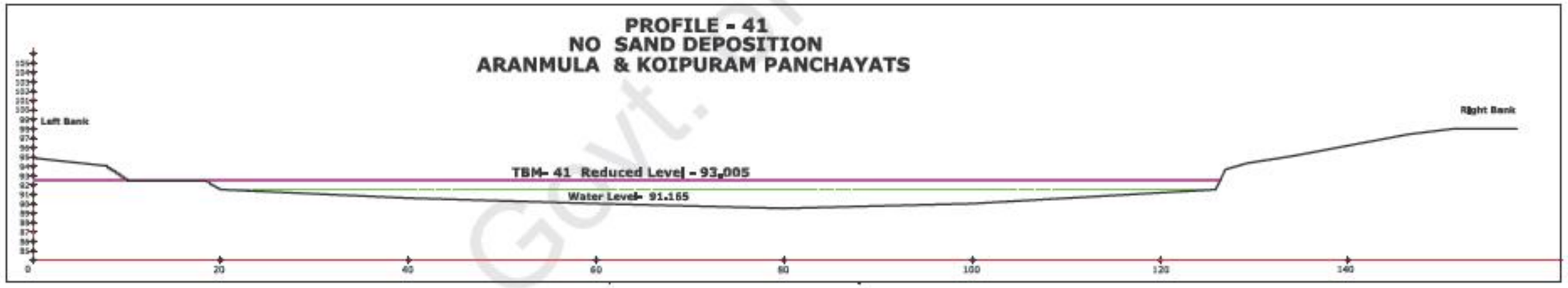
TBM-39 On Step Of Anandashramam Kadavu (left Bank)
TBM Cadastral Plot No : 380/3 (Aranmula village)

Govt. of Kerala



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.330			93.535	91.205			Change Point
TBM-40		0.650			92.885			Right side kadavu
P1		2.510			91.025			Right Water Level
P2		4.510			89.025			water
P3		5.010			88.525			water
P4		5.310			88.225			water
P5		5.510			88.025			water
P6		2.510			91.025			Left water Level
CP			0.560		92.975			Change Point

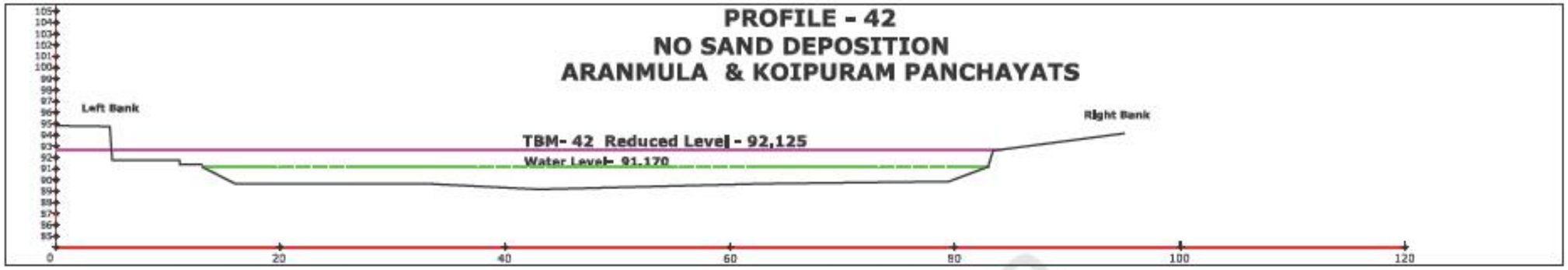
TBM- 40 On 2nd Step Of A Public Kadavu (Right Bank)
TBM Cadastral Plot No : 8/8 (Kolpuram village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.950			94.925	92.975			Change Point
TBM-41		1.920			93.005			Right side kadavu
P1		3.760			91.165			Right Water Level
P2		7.860			87.065			water
P3		7.560			87.365			water
P4		5.760			89.165			water
P5		5.760			89.165			water
P6		3.760			91.165			Left water Level
P7		1.785			93.140			b/w water level & Bank
CP			3.400		91.525			Change Point

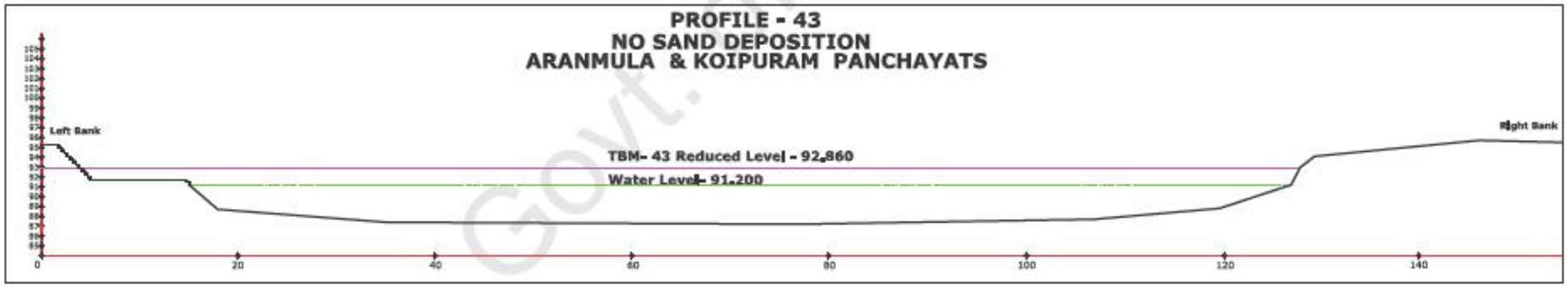
TBM- 41 On Step Of A Private Kadavu (Right Bank)
TBM Cadastral Plot No : 18/7 (kolpuram Village)

Govt. of India



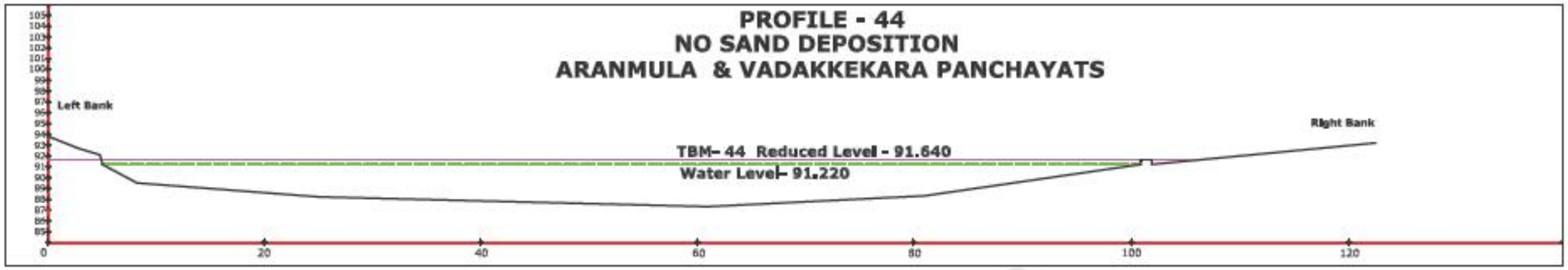
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.520			94.045	91.525			Change Point
CP	1.350		2.205	93.190	91.840			Change Point
TBM-42		1.065			92.125			Left side kadavu
P1		2.020			91.170			Left water Level
P2		2.520			90.670			water
P3		6.520			86.670			water
P4		7.020			86.170			water
P5		2.020			91.170			Right Water Level
CP			1.440		91.750			Change Point

TBM- 42 On Step Of A Public Kadavu (left Bank)
TBM Cadastral Plot No : 483/14 (Aranmula Village)



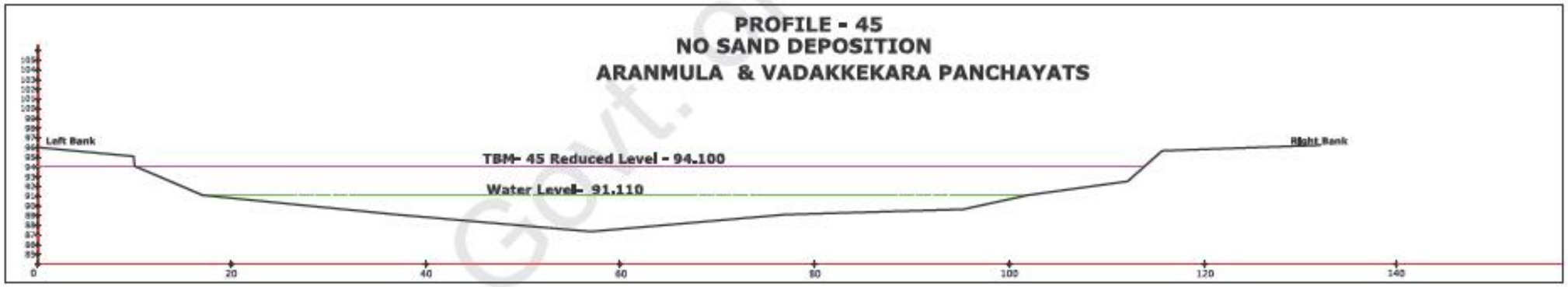
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.460			93.210	91.750			Change Point
TBM-43		0.350			92.860			Left bank temple kadavu
P1		2.010			91.200			Left water Level
P2		5.810			87.400			water
P3		6.010			87.200			water
P4		5.510			87.700			water
P5		2.010			91.200			Right Water Level
CP			0.900		92.310			Change Point

TBM- 43 On Step Of Temple Kadavu (left Bank)
TBM Cadastral Plot No : 484/4 (Aranmula Village)



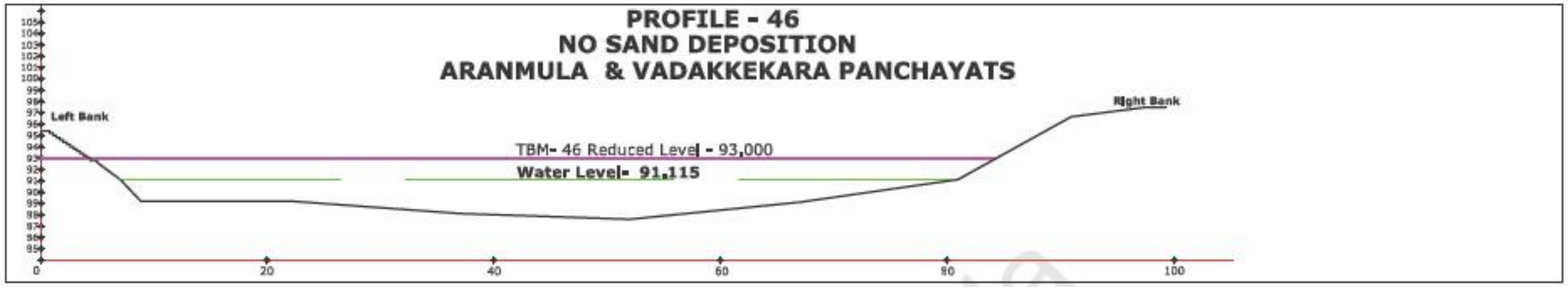
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.790			93.100	92.310			Change Point
TBM-44		1.460			94.560			Right side kadavu
P1		1.880			94.980			Right Water Level
P2		4.880			97.980			water
P3		5.780			98.880			water
P4		4.780			97.880			water
P5		1.880			94.980			Left water Level
CP			1.600		91.500			Change Point

TBM- 44 On A Slab Near Varattar Branching
TBM Cadastral Plot No : 187/17 (vadakkekara Village)



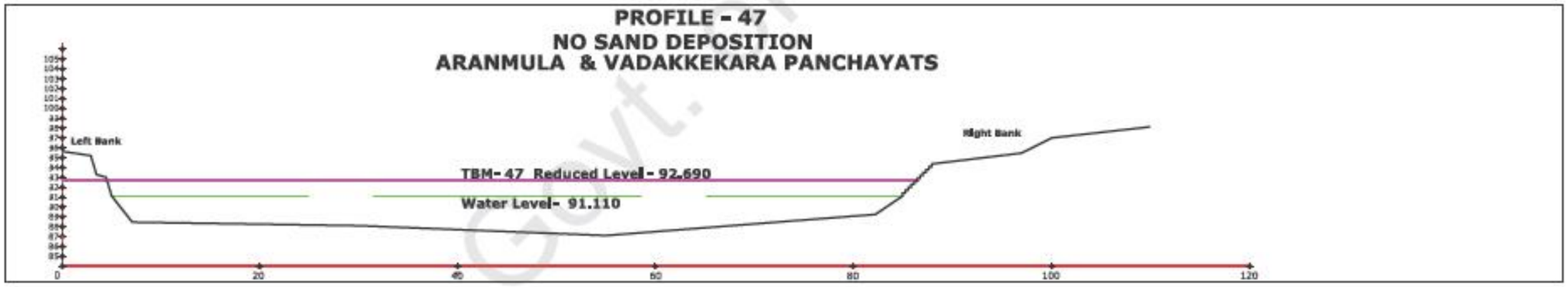
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.290			93.790	91.500			Change Point
CP	1.300		0.815	94.275	92.975			Change Point
TBM-45		0.175			94.100			Left side kadavu
P1		3.165			91.110			Left water Level
P2		5.165			89.110			water
P3		6.915			87.360			water
P4		6.165			88.110			water
P5		5.165			89.110			water
P6		3.165			91.110			Right Water Level
CP			3.165		91.110			Change Point

TBM- 45 On Retaining Wall Near Bathing Kadavu (left Bank)
TBM Cadastral Plot No : 499/12 (Aranmula Village)



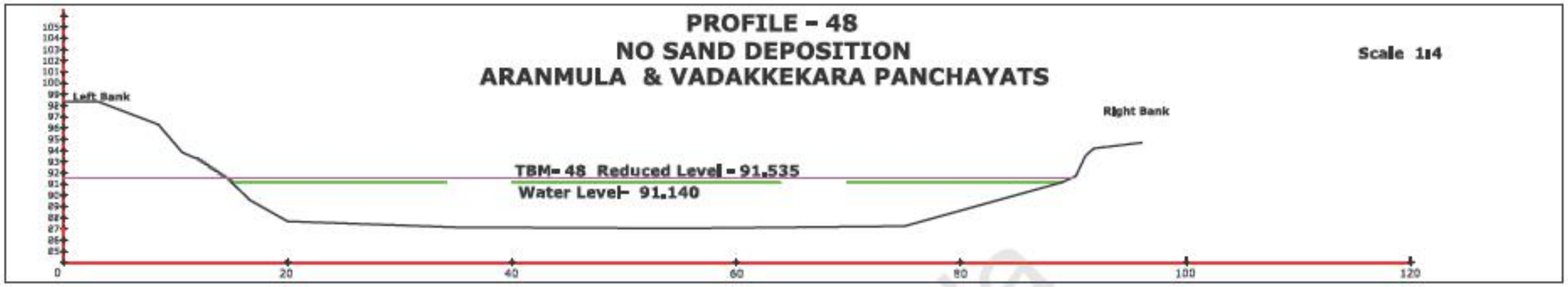
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.350			92.460	91.110			Change Point
CP	1.920		0.560	93.820	91.900			Change Point
TBM-46		0.820			93.000			Left side kadavu
P1		2.705			91.115			Left water Level
P2		4.605			89.215			water
P3		4.805			89.015			water
P4		5.705			88.115			water
P5		6.205			87.615			water
P6		4.705			89.115			water
P7		2.705			91.115			Right Water Level
CP			2.700		91.120			Change Point

TBM- 46 On 3rd Step Of Kadavu Near Irrigation Chanal Cum Pumbhouse
TBM Cadastral Plot No : 498/2 (Aranmula Village)



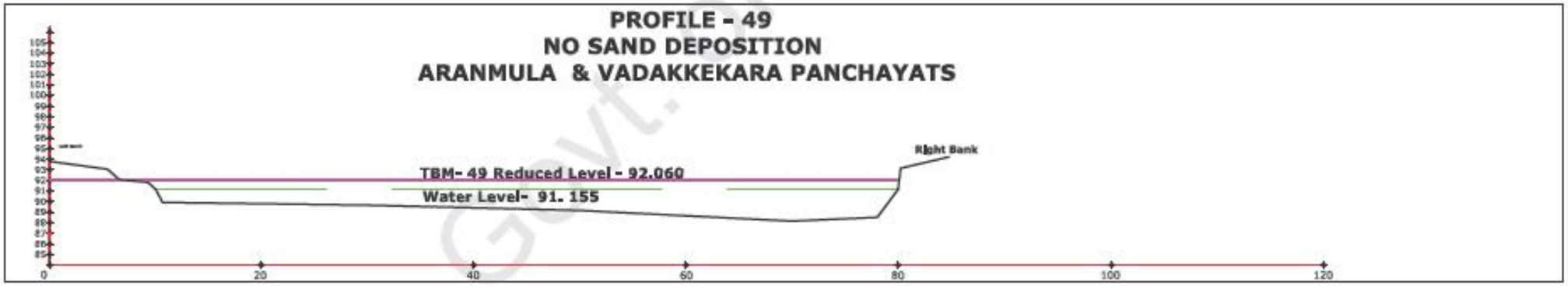
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.990			94.110	91.120			Change Point
TBM-47		1.420			92.690			Right side kadavu
P1		3.000			91.110			Right Water Level
P2		6.000			88.110			water
P3		7.000			87.110			water
P4		3.000			91.110			Left water Level
CP			0.530		93.580			Change Point

TBM- 47 On 4th Step Of A Private Kadavu (right Bank)
TBM Cadastral Plot No : 497/29 (vadakkekara Village)



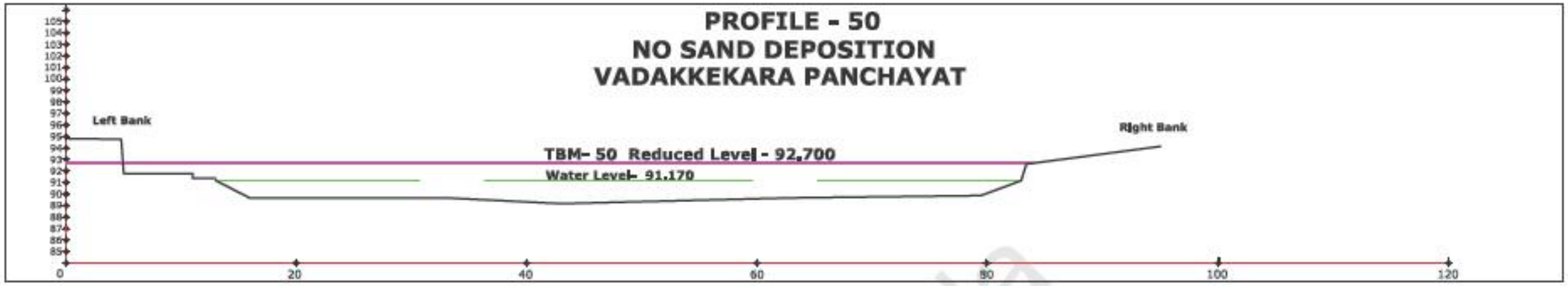
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.575			94.155	93.580			Change Point
CP	3.970		2.920	95.205	91.235			Change Point
TBM-48		3.670			91.535			Left Side Private Kadavu
P1		4.065			91.140			Left water Level
P2		8.065			87.140			water
P3		8.165			87.040			water
P4		7.965			87.240			water
P5		4.065			91.140			Right Water Level
CP			4.065		91.140			Change Point

TBM- 48 On A Private Kadavu (left Bank)
TBM Cadastral Plot No : 497/20 (Aranmula Village)



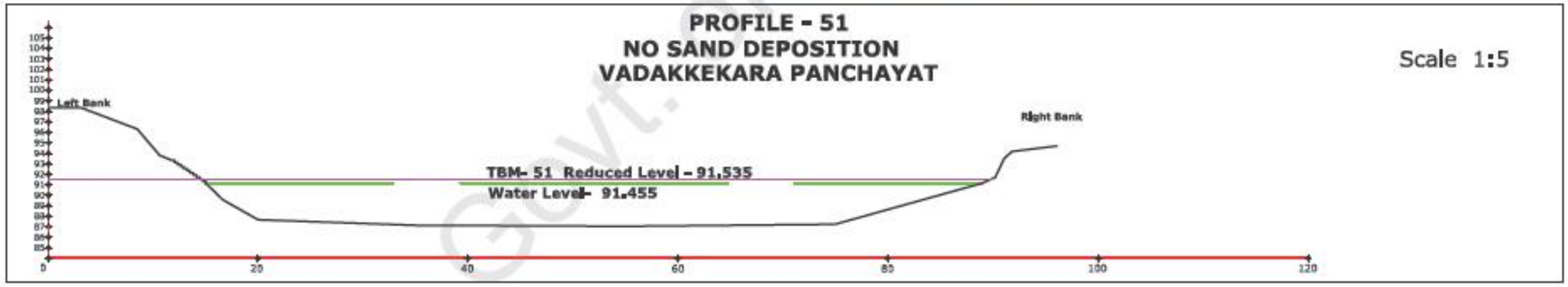
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.950			95.090	91.140			Change Point
CP	1.380		1.715	94.755	93.375			Change Point
TBM-49		2.695			92.060			Left side kadavu
CP	2.070		1.820	95.005	92.935			Change Point
P1		3.850			91.155			Right Water Level
P2		5.350			89.655			water
P3		5.850			89.155			water
P4		6.850			88.155			water
P5		3.850			91.155			Left water Level
CP			1.845		93.160			Change Point

TBM- 49 On A Bathing Kadavu Near Tributary Joints
TBM Cadastral Plot No : 497/18 (Aranmula Village)

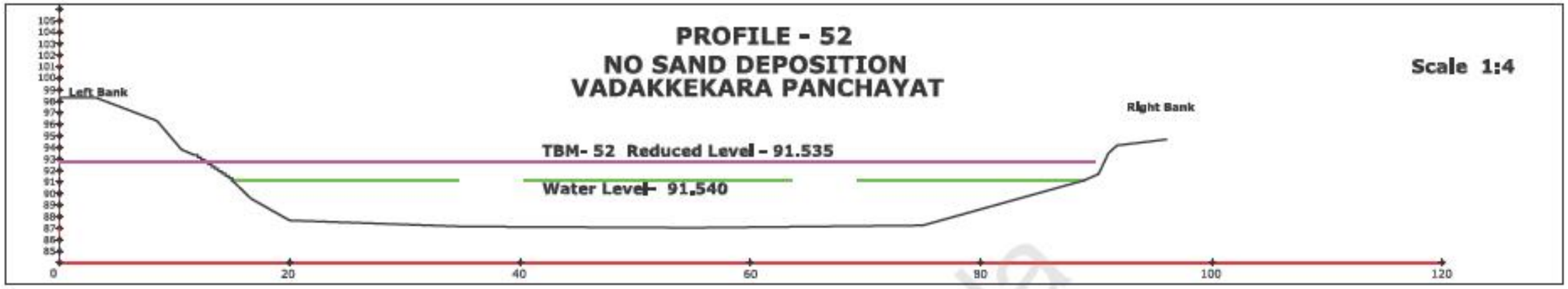


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.580			94.740	93.160			Change Point
TBM-50		2.040			92.700			Left side kadavu near school
P1		3.570			91.170			Left water Level
P2		5.070			89.670			water
P3		5.570			89.170			water
P4		5.070			89.670			water
P5		3.570			91.170			Right Water Level
CP			2.040		92.700			Change Point

TBM- 50 On Retaining Wall Of School Ground
TBM Cadastral Plot No : 497 (vadakkekara Village)



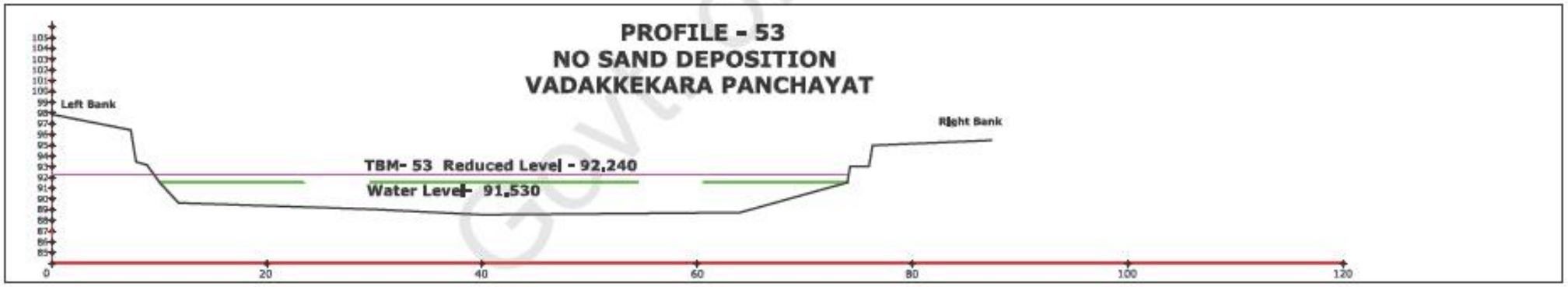
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	4.780			97.480	92.700			Change Point
CP	1.655		5.750	93.385	91.730			Change Point
P1		1.930			91.455			Right Water Level
P2		4.410			88.975			water
P3		5.030			88.355			water
P4		3.930			89.455			water
P5		1.930			91.455			Left water Level
CP			1.550		91.835			Change Point



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.655			93.490	91.835			Change Point
TBM-51,52		0.665			92.825			Left side kadavu
P2		1.950			91.540			Left water Level
P3		5.840			87.650			water
P4		4.850			88.640			water
P5		1.950			91.540			Right Water Level
CP			0.310		93.180			Change Point

TBM- 51,52 Marked On Bathing Kadavu (left Bank)

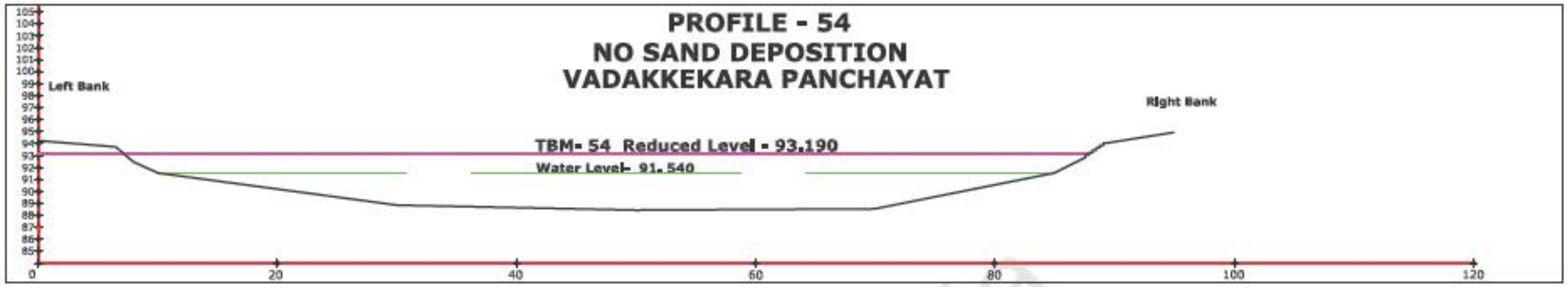
TBM Cadastral Plot No : 27 (vadakkekara Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.600			93.780	93.180			Change Point
TBM-53		1.540			92.240			Left side kadavu
P1		2.250			91.530			Left water Level
P2		4.750			89.030			water
P3		5.250			88.530			water
P4		5.050			88.730			water
P5		2.250			91.530			Right Water Level
CP			1.330		92.450			Change Point

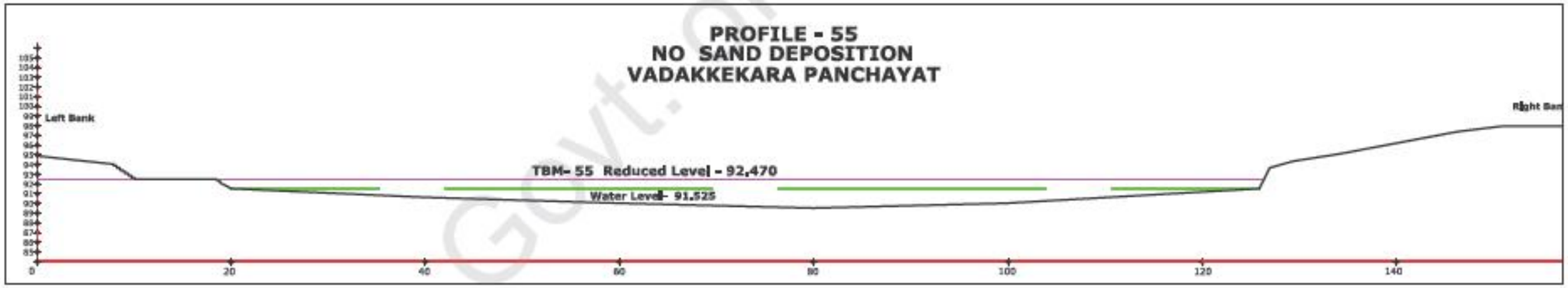
TBM- 53 On Rock (left Bank)

TBM Cadastral Plot No : 39 (Vadakkekara Village)



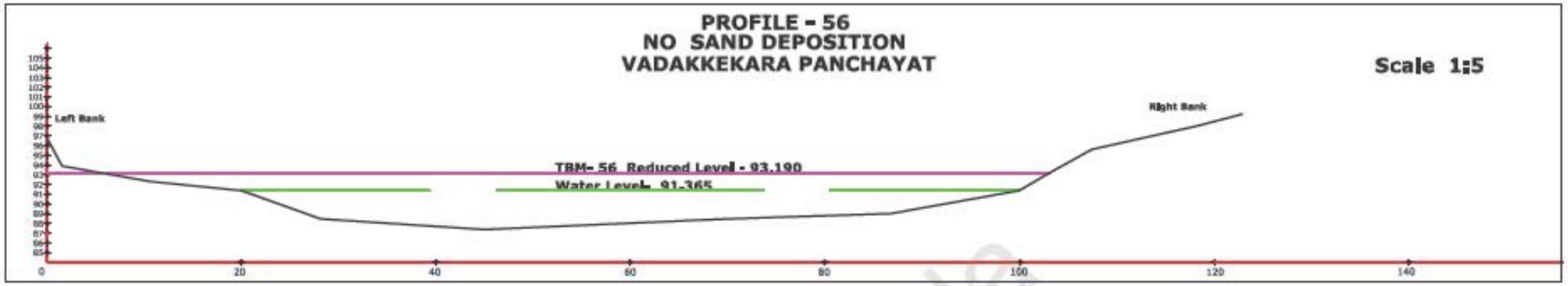
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.650			93.100	92.450			Change Point
CP	5.170		1.910	96.360	91.190			Change Point
TBM-54		3.170			93.190			Right side kadavu
P1		4.820			91.540			Right Water Level
P2		7.810			88.550			water
P3		7.920			88.440			water
P4		7.500			88.860			water
P5		4.820			91.540			Left water Level
CP			4.640		91.720			Change Point

TBM- 54 On Right Bank Private Kadavu
TBM Cadastral Plot No : 205/10 (Vadakkekara village)



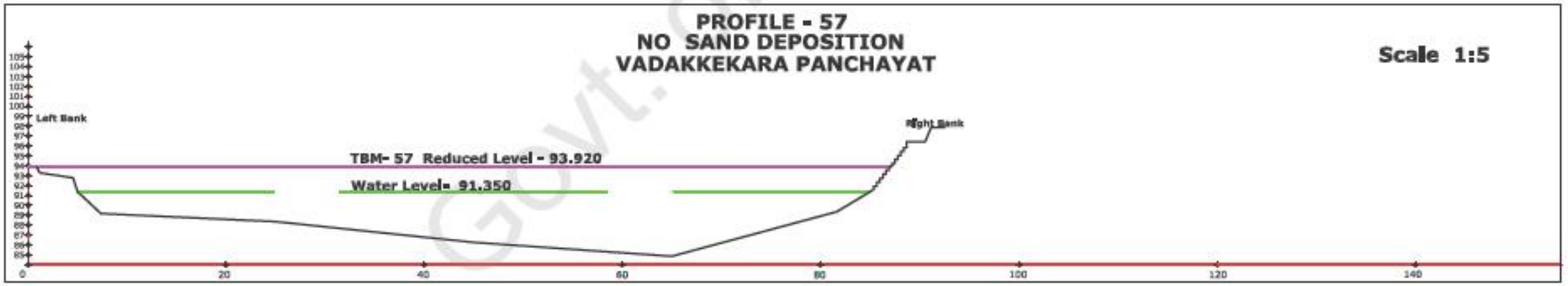
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.775			93.495	91.720			Change Point
TBM-55		1.025			92.470			Left side kadavu(palli kadavu)
CP	1.030		1.025	93.500	92.470			Change Point
P1		1.975			91.525			Left water Level
P2		2.875			90.625			water
P3		3.475			90.025			water
P4		3.975			89.525			water
P5		3.475			90.025			water
P6		1.975			91.525			Right Water Level
CP			1.035		92.465			Change Point

TBM- 55 On Marthoma Pallikadavu (left Bank)
TBM Cadastral Plot No : 62 (vadakkekara Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.175			92.640	92.465			Change Point
CP	2.820		1.755	93.705	90.885			Change Point
TBM-56		0.515			93.190			Right side Pulimuttu
P1		2.340			91.365			Right Water Level
P2		5.240			88.465			water
P3		6.335			87.370			water
P4		2.340			91.365			Left water Level
CP			0.115		93.590			Change Point

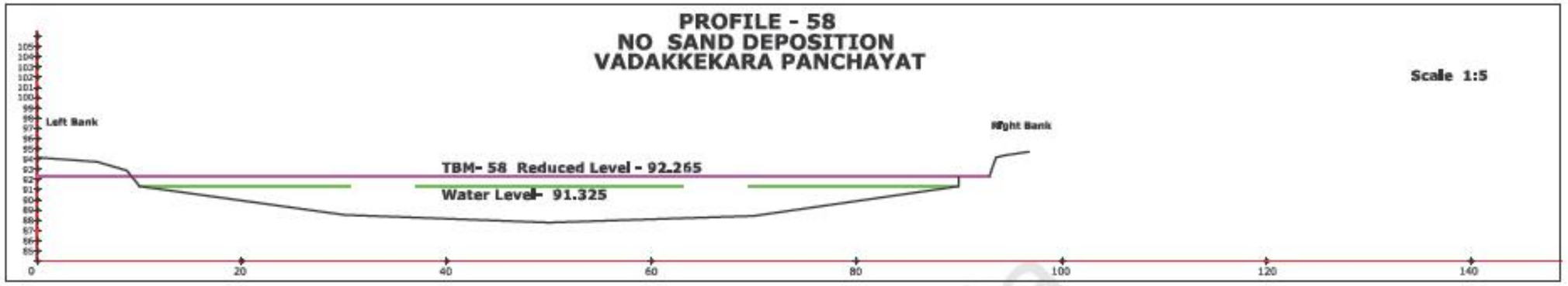
TBM- 56 On Pullmuttu (Right Bank)
TBM Cadastral Plot No : 244/10 (Vadakkekara Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.530			96.120	93.590			Change Point
CP	1.065		1.200	95.985	94.920			Change Point
TBM-57		2.065			93.920			Right side kadavu
P1		4.635			91.350			Right Water Level
P2		11.135			84.850			water
P3		9.135			86.850			water
P4		9.335			86.650			water
P5		7.635			88.350			water
P6		4.635			91.350			Left water Level
CP			2.825		93.160			Change Point

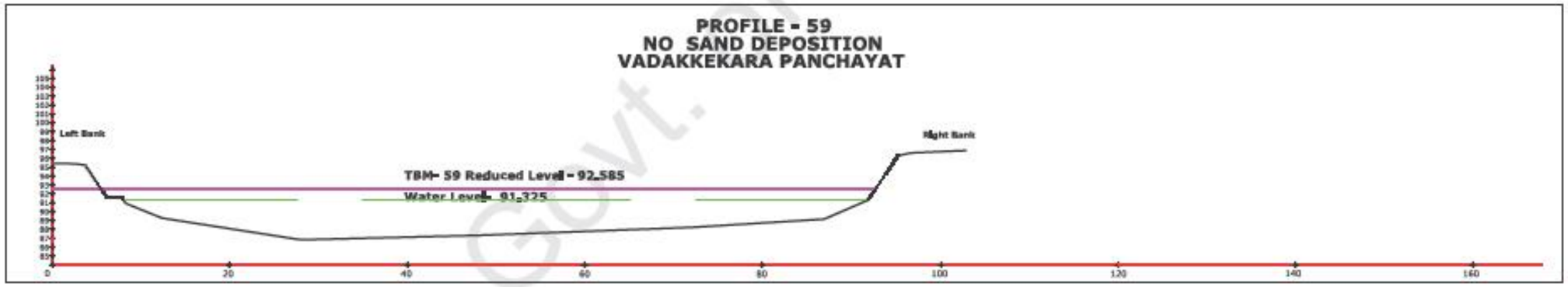
TBM- 57 On Step Of Bathing Kadavu Oppsite Pumbhouse (Right Bank)
TBM Cadastral Plot No : 244/14 (vadakkekara Village)

Govt. of Kerala



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.815			94.975	93.160			Change Point
CP	1.580		1.350	95.205	93.625			Change Point
TBM-58		2.940			92.265			Right side pitching
P1		3.880			91.325			Right Water Level
P2		6.780			88.425			water
P3		7.430			87.775			water
P4		6.680			88.525			water
P5		3.880			91.325			Left water Level
CP			2.940		92.265			Change Point

TBM- 58 On Retaining Wall (Right Bank)
TBM Cadastral Plot No : 246/16 (vadakkekara Village)



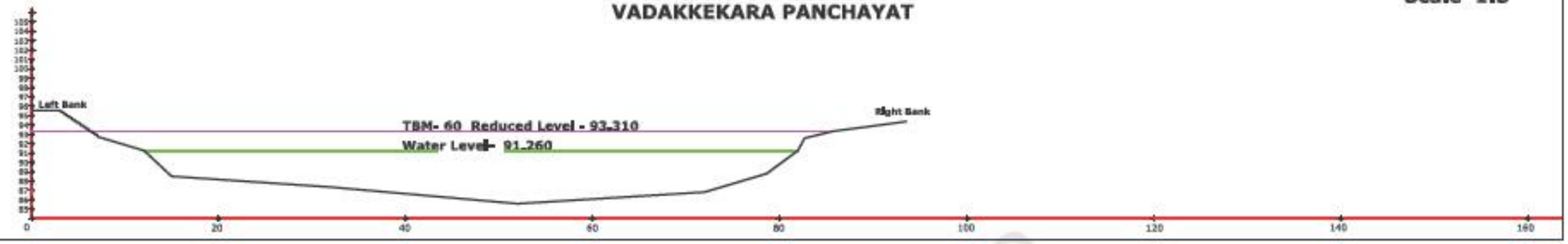
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.740			95.005	92.265			Change Point
CP	2.510		3.515	94.000	91.490			Change Point
TBM-59		1.415			92.585			Right side kadavu
P1		2.675			91.325			Right Water Level
P2		5.775			88.225			water
P3		6.675			87.325			water
P4		7.175			86.825			water
P5		2.675			91.325			Left water Level
CP			1.415		92.585			Change Point

TBM- 59 On A Private Kadavu Near Kavu (Right Bank)
TBM Cadastral Plot No : 247/1 (Vadakkekara Village)

Govt. of Kerala

PROFILE - 60
NO SAND DEPOSITION
VADAKKEKARA PANCHAYAT

Scale 1:5

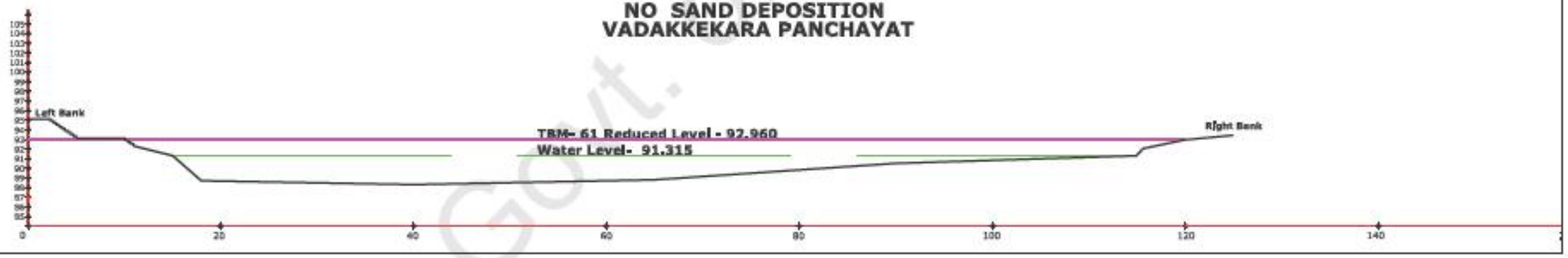


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.895			93.480	92.585			Change Point
TBM-60		0.170			93.310			Left side kadavu
P1		2.220			91.260			Left water Level
P2		6.120			87.360			water
P3		7.900			85.580			water
P4		6.660			86.820			water
P5		2.220			91.260			Right Water Level
CP			0.170		93.310			Change Point

TBM- 60 On Step Of Kadavu Near Bridge (left Bank)
TBM Cadastral Plot No : 83/7 (Vadakkekara Village)

PROFILE - 61
NO SAND DEPOSITION
VADAKKEKARA PANCHAYAT



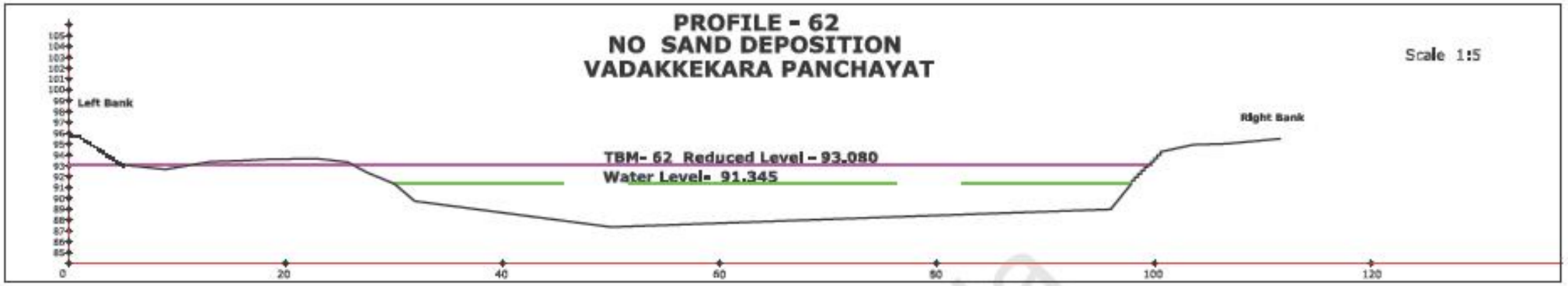
FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.035			96.345	93.310			Change Point
CP	4.150		4.730	95.765	91.615			Change Point
TBM-61		2.805			92.960			Left side temple kadavu
P1		4.450			91.315			Left water Level
P2		7.450			88.315			water
P3		6.950			88.815			water
P4		5.250			90.515			water
P5		4.450			91.315			Right Water Level
CP			3.300		92.465			Change Point

TBM- 61 On 5th Step Temple Kadavu (left Bank)
TBM Cadastral Plot No : 109/1 (Vadakkekara Village)

PROFILE - 62
NO SAND DEPOSITION
VADAKKEKARA PANCHAYAT

Scale 1:5

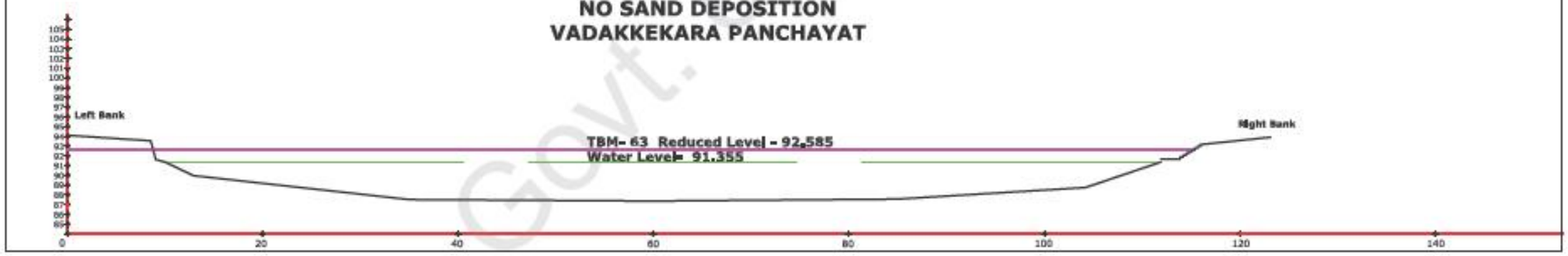


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.880			94.345	92.465			Change Point
TBM-62		1.265			93.080			Right side kadavu
P1		3.000			91.345			Right Water Level
P2		6.000			88.345			water
P3		7.000			87.345			water
P4		3.000			91.345			Left water Level
CP			1.950		92.395			Change Point

TBM- 62 On A Private Kadavu Opposit Parakkadavu (Right Bank)
TBM Cadastral Plot No : 251/9 (Vadakkekara Village)

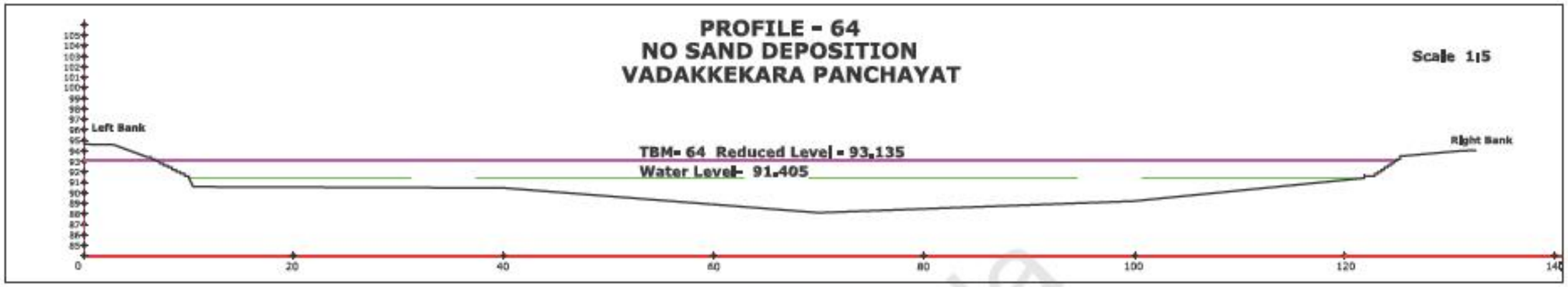
PROFILE - 63
NO SAND DEPOSITION
VADAKKEKARA PANCHAYAT



FIELD BOOK

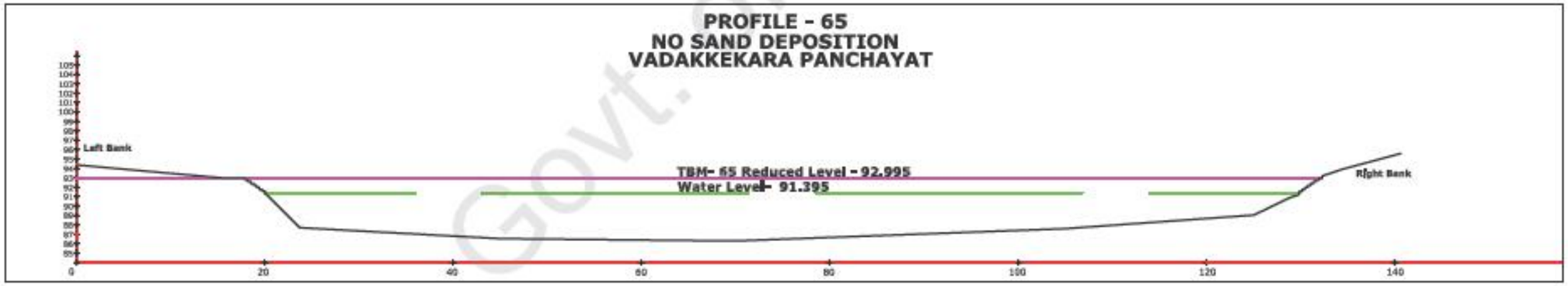
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.430			92.825	92.395			Change Point
TBM-63		0.240			92.585			Right side kadavu
P1		1.470			91.355			Right Water Level
P2		5.270			87.555			water
P3		5.470			87.355			water
P4		5.320			87.505			water
P5		1.470			91.355			Left water Level
CP			0.740		92.085			Change Point

TBM- 63 On Bathing Kadavu (Right Bank)
TBM Cadastral Plot No : 251/11 (vadakkekara Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.680			93.765	92.085			Change Point
TBM-64		0.630			93.135			Right side kadavu
P1		2.360			91.405			Right Water Level
P2		2.560			91.205			water
P3		2.660			91.105			water
P4		3.310			90.455			water
P5		2.360			91.405			Left water Level
CP			2.200		91.565			Change Point

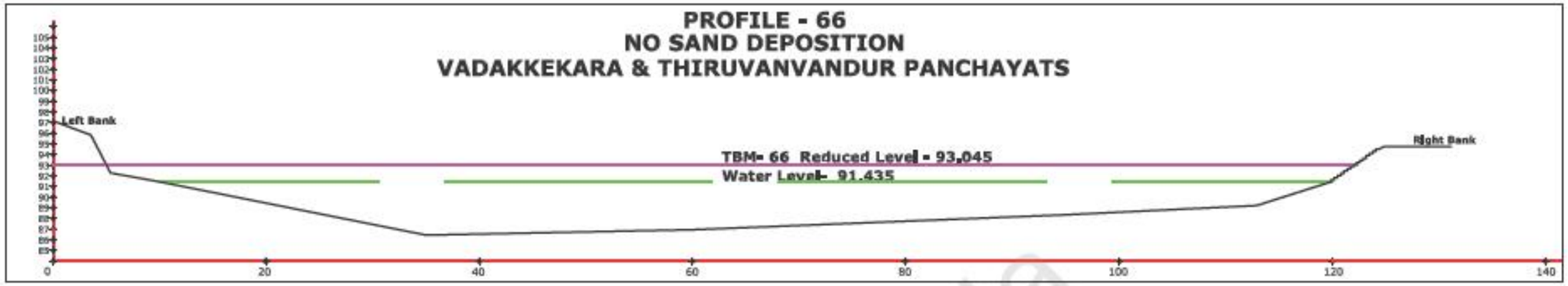
TBM- 64 On Bathing Kadavu (Right Bank)
TBM Cadastral Plot No : 252/6 (vadakkekara Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.730			93.295	91.565			Change Point
TBM-65		0.300			92.995			Left side vallapura kadavu
P1		1.900			91.395			Left water Level
P2		6.750			86.545			water
P3		7.000			86.295			water
P4		5.700			87.595			water
P5		1.900			91.395			Right Water Level
CP			0.800		92.495			Change Point

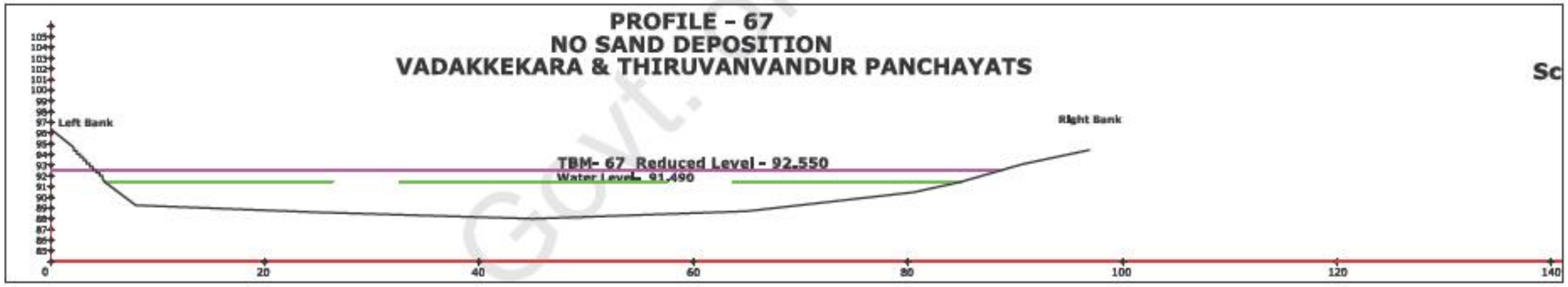
TBM- 65 On Step Of Kodayattukara Vallapura Kadavu (left Bank)
TBM Cadastral Plot No : 123/2 (Vadakkekara Village)

Govt. of Kerala



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.100			93.595	92.495			Change Point
TBM-66		0.550			93.045			Right side kadavu
P1		2.160			91.435			Right Water Level
P2		5.260			88.335			water
P3		6.660			86.935			water
P4		7.160			86.435			water
P5		2.160			91.435			Left water Level
CP			2.010		91.585			Change Point

TBM- 66 On Bathing Kadavu (Right Bank)
TBM Cadastral Plot No : 569 (Thiruvanvandur village)

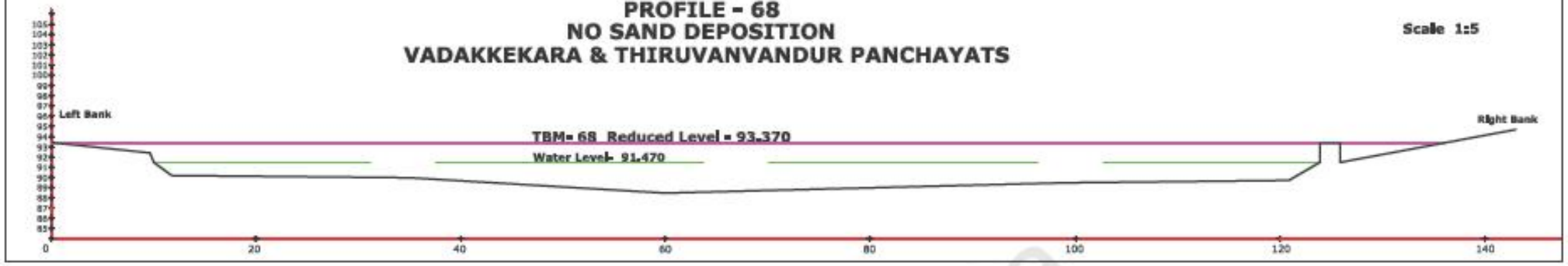


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.805			93.390	91.585			Change Point
TBM-67		0.840			92.550			Left side private kadavu
P1		1.900			91.490			Left water Level
P2		4.800			88.590			water
P3		5.400			87.990			water
P4		4.700			88.690			water
P5		1.900			91.490			Right Water Level
CP			0.600		92.790			Change Point

TBM- 67 On A Private Kadavu (left Bank)
TBM Cadastral Plot No : 133/8 (Vadakkekara Village)

PROFILE - 68
NO SAND DEPOSITION
VADAKKEKARA & THIRUVANVANDUR PANCHAYATS

Scale 1:5

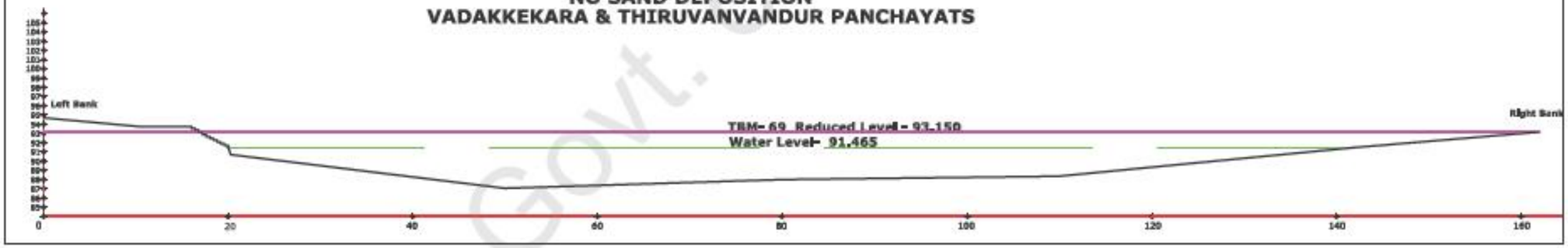


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.100			95.890	92.790			Change Point
TBM-68		2.520			93.370			Railway bridge piller
P1		4.420			91.470			Right Water Level
P2		6.420			89.470			water
P3		7.420			88.470			water
P4		5.920			89.970			water
P5		4.420			91.470			Left water Level
CP			4.420		91.470			Change Point

TBM- 68 Marked On Railway Bridge Piller (Right Bank)
TBM Cadastral Plot No : 563 (Thiruvanvandur Village)

PROFILE - 69
NO SAND DEPOSITION
VADAKKEKARA & THIRUVANVANDUR PANCHAYATS



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.820			94.290	91.470			Change Point
CP	1.405		1.350	94.345	92.940			Change Point
TBM-69		1.195			93.150			Left side kadavu
P1		2.880			91.465			Left water Level
P2		7.290			87.055			water
P3		5.980			88.365			water
P4		2.880			91.465			Right Water Level
CP			3.550		90.795			Change Point

TBM- 69 On Bathing Kadavu Below Kallisseri Bridge
TBM Cadastral Plot No : 168/8 (Vadakkekara Village)

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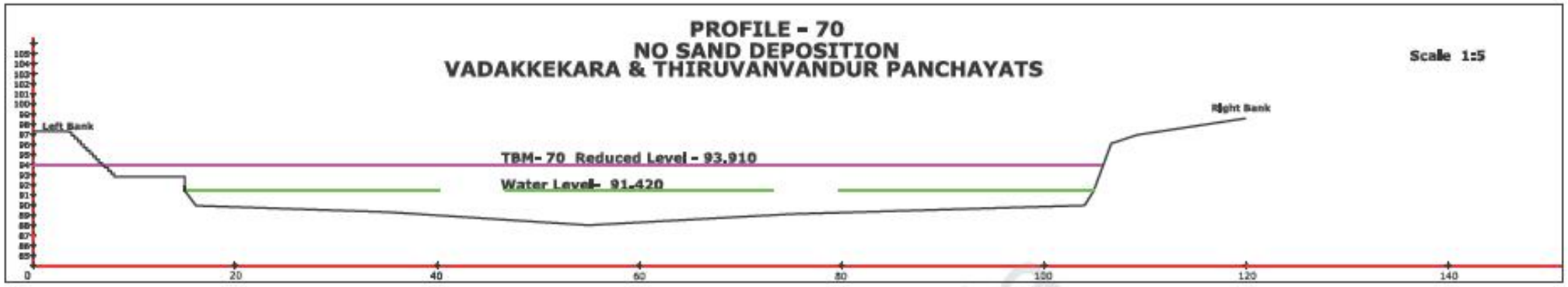
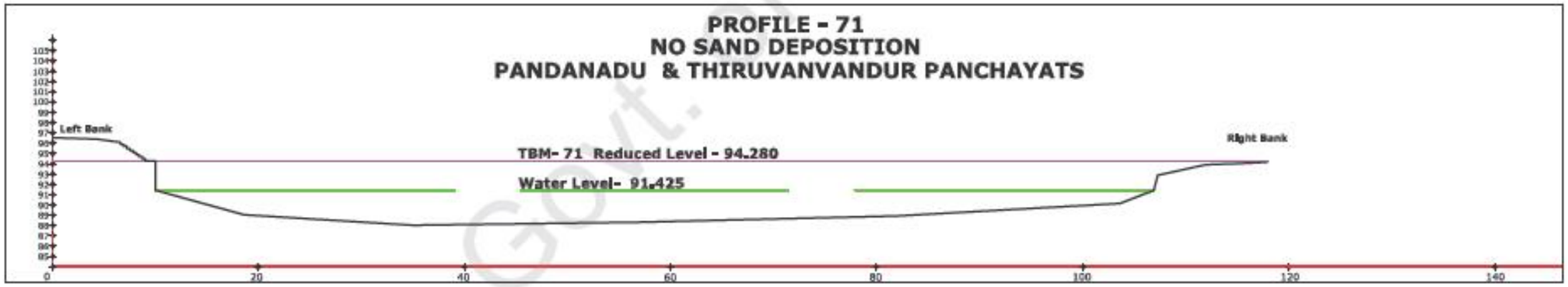


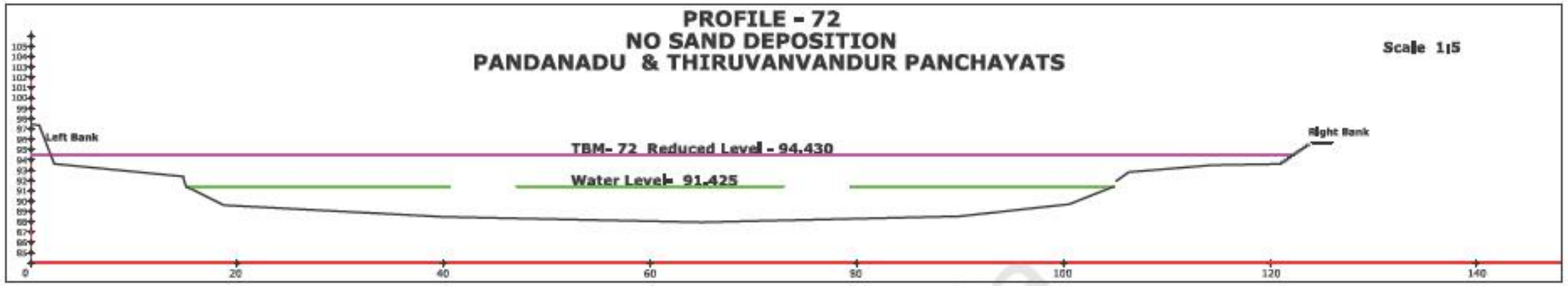
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	4.040			94.835	90.795			Change Point
TBM-70		0.925			93.910			Left side kadvu
P1		3.415			91.420			Left water Level
P2		5.515			89.320			water
P3		6.815			88.020			water
P4		5.715			89.120			water
P5		3.415			91.420			Right Water Level
CP			2.610		92.225			Change Point

TBM- 70 Step Of Madam Kadavu (left Bank)
TBM Cadastral Plot No : 557 (Vadakkekara Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.900			95.125	92.225			Change Point
TBM-71		0.845			94.280			Left side kadavu
P1		3.700			91.425			Left water Level
P2		7.100			88.025			water
P3		6.800			88.325			water
P4		6.200			88.925			water
P5		3.700			91.425			Right Water Level
CP			2.575		92.550			Change Point

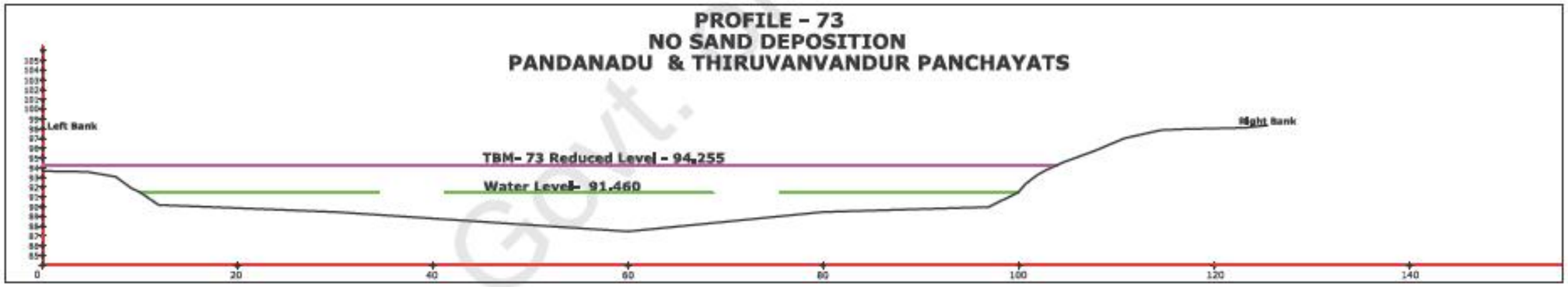
TBM- 71 Left Bank Pumbhouse Kadavu
TBM Cadastral Plot No : 554 (Pandanadu Village)



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.090			94.640	92.550			Change Point
TBM-72		0.210			94.430			Right side kadavu
P1		3.215			91.425			Right Water Level
P2		6.115			88.525			water
P3		6.695			87.945			water
P4		6.170			88.470			water
P5		3.215			91.425			Left water Level
CP			1.535		93.105			Change Point

TBM- 72 On A Private Kadavu Near Umayattu Kara Temple Kadavu (Right Bank)
TBM Cadastral Plot No : 541 (Thiruvanvandur Village)



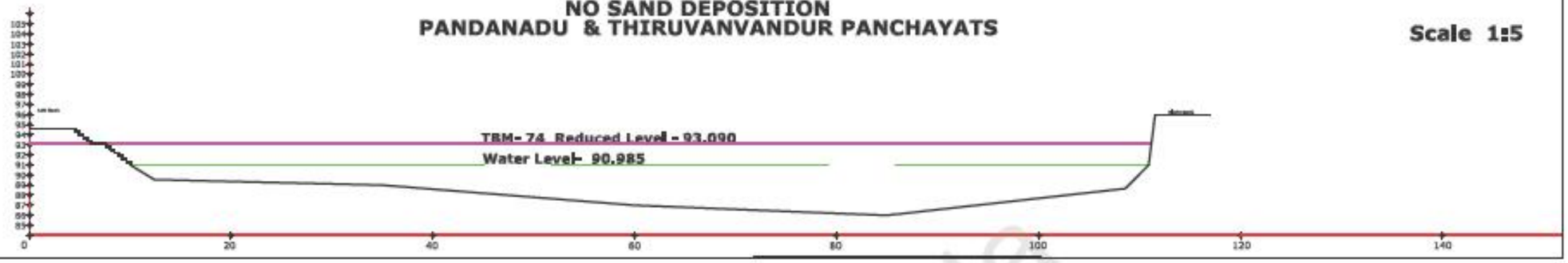
FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.260			94.365	93.105			Change Point
CP	2.640		0.120	96.885	94.245			Change Point
TBM-73		2.630			94.255			Right side pulimuttu
P1		5.425			91.460			Right Water Level
P2		7.425			89.460			water
P3		9.425			87.460			water
P4		7.425			89.460			water
P5		5.425			91.460			Left water Level
CP			2.630		94.255			Change Point

TBM- 73 On Pulimuttu Near Pattathil Thodu
TBM Cadastral Plot No : 537 (Thiruvanvandur Village)

PROFILE - 74
NO SAND DEPOSITION
PANDANADU & THIRUVANVANDUR PANCHAYATS

Scale 1:5

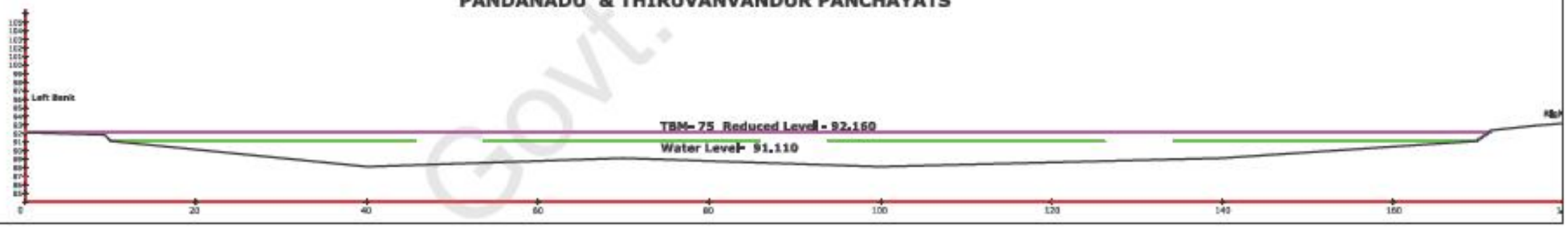


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.525			94.780	94.255			Change Point
TBM-74		1.690			93.090			Left side kadavu (palli kadavu
P1		3.795			90.985			Left water Level
P2		5.795			88.985			water
P3		7.795			86.985			water
P4		8.795			85.985			water
P5		3.795			90.985			Right Water Level
CP			3.200		91.580			Change Point

TBM- 74 Pallikadavu (left Bank)
TBM Cadastral Plot No : 574 (Pandanadu Village)

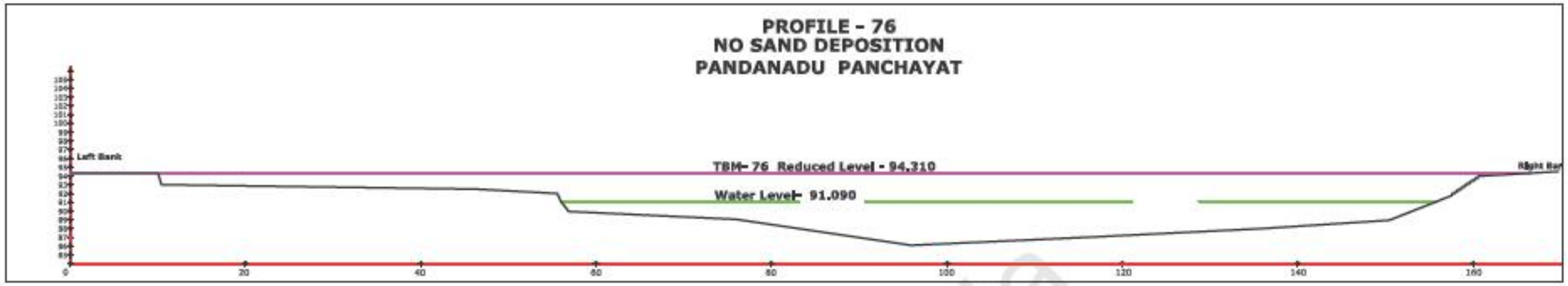
PROFILE - 75
NO SAND DEPOSITION
PANDANADU & THIRUVANVANDUR PANCHAYATS



FIELD BOOK

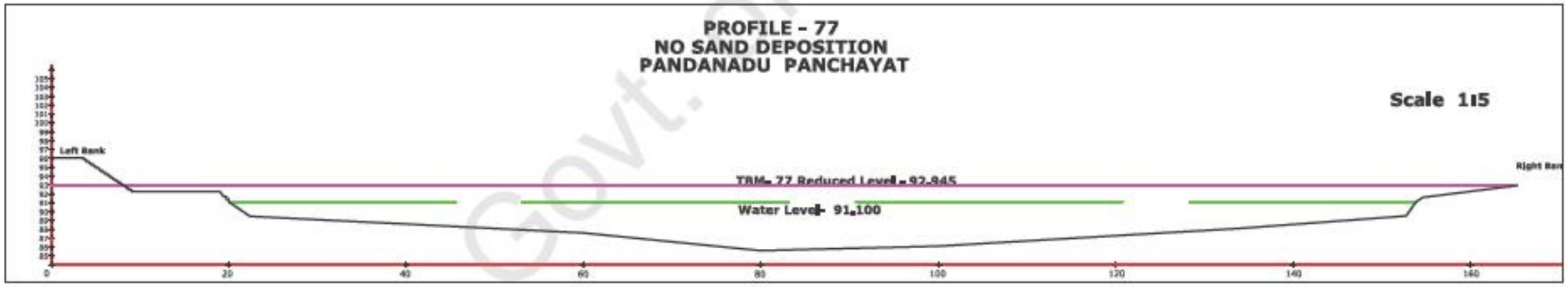
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.370			94.950	91.580			Change Point
TBM-75		2.790			92.160			Right side kadavu
P1		3.840			91.110			Right Water Level
P2		5.840			89.110			water
P3		6.840			88.110			water
P4		6.840			88.110			water
P5		5.840			89.110			water
P6		3.840			91.110			Left water Level
CP			2.790		92.160			Change Point

TBM- 75 On Idakkadavu (Right Bank)
TBM Cadastral Plot No : 536 (Thiruvanvandur Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.750			95.910	92.160			Change Point
TBM-76		1.600			94.310			Left side kadavu
P1		4.820			91.090			Left water Level
P2		7.920			87.990			water
P3		8.920			86.990			water
P4		9.820			86.090			water
P5		6.870			89.040			water
P6		4.820			91.090			Right Water Level
CP			4.820		91.090			Change Point

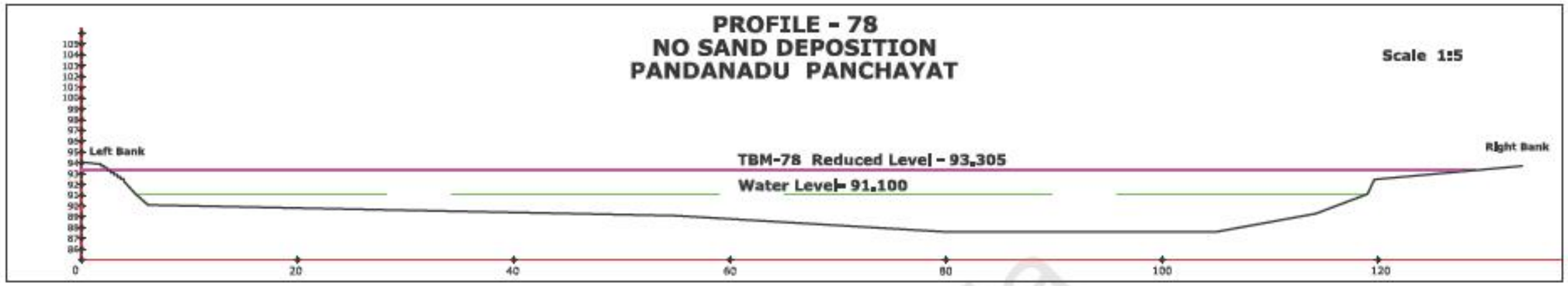
TBM- 76 Retaining Wall Of Kuzhayannoor Kadavu (left Bank)
TBM Cadastral Plot No : 599 (Pandanadu Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.970			94.060	91.090			Change Point
TBM-77		1.115			92.945			Left side kadavu
P1		2.960			91.100			Left water Level
P2		5.460			88.600			water
P3		6.460			87.600			water
P4		8.460			85.600			water
P5		7.960			86.100			water
P6		5.960			88.100			water
P7		2.960			91.100			Right Water Level
CP			1.600		92.460			Change Point

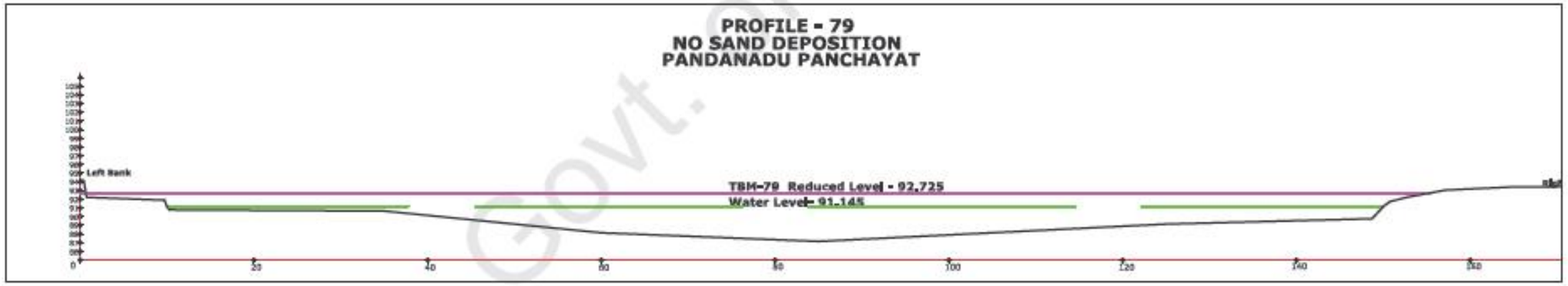
TBM- 77 On Step Of Medakkadavu (left Bank)
TBM Cadastral Plot No : 604 (Pandanadu Village)

Govt. of Kerala



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.260			93.720	92.460			Change Point
TBM-78		0.415			93.305			Left side kadavu
P1		2.620			91.100			Left water Level
P2		4.120			89.600			water
P3		4.620			89.100			water
P4		6.120			87.600			water
P5		6.020			87.700			water
P6		2.620			91.100			Right Water Level
CP			1.900		91.820			Change Point

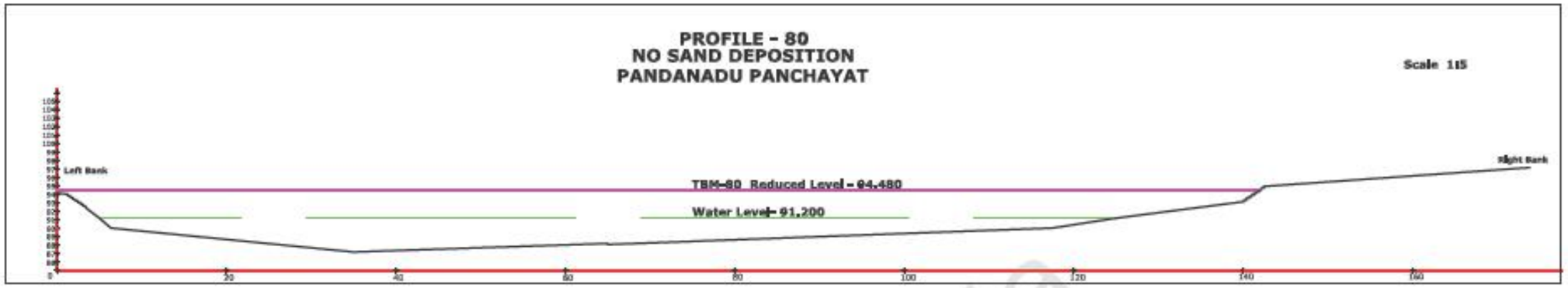
TBM-78 Marked On Ambatteth Kadavu (left Bank)
TBM Cadastral Plot No : 512 (Pandanadu Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.880			93.700	91.820			Change Point
TBM-79		0.975			92.725			Left side vallapura kadavu
P1		2.555			91.145			Left water Level
P2		3.055			90.645			water
P3		5.555			88.145			water
P4		6.555			87.145			water
P5		4.555			89.145			water
P6		2.555			91.145			Right Water Level
CP			1.350		92.350			Change Point

TBM-79 On Protection Wall Of Mithramadom Kadavu (left Bank)
TBM Cadastral Plot No : 402 (Pandanadu Village)

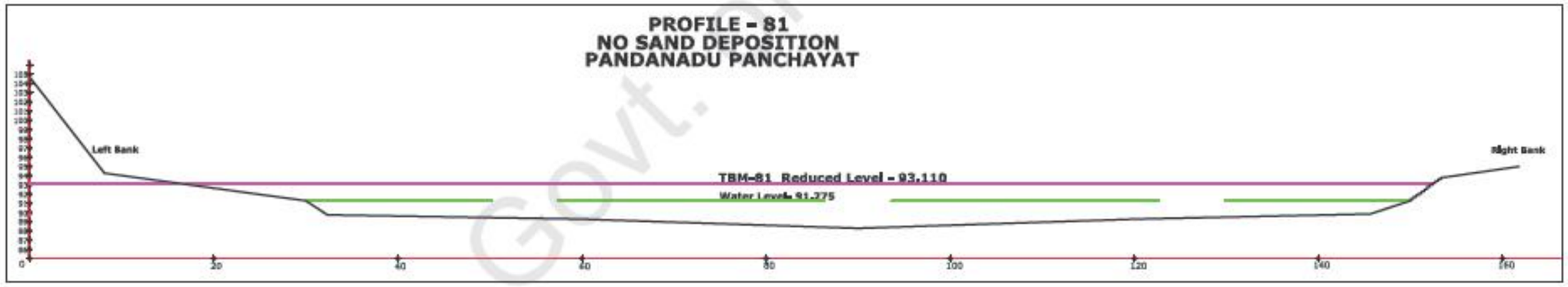
Govt. of Kerala



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.200			94.550	92.350			Change Point
TBM-80		0.070			94.480			Right side kadavu
P1		3.350			91.200			Right Water Level
P2		5.350			89.200			water
P3		6.350			88.200			water
P4		7.350			87.200			water
P5		3.350			91.200			Left water Level
CP			2.750		91.800			Change Point

TBM-80 On Idathll Kadavu (Rlght Bank)

TBM Cadastral Plot No : 392 (Pandanadu Vllage)

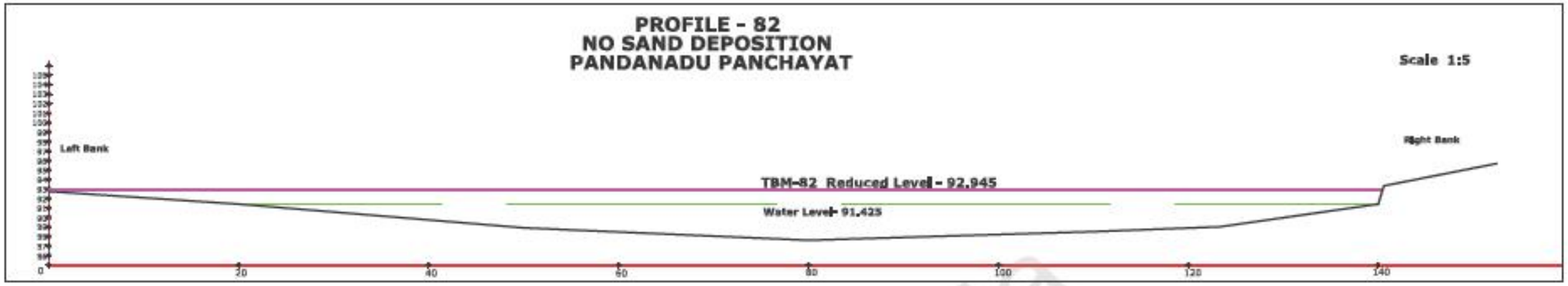


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.500			93.300	91.800			Change Point
TBM-81		0.190			93.110			Right side kadavu
P1		2.025			91.275			Right Water Level
P2		4.025			89.275			water
P3		5.025			88.275			water
P4		4.025			89.275			water
P5		2.025			91.275			Left water Level
CP			0.310		92.990			Change Point

TBM 81-marked On Rlght Bank Bathlng Kadavu

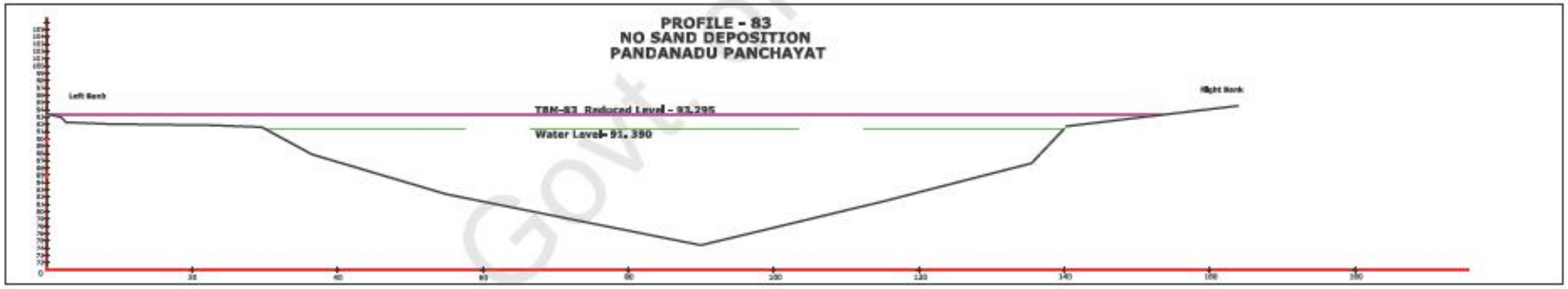
TBM Cadastral Plot No : 338 (Pandanadu Vllage)

Govt. of Kerala



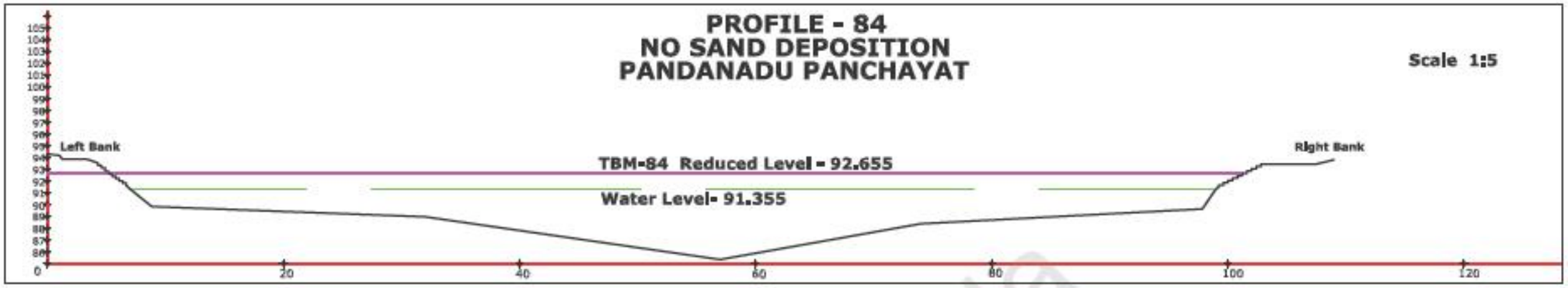
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.485			94.475	92.990			Change Point
CP	2.110		0.360	96.225	94.115			Change Point
TBM-82		3.280			92.945			Right side pumb house
P1		4.800			91.425			Right Water Level
P2		7.700			88.525			water
P3		8.610			87.615			water
P4		7.300			88.925			water
P5		4.800			91.425			Left water Level
CP			4.330		91.895			Change Point

TBM-82 Marked On Right Bank Pumb House
TBM Cadastral Plot No : 337 (Pandanadu Village)



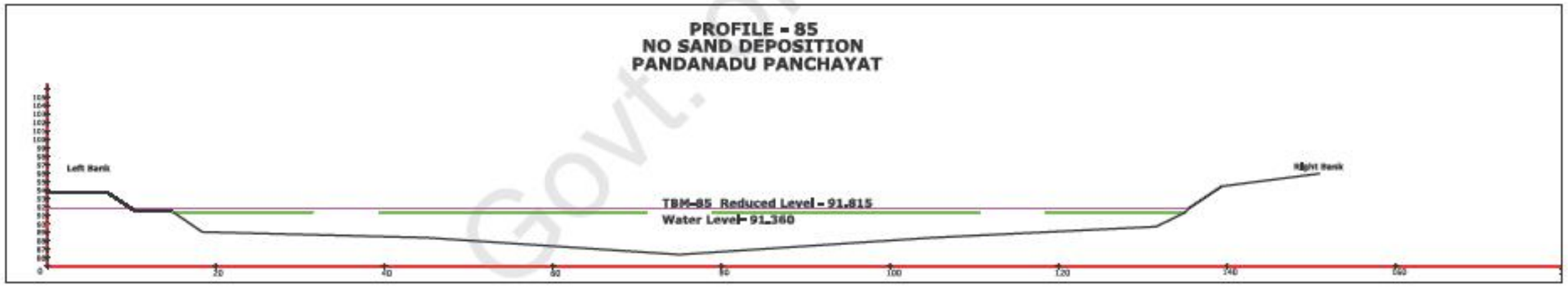
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.900			93.795	91.895			Change Point
CP	1.620		1.990	93.425	91.805			Change Point
TBM-83		0.130			93.295			Right side kadavu
P1		2.035			91.390			Right Water Level
P2		12.035			81.390			water
P3		18.035			75.390			water
P4		11.035			82.390			water
P5		2.035			91.390			Left water Level
CP			0.130		93.295			Change Point

TBM-83 On Step ,parambathu Kadavu (Right Bank)
TBM Cadastral Plot No : 270 (Pandanadu Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.350			94.645	93.295			Change Point
CP	1.370		2.750	93.265	91.895			Change Point
TBM-84		0.610			92.655			Left side kadavu
P1		1.910			91.355			Left water Level
P2		4.310			88.955			water
P3		7.900			85.365			water
P4		4.860			88.405			water
P5		1.910			91.355			Right Water Level
CP			0.610		92.655			Change Point

TBM-84 On Uriyalkkara Bathing Kadavu (left Bank)
TBM Cadastral Plot No : 197 (Pandanadu Village)

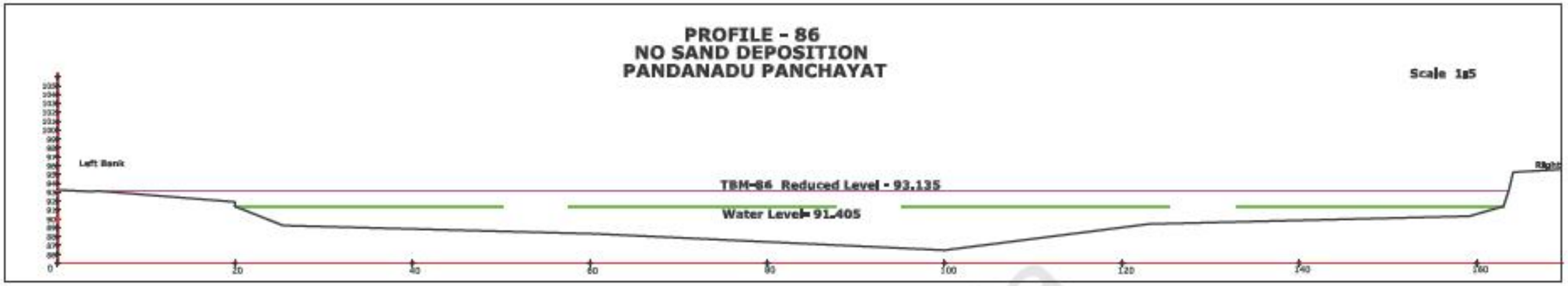


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.710			93.365	92.655			Change Point
TBM-85		1.550			91.815			Left side private kadavu
P1		2.005			91.360			Left water Level
P2		5.005			88.360			water
P3		7.005			86.360			water
P4		5.005			88.360			water
P5		2.005			91.360			Right Water Level
CP			1.810		91.555			Change Point

TBM-85 On Private Kadavu (left Bank)
TBM Cadastral Plot No : 201 (pandanadu Village)

Govt.of Kerala

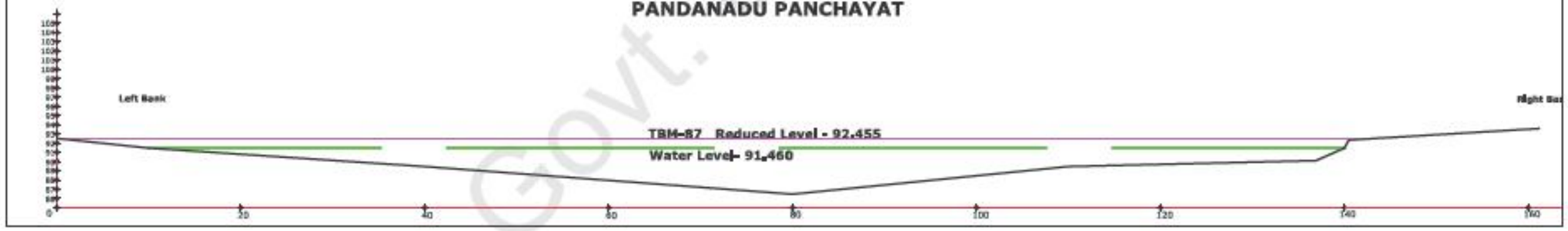
PROFILE - 86
NO SAND DEPOSITION
PANDANADU PANCHAYAT



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.210			93.765	91.555			Change Point
TBM-86		0.630			93.135			Left side private kadavu
P1		2.360			91.405			Left water Level
P2		5.460			88.305			water
P3		7.310			86.455			water
P4		4.360			89.405			water
P5		2.360			91.405			Right Water Level
CP			1.860		91.905			Change Point

TBM-86 On Private Bathing Kadavu(Left Bank)
TBM Cadastral Plot No : 202 (Pandanadu village)

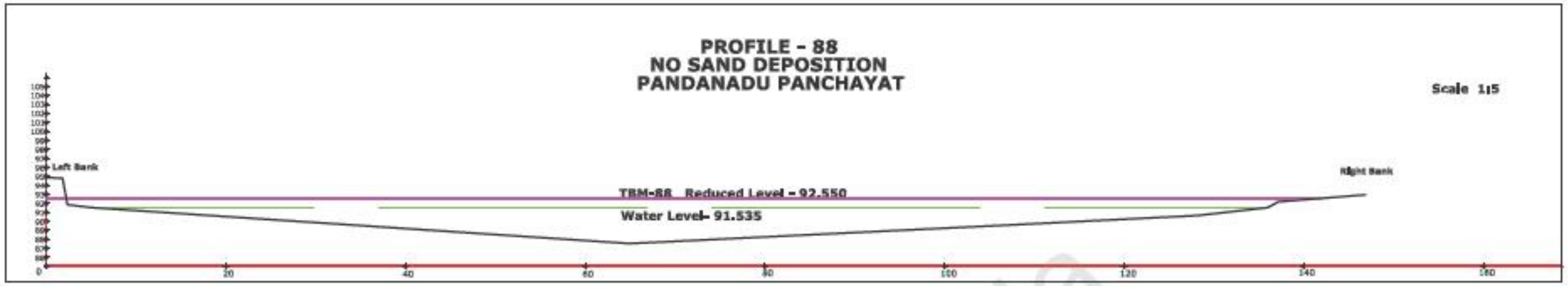
PROFILE - 87
NO SAND DEPOSITION
PANDANADU PANCHAYAT



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.060			93.965	91.905			Change Point
TBM-87		1.510			92.455			Left side kadavu
P1		2.505			91.460			Left water Level
P2		4.505			89.460			water
P3		7.505			86.460			water
P4		4.505			89.460			water
P5		2.505			91.460			Right Water Level
CP			2.300		91.665			Change Point

TBM-87 Mullaeri Kadathu Kadavu (left Bank)
TBM Cadastral Plot No : 212 (Pandanadu Village)

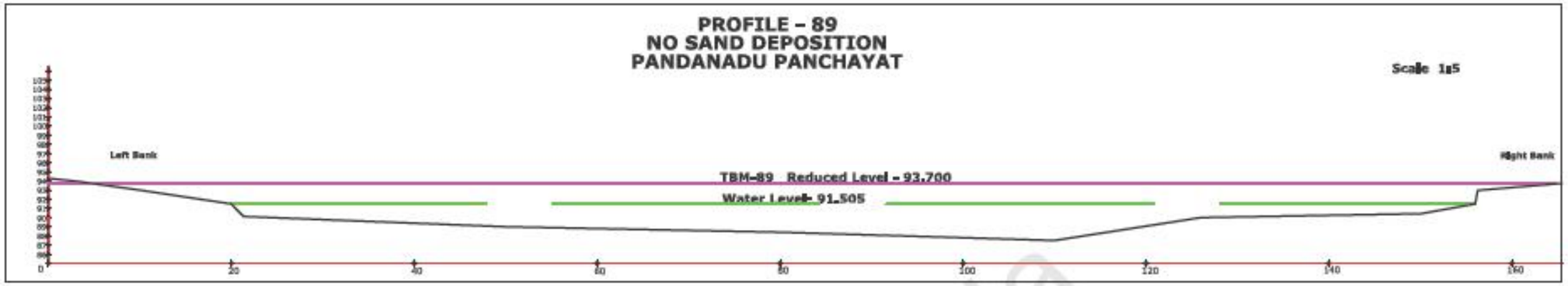
Govt. of Kerala



FIELD BOOK								
Sight To	*BS*	*IS*	*FS*	*HC*	*RL*	*Angle*	*Thickness of Sand in m*	*Remarks*
CP	2.030			93.675	91.665			Change Point
CP	3.710		2.070	95.315	91.605			Change Point
TBM-88		2.765			92.550			Left side pumb house kadavu
P1		3.780			91.535			Left water Level
P2		5.780			89.535			water
P3		7.780			87.535			water
P4		5.780			89.535			water
P5		3.780			91.535			Right Water Level
CP			3.780		91.535			Change Point

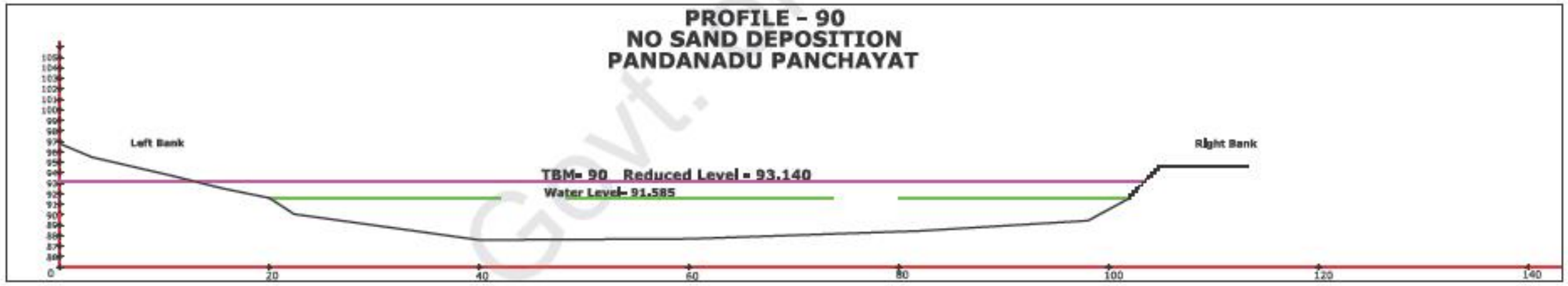
TBM-88 On Retaining Wall (left Bank)
TBM Cadastral Plot No : 66 (Pandanadu Village)

Govt. of Kerala



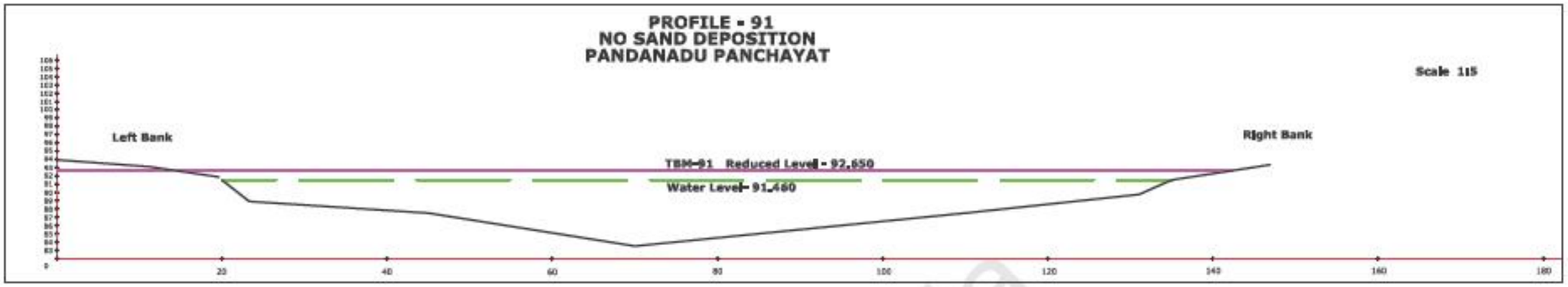
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.700			95.235	91.535			Change Point
TBM-89		1.535			93.700			Left side munduchira kadavu
P1		3.730			91.505			Left water Level
P2		6.230			89.005			water
P3		6.830			88.405			water
P4		7.730			87.505			water
P5		5.230			90.005			water
P6		3.730			91.505			Right Water Level
CP			1.535		93.700			Change Point

TBM-89 On Munduchira Kadavu (left Bank)
TBM Cadastral Plot No : 65 (Pandanadu Village)



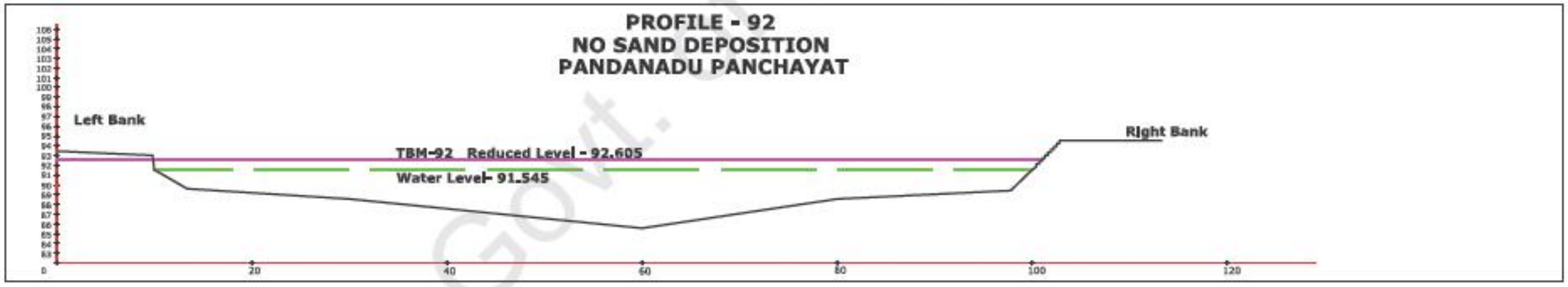
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.060			93.965	91.905			Change Point
TBM-87		1.510			92.455			Left side kadavu
P1		2.505			91.460			Left water Level
P2		4.505			89.460			water
P3		7.505			86.460			water
P4		4.505			89.460			water
P5		2.505			91.460			Right Water Level
CP			2.300		91.665			Change Point

TBM 90 Marked On Kuthiyathodu Public Kadavu(right Bank)
TBM Cadastral Plot No : 20 (Pandanadu Village)



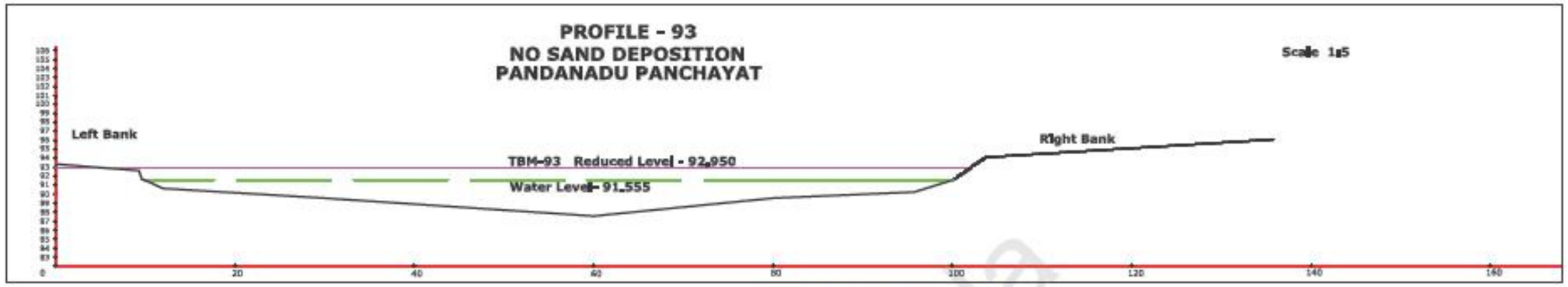
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.880			93.635	91.755			Change Point
TBM-91		0.985			92.650			Left side kadavu
P1		2.130			91.505			Left water Level
P2		6.130			87.505			water
P3		10.130			83.505			water
P4		6.130			87.505			water
P5		2.130			91.505			Right Water Level
CP			1.460		92.175			Change Point

TBM 91 Marked On Left Bank Kadathukadavu
TBM Cadastral Plot No: 35 (Pandanadu village)



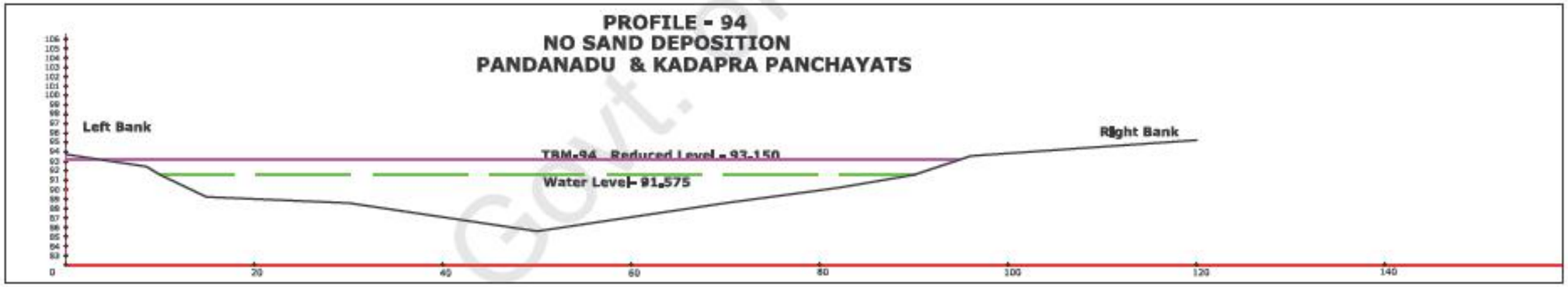
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.280			95.455	92.175			Change Point
TBM-92		2.850			92.605			Right side kadavu
P1		3.910			91.545			Right Water Level
P2		6.910			88.545			water
P3		9.910			85.545			water
P4		6.910			88.545			water
P5		3.910			91.545			Left water Level
CP			3.535		91.920			Change Point

TBM 92 Marked On 3rd Step,right Bank Private Kadavu
TBM Cadastral Plot No: 9 (pandanadu Village)



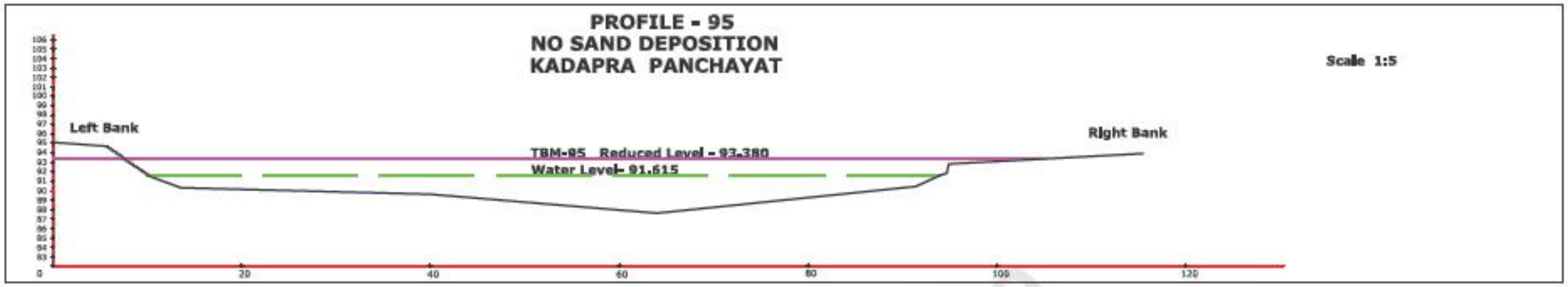
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.025			93.945	91.920			Change Point
TBM-93		0.995			92.950			Right side kadavu
P1		2.390			91.555			Right Water Level
P2		4.390			89.555			water
P3		6.390			87.555			water
P4		4.390			89.555			water
P5		2.390			91.555			Left water Level
CP			0.200		93.745			Change Point

TBM 93 Marked On 5th Step Right Bank Panchayat Kadavu
TBM Cadastral Plot No: 6 (pandanadu Village)



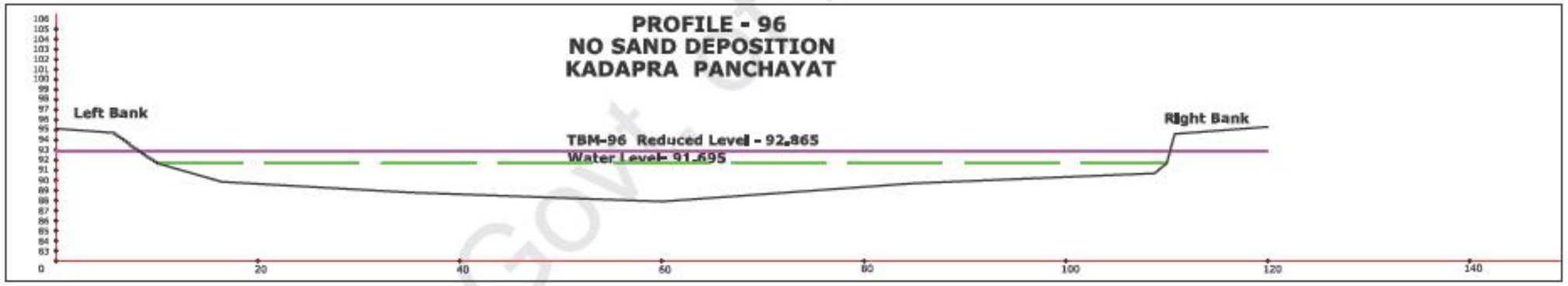
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.620			94.365	93.745			Change Point
TBM-94		1.215			93.150			Right side kadavu
P1		2.790			91.575			Right Water Level
P2		5.790			88.575			water
P3		8.790			85.575			water
P4		5.790			88.575			water
P5		2.790			91.575			Left water Level
CP			2.790		91.575			Change Point

TBM 94 Marked On Right Bank Panchayat Kadavu
TBM Cadastral Plot No: 5 (kadapra Village)



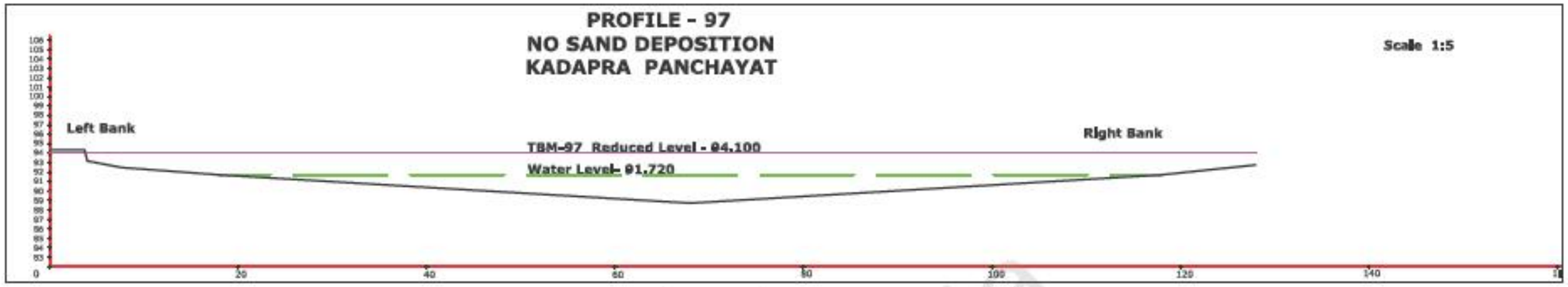
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.885			93.460	91.575			Change Point
CP	1.060		0.630	93.890	92.830			Change Point
TBM-95		0.510			93.380			Left side kadavu
P1		2.275			91.615			Left water Level
P2		4.275			89.615			water
P3		6.275			87.615			water
P4		2.275			91.615			Right Water Level
CP			2.275		91.615			Change Point

TBM 95 Marked On Left Bank Public Kadavu
TBM Cadastral Plot No: 458 (kadapra Village)



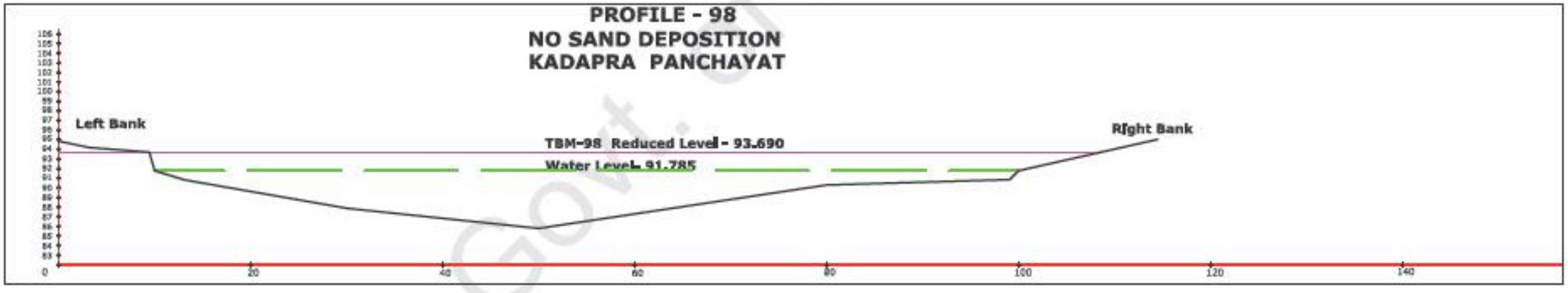
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.260			94.875	91.615			Change Point
TBM-96		2.010			92.865			Left side kadavu
P1		3.180			91.695			Left water Level
P2		6.080			88.795			water
P3		6.980			87.895			water
P4		5.180			89.695			water
P5		3.180			91.695			Right Water Level
CP			2.600		92.275			Change Point

TBM 96 Marked On Left Bank Public Kadavu
TBM Cadastral Plot No: 457 (kadapra Village)



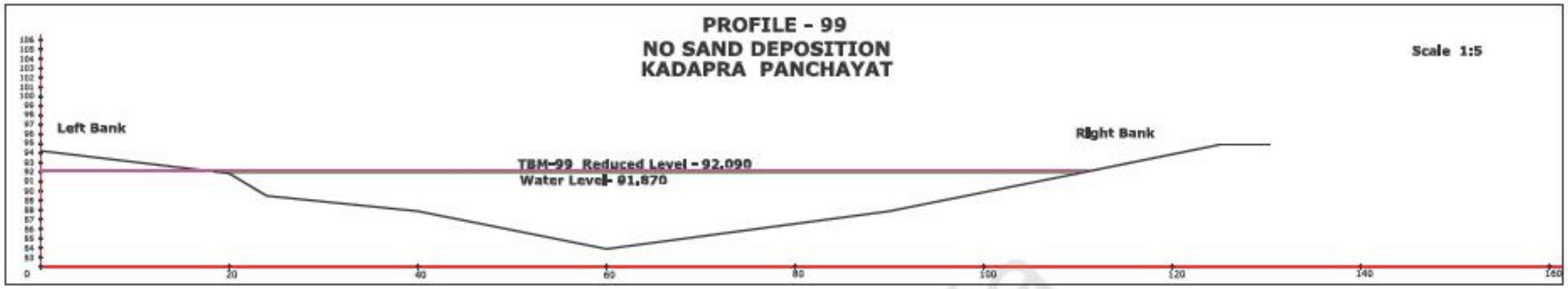
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.125			94.400	92.275			Change Point
TBM-97		0.300			94.100			Left side road
P1		2.680			91.720			Left water Level
P2		4.180			90.220			water
P3		5.680			88.720			water
P4		4.180			90.220			water
P5		2.680			91.720			Right Water Level
CP			2.440		91.960			Change Point

TBM 97 Marked On Left Bank Road Protection Wall
TBM Cadastral Plot No: 401 (kadapra Village)



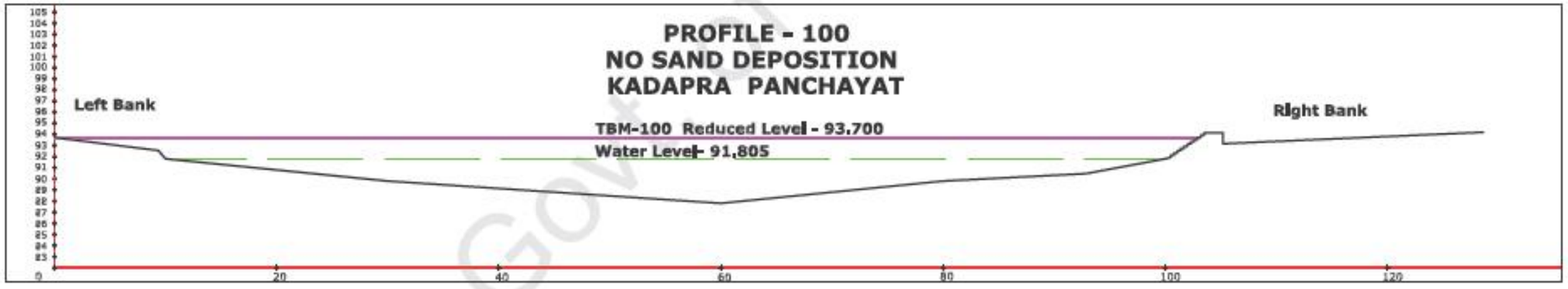
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.370			95.330	91.960			Change Point
TBM-98		1.640			93.690			Left side kadavu
P1		3.545			91.785			Left water Level
P2		7.445			87.885			water
P3		9.545			85.785			water
P4		5.045			90.285			water
P5		3.545			91.785			Right Water Level
CP			3.710		91.620			Change Point

TBM 98 Marked On Kunnukathu Kadavu
TBM Cadastral Plot No: 397 (kadapra Village)



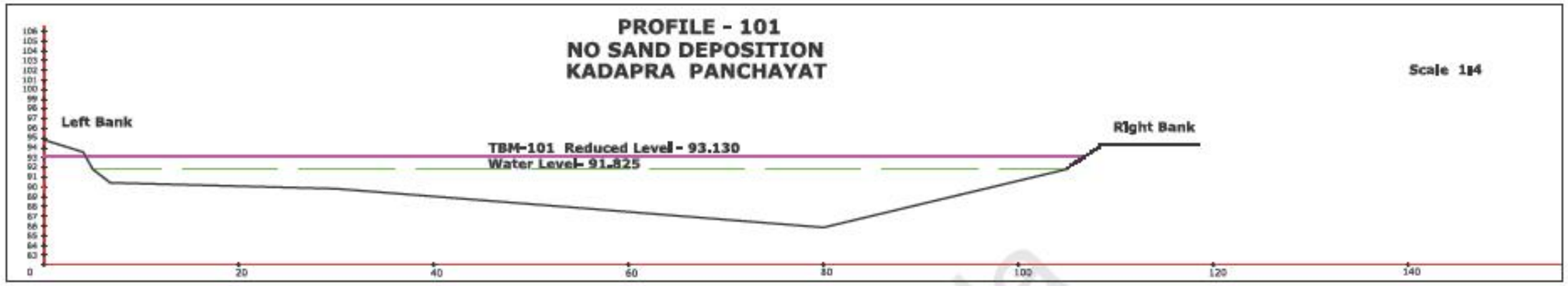
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.820		95.440		91.620			Change Point
TBM-99		3.350			92.090			Right side kadavu
P1		3.570			91.870			Right Water Level
P2		7.570			87.870			water
P3		11.570			83.870			water
P4		7.570			87.870			water
P5		3.570			91.870			Left water Level
CP			3.350		92.090			Change Point

TBM 99 Marked On Right Bank Kadathu Kadavu
TBM Cadastral Plot No: 396 (kadapra Village)



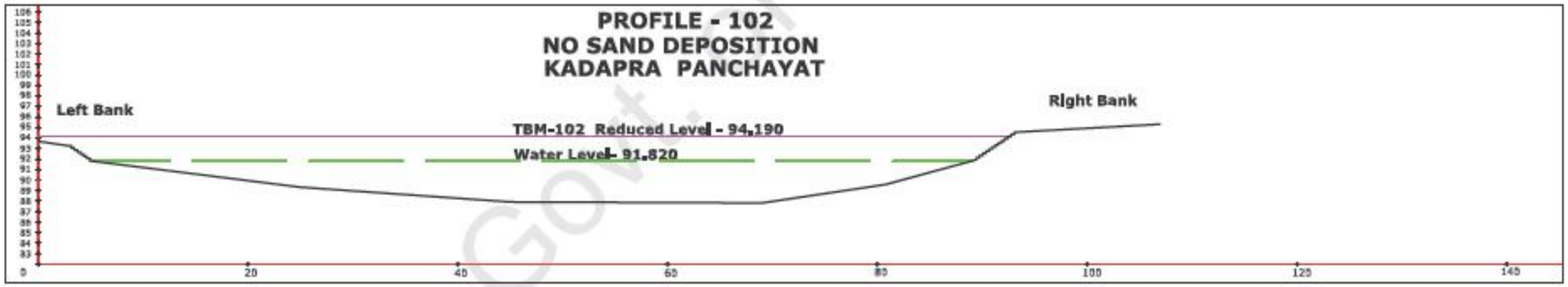
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.660			94.750	92.090			Change Point
CP	2.070		3.050	93.770	91.700			Change Point
CP	2.060		0.940	94.890	92.830			Change Point
TBM-100		1.190			93.700			Right side kadavu
P1		3.085			91.805			Right Water Level
P2		5.085			89.805			water
P3		7.085			87.805			water
P4		5.085			89.805			water
P5		3.085			91.805			Left water Level
CP			3.080		91.810			Change Point

TBM 100 Marked On Right Bank Colony Kadavu
TBM Cadastral Plot No: 309 (kadapra Village)



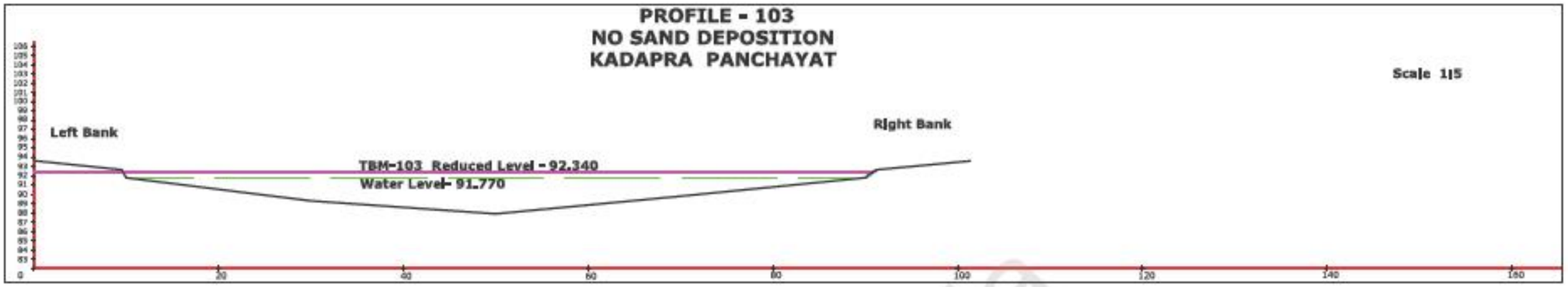
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.260			95.070	91.810			Change Point
TBM-101		1.940			93.130			Right side kadavu
P1		3.245			91.825			Right Water Level
P2		9.245			85.825			water
P3		7.245			87.825			water
P4		5.245			89.825			water
P5		3.245			91.825			Left water Level
CP			2.690		92.380			Change Point

TBM 101 On Right Bank Private Kadavu
TBM Cadastral Plot No: 239 (kadapra Village)



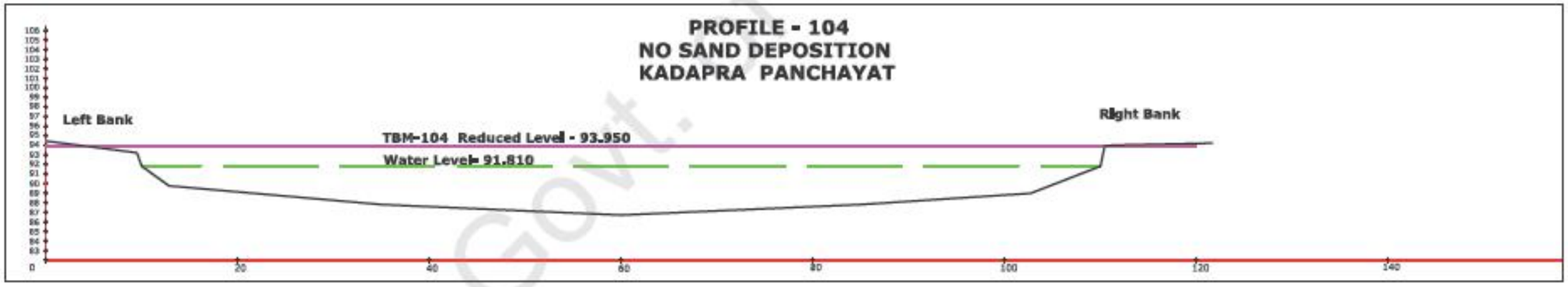
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.540			94.920	92.380			Change Point
TBM-102		0.730			94.190			Right side kadavu
P1		3.100			91.820			Right Water Level
P2		7.100			87.820			water
P3		7.000			87.920			water
P4		5.600			89.320			water
P5		3.100			91.820			Left water Level
CP			2.520		92.400			Change Point

TBM 102 Marked On Step,rfght Bank Panchayat Kadavu
TBM Cadastral Plot No: 237 (kadapra Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.160			94.560	92.400			Change Point
TBM-103		2.220			92.340			Right side kadavu
P1		2.790			91.770			Right Water Level
P2		4.790			89.770			water
P3		6.690			87.870			water
P4		5.290			89.270			water
P5		2.790			91.770			Left water Level
CP			0.600		93.960			Change Point

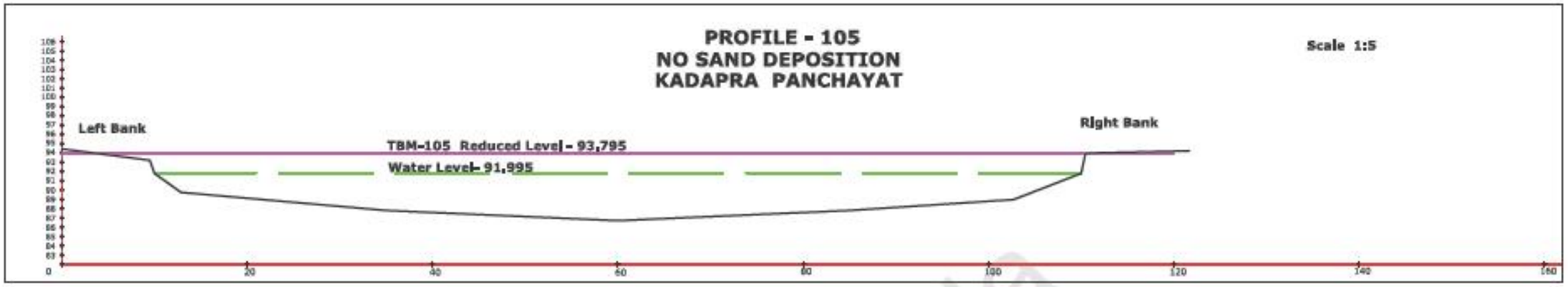
TBM 103 Marked On Right Bank Kadavu
TBM Cadastral Plot No: 225 (kadapra Village)



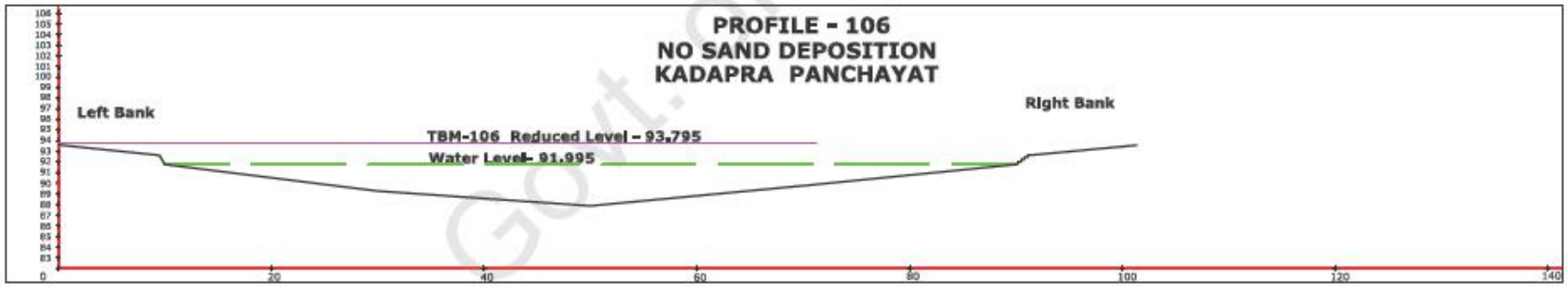
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.950			94.910	93.960			Change Point
TBM-104		0.960			93.950			Right side kadavu
P1		3.100			91.810			Right Water Level
P2		7.100			87.810			water
P3		8.200			86.710			water
P4		3.100			91.810			Left water Level
CP			1.595		93.315			Change Point

TBM 104 Marked On Protection Wall Near Panchayat Kadavu
TBM Cadastral Plot No: 225 (kadapra Village)

Govt. of Kerala



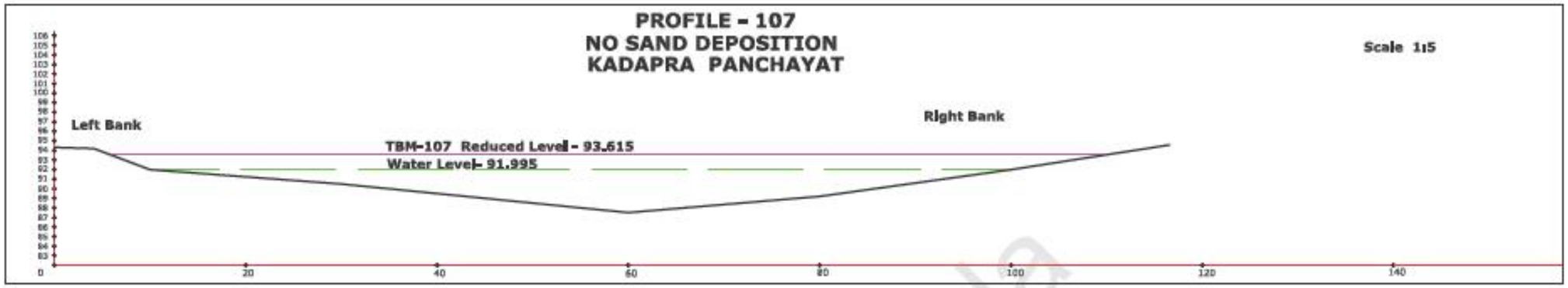
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.500		1.595	94.815	93.315			Change Point
CP	1.890		1.755	94.950	93.060			Change Point
CP	2.870		2.365	95.455	92.585			Change Point
P1		3.460			91.995			Left water Level
P2		5.360			90.095			water
P3		7.360			88.095			water
P4		5.460			89.995			water
P5		3.460			91.995			Right Water Level
CP			3.460		91.995			Change Point



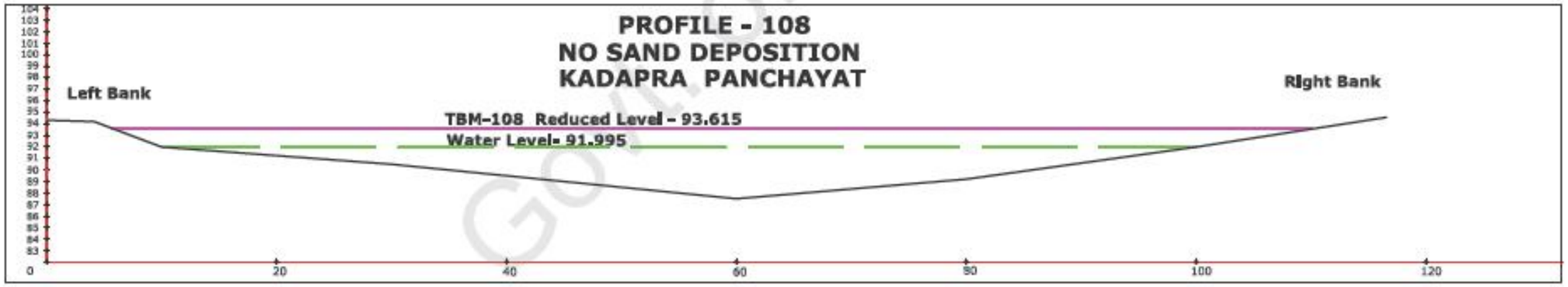
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.500		1.595	94.815	93.315			Change Point
CP	1.890		1.755	94.950	93.060			Change Point
CP	2.870		2.365	95.455	92.585			Change Point
TBM-105, 106		1.660			93.795			Left side kadavu
P1		3.460			91.995			Left water Level
P2		5.360			90.095			water
P3		7.360			88.095			water
P4		5.460			89.995			water
P5		3.460			91.995			Right Water Level
CP			3.460		91.995			Change Point

TBM 105&106 Marked On 6th Step,arayan Parambil Kadavu,left Bank
TBM Cadastral Plot No: 364 (kadapra Village)

Govt. of Kerala



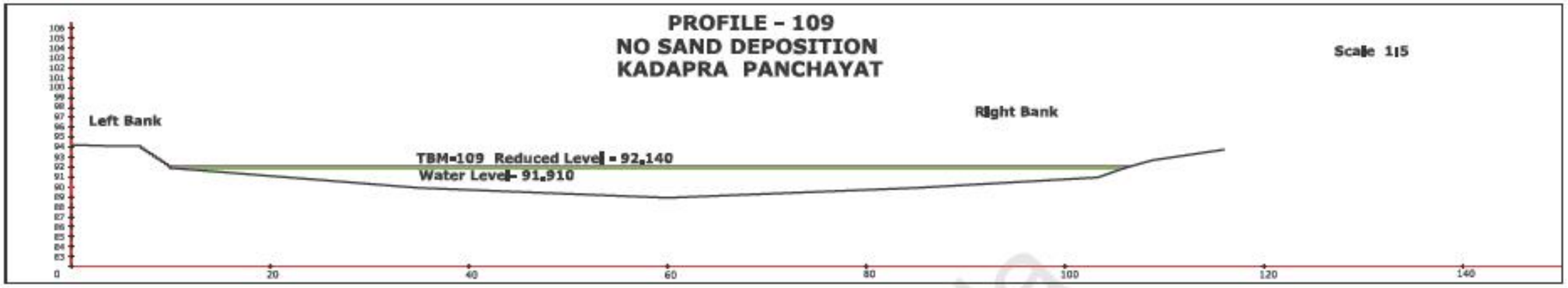
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.720			95.715	91.995			Change Point
P1		3.720			91.995			Right Water Level
P2		6.520			89.195			water
P3		7.620			88.095			water
P4		8.220			87.495			water
P5		6.720			88.995			water
P6		5.220			90.495			water
P7		3.720			91.995			Left water Level
CP			2.750		92.965			Change Point



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.720			95.715	91.995			Change Point
TBM-107, 108		2.100			93.615			Right side kadavu
P1		3.720			91.995			Right Water Level
P2		6.520			89.195			water
P3		7.620			88.095			water
P4		8.220			87.495			water
P5		6.720			88.995			water
P6		5.220			90.495			water
P7		3.720			91.995			Left water Level
CP			2.750		92.965			Change Point

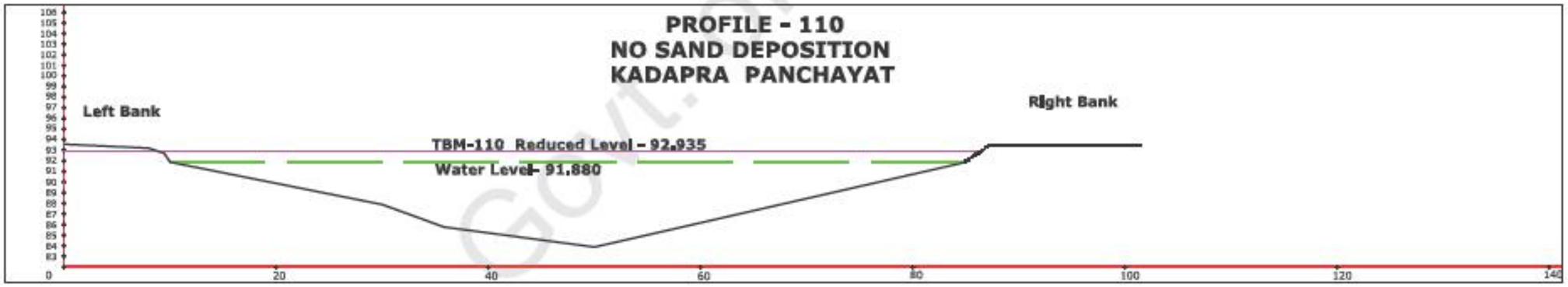
TBM 107& 108 Marked On Panchayat Kadavu ,right Bank
TBM Cadastral Plot No: 250 (kadapra Village)

Govt. of Kerala



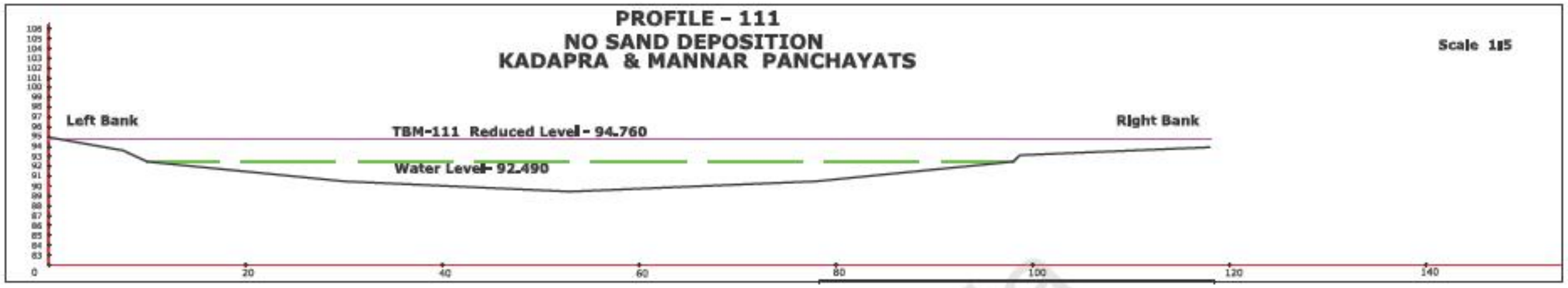
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.965			95.630	94.665			Change Point
TBM-109		3.490			92.140			Lef side kadavu
P1		3.720			91.910			Left water Level
P2		5.720			89.910			water
P3		6.720			88.910			water
P4		5.720			89.910			water
P5		3.720			91.910			Right Water Level
CP			1.835		93.795			Change Point

TBM 109 Marked On Left Bank Temple Kadavu
TBM Cadastral Plot No: 257 (kadapra Village)



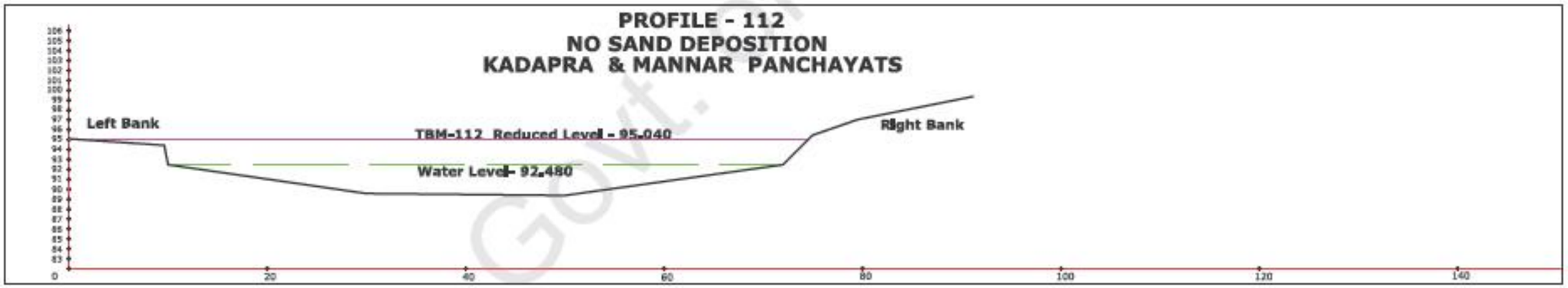
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.300			95.095	93.795			Change Point
CP	2.210		2.670	94.635	92.425			Change Point
CP	2.770		2.770	94.635	91.865			Change Point
TBM-110		1.700			92.935			Right side kadavu
P1		2.755			91.880			Right Water Level
P2		10.755			83.880			water
P3		6.755			87.880			water
P4		2.755			91.880			Left water Level
CP			2.750		91.885			Change Point

TBM 110 Marked On Private Kadavu,right Bank
TBM Cadastral Plot No: 255 (kadapra Village)



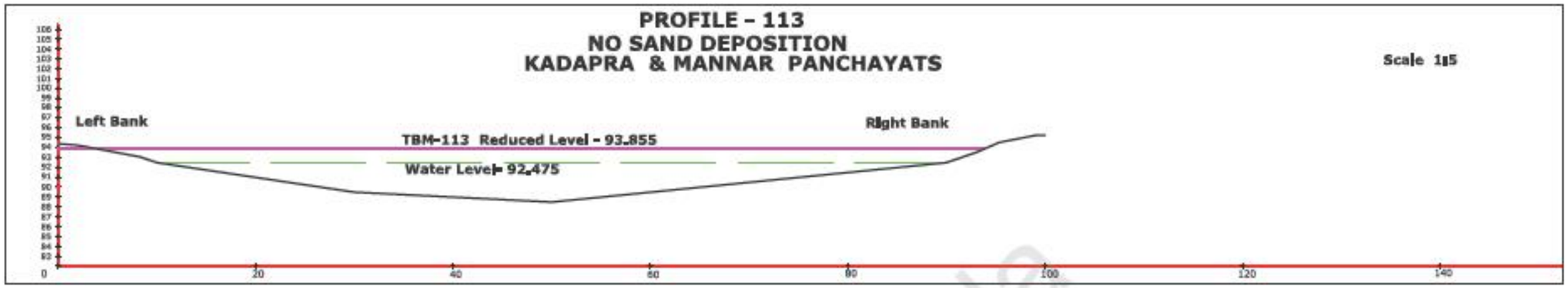
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.755			94.640	91.885			Change Point
CP	4.800		2.000	97.440	92.640			Change Point
CP	1.320		3.840	94.920	93.600			Change Point
TBM-111		0.160			94.760			Left side below bridge
P1		2.430			92.490			Left water Level
P2		4.430			90.490			water
P3		5.470			89.450			water
P4		4.470			90.450			water
P5		2.430			92.490			Right Water Level
CP			2.210		92.710			Change Point

TBM 111 Marked On Parumalakadavu Below Parumala Bridge
TBM Cadastral Plot No: 147 (kadapra Village)



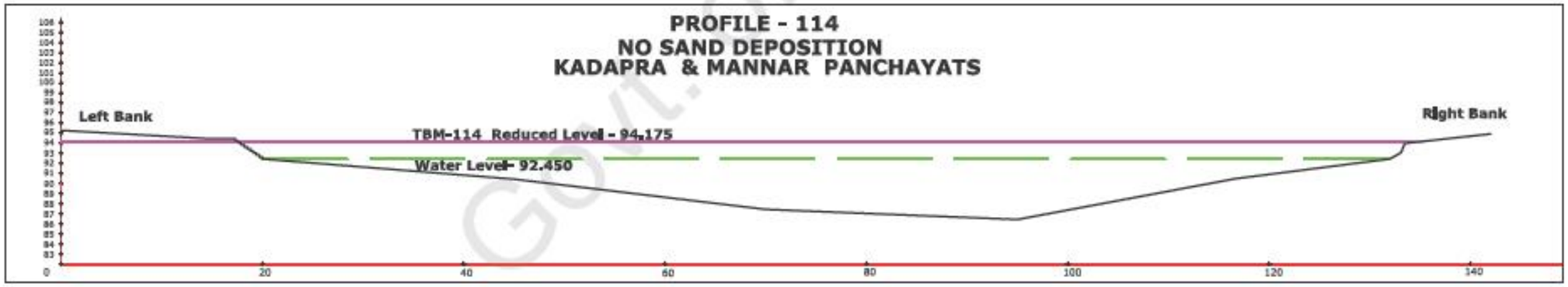
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.205			93.915	92.71			Change Point
CP	2.085		0.270	95.730	93.645			Change Point
TBM-112		0.690			95.040			Right side pulimuttu
P1		3.250			92.480			Right Water Level
P2		6.350			89.380			water
P3		6.150			89.580			water
P4		5.150			90.580			water
P5		3.250			92.480			Left water Level
CP			2.995		92.735			Change Point

TBM 112 Marked On Right Bank Pullmuttu
TBM Cadastral Plot No: 220 (Mannar Village)



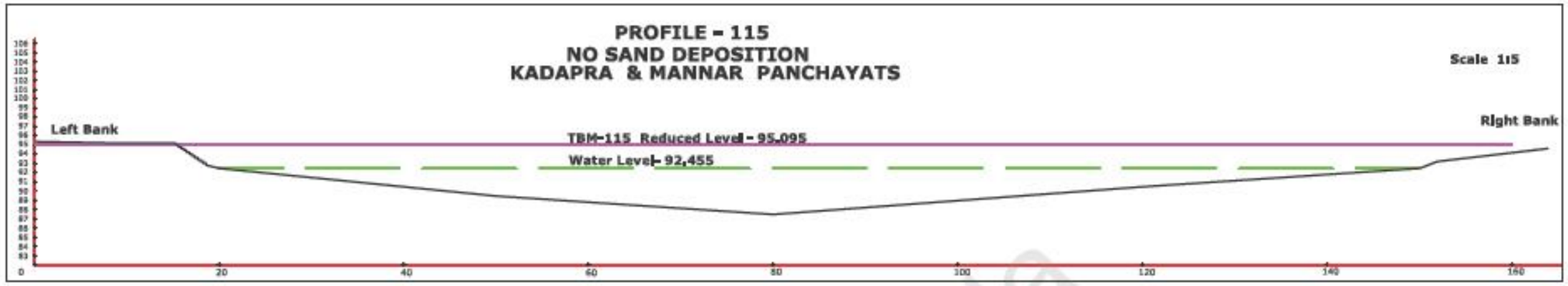
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.205			94.940	92.735			Change Point
TBM-113		1.085			93.855			Right side pulimuttu
P1		2.465			92.475			Right Water Level
P2		5.465			89.475			water
P3		6.465			88.475			water
P4		4.465			90.475			water
P5		2.465			92.475			Left water Level
CP			2.115		92.825			Change Point

TBM 113 Marked On Right Bank Pullimuttu
TBM Cadastral Plot No: 219 (Mannar Village)



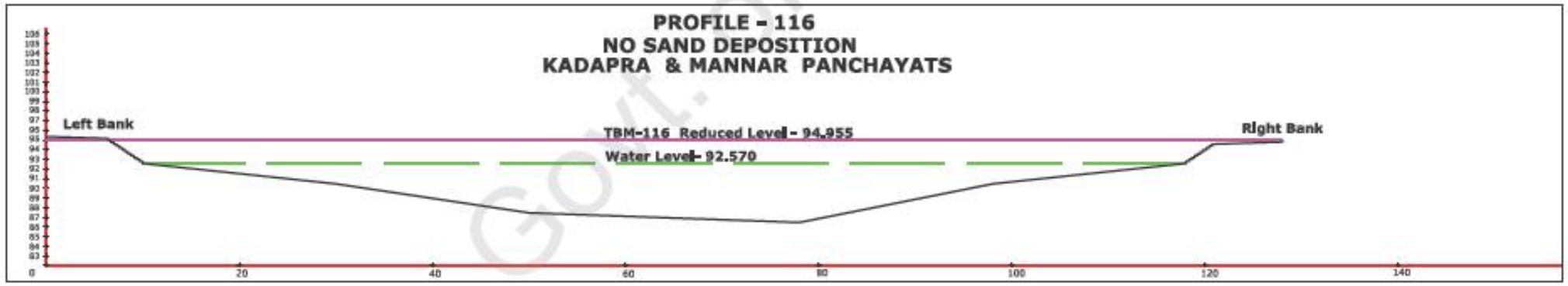
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.900			95.725	92.825			Change Point
TBM-114		1.550			94.175			Left side kadavu
P1		3.275			92.450			Left water Level
P2		5.275			90.450			water
P3		8.275			87.450			water
P4		9.275			86.450			water
P5		5.275			90.450			water
P6		3.275			92.450			Right Water Level
CP			1.530		94.195			Change Point

TBM 114 Marked On Left Bank Panchayat Kadavu
TBM Cadastral Plot No: (kadapra Village)



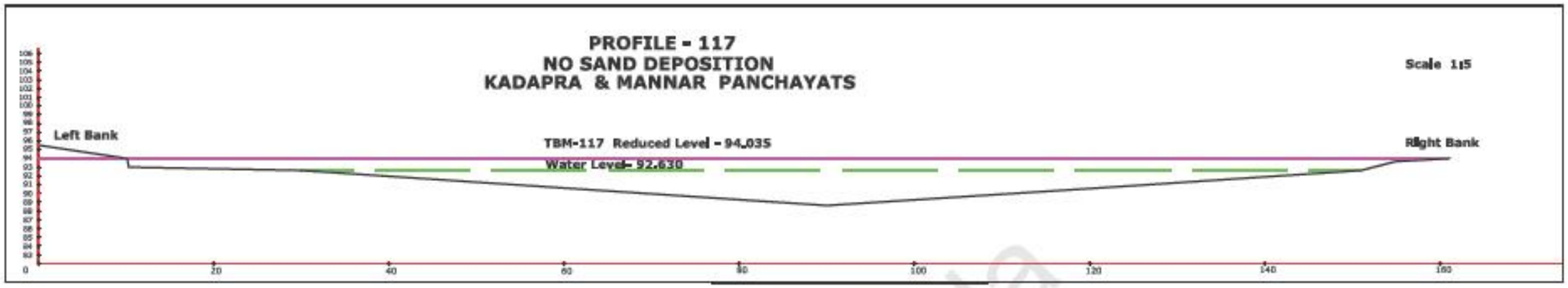
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.780			94.975	94.195			Change Point
CP	3.450		2.415	96.010	92.560			Change Point
TBM-115		0.915			95.095			Left side kadavu
P1		3.555			92.455			Left water Level
P2		6.555			89.455			water
P3		8.555			87.455			water
P4		5.555			90.455			water
P5		3.555			92.455			Right Water Level
CP			0.400		95.610			Change Point

TBM 115 Marked On 6th Step ,left Bank Panchayat Kadavu
TBM Cadastral Plot No: 137 (kadapra Village)



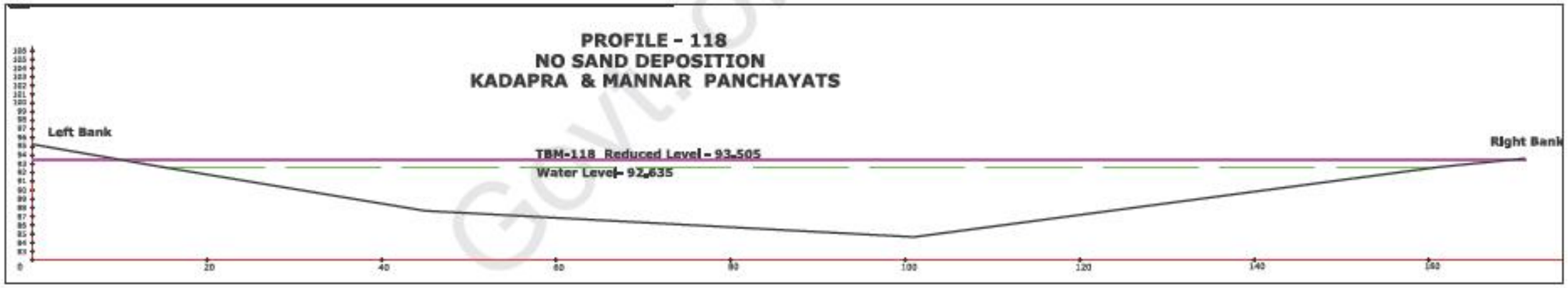
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.800			96.410	95.610			Change Point
TBM-116		1.455			94.955			Pallikadavu
P1		3.840			92.570			Right Water Level
P2		8.840			87.570			water
P3		15.840			80.570			water
P4		8.840			87.570			water
P5		3.840			92.570			Left water Level
CP			1.455		94.955			Change Point

TBM Marked On Step,right Bank Pallikkadavu
TBM Cadastral Plot No: 182 (mannar Village)



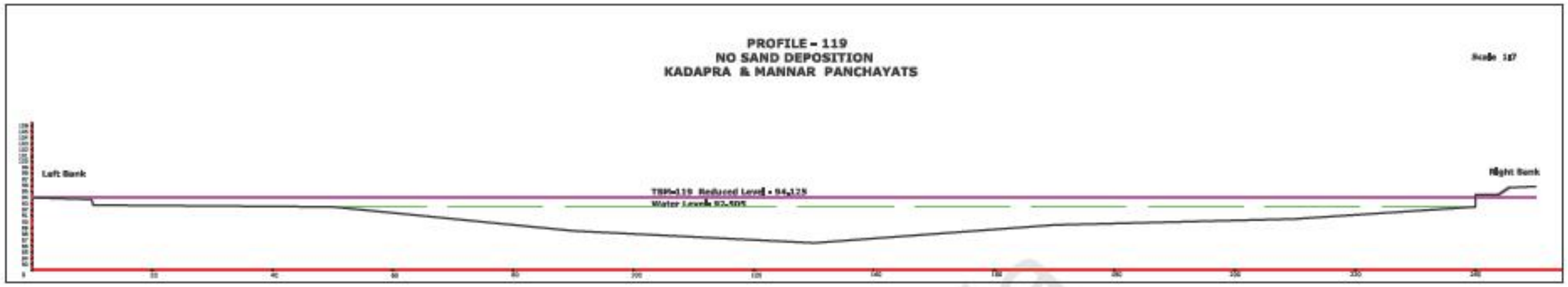
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.125			96.080	94.955			Change Point
TBM-117		2.045			94.035			Left side pavukkara pumbhou
P1		3.450			92.630			Left water Level
P2		5.450			90.630			water
P3		7.450			88.630			water
P4		5.450			90.630			water
P5		3.450			92.630			Right Water Level
CP			0.825		95.255			Change Point

TBM 117 Marked On Irrigation Pumbhouse ,left Bank
TBM Cadastral Plot No: 86 (kadapra Village)



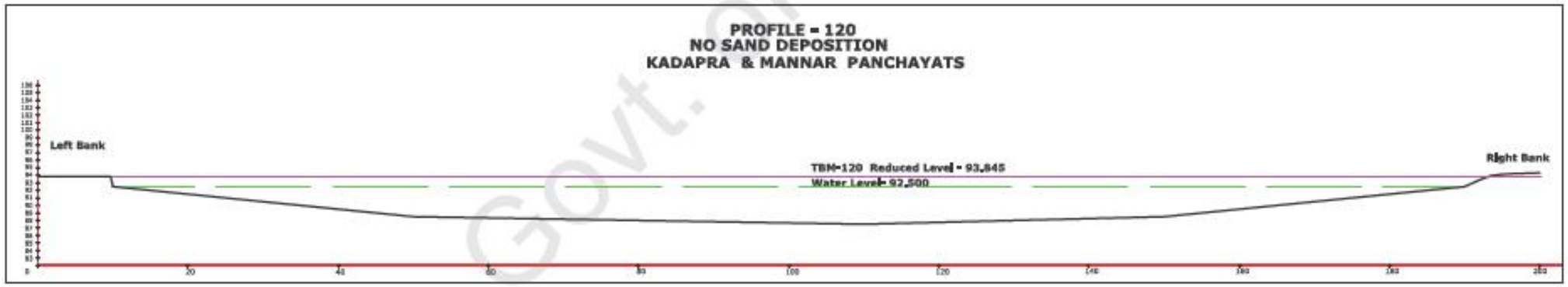
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.575			96.830	95.255			Change Point
CP	0.720		3.065	94.485	93.765			Change Point
TBM-118		0.980			93.505			Left side kadavu
P1		1.850			92.635			Left water Level
P2		6.850			87.635			water
P3		9.850			84.635			water
P4		5.850			88.635			water
P5		1.850			92.635			Right Water Level
CP			1.850		92.635			Change Point

TBM 118 Marked On Panchayat Kadavu ,left Bank
TBM Cadastral Plot No: 84 (Mannar Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.800			94.435	92.635			Change Point
TBM-119		0.310			94.125			Right side kadavu
P1		1.930			92.505			Right Water Level
P2		3.930			90.505			water
P3		4.930			89.505			water
P4		7.930			86.505			water
P5		5.930			88.505			water
P6		1.930			92.505			Left water Level
CP			1.700		92.735			Change Point

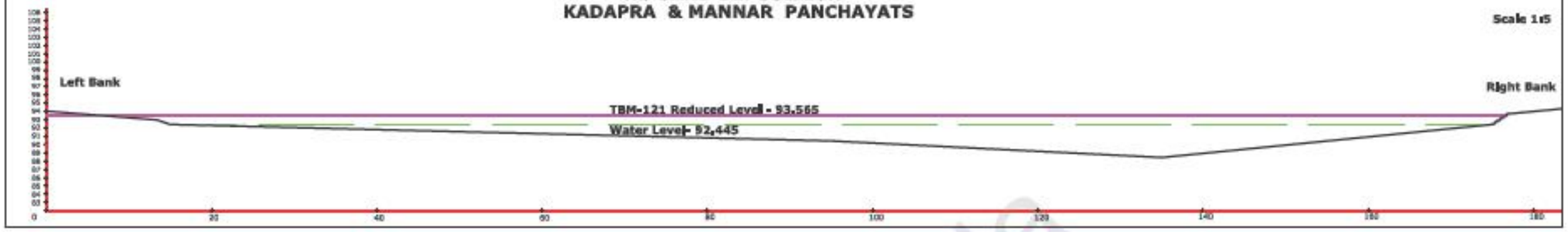
TBM 119 Marked On Right Bank Private Kadavu
TBM Cadastral Plot No: 118 (Mannar Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.750			95.485	92.735			Change Point
TBM-120		1.640			93.845			Left side kadavu
P1		2.985			92.500			Left water Level
P2		6.985			88.500			water
P3		7.985			87.500			water
P4		7.985			87.500			water
P5		6.985			88.500			water
P6		2.985			92.500			Right Water Level
CP			2.750		92.735			Change Point

TBM 120 Marked On Irrigation Chanal Protection Wall
TBM Cadastral Plot No: 80 (kadapra Village)

PROFILE - 121
NO SAND DEPOSITION
KADAPRA & MANNAR PANCHAYATS

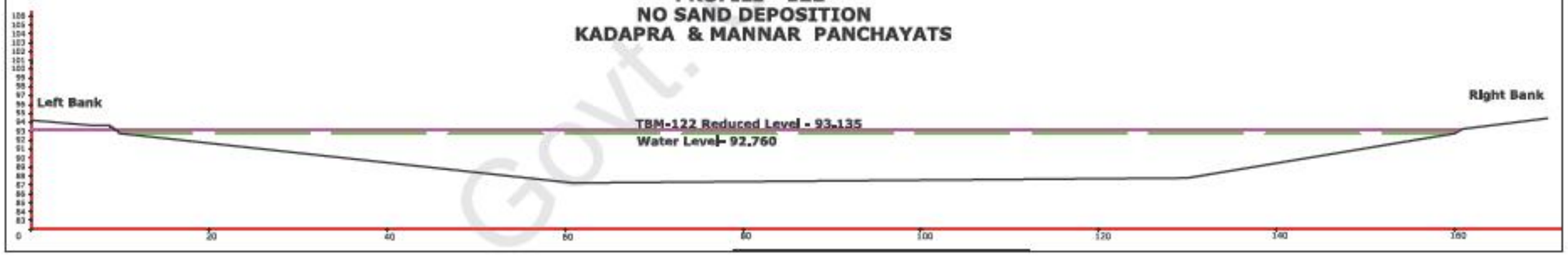


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.620			94.355	92.735			Change Point
CP	2.120		1.530	94.945	92.825			Change Point
TBM-121		1.380			93.565			Right side kadavu
P1		2.500			92.445			Right Water Level
P2		6.500			88.445			water
P3		4.500			90.445			water
P4		3.500			91.445			water
P5		2.500			92.445			Left water Level
CP			2.800		92.145			Change Point

TBM 123 Marked On Panchayat Kadavu ,right Bank
TBM Cadastral Plot No: 114 (Mannar Village)

PROFILE - 122
NO SAND DEPOSITION
KADAPRA & MANNAR PANCHAYATS



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.690		2.800	94.835	92.145			Change Point
TBM-122		1.700			93.135			Marked on kadavu (Right bank
P1		2.075			92.760			Right water level
P2		7.075			87.760			Water
P3		12.075			82.760			Water
P4		7.075			87.760			Water
P5		2.075			92.760			Left water level
CP			0.200		94.635			Change Point

TBM 122 Marked On Step,left Bank Private Kadavu
TBM Cadastral Plot No: 112 (kadapra Village)

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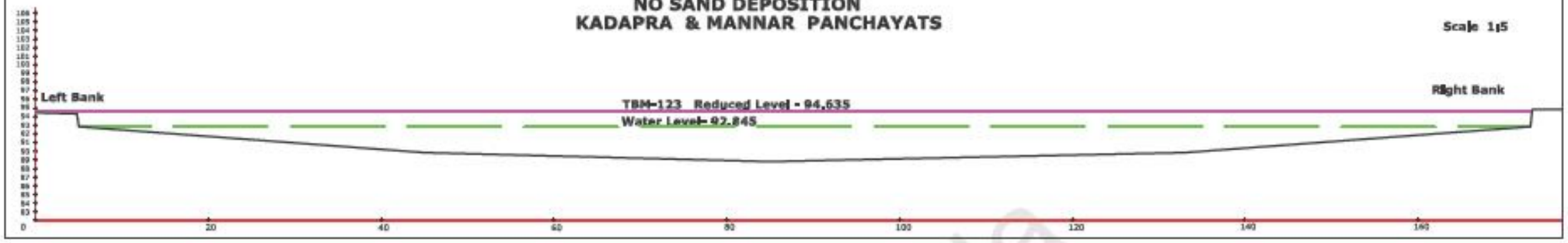
PROFILE - 123
NO SAND DEPOSITION
KADAPRA & MANNAR PANCHAYATS

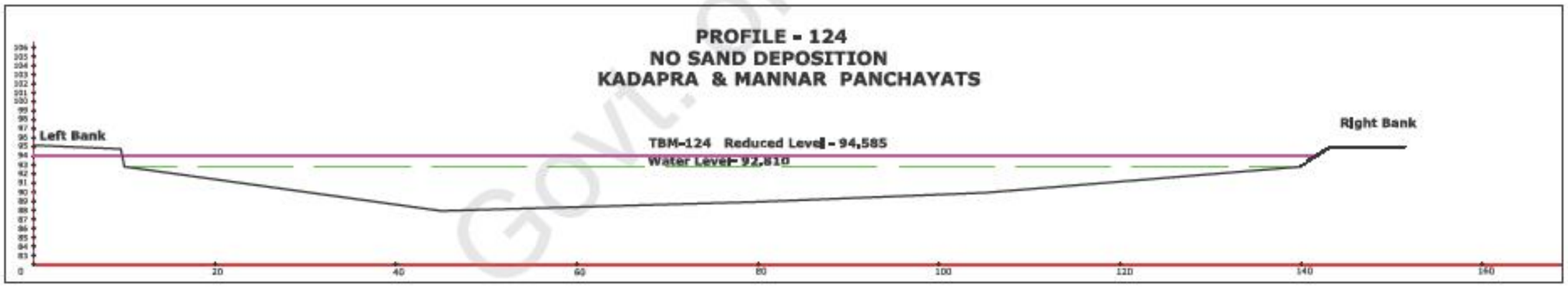


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.265		0.200	95.900	94.635			Change Point
TBM-123		1.265			94.635			Marked on old ferry ghut,Near church
P1		3.055			92.845			Right Water Level
P2		6.055			89.845			water
P3		7.100			88.800			water
P4		6.055			89.845			water
P5		3.055			92.845			Left water level
CP			2.170		93.730			Change Point

TBM 123 Marked On Panchayat Kadavu ,right Bank
TBM Cadastral Plot No: 114 (Mannar Village)

PROFILE - 124
NO SAND DEPOSITION
KADAPRA & MANNAR PANCHAYATS

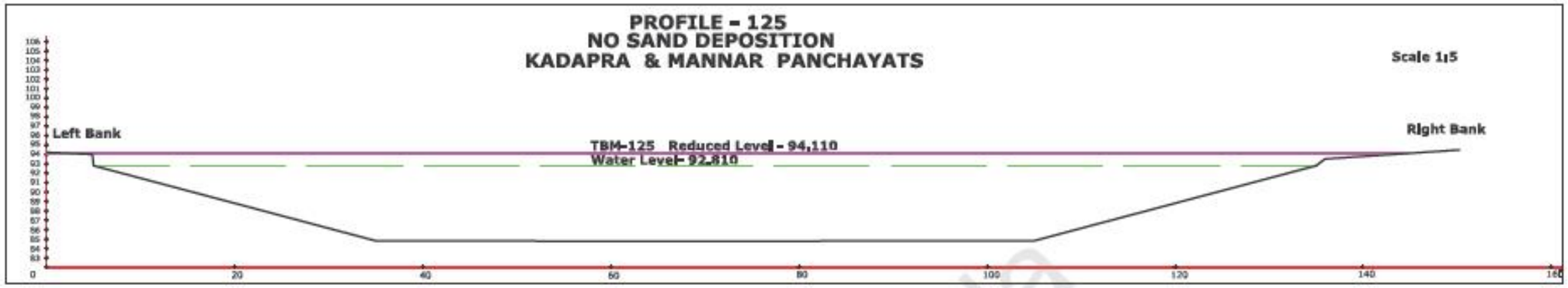


FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.720		2.170	96.450	93.730			Change Point
TBM-124	1.670		2.400	95.720	94.050			Change Point
P1		1.135			94.585			Marked on Kadavu (Malikadavu)
P2		2.910			92.810			Right Water Level
P3		5.800			89.920			water
P4		6.800			88.920			water
P5		7.800			87.920			water
P6		2.910			92.810			Left water level
CP			2.800		92.920			Change Point

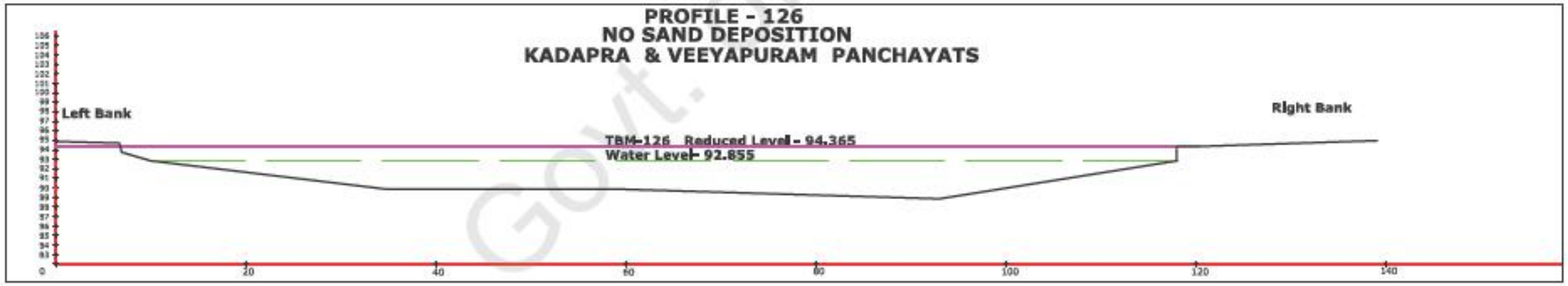
TBM 124 Marked On Right Bank Panchayat Kadavu
TBM Cadastral Plot No: 67 (Mannar Village)

Govt. of Kerala



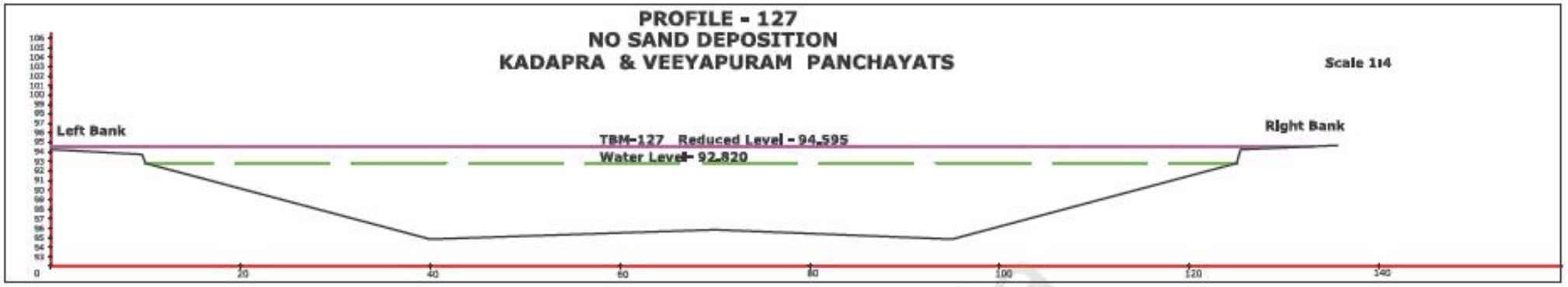
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.820		2.800	94.740	92.920			Change Point
CP	0.670		0.650	94.760	94.090			Change Point
TBM-125		0.650			94.110			Marked on Kadavu (Kadathu kadavu))
P1		1.950			92.810			Right Water Level
P2		9.950			84.810			water
P3		10.000			84.760			water
P4		9.950			84.810			water
P5		1.950			92.810			Left water level
CP			0.650		94.110			Change Point

TBM 125 Marked On Step, Right Bank Panchayat Kadathu Kadavu
TBM Cadastral Plot No: 66 (Mannar Village)



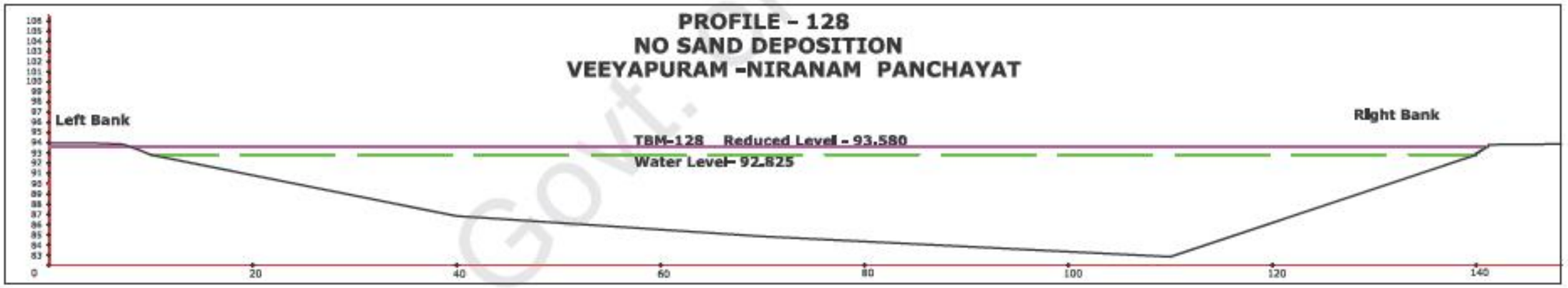
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.800		0.650	94.910	94.110			Change Point
CP	2.600		2.075	95.435	92.835			Change Point
CP	1.960		0.870	96.525	94.565			Change Point
CP	1.610		1.900	96.235	94.625			Change Point
CP	1.435		1.690	95.980	94.545			Change Point
TBM-126		1.615			94.365			Marked on punnamoottil boat jetty
P1		3.125			92.855			Right Water Level
P2		7.125			88.855			water
P3		6.125			89.855			water
P4		6.125			89.855			water
P5		3.125			92.855			Left water level
CP			1.740		94.240			Change Point

TBM 126 On Boat Jetty
TBM Cadastral Plot No: 21 (Mannar Village)



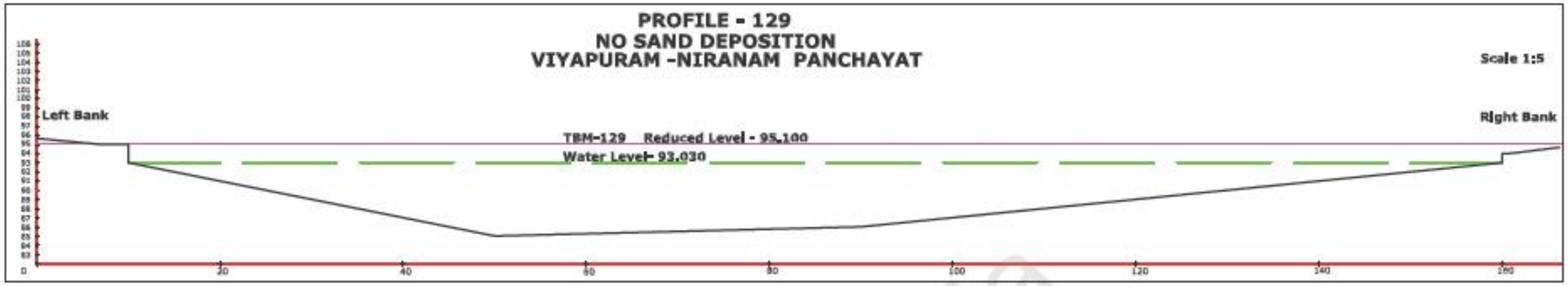
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.550		1.740	95.790	94.240			Change Point
CP	2.455		2.600	95.645	93.190			Change Point
TBM-127		1.050			94.595			Marked on Meppadam theveri Boat jetty
P1		2.825			92.820			Left water level
P2		10.825			84.820			water
P3		9.825			85.820			water
P4		9.825			85.820			water
P5		2.825			92.820			Right water level
CP			1.050		94.595			Change Point

TBM 127 On Step ,meppadam Theveri Boat Jetty
TBM Cadastral Plot No: 295 (veeyapuram V[redacted]age)



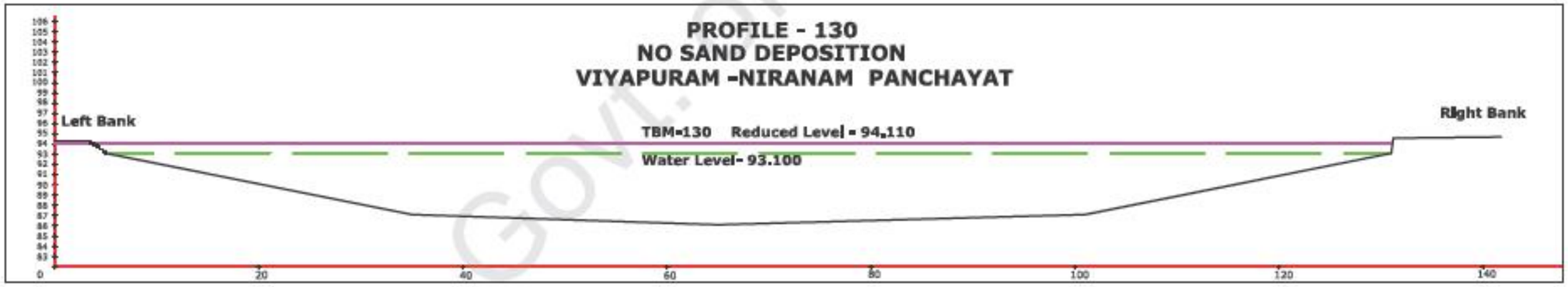
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.605		1.050	96.200	94.595			Change Point
CP	2.770		3.275	95.695	92.925			Change Point
TBM-128		2.115			93.580			Marked on Kadavu
P1		2.870			92.825			Right water level
P2		12.870			82.825			water
P3		10.870			84.825			water
P4		8.870			86.825			water
P5		2.870			92.825			Left water level
CP			2.790		92.905			Change Point

TBM 128 On Private Kadavu,right Bank
TBM Cadastral Plot No: 61 (Niranam Village)



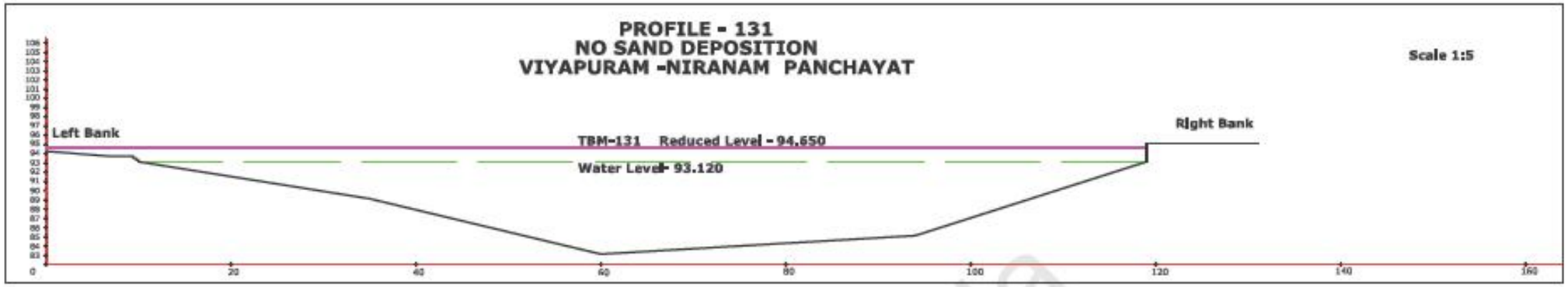
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.300		2.790	96.205	92.905			Change Point
TBM-129		1.105			95.100			Marked on kannikonipadi Boat jetty
P1		3.175			93.030			Left water level
P2		11.175			85.030			water
P3		10.175			86.030			water
P4		7.175			89.030			water
P5		3.175			93.030			Right water level
CP			3.070		93.135			Change Point

TBM 129 Marked On Boat Jetty,left Bank
TBM Cadastral Plot No: 290 (Viyapuram Village)



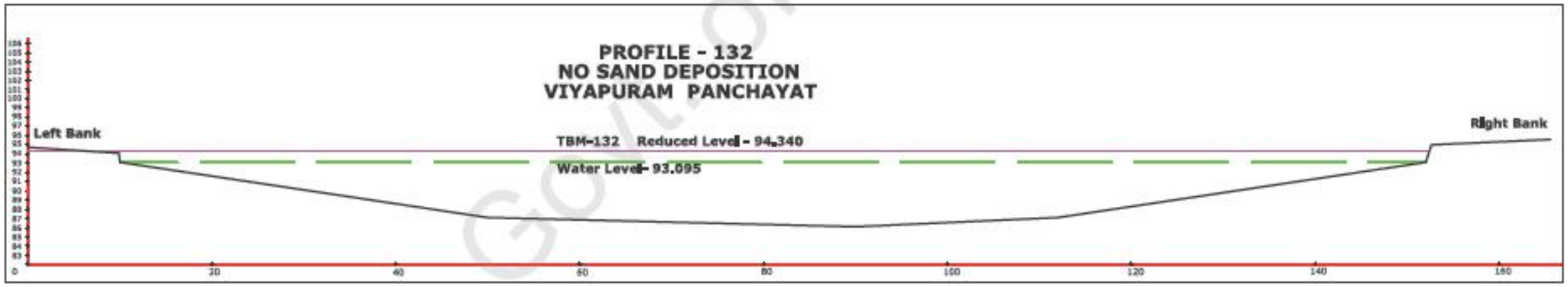
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.580		3.070	95.715	93.135			Change Point
CP	1.140		1.920	94.935	93.795			Change Point
TBM-130		0.825			94.110			Marked on Left bank kadavu
P1		1.835			93.100			Left water level
P2		7.835			87.100			water
P3		8.835			86.100			water
P4		7.835			87.100			water
P5		1.835			93.100			Right water level
CP			1.400		93.535			Change Point

TBM 130 Marked On Step, Left Bank Private Kadavu
TBM Cadastral Plot No: 287 (viyapuram Village)



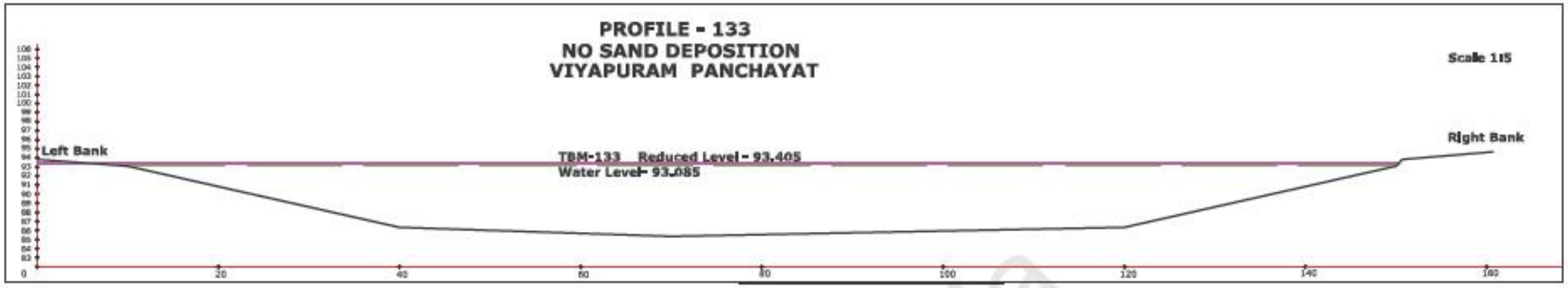
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.535		1.400	95.070	93.535			Change Point
CP	1.120		0.785	95.405	94.285			Change Point
TBM-131		0.755			94.650			Marked on Boat jetty (Right bank)
P1		2.285			93.120			Right water level
P2		10.285			85.120			water
P3		12.285			83.120			water
P4		6.285			89.120			water
P5		2.285			93.120			Left water level
CP			0.755		94.650			Change Point

TBM 131 Marked On Step,right Bank Boat Jetty
TBM Cadastral Plot No: 40 (Niranam Village)



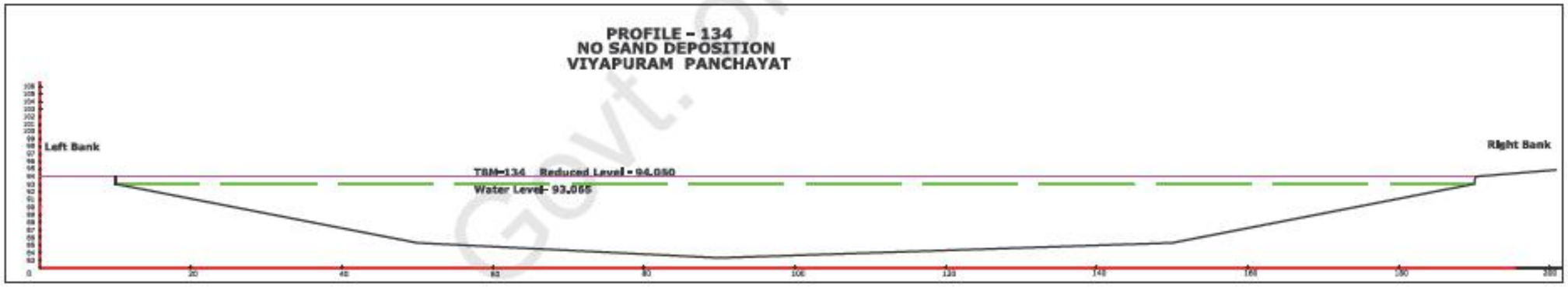
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.535		0.755	95.185	94.650			Change Point
CP	1.945		1.370	95.760	93.815			Change Point
TBM-132		1.420			94.340			Marked on Boat jetty (Right bank)
P1		2.665			93.095			Left water level
P2		8.665			87.095			water
P3		9.665			86.095			water
P4		8.665			87.095			water
P5		2.665			93.095			Right water level
CP			2.505		93.255			Change Point

TBM 132 Marked On Step,right Bank Boat Jetty
TBM Cadastral Plot No: 115 (Viyapuram Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.750		2.505	95.005	93.255			Change Point
TBM-133		1.600			93.405			Marked on private kadavu (Left bank)
P1		1.920			93.085			Left water level
P2		8.665			86.340			water
P3		9.665			85.340			water
P4		8.665			86.340			water
P5		1.920			93.085			Right water level
CP			1.730		93.275			Change Point

TBM 133 Marked On Left Bank Private Kadavu
TBM Cadastral Plot No: 116 (Viyapuram Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.280		1.730	95.555	93.275			Change Point
TBM-134		1.495			94.050			Marked on Electric post (Left bank)
P1		2.490			93.065			Left water level
P2		10.285			85.270			water
P3		12.285			83.270			water
P4		10.285			85.270			water
P5		2.490			93.065			Right water level
CP			2.490		93.065			Change Point

TBM 134 Marked On Left Bank Electric Post
TBM Cadastral Plot No: 122 (Viyapuram Village)

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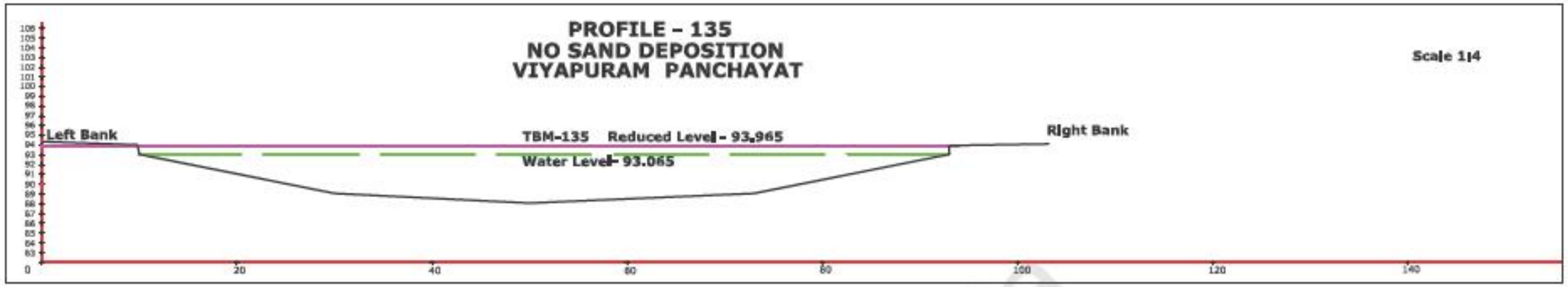
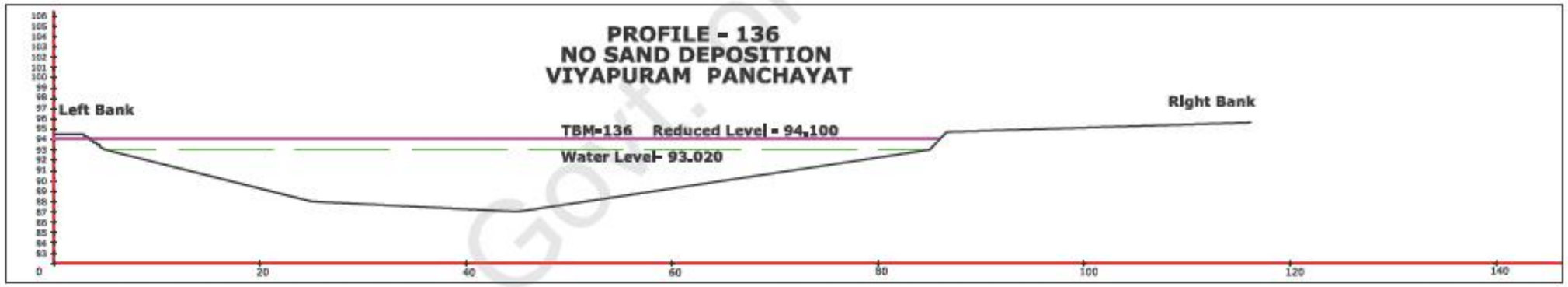


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.380		2.490	95.445	93.065			Change Point
TBM-135		1.480			93.965			Marked on Private kadavu(Right bank)
P1		2.380			93.065			Left water level
P2		6.380			89.065			water
P3		7.380			88.065			water
P4		6.380			89.065			water
P5		2.380			93.065			Right water level
CP			1.480		93.965			Change Point

TBM 135 Marked On Right Bank Private Kadavuu
TBM Cadastral Plot No:93 (Viyapuram Village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.800		1.480	94.765	93.965			Change Point
CP	1.940		1.475	95.230	93.290			Change Point
TBM-136		1.130			94.100			Marked onPrivate kadavu (Left bank)
P1		2.210			93.020			Left water level
P2		7.210			88.020			water
P3		8.210			87.020			water
P4		5.210			90.020			water
CP		2.210			93.020			Right water level

TBM 136 Marked On Left Bank Private Kadavu
TBM Cadastral Plot No:36 (Viyapuram Village)

Cross section of sand profile- Sub pamba- A

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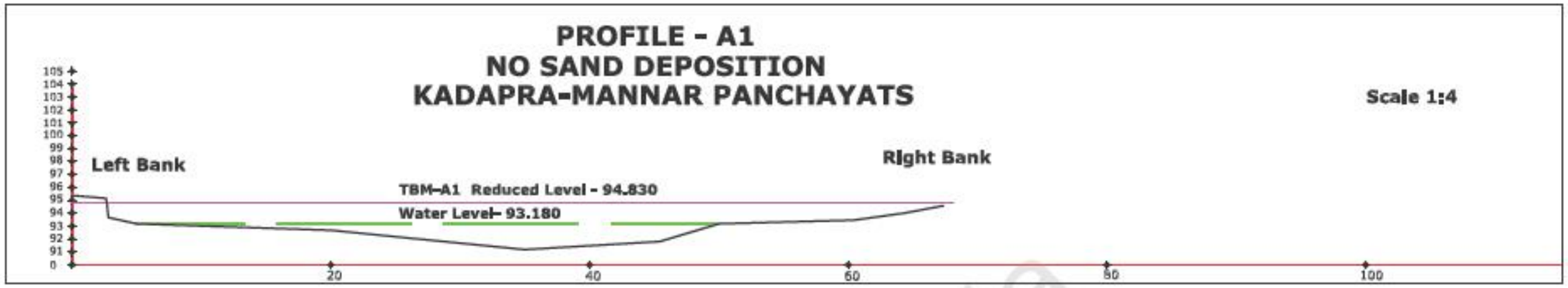
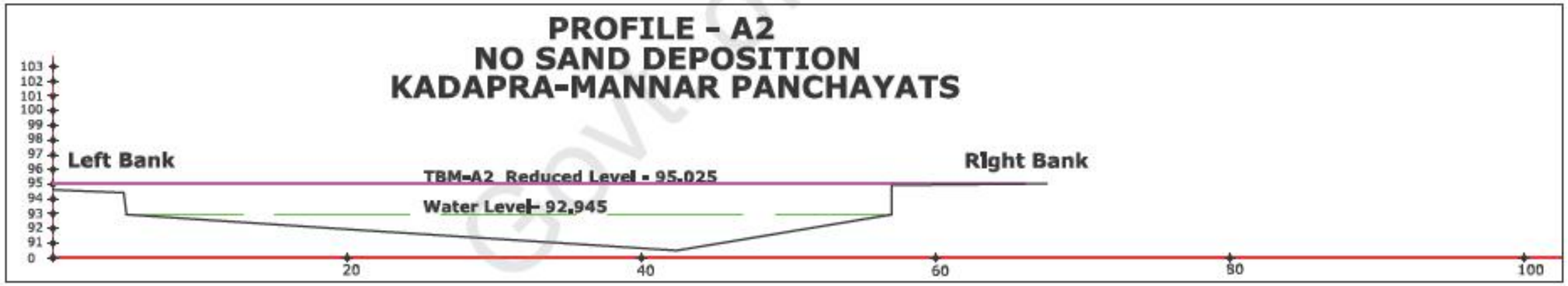


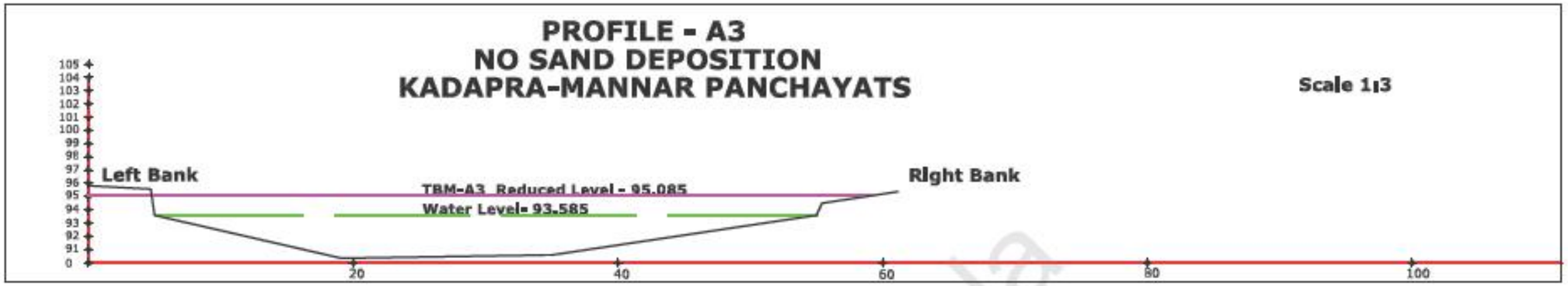
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
TBM-111	0.700			95.460	94.760			Starting point
CP	1.460		1.840	95.080	93.620			Change Point
TBM- A1		0.250			94.830			Left bank private kadavu (Near bridge)
P1		1.900			93.180			Left Water Level
P2		2.400			92.680			water
P3		3.900			91.180			water
P4		3.400			91.680			water
P5		1.900			93.180			Right water Level
CP			1.675		93.405			Change Point

TBM A1 Marked On Left Bank Private Kadavu
TBM Cadastral Plot No: 148 (Kadapra village)



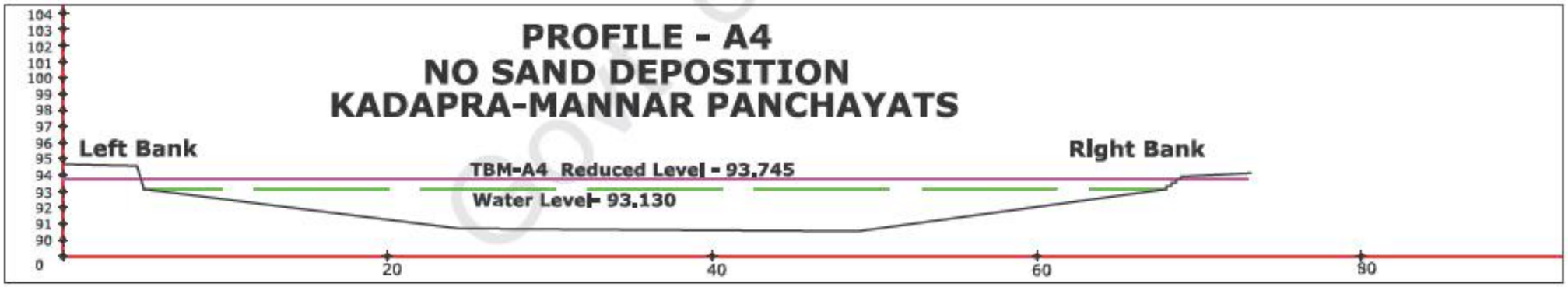
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.400		1.675	95.805	93.405			Change Point
TBM- A2		0.780			95.025			Markked on old boat jetty(pannayil kadavu)
P1	3.425		1.375	97.855	94.430			Change Point
P2		4.910			92.945			Right water Level
P3		5.910			91.945			water
P4		7.910			89.945			water
P5		5.000			92.855			water
P6		4.910			92.945			Left Water Level
CP			3.275		94.580			Change Point

TBM A2 Marked On Old Boad Jetty (pannayil Kadavu)
TBM Cadastral Plot No: 148 (Kadapra village)



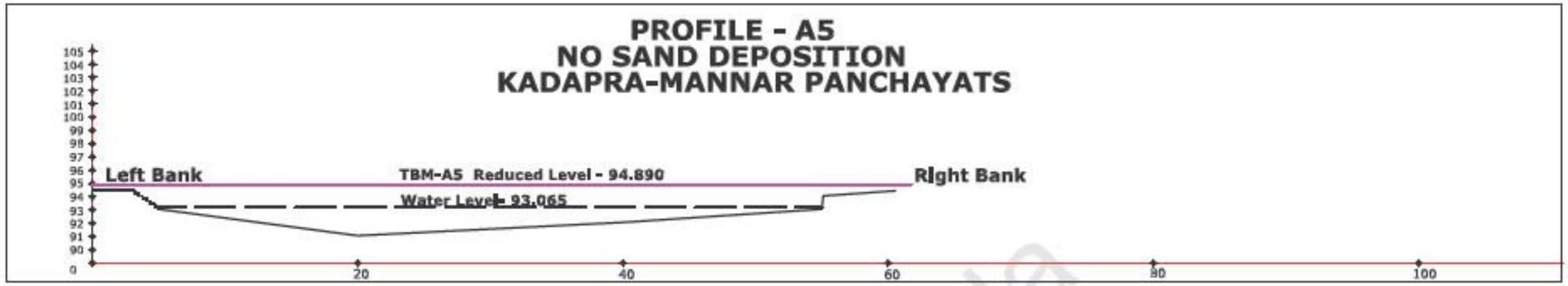
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.620		3.275	96.400	94.580			Change Point
TBM-A3		1.315			95.085			Marked on kadavu (Right bank)
P1	2.155		1.400	97.155	95.000			Change Point
P2		2.155			95.000			Right bank
P3		3.570			93.585			Right water Level
P4		6.570			90.585			water
P5		7.570			89.585			water
P6		3.570			93.585			Left Water Level
CP			2.025		95.130			Change Point

TBM A3 Marked On Kadavu(Right Bank)
TBM Cadastral Plot No: 150 (Kadapra village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.010		2.025	95.140	95.130			Change Point
TBM-A4		1.395			93.745			Marked on kadavu (Right bank)
P1		2.010			93.130			Left Water Level
P2		4.010			91.130			water
P3		7.010			88.130			water
P4		4.010			91.130			water
P5		2.010			93.130			Right water Level
CP	1.555		1.605		93.535			Change Point

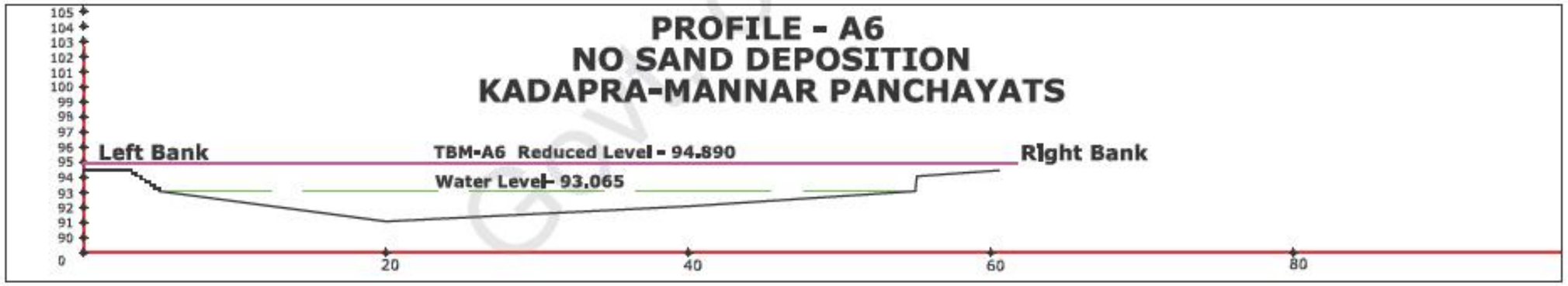
TBM A4 Marked On Kadavu(Right Bank)
TBM Cadastral Plot No: 150 (Kadapra village)



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.555		1.605	95.090	93.535			Change Point
TBM-A5		0.200			94.890			Marked on kadavu (Thachery kadavu)
P1		2.025			93.065			Left Water Level
P2		4.025			91.065			water
P3		3.025			92.065			water
P4		2.025			93.065			Right water Level
CP			2.025		93.065			Change Point

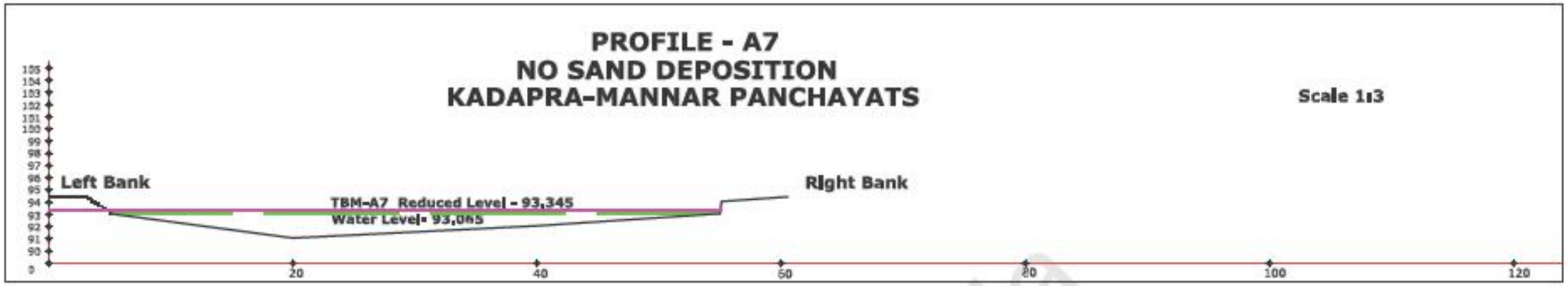
TBM A5 Marked On Thachery Kadavu
TBM Cadastral Plot No: 150 (Kadapra village)



FIELD BOOK

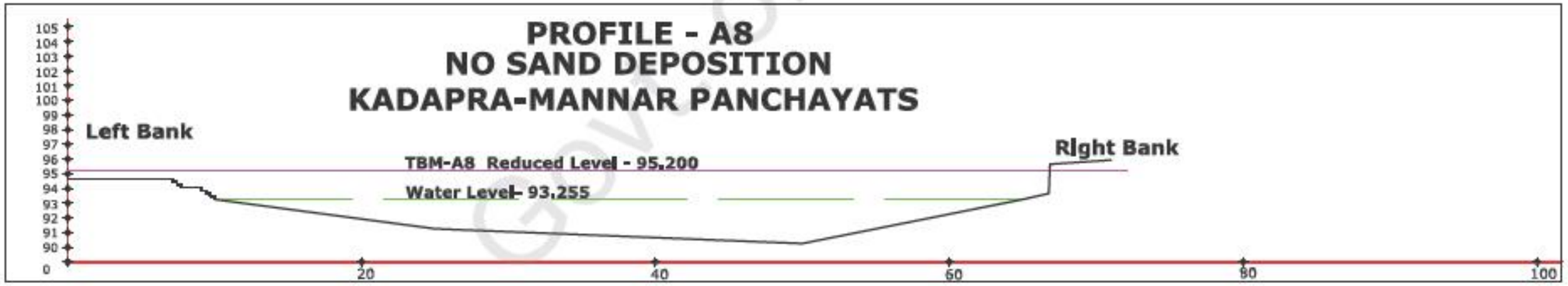
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.730		2.025	95.795	93.065			Change Point
TBM-A6		2.450			93.345			Marked on kadavu
P1		2.730			93.065			Left Water Level
P2		4.730			91.065			water
P3		5.730			90.065			water
P4		2.730			93.065			Right water Level
CP			2.730		93.065			Change Point

TBM A6 Marked On Private Kadavu (left Bank)
TBM Cadastral Plot No: 180 (Kadapra village)

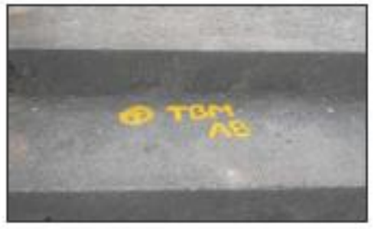


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.730		2.025		93.065			Change Point
TBM-A7		2.450			93.345			Marked on kadavu
P1		2.730			93.065			Left Water Level
P2		4.730			91.065			water
P3		5.730			90.065			water
P4		2.730			93.065			Right water Level
CP			2.730		93.065			Change Point

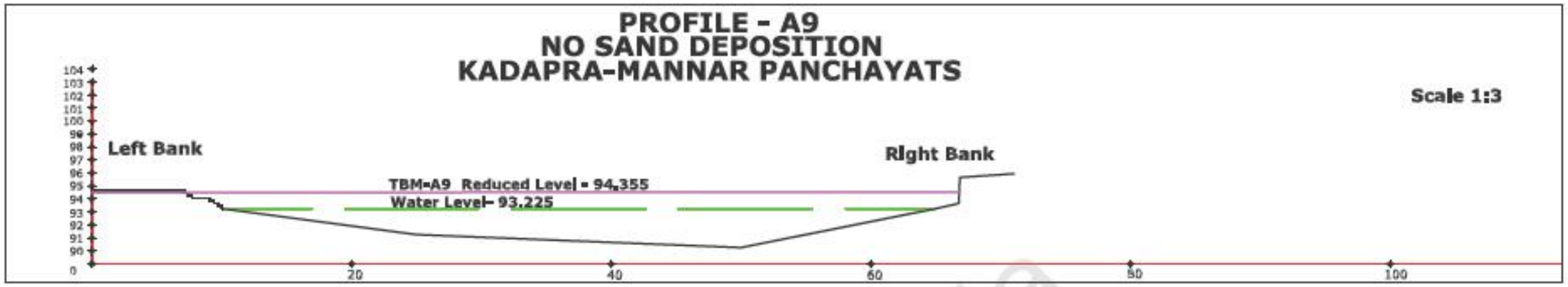
TBM A7 Marked On Private Kadavu (left Bank)
TBM Cadastral Plot No: 180 (Kadapra village)



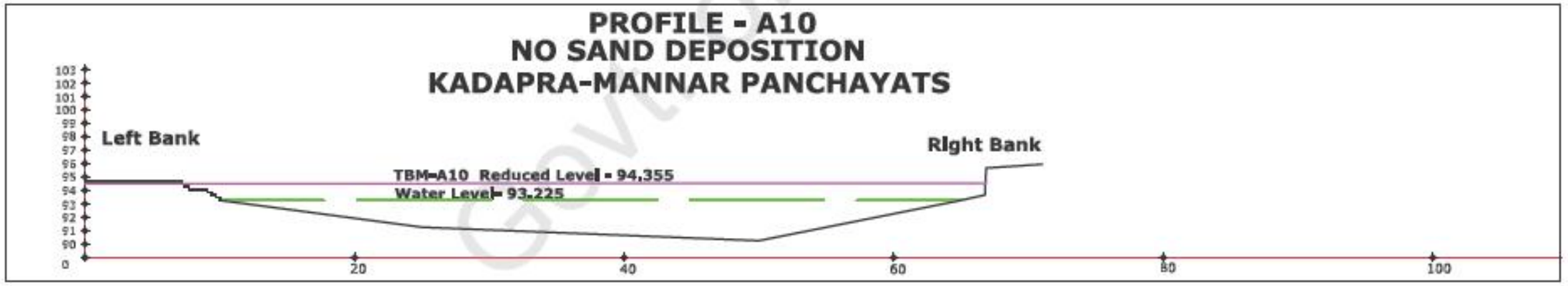
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.560		2.730	96.625	93.065			Change Point
TBM-A8		0.425			95.200			Marked on kadavu (Thottum mukham kadavu)
P1		2.370			93.255			Left Water Level
P2		4.370			91.255			water
P3		5.370			90.255			water
P4		2.370			93.255			Right water Level
CP			2.370		93.255			Change Point



TBM A8 Marked On Step (Thotumugham Kadavu)
TBM Cadastral Plot No: 180 (Kadapra village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.560		2.370	95.815	93.255			Change Point
P0		1.460			94.355			Marked on kadavu
P1		2.590			93.225			Left Water Level
P2		6.590			89.225			water
P3		5.590			90.225			water
P4		2.590			93.225			Right water Level
CP			1.460		94.355			Change Point

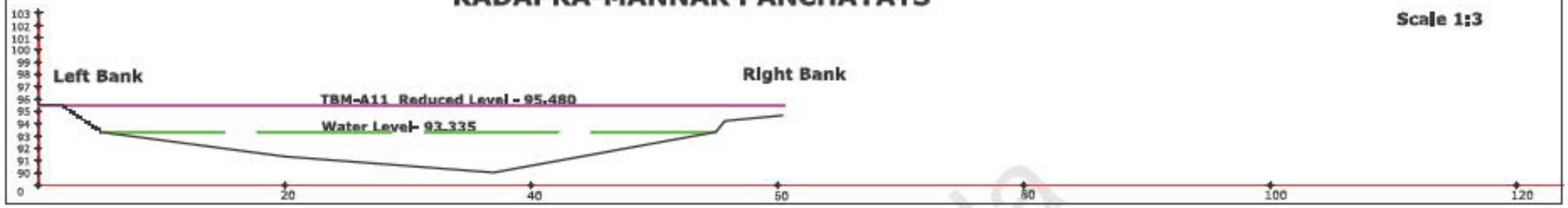


FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.560		2.370	98.375	95.815			Change Point
TBM-A9,10		1.460			94.355			Marked on kadavu (Kotte kadavu)
P1		2.590			93.225			Left Water Level
P2		6.590			89.225			water
P3		5.590			90.225			water
P4		2.590			93.225			Right water Level
CP			1.460		94.355			Change Point

TBM A9 & A10 Marked On Step (Kotte Kadavu)
TBM Cadastral Plot No: 72 (Kadapra village)

PROFILE - A11
NO SAND DEPOSITION
KADAPRA-MANNAR PANCHAYATS

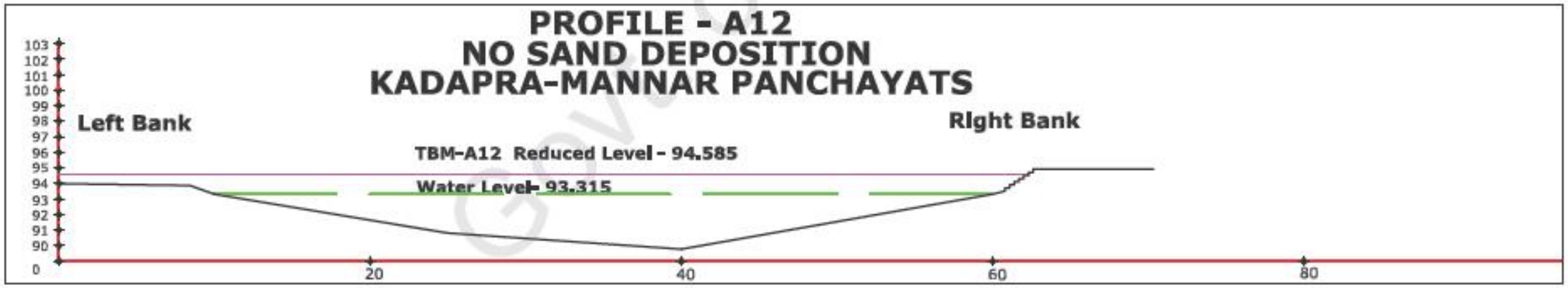
Scale 1:3



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.665		1.460	96.020	94.355			Change Point
CP	2.115		0.740	97.395	95.280			Change Point
TBM-11		1.915			95.480			Mark on panchayat kadavu(Right bank)
P2		4.060			93.335			Right water Level
P3		6.060			91.335			water
P4		8.060			89.335			water
P5		4.060			93.335			Left water level
CP			3.260		94.135			Change Point

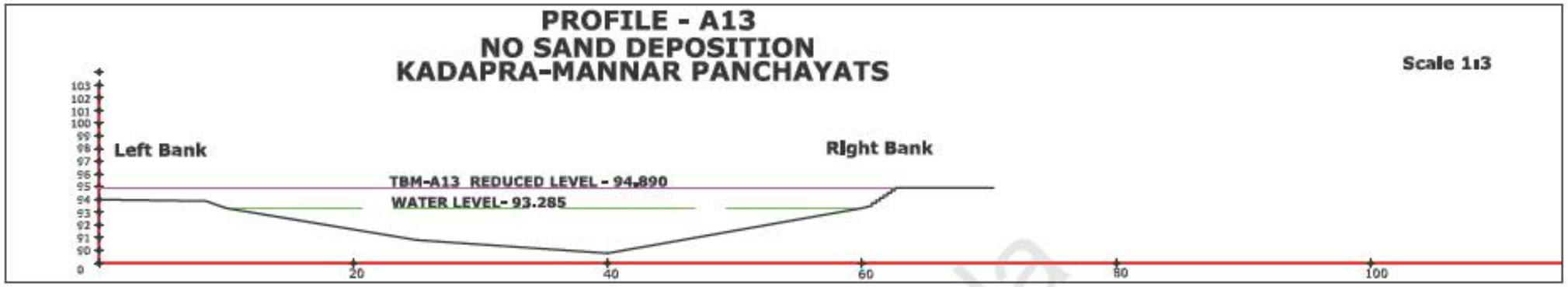
TBM A11 Marked On Step At Panchayat Kadavu Right Bank
TBM Cadastral Plot No: 298 (Mannar village)

PROFILE - A12
NO SAND DEPOSITION
KADAPRA-MANNAR PANCHAYATS



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.390		3.260	96.525	94.135			Change Point
TBM-12		1.940			94.585			Marked on kadavu (Right bank)
P1		3.210			93.315			Right water Level
P2		5.710			90.815			water
P3		6.750			89.775			water
P4		3.210			93.315			Left water level
CP			0.000					Change Point

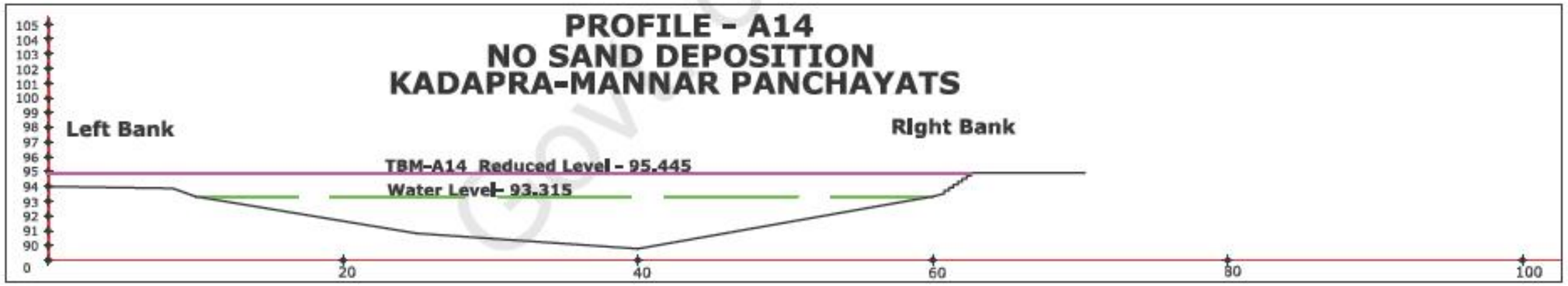
TBM A12 Marked On Step At Private Kadavu Right Bank
TBM Cadastral Plot No: 306 (Mannar village)



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.000		0.000					Change Point
TBM-13		1.635			94.890			Marked on kadavu (Right bank Pullmoottil kadavu
P1		3.240			93.285			Left water level
P2		6.240			90.285			water
P3		6.500			90.025			water
P4		3.240			93.285			Right water Level
CP			1.700		94.825			Change Point

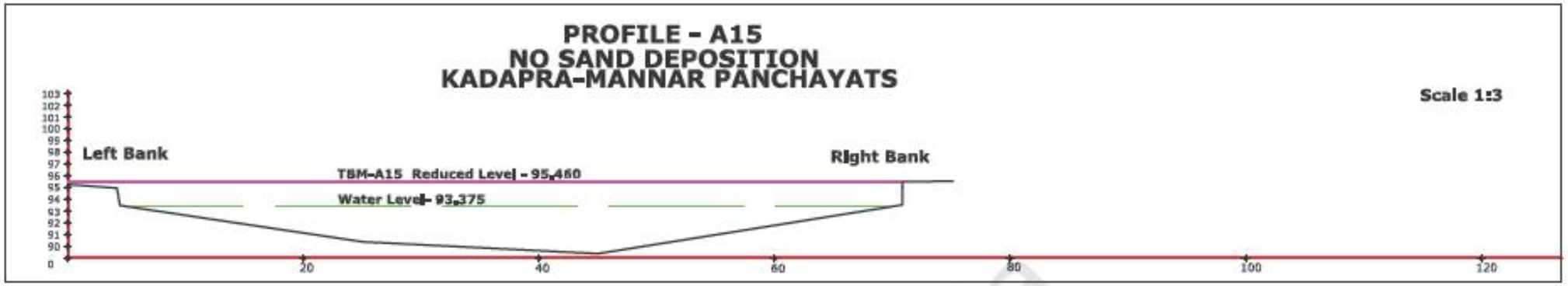
TBM A13 Marked On Step At Panchayat Kadavu Right Bank
TBM Cadastral Plot No: 78 (Mannar village)



FIELD BOOK

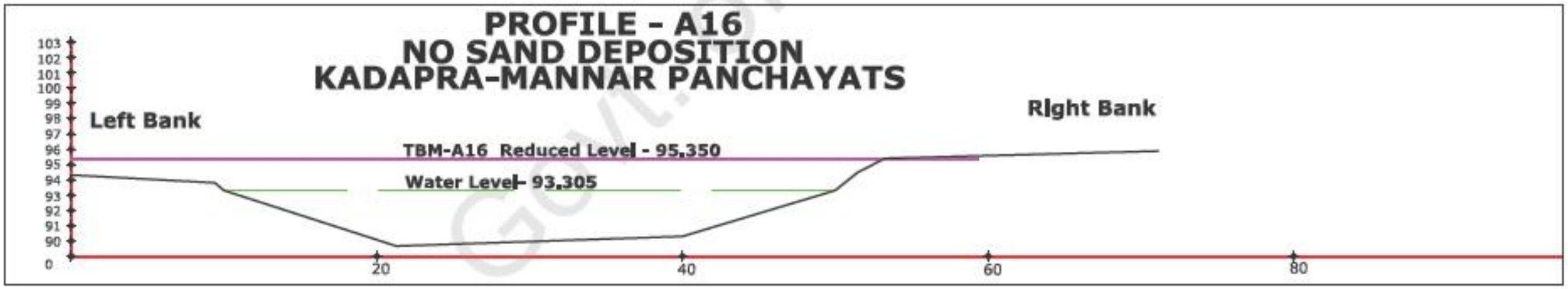
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.120		1.700	95.945	94.825			Change Point
TBM-14		0.500			95.445			Marked on kadavu (Right bank)
P1		2.630			93.315			Rigt water level
P2		5.630			90.315			water
P3		6.630			89.315			water
P4		2.630			93.315			Left water Level
CP			0.500		95.445			Change Point

TBM A14 Marked On Step At Panchayat Kadavu Right Bank
TBM Cadastral Plot No:309 (Mannar village)



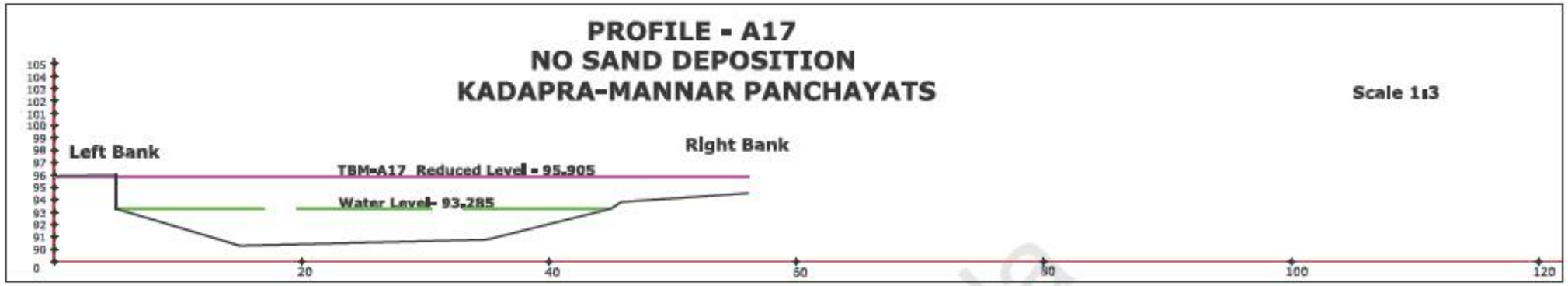
FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.025		0.500	96.480	95.455			Change Point
TBM-15	1.070		1.020	96.530	95.460			Marked on Right bank protection wall near college
P1		3.155			93.375			Right water Level
P2		6.155			90.375			water
P3		7.155			89.375			water
P4		3.155			93.375			Left water level
CP			1.710		94.820			Change Point

TBM A15 Marked On Step At Panchayat Kadavu Right Bank
TBM Cadastral Plot No: 500 (Mannar village)



FIELD BOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.620		1.710	96.440	94.820			Change Point
TBM-16		1.090			95.350			Marked on Right bank protection wall near college
P1		3.135			93.305			Right water Level
P2		6.135			90.305			water
P3		7.135			89.305			water
P4		3.135			93.305			Left water level
CP			0.915		95.525			Change Point

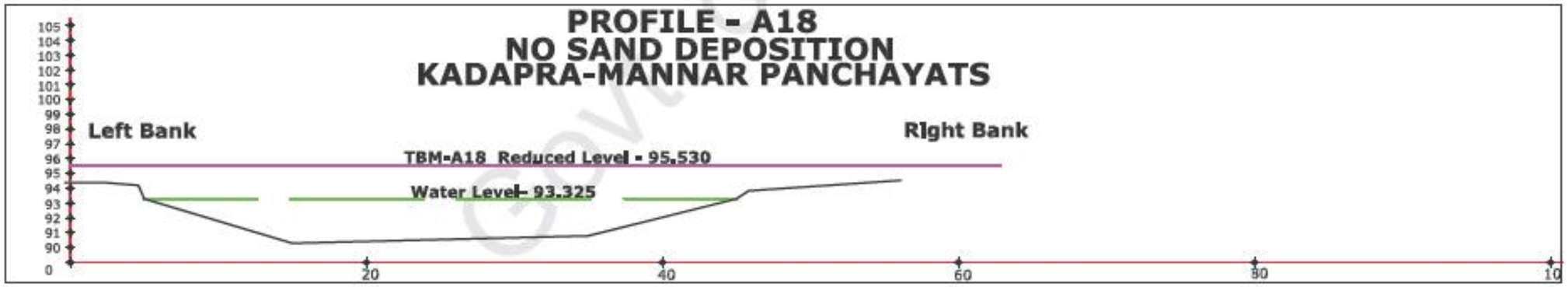
TBM A16 Marked On Step At Panchayat Kadavu Right Bank
TBM Cadastral Plot No: 505 (Mannar village)



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.525		0.915	97.050	95.525			Change Point
TBM-17		1.145			95.905			Marked on culvert (left bank)
P1		3.765			93.285			Left water level
P2		6.765			90.285			water
P3		6.265			90.785			water
P4		3.765			93.285			Right water level
CP			2.350		94.700			Change Point

TBM A17 Marked On Step At Panchayat Kadavu Right Bank
TBM Cadastral Plot No: 84 (Kadapra village)



FIELD BOOK

Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	1.935		2.350	96.635	94.700			Change Point
TBM-17		1.105			95.530			Marked on Tree (right bank)
P1		3.310			93.325			Left water level
P2		6.310			90.325			water
P3		5.310			91.325			water
P4		3.310			93.325			Right water level
CP			4.455		92.180			Change Point

TBM A18 Marked On a Coconut tree Right Bank
TBM Cadastral Plot No: 469 (Mannar village)

Cross section of sand profile- Sub pamba- B

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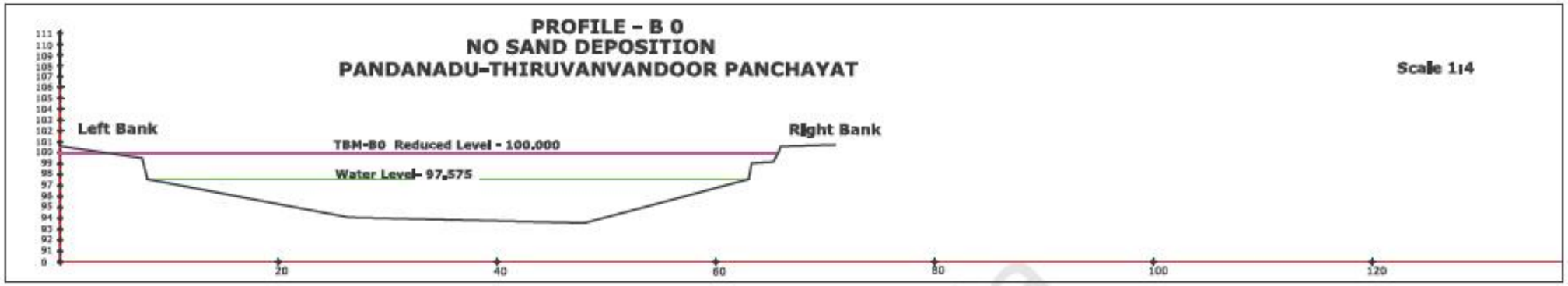
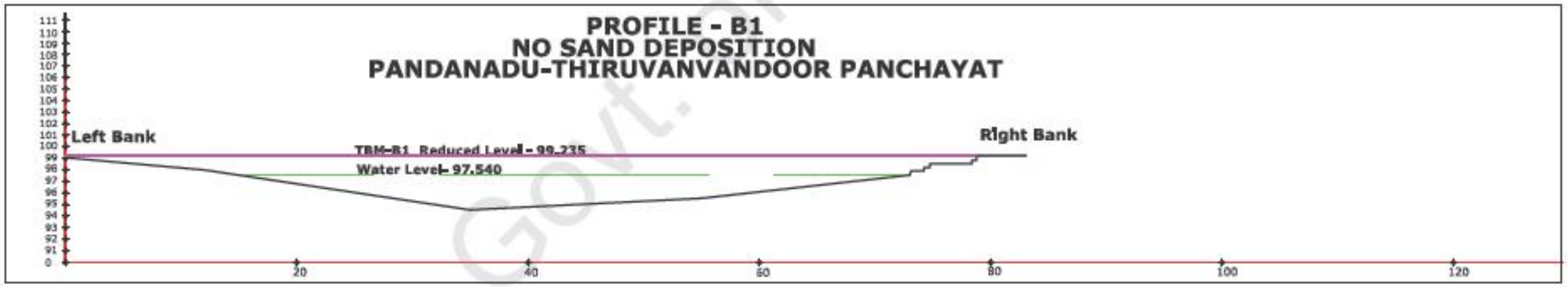


FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
TBM-B0	0.925			100.925	100			Marked on right bank (Mathai kadavu)
P1		0.010			100.545			Right bank
P2		3.990			97.575			Right water Level
P3		6.990			93.575			water
P4		6.990			93.575			water
P5		3.990			97.575			Left Water Level
P6		0.760			99.805			Left bank
CP			0.760		99.805			Change Point

TBM-B0 Marked On Right Bank Mathai Kadavu
TBM-survey Plot No: 19 (Thiruvanvandur village)



FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	0.990		0.760	100.795	99.805			Change Point
TBM- B1		1.560			99.235			Marked on right bank (Mathai kadavu)
P2		3.255			97.540			Right water Level
P3		5.255			95.540			water
P4		6.255			94.540			water
P5		3.255			97.540			Left Water Level
CP			2.900		97.895			Change Point

TBM-B1 Marked On Right Bank Mathai Kadavu
TBM-survey Plot No: 19 (Thiruvanvandur Village)

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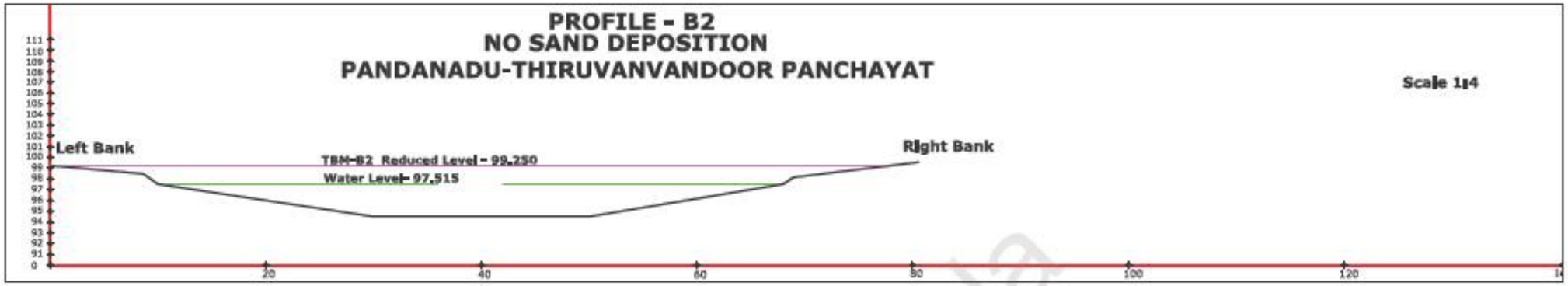
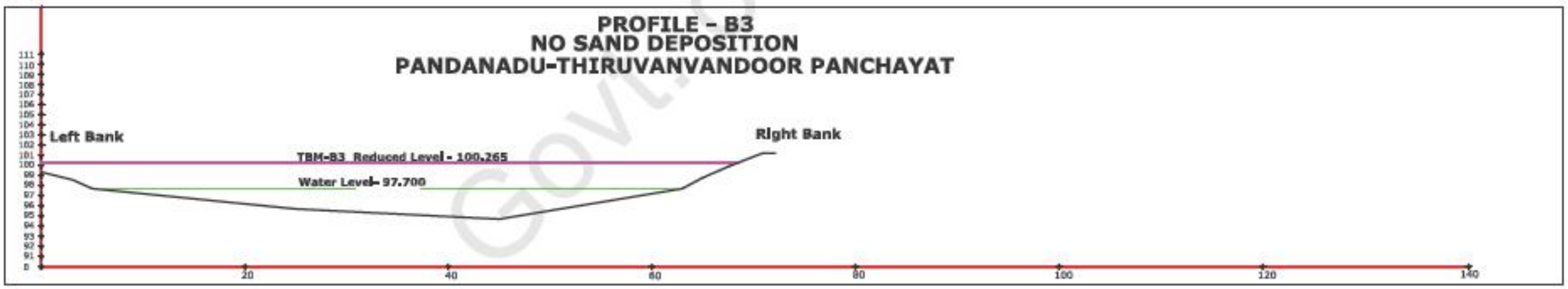


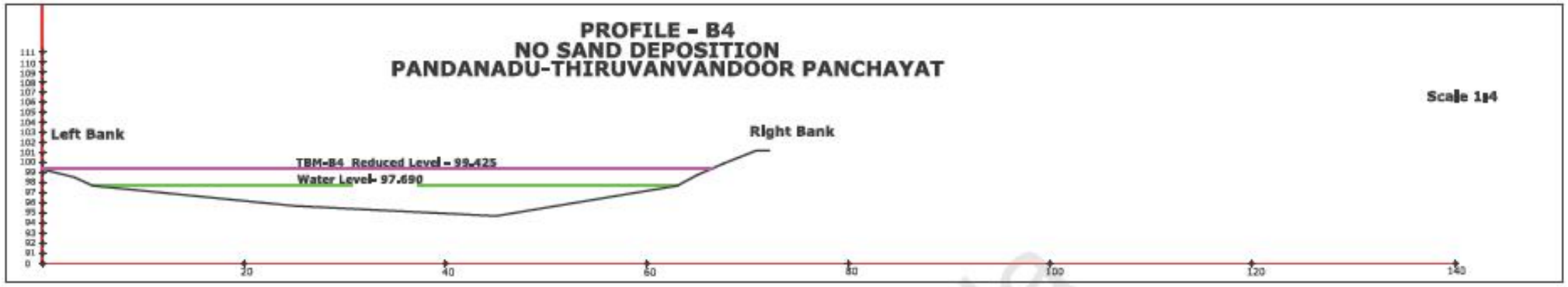
FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.510		2.900	100.405	97.895			Change Point
TBM- B2		1.155			99.250			Marked on right bank (Velutedathu kadavu)
P1		2.890			97.515			Right water Level
P2		5.890			94.515			water
P3		5.890			94.515			water
P4		2.890			97.515			Left Water Level
CP			1.135		99.270			Change Point

TBM-B2 Marked On Electric Post ,right Bank
TBM-survey Plot No: 16 (Thiruvanvandur village)



FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.990		1.135	102.260	99.270			Change Point
TBM- B3		1.995			100.265			Marked on right bank (Velutedathu kadavu)
P1		4.560			97.700			Right water Level
P2		7.560			94.700			water
P3		6.560			95.700			water
P4		4.560			97.700			Left Water Level
CP			4.050		98.210			Change Point

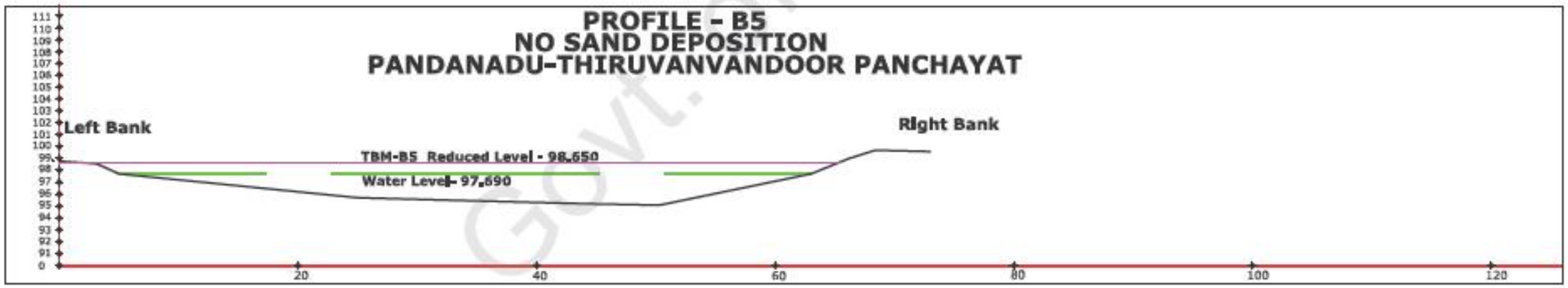
TBM-B3 Marked On Private Kadavu,right Bank
TBM-survey Plot No: 13 (Thiruvanvandur village)



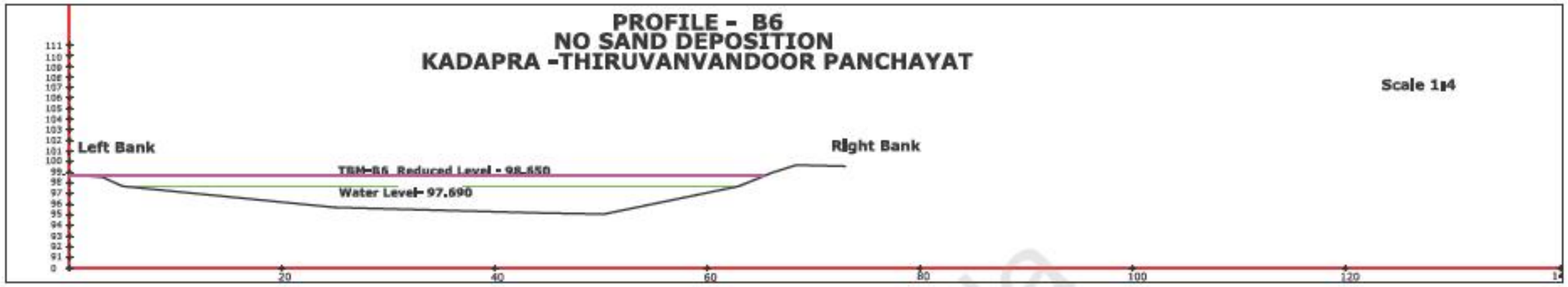
FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.705		4.060	100.915	98.210			Change Point
CP	1.665		3.100	99.480	97.815			Change Point
TBM- B4		0.055			99.425			Marked on right bank (Velutedathu kadavu)
P2		1.790			97.690			Left water level
P3		4.790			94.690			water
P4		4.500			94.980			water
CP		1.790			97.690			Right Water Level
			1.790		97.690			Change Point

TBM-B4 Marked On Panchayat Kadavu,left Bank

TBM-survey Plot No: 330 (Pandanadu village)

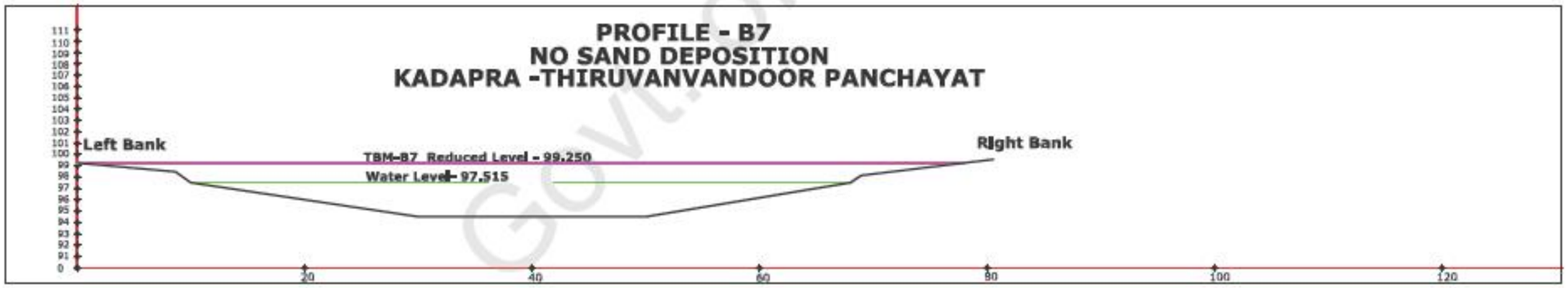


FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.740		1.790	100.430	97.69			Change Point
TBM- B5		1.780			98.650			Marked on left bank Kadavu
P1		2.740			97.690			Left water level
P2		5.700			94.730			water
P3		6.700			93.730			water
P4		2.740			97.690			Right Water Level
CP			2.740		97.690			Change Point



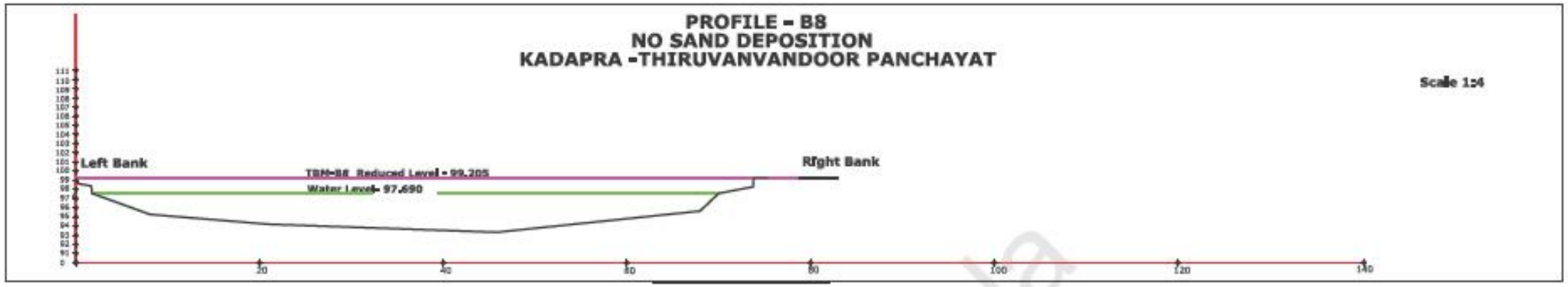
FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.990		1.135	102.260	99.270			Change Point
TBM-B6		1.940			97.375			Marked on right bank kadavu
P1		4.560			96.700			Left water level
P2		7.560			93.700			water
P3		6.560			92.700			water
P4		4.560			94.700			Right Water Level
CP			4.050		96.720			Change Point

TBM-B5 & B6 Marked On Pumbhouse Kadavu
TBM-survey Plot No: 325 (Pandanadu village)



FIELDBOOK								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	2.990		1.135	102.260	99.270			Change Point
TBM- B7		1.995			97.275			Marked on right bank kadavu
P1		4.560			94.730			Left water level
P2		7.560			91.730			water
P3		6.560			92.730			water
P4		4.560			94.730			Right Water Level
CP			4.050		95.220			Change Point

TBM-B7 Marked On Pullmuttu,left Bank
TBM-survey Plot No: 295 (Pandanadu village)



PROFILE- B8								
Sight To	BS	IS	FS	HC	RL	Angle	Thickness of Sand in m	Remarks
CP	3.135		2.740	100.825	97.690			Change Point
TBM- B8		1.620			99.205			Marked on Arattu kadavu (Below bridge)
P1		3.135			97.690			Left water level
P2		6.300			94.525			water
P3		6.500			94.325			water
P4		3.135			97.690			Right Water Level

TBM-B8 Marked On Panchayat Kadavu,near Bridge
TBM-survey Plot No: 5 (Thiruvanvandur)

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Photographs depicting environmental and social aspects