IRRIGATION DEPARTMENT

CITY FLOODS 2021
THIRUVANANTHAPURAM

INITIAL PROJECT REPORT ON

FLOOD MITIGATION WORKS

CHIEF ENGINEER, IRRIGATION AND ADMINISTRATION

JUNE 2021

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Introduction:

The Thiruvanathapuram city is the largest Corporation in the state by area and population. It covers an area of 214.86 sq.km and has 100 administrative wards with a population of 9,57,730 as per the 2011 census. It has relatively high humid climate and an average annual rainfall of 2197 mm (as per IMD data). The district gets both southwest monsoon and north east monsoon. The percolation of storm water into the ground takes place slowly due to the soil characteristics and it leads to water logging and flooding in the area.

The most severe and frequent flooding in the city occurs at Thampanoor, East fort area, Uppidamoodu and Kannammoola. The flooding in this area occurs 3 to 6 times during monsoon. The average water depth is 0.6 to 1.2m and persists for 2 to 24 hours in the central part and 3 to 4 days in the southern part of the city. The drainage network of the city consists of two major rivers namely Karamana and Killi, a few canals, their feeders and lakes.

Figure 1 : The condition of railway station on 11.05.2021

Executive Summary

The cyclone Tauktae was in its fury causing heavy rainfalls in Thiruvananthapuram city during the month of May. The whole Thiruvananthapuram city was inundated causing great losses to the properties and belongings of the city dwellers. In order to address this issue Hon. Chief Secretary convened a meeting on 14th May 2021 with all the line departments. In the meeting emphasis was given to importance of taking up continuous cleaning of the water bodies within the city limits. He also added that the scope of maintenance of rivers, thodus, canals flowing within the city will be under the charge of Irrigation department.

This was followed up by a meeting by The Addl Chief Secretary, Water resources department Sri. T.K Jose IAS to identify the bottlenecks in each water bodies. The city drainage system has four major thodu namely Ulloor thodu, Pattom thodu, Amayizhanjan Thodu and Pazhavangadi Thodu which traverse through Thiruvananthapuram city flowing under gravity to Akkulam Lake finally joining Arabian sea through Veli Pozhi. The Thekkanakara canal starting from Karimadom tank joins Parvathy Puthanar and finally joins Arabian sea through Poonthura pozhy. The Karamana river and Killi river also plays a major role in draining away the city flood water to the Arabian sea. Other thodu like Kariyil thodu and Thettiyar thodu also have respective role in mitigating the flood waters in Thiruvananthapuram city regions.

The ACS (WRD) instructed that each water body has to be assigned with an officer in charge to identify the bottle neck points including waste dumping areas, delta formation areas and areas with jungles and trees which interrupt the smooth flow of water. As per site visit conducted by the officers in charge around 500 vulnerable points have been identified in the water bodies which requires immediate attention. These points were

photographed, data bank was created and the same is reviewed on every Wednesday.

The initial cleaning of these water bodies should start with immediate effect and should be finished on war foot basis. Once the initial cleaning is done monthly/fortnightly cleaning should be taken up continuously to maintain the water bodies in good condition.

The following steps to be taken on war foot basis to check the city floods: -

1. Timely and frequent cleaning is necessary to avoid delta formation inside the water bodies.
2. To identify waste dumping areas which are to be cleaned, steps are to be taken up by Municipal Corporation to prevent further dumping of wastes into the water bodies.
3. Preventing growth of vegetation inside the water body
4. CCTVs , fencing and notice boards to be installed along the vulnerable points in the water body with the help of District administration.

   The priority of cleaning of the water bodies are as detailed below: -

- Pazhavangadi thodu
- Amayizhanjan thodu
- Pattom thodu
- Ulloor thodu
- Kariyil thodu
- Karimadom pond
- Thekkenekara canal
- Killi
- Karamana
- Parvathy puthanar
- Thettiyar thodu

Based on the above study, this project report is prepared for the immediate/ initial cleaning of all the water bodies to mitigate flooding in Trivandrum city.

OFFICERS IN CHARGE

CHIEF ENGINEER

Sri. ALEX VARGHESE
Chief Engineer
Irrigation & Administration, Thiruvananthapuram

TEAM LEADER

Sri. SUNIL RAJ D
Superintending Engineer
Irrigation South Circle, Thiruvananthapuram

KARAMANA RIVER

Sri. BALACHANDRAN P K
(Co-ordinator)
Executive Engineer

Sri. BALU R
Assistant Engineer

KILLI RIVER

Sri. PREMCHAND P S
(Co-ordinator)
Asst. Executive Engineer

Sri. SABARINATH C L
Assistant Engineer

KARIYIL THODU

Smt. JYOTHI MARY CHACKO
(Co-ordinator)
Executive Engineer

PARVATHI PUTHANAR

Smt. MANJU V
(Co-ordinator)
Asst. Executive Engineer

ULLOOR THODU

Smt. BINDU C S
(Co-ordinator)
Asst. Executive Engineer

AAMAYIZHANCHAN & PAZHAVANGADI THODU

Sri. GOKULAN T
Assistant Engineer

PATTOM THODU

Sri. SURAJITH S R
Assistant Engineer

THEKKENAKARA CANAL

Sri. MANEESH M
Assistant Engineer

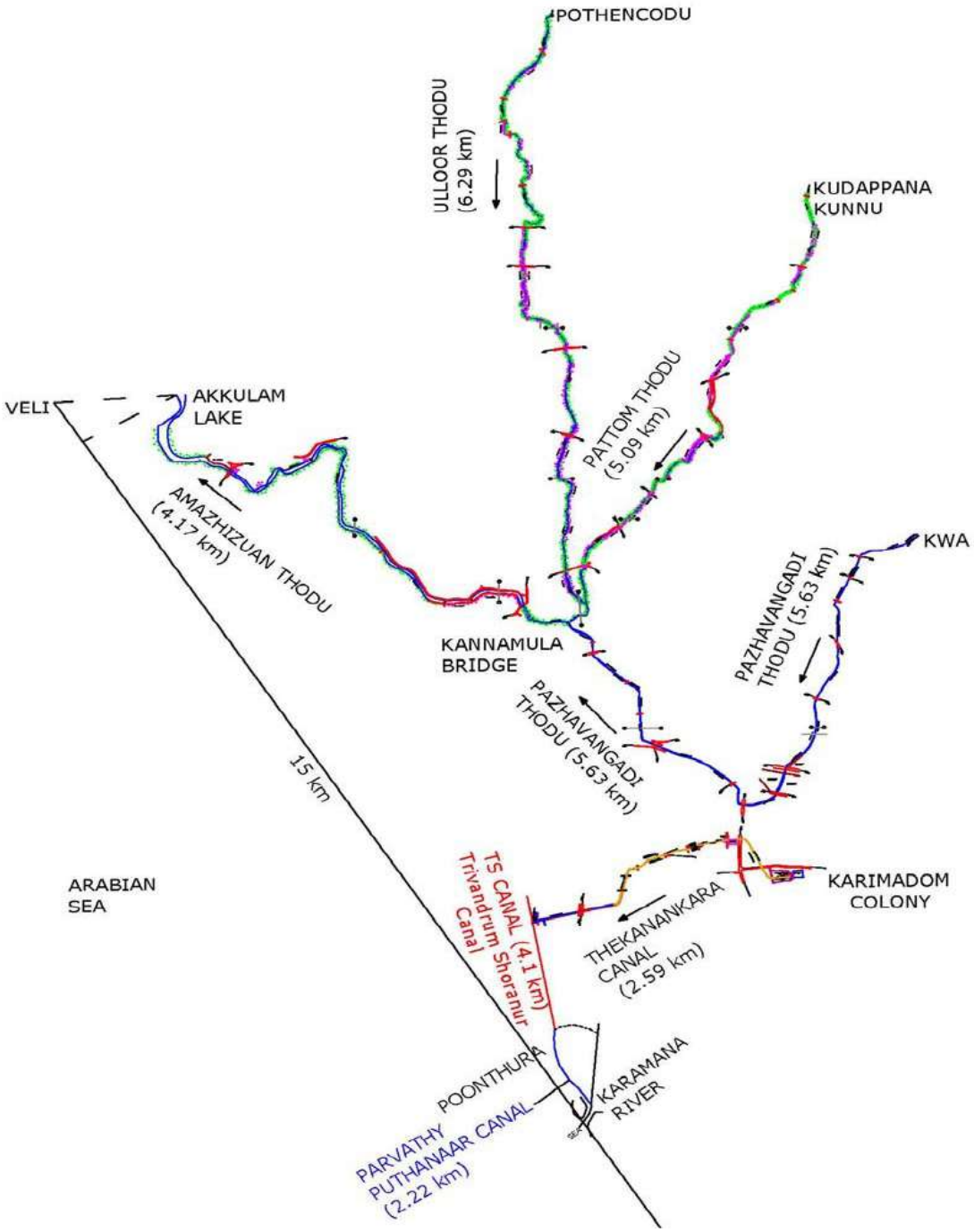
THETTIYAR THODU

Sri. SABARINATH R
Assistant Engineer

VELI & POONTHURA ESTUARIES

Sri. BIJU M G
(Co-ordinator)
Asst. Executive Engineer

DRAINAGE MAP OF THIRUVANANTHAPURAM CITY



The major water bodies in the city : -

Sl. No.	Name of water body	Length	Width	Originates at	Ends at
1	Karamana	22km/ 66km in city	40 – 45 m	Agasthyarkoodam	Arabian sea
2	Killi	14/33 km in city	10- 15 m	Panavoor GP	Merges with Karamana river at Pallathukadavu
3	Ulloorthodu	8.67 km	15-20 m	Keraladithyapuram	Amayizhanjanthodu
4	Pattomthodu	5.80 km	9-12m	Mukkola	Converges with Ulloorthodu and ends at Amayizhanjanthodu
5	Pazhavangadithodu	5.89km	3-7 m	Near Jimmy George stadium	Converges with Ulloorthodu and Pattomthodu at Kannamoola and flows downstream as Amayizhanjanthodu
6	Amayizhanjanthodu	5.4 km	28-32m	Confluence point of Ulloor and Pattomthodu	Legislative assembly thodu also confluences with Amayizhanjanthodu and ends at Veli lake
7	Thekkenekara canal	2.56 km	Covered portion- 2.5m Open portion– 5m	Karimadom tank	Parvathyuthanar
8	Thettiyarthodu	5.00 km	4 to 10m	3 branches start from MadavoorparaGuhakshethram , Green field stadium, Anthiyoor bridge respectively. The three branches join together at Moonattumukku and ends at VeliKayal	

9	Kariyil thodu	5.25km	2.0m-2.5m	Ambalathara	South end joins Parvathyputhanar at Moonattumukk North end joins Thekkenakara canal near Enchakkal
10	Parvathyputhanar	24 km	20m-40m	Kovalam	Kadinamkulam lake

ABSTRACT OF ESTIMATES

- **Phase I - Fund requirement for initial cleaning**

Sl.no	Name of water body	Fund requirement for initial cleaning (in lakhs)	Priority	Time period required for completion
1	Pazhavangadi thodu	70.00	I	3 months
2	Amayizhanjan thodu	48.00	II	3 months
3	Pattom thodu	35.00	III	3 months
4	Ulloor thodu	30.00	IV	3 months
5	Kariyil thodu	55.00	V	3 months
6	Karimadom pond	45.00	VI	4 months
7	Thekkenekara canal	15.00	VII	3 months
8	Killi	25.00	VIII	3 months
9	Karamana	25.00	IX	3 months
10	Parvathy puthanar	45.00	X	3 months
11	Thettiyar thodu	20.00	XI	3 months
	Total	**413 lakhs**		

- **Phase 2 - Fund requirement for emergency side protection works**

Sl.no	Name of water body	Fund requirement (in lakhs)
1	Killi	195.00
2	Karamana	142.00
3	Pazhavangadi thodu	75.00
	Total	**412 lakhs**

PATTOM THODU

Introduction:

Pattomthodu is a natural drain which originates from upper reaches of Kudappanakunnu ,on the eastern part of the city and passes through the major areas of the city such as Vayalikkada, Marappalam, Plamoodu, Thekkummoodu and finally joins with Ulloorthodu at Kannamoola. It has a total length of 5.09 km and top widthvarying from 4m to 20m (average width of 8m) It collects storm water from the city area and finally discharges into Ulloorthodu at Kannamoola. This drain in its full capacity has a major role in controlling the flood in the city.

Problems identified:

- The drainis presently silted in a large scale which inturn reduces the actual water holding capacity.
- The width of the drain is also reduced at various locations due to encroachments.
- The large scale of waste dumping at various points along the drain especially from the bridges which causes blockages at bottleneck points.
- The sewage lines from domestic households which are let directly into the drains
- The low-lying service cables and lines passing across the drain which traps the floating materials during heavy inflow and causes flooding in the upstream.

Short term initial cleaning proposal: -

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl. No.	Vulnerable locations	Nature of work	Estimate amount (in lakhs)	Remarks
1	U/s and D/s of Vayalikkada bridge, Thozhuvarthala bridge, Resmi Nagar bridge, KairaliNagar bridge, and Parayattinmoola bridge.	Clearing jungle, pruning of trees, cleaning silt from bottom of bridges, solid wastes including plastics sewage and organic waste etc	4.00	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream of bridges. Solution- cleaning of this portion of thodu once in a month
2	U/s and D/s of Moolayilthala bridge, Marakkal bridge, Foot bridge, and Pattomthanupillai bridge.	Clearing jungle, pruning of trees cleaning silt at bottom of bridges, solid wastes including plastics wastes	3.45	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream of bridges. Solution- cleaning of this portion of thodu once in a month
3	U/s & D/s of Marappalam bridge	Clearing jungle, cleaning silt, solid wastes including plastics and house hold wastes. Lifting and tying of loose and damaged cables across thodu	6.10	Problems- Dumping of all types of waste materials to thodu. The low laying cables/ service lines causes blockage during heavy flow. Solution- cleaning of thodu once in a month ,lifting of all service lines to top of deck slab level
4	U/s and D/s at the end of Pattomthodu	Clearing jungle, pruning of trees, cleaning silt, solid wastes including plastics, sewage and organic wastes manually, in the portions where machinery is not possible	6.24	Many encroachments and sewage outlets are exists along the banks of thodu.
5	U/s and D/s of Plamoodubridge,and Thekkummoodu bridge.	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwast	8.61	Dumping of wastes such as solid wastes, organic and inorganic wastes into the thodu.

		es removal including plastics ,sewage , organic waste etc		
6	U/s and D/s of Mulavanabridge, Kambipalam and Shutterpalam	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwastes removal including plastics,sewage , organic waste etc	6.60	Dumping of wastes such as solid wastes, sewage, organic and inorganic wastes into the thodu.
		Total	**35 lakhs**	

After studying the condition of Pattom Thodu, it is understood that desiltation, removal of garbage and debris, cutting and removal of weeds, jungle growth etc. should be taken up and also the existing conditions required to be improved to meet the heavy discharges that occur during severe flood. Fencing has to be provided to all the footbridges to prevent dumping of wastes and CCTVs to be provided at these vulnerable points.

However, the existing capacity of the thodu is not adequate to drain out flood water during flash and heavy floods. In view of this, it is necessary to increase the height of the bunds to enhance the capacity of the thodus capable to discharge severe flood water.

Sl.no	Name of work	Amount
1	Monthly cleaning of Pattom thodu at U/s and D/s of Marappalam bridge phase 1	6.10 lakhs
2	Monthly cleaning of Pattom thodu From u/s of Vayalikkada bridge to d/s of Parayattinmoola bridge phase 1	4.63 lakhs
3	Monthly cleaning at bridge locations in Pattom thodu, U/s of Plamoodu bridge,to D/S of Thekkummoodu bridge. phase 1	8.62 lakhs
4	Monthly cleaning of Pattom thodu from U/s of Moolayilthala bridge to D/s of Pattom thanupillai bridge phase 1	3.49 lakhs
5	Monthly cleaning of Pattom thodu at confluence point of Pattom and Ulloor thodu at Kananmmoola phase -1	5.66 lakhs
6	Monthly cleaning of Pattom thodu at bridge locations of Mulavana,Kampippalam, shutterpalam, phase -1	6.50 lakhs
	Total	35 lakhs

Abstract Estimate

Monthly cleaning of Pattom thodu at bridge locations of Mulavana,Kampippalam, shutterpalam, phase -1

(Cost Index Applied for this estimate is 37.93%)

1 Monthly cleaning of Pattom thodu at bridge locations of Mulavana,Kampippalam, shutterpalam, phase -1		
1	od17653/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	390.000 each
	Say 390.000 each @ Rs 589.56 / each	**Rs 229928.40**
2	od17654/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	52.000 Day
	Say 52.000 Day @ Rs 2883.70 / Day	**Rs 149952.40**
3	od17655/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	
	Net Total Quantity	156.000 hour
	Say 156.000 hour @ Rs 1281.65 / hour	**Rs 199937.40**

Total Amount	579818.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**69578.16**
Total	**649396.16**
Lumpsum for round off	**603.84**
TOTAL Rs	**650000.00**
Rounded Total Rs	**6,50,000**
Rupees Six Lakh Fifty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Monthly cleaning of Pattom thodu at U/s and D/s of Marappalam bridge phase 1

(Cost Index Applied for this estimate is 37.93%)

1 Monthly cleaning of Pattom thodu at U/s and D/s of Marappalam bridge		
1	od17644/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	280.000 each
	Say 280.000 each @ Rs 589.56 / each	**Rs 165076.80**
2	od17645/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	
	Net Total Quantity	160.000 hour
	Say 160.000 hour @ Rs 1281.65 / hour	**Rs 205064.00**
3	od17646/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	60.000 Day
	Say 60.000 Day @ Rs 2883.70 / Day	**Rs 173022.00**
	Total Amount	543163.00
	Provision for GST payments (in %) @	**12.0%**
	Amount reserved for GST payments	**65179.56**
	Total	**608342.56**
	Lumpsum for round off	**1657.44**
	TOTAL Rs	**610000.00**
	Rounded Total Rs	**6,10,000**
	Rupees Six Lakh Ten Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Monthly cleaning of Pattom thodu from U/s of Moolayilthala bridge to D/s of Pattom thanupillai bridge phase 1

(Cost Index Applied for this estimate is 37.93%)

1 Monthly cleaning of Pattom thodu from U/s of Moolayilthala bridge to D/s of Pattom thanupillai bridge		
1	od17642/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	185.000 each
	Say 185.000 each @ Rs 589.56 / each	**Rs 109068.60**
2	od18133/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	30.000 Day
	Say 30.000 Day @ Rs 2883.70 / Day	**Rs 86511.00**
3	od17643/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	90.000 hour
	Say 90.000 hour @ Rs 1281.65 / hour	**Rs 115348.50**

Total Amount	310928.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**37311.36**
Total	**348239.36**
Lumpsum for round off	**760.64**
TOTAL Rs	**349000.00**
Rounded Total Rs	**3,49,000**
Rupees Three Lakh Forty Nine Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Monthly cleaning of Pattom thodu at confluence point of Pattom and Ulloor thodu at Kananmmoola phase -1

(Cost Index Applied for this estimate is 37.93%)

1 Monthly cleaning of Pattom thodu at meetting point of Pattom and Ulloor thodu at Kananmmoola phase -1		
1	od17656/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	367.000 each
	Say 367.000 each @ Rs 589.56 / each	**Rs 216368.52**
2	od17657/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	36.000 Day
	Say 36.000 Day @ Rs 2883.70 / Day	**Rs 103813.20**
3	od17658/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	144.000 hour
	Say 144.000 hour @ Rs 1281.65 / hour	**Rs 184557.60**

Total Amount	504739.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**60568.68**
Total	**565307.68**
Lumpsum for round off	**692.32**
TOTAL Rs	**566000.00**
Rounded Total Rs	**5,66,000**
Rupees Five Lakh Sixty Six Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Monthly cleaning at bridge locations in Pattom thodu, U/s of Plamoodu bridge,to D/S of Thekkummoodu bridge. phase 1

(Cost Index Applied for this estimate is 37.93%)

1 Monthly cleaning at bridge locations in Pattom thodu, U/s & D/s of Plamoodu bridge, Thekkummoodu bridge. phase 1		
1	od17648/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	490.000 each
	Say 490.000 each @ Rs 589.56 / each	**Rs 288884.40**
2	od17649/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	60.000 Day
	Say 60.000 Day @ Rs 2883.70 / Day	**Rs 173022.00**
3	od17650/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	240.000 hour
	Say 240.000 hour @ Rs 1281.65 / hour	**Rs 307596.00**
	Total Amount	769502.00
	Provision for GST payments (in %) @	**12.0%**
	Amount reserved for GST payments	**92340.24**
	Total	**861842.24**
	Lumpsum for round off	**157.76**
	TOTAL Rs	**862000.00**
	Rounded Total Rs	**8,62,000**
	Rupees Eight Lakh Sixty Two Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Monthly cleaning of Pattom thodu From u/s of Vayalikkada bridge to d/s of Parayattinmoola bridge phase 1

(Cost Index Applied for this estimate is 37.93%)

1 Monthily cleaning of Pattom thodu u/s and d/s of various bridges Vayalikkada ,Thozhuvarthala ,Resmi nagar, Kairali nagar, Parayattinmoola.		
1	od17638/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc. complete	
	Net Total Quantity	335.000 each
	Say 335.000 each @ Rs 589.56 / each	**Rs 197502.60**
2	od18128/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	32.000 Day
	Say 32.000 Day @ Rs 2883.70 / Day	**Rs 92278.40**
3	od17640/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	96.000 hour
	Say 96.000 hour @ Rs 1281.65 / hour	**Rs 123038.40**

Total Amount	412819.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**49538.28**
Total	**462357.28**
Lumpsum for round off	**642.72**
TOTAL Rs	**463000.00**
Rounded Total Rs	**4,63,000**
Rupees Four Lakh Sixty Three Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

PHOTOS OF PATTOM THODU

Pattom Thodu @ Vayalikkada Bridge (Blokage due to low level crossing of service lines)

Pattom thodu @ shivodaya green vally portion D/S of Vayalikkada bridge (Pruning of trees required)

Pattomthodu@Kairalinagar portion

Pattomthodu @U/S of Pattomthanupillai bridge portion (High siltation Waste deposit)

Pattomthodu @U/S of Pattomthanupillai bridge portion (High siltation Waste deposit)

Pattomthodu @U/S of Pattomthanupillai bridge portion (High siltation Waste deposit)

Pattom thodu @ Parayattinmoola Bridge portion U/S

Pattomthodu@ foot bridge portion D/S of Parayattinmoolabridge

Pattomthodu@ U/S of Marappalam bridge portion

Pattomthodu@ D/S Marappalambridge portion

Pattomthodu @Marappalambridge portion

Pattom thodu@ D/S Marappalam bridge portion

Pattom thodu@ Marappalam portion

Pattom thodu @ Marappalam portion

Pattom thodu @Thekkummoodu bridge D/S

Pattom thodu @Thekkummoodu bridge d/s

Pattom thodu @ Thekkummoodu bridge – u/s portion

Pattom thodu @ D/S of Plamoodu bridge

Pattomthodu @ D/s of Marappalambridge.

Pattom Thodu @D/s Goureeshapattom bridge

PattomThodu @ u/s of Marappalambri

Pattom Thodu @ U/s of Plamoodu bridge

PattomThodu @ D/s of Thekkumoodubridge

Pattom Thodu @ D/s of Plammoodu bridge

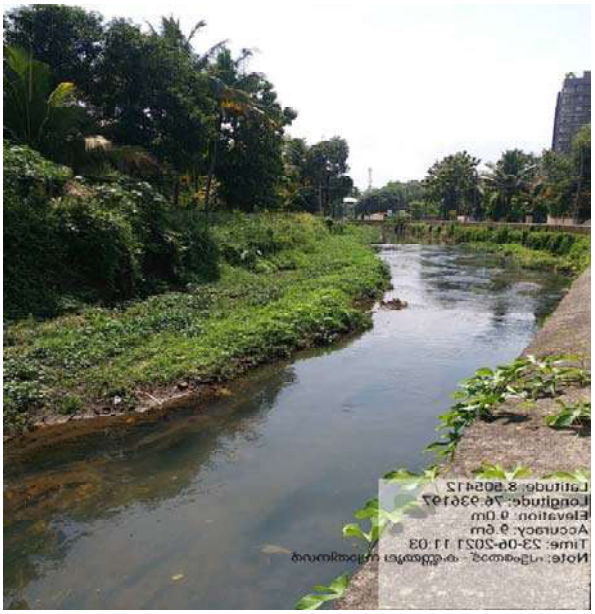
PattomThodu @KolloorPalamnear kannammola

Pattom Thodu @ Kolloor Palam near Kannammola

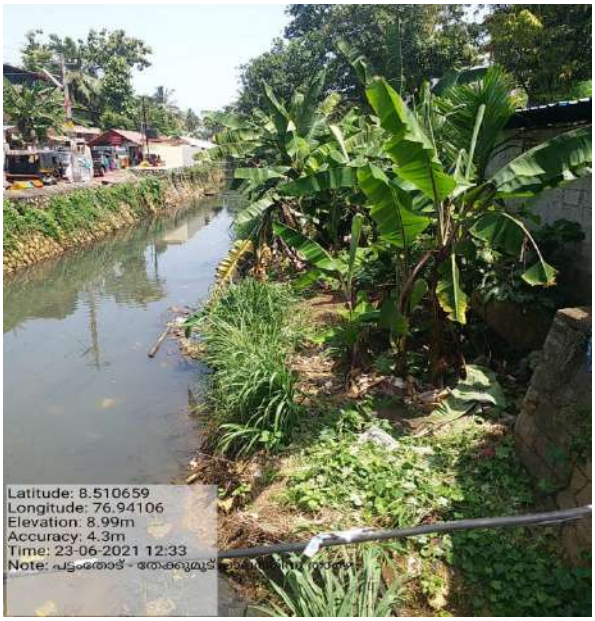
Pattomthodu @ d/s of Kolloorbridge.

PattomThodu @ Kannammoolakambipalam

Pattom Thodu @ L/B Mulavana Bund



PattomThodu @ KannammoolaSwathy Nagar



Pattom Thodu @ d/s Thekkummoodu brdige

PattomThodu @ u/s of Thekkumoodu bridge

PattomThodu @ d/s of Kolloorbridge

Pattom Thodu @ Thekkummoodu mele bund

Pattom Thodu @ Thekkummoodu mele bund

Pattom Thodu @ d/s of Plammoodu bridge

Pattom Thodu @ Breached portion in U/s of plammoodu bridge

Pattom Thodu @ d/s of Plammoodu bridge

Pattom Thodu @ d/s of Plammoodubridge

Pattom Thodu @ d/s of Plammoodubridge

Pattom Thodu @ Mulavana Prabha lane collapsed portion

Pattom Thodu @ Mulavana Prabha Lane

Pattom Thodu @ Mulavana Prabha Lane

Pattom Thodu @ Mulavana Prabha Lane

Pattom Thodu @ Mulavana area

Pattom thodu@ Mulavana

Pattom thodu@ Mulavana

Pattom thodu @ Mulavana

PattomThodu @ Marappalam portion

Pattomthodu&Ulloorthodu joining portion @Kannamoola

Pattomthodu Vayalikkada portion

ULLOOR THODU

Introduction:

Ulloor Thodu has its origin from Pothencodu area and passes through the northern part of the city namely Mannanthala, Ulloor, Chalakkuzhy and Murinjapalam and reaches Kannammoola where it joins the Pattom thodu. The city reach from Edavacodu to Kannammoola has a length 6.39 km (approx) and top width 3 to 15 m (average width of 8-10 m).

Problems identified:

- The drains presently silted in a large scale which in turn reduces the actual water holding capacity.
- The width of the drain is also reduced at various locations due to encroachments.
- The large scale of waste dumping at various points along the drain especially from the bridges degrades the water quality and also causes blockages at bottleneck points.
- The sewage lines from domestic households which are let directly into the drains
- The flow is almost stagnant at various locations due to large scale presence of floating bodies.

Short term initial cleaning proposal: -

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl. no.	Vulnerable locations	Nature of work	Estimate amount (in lakhs)	Remarks
1	U/s and d/s of Murinjapalam bridge near cosmopolitan hospital	Clearing jungle,pruning of trees, cleaning silt and vegetation,removing solid waste including plastic ,sewage& organic wastes and fencing at bridge locations	11.40	Dumping of all types of waste materials to thodu, The low laying cabiles/ service lines causes blockage during heavy flow. Many encroachments and sewage outlets are exists along the banks of thodu.
2	U/s and d/s of Chalakuzhy bridge	Clearing jungle,pruning of trees, cleaning silt and vegetation,removing solid waste including plastic ,sewage& organic wastes and fencing at bridge locations	7.45	Dumping of all types of waste materials to thodu, many encroachments and sewage outlets are exists along the banks of thodu
3	U/s and d/s of Ulloorbridge Krishna Nagar Parayil near Credence hospital	Clearing jungle,pruning of trees, cleaning silt and vegetation,removing solid waste including plastic ,sewage& organic wastes and fencing at bridge locations	5.75	Many encroachments and sewage outlets are exists along the banks of thodu. Dumping of all types of waste materials such as organic and inorganic wastes to thodu
4	U/s & D/s of Kollavilappalam	Clearing jungle,pruning of trees, cleaning silt and vegitation,removing solid waste including plastic ,sweage,& organic wastesFencing and CC TV camera necessary for bridge locations	5.40	Many encroachments are exists along the banks of thodu. Dumping of all types of waste materials to thodu
		Total	**30 lakhs**	

Sl.no	Name of work	Amount
1	Cleaning of Ulloor thodu at u/s and d/s of Murinjapalam bridge near cosmo politan hospital in TVPM Crptn phase I	11.60 lakhs
2	Cleaning of Ulloor thodu at u/s and d/s of Chalakuzhy bridge phase I in TVPM Crptn	7.50 lakhs
3	Cleaning of Ulloor thodu at u/s and d/s of Ulloor bridge Krishna Nagar Parayil near Credence hospital in TVPM Crptn phase I	5.80 lakhs
4	Cleaning of Ulloor Thodu U/S & D/S of Kollavilappalam phase- 1	5.10 lakhs
	Total	30 lakhs

Abstract Estimate

Cleaning of Ulloor thodu at u/s and d/s of Ulloor bridge Krishna Nagar Parayil near Credence hospital in TVPM Crptn phase I

(Cost Index Applied for this estimate is 37.93%)

1 cleaning of Ulloor thodu at U/s & D/s of Krishna Nagar Parayil phase 1		
1	od20463/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc. complete	
	Net Total Quantity	360.000 each
	Say 360.000 each @ Rs 589.56 / each	**Rs 212241.60**
2	od20464/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	50.000 Day
	Say 50.000 Day @ Rs 2883.70 / Day	**Rs 144185.00**
3	od20465/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	
	Net Total Quantity	150.000 hour
	Say 150.000 hour @ Rs 1281.65 / hour	**Rs 192247.50**

Total Amount	548674.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**27433.70**
Total	**576107.70**
Lumpsum for round off	**3892.30**
TOTAL Rs	**580000.00**
Rounded Total Rs	**5,80,000**
Rupees Five Lakh Eighty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

cleaning of Ulloor Thodu U/S & D/S of Kollavilappalam phase- 1

(Cost Index Applied for this estimate is 37.93%)

1 cleaning of Ulloor Thodu U/S & D/S of Kollavilappalam		
1	od20482/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	410.000 each
	Say 410.000 each @ Rs 589.56 / each	**Rs 241719.60**
2	od20483/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu and disposing in availabile land within 5 km distance as per the direction of departmental officers at site, after heaping at available places etc complete	
	Net Total Quantity	30.000 Day
	Say 30.000 Day @ Rs 2883.70 / Day	**Rs 86511.00**
3	od20484/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	
	Net Total Quantity	120.000 hour
	Say 120.000 hour @ Rs 1281.65 / hour	**Rs 153798.00**

Total Amount	482029.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**24101.45**
Total	**506130.45**
Lumpsum for round off	**3869.55**
TOTAL Rs	**510000.00**
Rounded Total Rs	**5,10,000**
Rupees Five Lakh Ten Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

cleaning of Ulloor thodu at u/s and d/s of Chalakuzhy bridge phase I in TVPM Crptn

(Cost Index Applied for this estimate is 37.93%)

1 cleaning of Ulloor thodu at U/s & D/s of Chalakuzhy bridge phase 1		
1	od20460/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc. complete	
	Net Total Quantity	400.000 each
	Say 400.000 each @ Rs 589.56 / each	**Rs 235824.00**
2	od20461/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	70.000 Day
	Say 70.000 Day @ Rs 2883.70 / Day	**Rs 201859.00**
3	od20462/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	
	Net Total Quantity	210.000 hour
	Say 210.000 hour @ Rs 1281.65 / hour	**Rs 269146.50**

Total Amount	706830.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**35341.50**
Total	**742171.50**
Lumpsum for round off	**7828.50**
TOTAL Rs	**750000.00**
Rounded Total Rs	**7,50,000**
Rupees Seven Lakh Fifty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

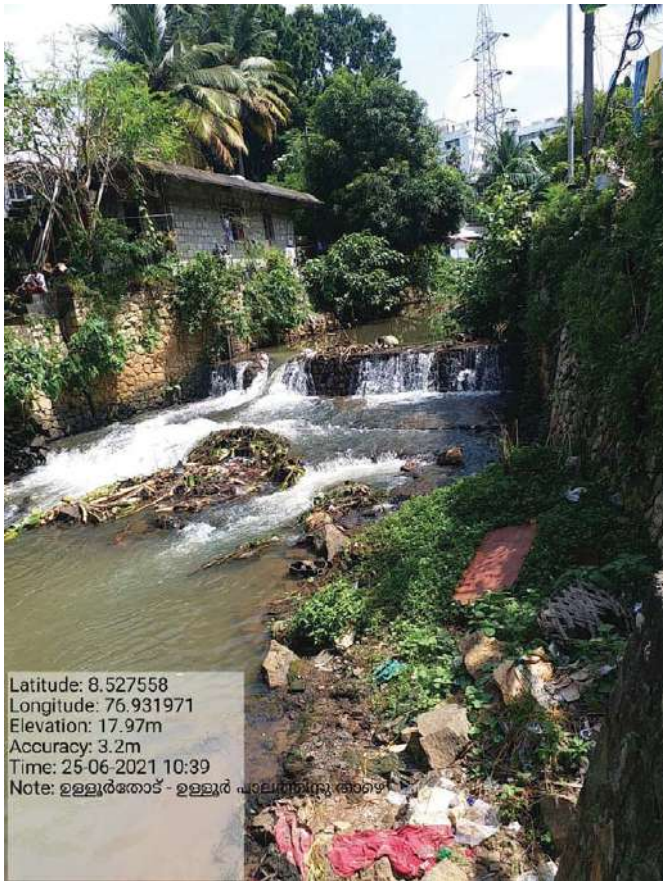
cleaning of Ulloor thodu at u/s and d/s of Murinjapalam bridge near cosmo politan hospital in TVPM Crptn phase I

(Cost Index Applied for this estimate is 37.93%)

1 cleaning of Ulloor thodu at U/s & D/s of Kollavilappalam phase 1		
1	od20454/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc. complete	
	Net Total Quantity	575.000 each
	Say 575.000 each @ Rs 589.56 / each	**Rs 338997.00**
2	od20455/2021_2022/IA Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc. complete	
	Net Total Quantity	70.000 Day
	Say 70.000 Day @ Rs 5767.41 / Day	**Rs 403718.70**
3	od20456/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	
	Net Total Quantity	280.000 hour
	Say 280.000 hour @ Rs 1281.65 / hour	**Rs 358862.00**

Total Amount	1101578.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**55078.90**
Total	**1156656.90**
Lumpsum for round off	**3343.10**
TOTAL Rs	**1160000.00**
Rounded Total Rs	**11,60,000**
Rupees Eleven Lakh Sixty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)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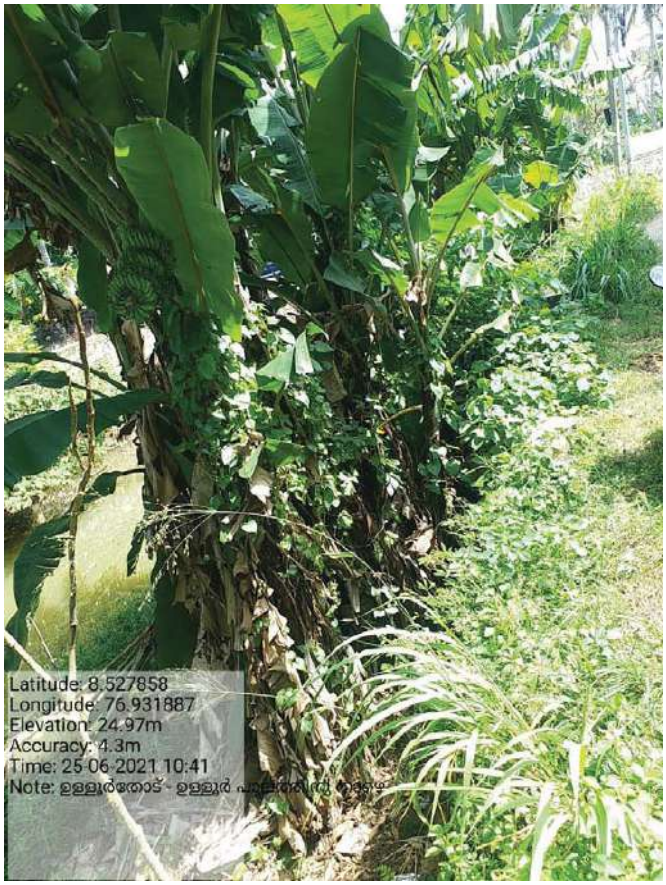
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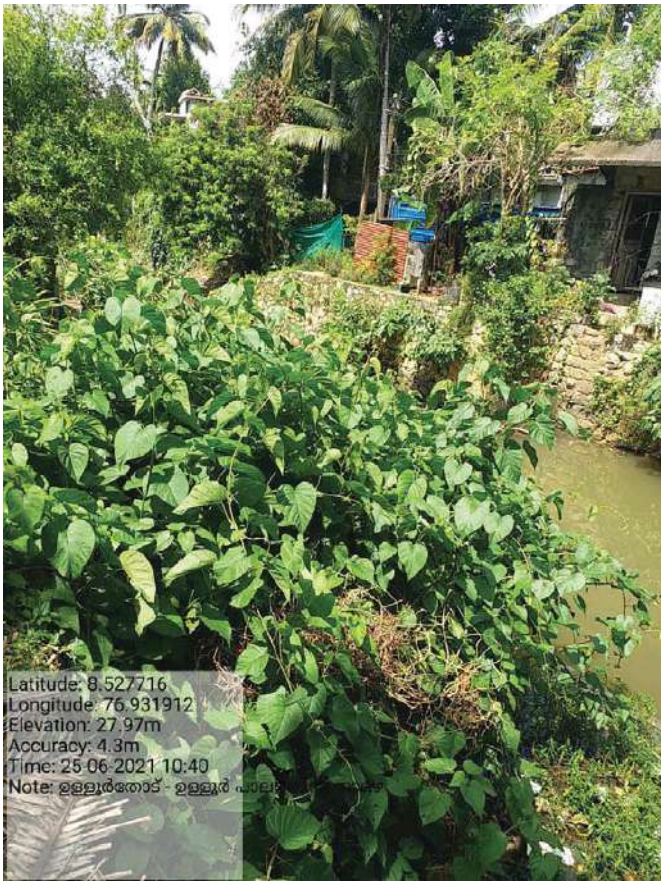
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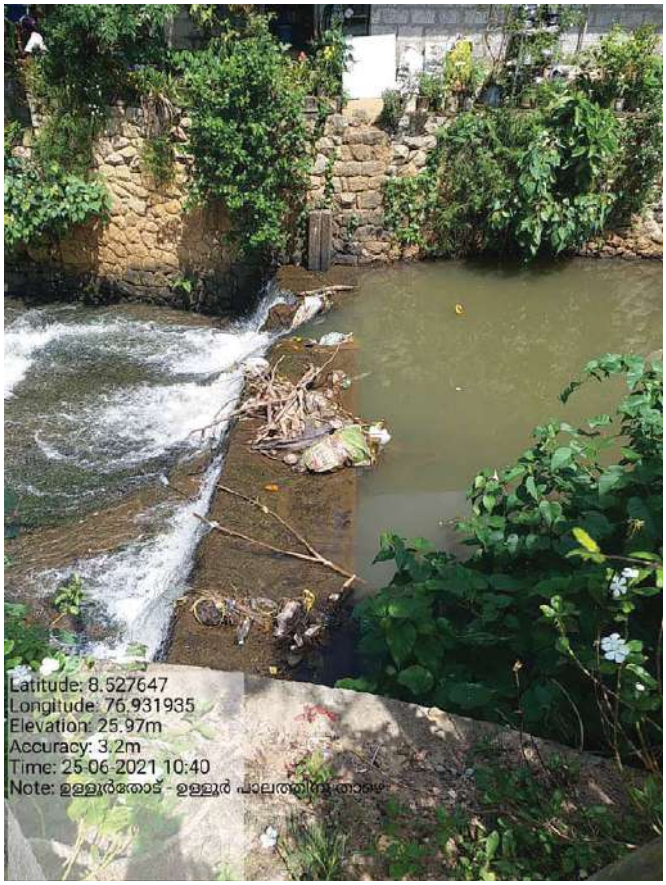
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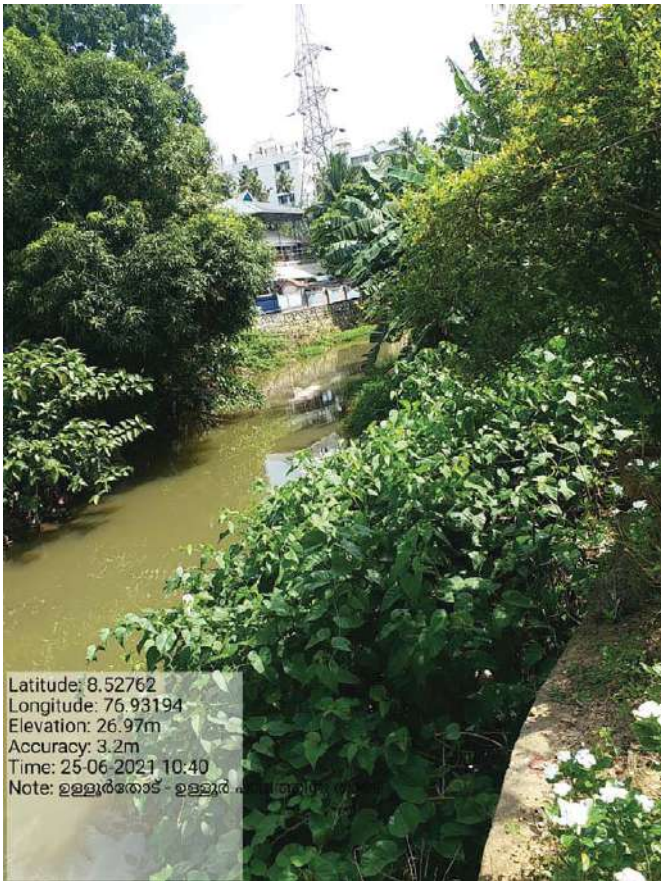
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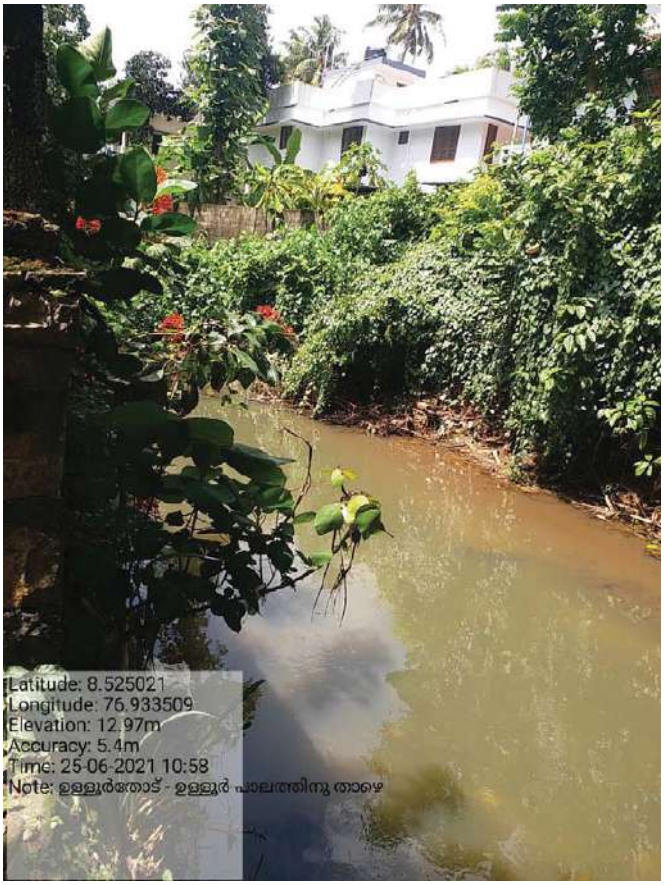
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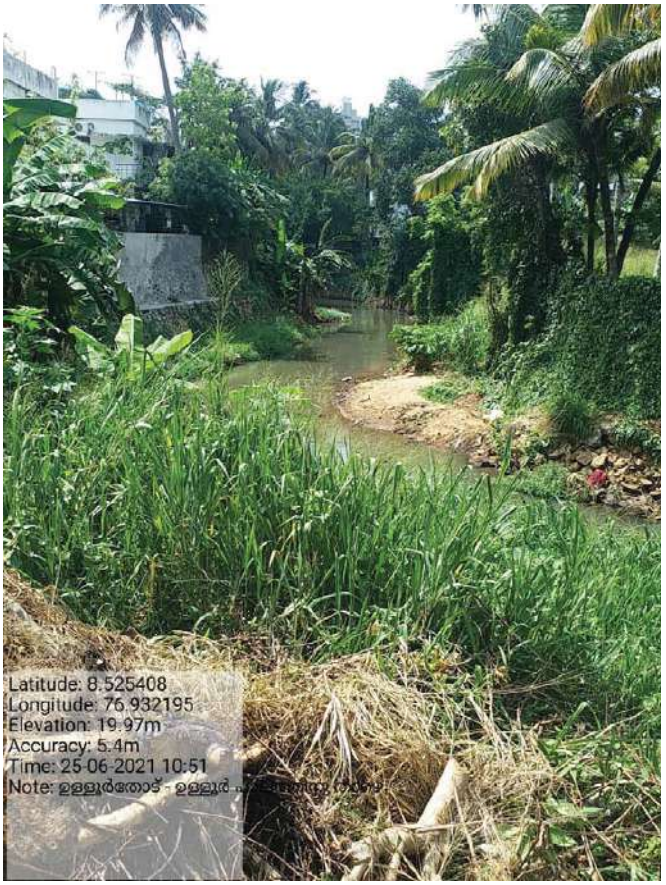
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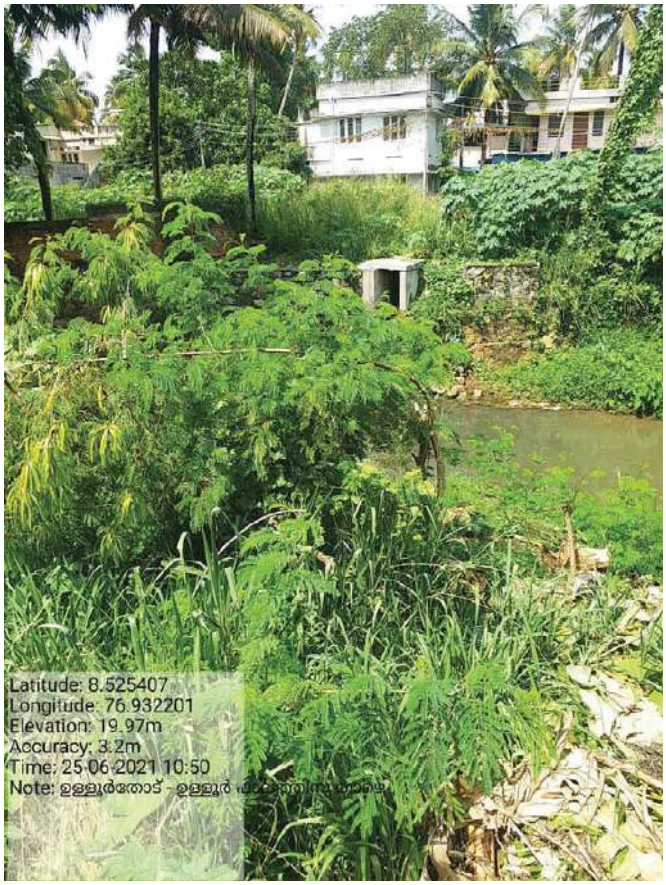
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Time: 25-06-2021 10:51


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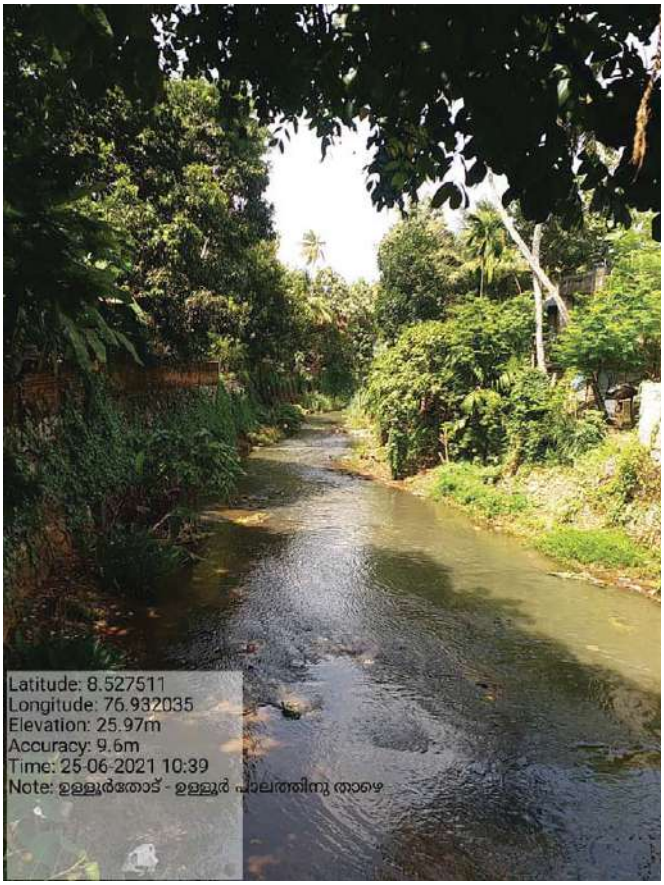
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UlloorThodu @Ulloor Bridge

Ulloor Thodu @ U/S Chalakuzhy bridge

Ulloor Thodu @ Chalakuzhy bridge d/s portion

Ulloorthodu, @ Murinjapalam, near Cosmopolitan Hospital

Ulloorthodu, Murinjapalam, Cosmopolitan Hospital portion U/s

Ulloor thodu Keraladithyapuram palam u/s

UlloorthoduThykoottamPalam down

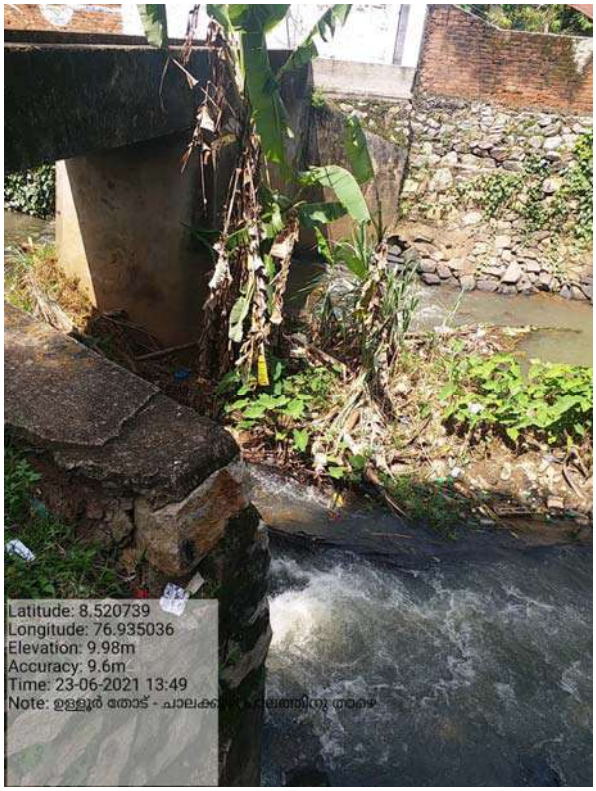
Ulloor thodu near Thykkoottam bridge

Ulloorthodu near Cosmo Hospital

Ulloor thodu – Chalakuzhy bridge - down

Ulloorthodu–Kuzhivayal

Ulloor thodu – Cosmo Hospital



Ulloorthodu – Chalakuzhy bridge– down

Ulloorthodu – Chalakuzhy bridge – down

Ulloorthodu – Chalakuzhy bridge – down

Ulloorthodu – Chalakuzhy bridge – down

Ulloorthodu - Kannammoola

Pazhavangadi Thodu

Introduction:

Pazhavangadi thodu originates from the Observatory hills and passes through Bakery junction, Thampanoor, East Fort, Pazhavangadi, Thakaraparambu, Vanchiyoor, Pattoor to join in Amayizhanchan thodu. The thodu has a total length of 5.90 km and an average width varying from 5 - 6.5m. The thodu passes through Trivandrum central railway station through a tunnel under the railway track.

Importance of Pazhavangadi Thodu

- Pazhavangadi thodu is the only one flood water drainage system in the Thamapnoor area. Almost all new drain constructed in this area drains into Pazhavangadi thodu.

Problems identified:

- Under the cover of night, anti-social elements are dumping a lot of waste into the thodu. At present condition day by day cleaning is required.
- In the Pazhavangadi-Uppulamoodu stretch of thodu, at many locations the side retaining wall is in collapsed condition.
- At many locations, the existing fencing got damaged.
- At two locations, KWA gravity sewage lines are laid across the thodu. These lines are laid about 0.6m above the bed level of thodu. These are causing blockages of wastes at these locations thereby aiding flood.
- The major cause for flooding in Thampanoor area is due to the choking of the tunnel passing under the Central Railway station.

Short term initial cleaning proposal :-

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl. No.	Vulnerable points	Works to be arranged	Amount
1	Bakery Jn. To KSRTC bus stand	Small scale desiltation, waste removal and jungle clearance	5 lakhs
2	Power House Road to Central Theater	Small scale desiltation, waste removal and jungle clearance	15 lakhs
3	GanapathiKovil Temple to Uppadamoodupalam	Small scale desiltation, waste removal and jungle clearance	40 lakhs
4	Vanchiyoor to Pattoor	Waste removal and jungle clearance	10 lakhs

Total Amount:- 70 Lakhs

Urgent Side wall protection required to prevent Overflow in Thakaraparambu area

Sl.no	Name of water body	Fund requirement (in lakhs)
1	Pazhavangadi thodu	**75 lakhs**

Conclusion:

After studying the condition of Pazhavangadi thodu, it is understood that desiltation, removal of garbage and debris, cutting and removal of weeds, jungle growth etc. should be taken up and also the existing conditions required to be improved to meet the heavy discharges that occur during severe flood. However, the existing capacity of the thodu is not adequate to drain out flood water during flash and heavy floods. In view of this, it is necessary to construct the side retaining walls to prevent flooding in side banks. Also fencing in the side banks are requires especially at

locations were bund roads are there inorder to prevent the disposal of wastes. In order avoid flooding in Thampanoor area, it is necessary to construct a new tunnel through railway compound. Also removal of KWA sewage/ water lines across the thodu is highly necessary inorder to ensure smooth flow.CCTV cameras to be provided in major locations.

Note:- In the initial cleaning proposed in Pazhavangadi thodu, desiltation inside the railway compound is not included because for cleaning the tunnel, flow through the tunnel have to be regulated. All the flood/ storm water from Thampanoor area are drained into Pazhavangadi thodu near to railway compound. Also the KWA waste water and water from swimming pool in Observatory hills is drained into this thodu. Hence regulation of flow through the tunnel is not possible during the monsoon period. The work can be carried only on summer season i.e from February to May period. Estimate for this work of special nature will be submitted soon.

Abstract Estimate

Cleaning of Pazhavangadi thodu Phase-1

(Cost Index Applied for this estimate is 37.93%)

1 cleaning		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	6000.000 sqm
	Say 6000.000 sqm @ Rs 9.93 / sqm	**Rs 59580.00**
2	2.32 Clearing grass and removal of the rubbish up to a distance of 50 m outside the periphery of the area cleared.	
	Net Total Quantity	2075.000 sqm
	Say 2075.000 sqm @ Rs 5.03 / sqm	**Rs 10437.25**
3	50.2.33.5 Cutting branches of trees overhanging above any structures of girth between 40cm to 60cm including stacking of serviceable materials and disposal of unserviceable material, cost of labour, hire charges of rope and pully etc without making any damages to nearby structures etc complete.	
	Net Total Quantity	30.000 each
	Say 30.000 each @ Rs 208.00 / each	**Rs 6240.00**
4	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	3.000 each
	Say 3.000 each @ Rs 302.34 / each	**Rs 907.02**
5	15.9.2 Demolishing stone rubble masonry manually / by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer -in-Charges:In cement mortar	
	Net Total Quantity	87.000 cum
	Say 87.000 cum @ Rs 1387.16 / cum	**Rs 120682.92**
6	od20398/2021_2022/IA Engaging labour to removing and refixing the fencing at various location for carrying out desiltation/ waste removal	
	Net Total Quantity	4.000 Day
	Say 4.000 Day @ Rs 1896.84 / Day	**Rs 7587.36**

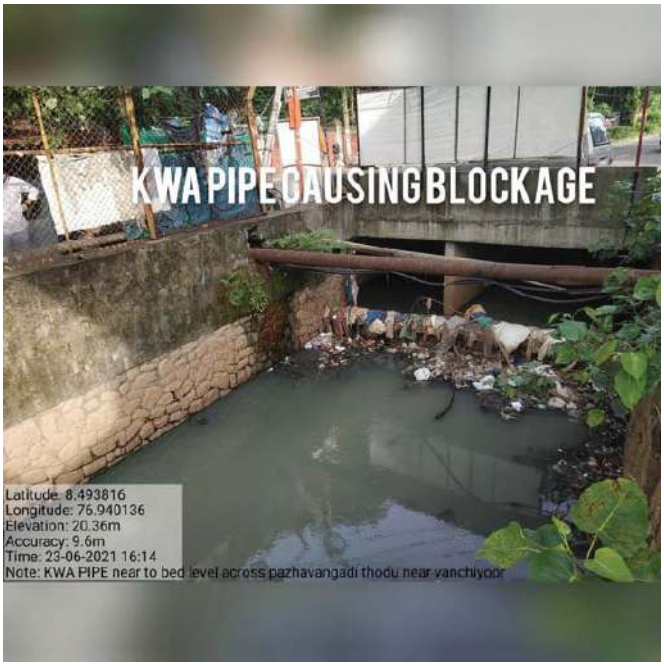
7	od20401/2021_2022/IA Removal of all floating organic and inorganic wastes such as cloth wastes, bottles, electronic wastes, electric wastes, wooden branches of trees, thermocols, hotel wastes, poultry waste, plastic wastes, kitchen utensils, leafs and other dumped wastes Using any type of departmental/ contractors own machinery including disposal of removed materials by the contractor at his own means without causing damage to environment and society including all leads lifts etc complete as departmental officers in charge.	
	Net Total Quantity	120.000 hour
	Say 120.000 hour @ Rs 2135.35 / hour	**Rs 256242.00**
8	od20392/2021_2022/IA Desiltation/ Excavation by mechanical means(department/contractors own machine) over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm in plan)in or under water including getting out and disposal of removed excavated material combined with all deposited debris which comprises a mixture of organic and inorganic waste mixed with liquid mud, silt in any form without causing damages to environment or society, to contractors own place of choice including all leads and lift upto 1.5m etc. complete as directed by departmental officers in charge.	
	Net Total Quantity	12597.750 cum
	Say 12597.750 cum @ Rs 389.92 / cum	**Rs 4912114.68**
9	od20408/2021_2022/IA Removing the existing heavy precast slab laid over the thodu at various location for cleaning and then placing back the slab in position after cleaning as per the instruction of departmental officers including all rates.	
	Net Total Quantity	2.000 Day
	Say 2.000 Day @ Rs 5267.40 / Day	**Rs 10534.80**
10	od20413/2021_2022/IA Engaging labour for removing wastes, all form of silt, clay etc.. at locations where it is not possible to remove wastes mechanically in placesn such as cut and cover, beneath pedestrian bridges.etc.. complete as per the instruction of departmental officers at site	
	Net Total Quantity	135.000 each
	Say 135.000 each @ Rs 624.80 / each	**Rs 84348.00**
11	od20420/2021_2022/IA Providing and fixing 50mm G.I. pipe embeded in cement concrete for fencing including cost of G.I. pipes, and fixing charge of G.I.pipe etc., complete as directed by the Engineer -in-charge	
	Net Total Quantity	20.000 metre
	Say 20.000 metre @ Rs 366.77 / metre	**Rs 7335.40**
12	7.1.1 Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)	

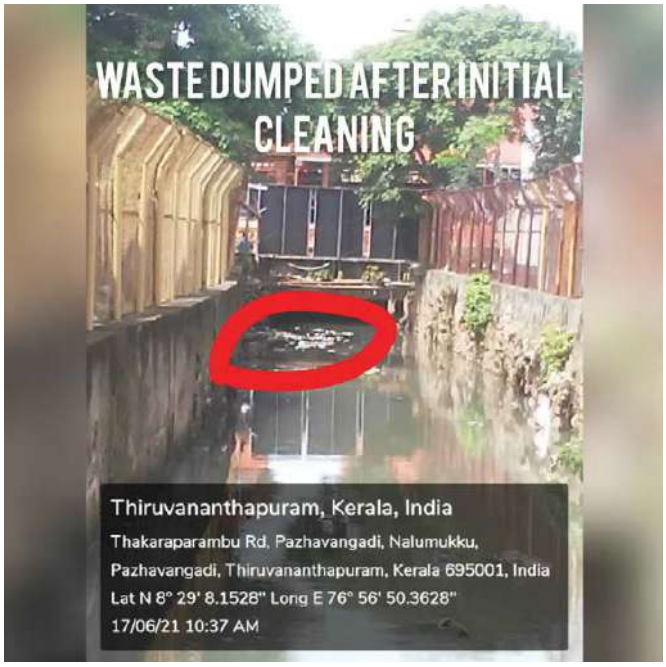
	Net Total Quantity	56.100 cum
	Say 56.100 cum @ Rs 5470.10 / cum	**Rs 306872.61**
13	od20425/2021_2022/IA Random rubble masonry with department hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with: Cement mortar 1:6 (1 cement : 6 coarse sand)	
	Net Total Quantity	60.900 cum
	Say 60.900 cum @ Rs 4084.35 / cum	**Rs 248736.91**
14	4.1.3 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	
	Net Total Quantity	17.800 cum
	Say 17.800 cum @ Rs 7561.25 / cum	**Rs 134590.25**
15	4.3.2 Centering and shuttering including strutting, propping etc. and removal of form work for:Retaining walls, return walls, (any thickness) including attached pilasters, buttresses, plinth and string courses fillets, kerbs and steps etc.	
	Net Total Quantity	160.000 sqm
	Say 160.000 sqm @ Rs 522.20 / sqm	**Rs 83552.00**

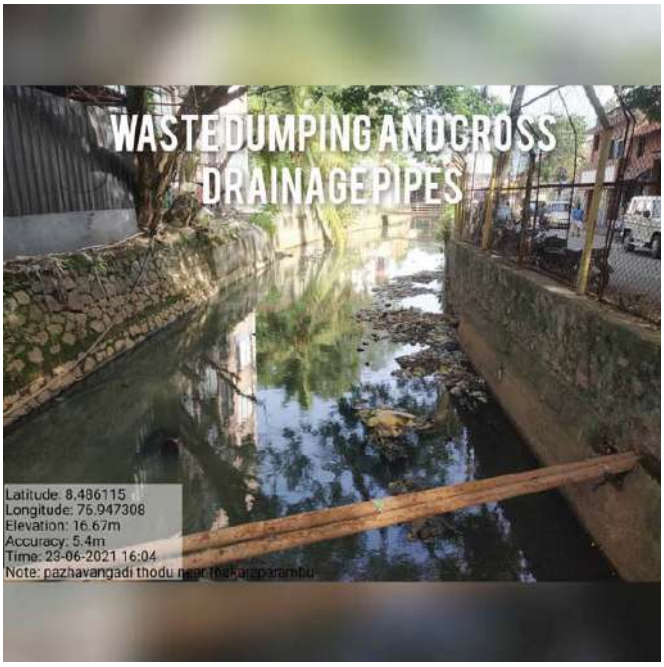
Total Amount	6249761.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**749971.32**
Total	**6999732.32**
Lumpsum for round off	**267.68**
TOTAL Rs	**7000000.00**
Rounded Total Rs	**70,00,000**
Rupees Seventy Lakh Only	

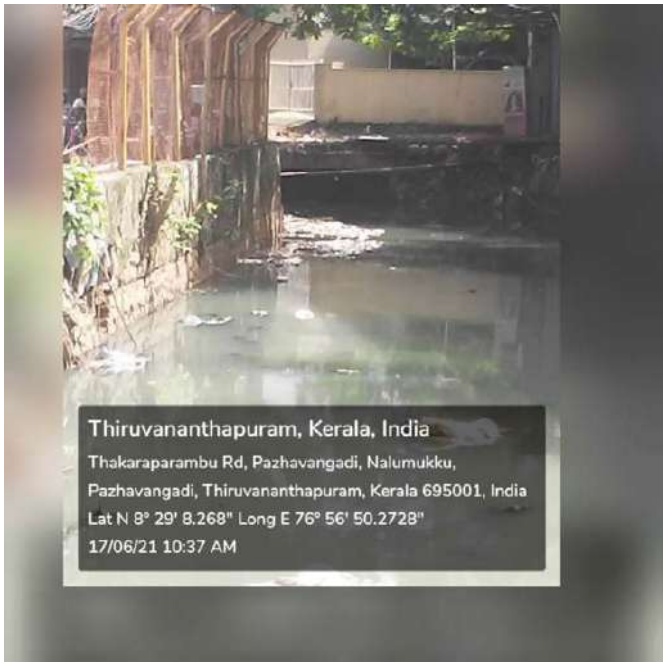
(Cost Index Applied for this estimate is 37.93%)


WASTE DUMPING PLACE AND TREES GROWN IN BUND
Latitude: 8.485498
Longitude: 76.950064
Elevation: 19.61m
Accuracy: 4.3m
Time: 23-06-2021 15:58
Note: pazhavangadi thodu near powerhouse road


KWA PIPE CAUSING BLOCKAGE
Latitude: 8.493816
Longitude: 76.940136
Elevation: 20.36m
Accuracy: 9.6m
Time: 23-06-2021 16:14
Note: KWA PIPE near to bed level across pazhavangadi thodu near vanchiyoor


WASTE DUMPED AFTER INITIAL CLEANING
Thiruvananthapuram, Kerala, India
Thakaraparambu Rd, Pazhavangadi, Nalumukku, Pazhavangadi, Thiruvananthapuram, Kerala 695001, India
Lat N 8° 29' 8.1528" Long E 76° 56' 50.3628"
17/06/21 10:37 AM


WASTE DUMPING AND CROSS DRAINAGE PIPES
Latitude: 8.486115
Longitude: 76.947308
Elevation: 16.67m
Accuracy: 5.4m
Time: 23-06-2021 16:04
Note: pazhavangadi thodu near thakaraparambu


Thiruvananthapuram, Kerala, India
Thakaraparambu Rd, Pazhavangadi, Nalumukku,
Pazhavangadi, Thiruvananthapuram, Kerala 695001, India
Lat N 8° 29' 8.268" Long E 76° 56' 50.2728"
17/06/21 10:37 AM


WASTE ACCUMULATED BEFORE
INITIAL CLEANING IN KSRTC
COMPOUND-20/5/21
Samsung Triple Camera

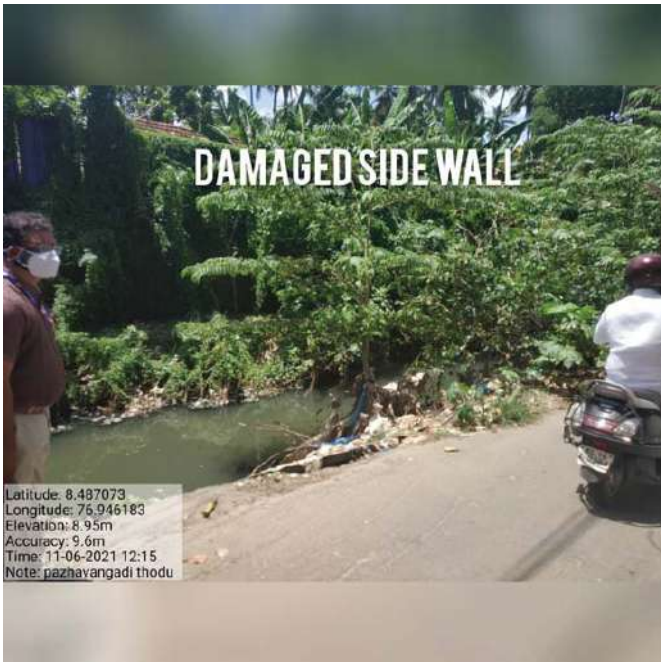

ENCROACHMENT
Latitude: 8.497355
Longitude: 76.936766
Elevation: 18.22m
Accuracy: 9.6m
Time: 29-06-2021 16:18
Note: pazhavangadi thodu near ppattoor central mall

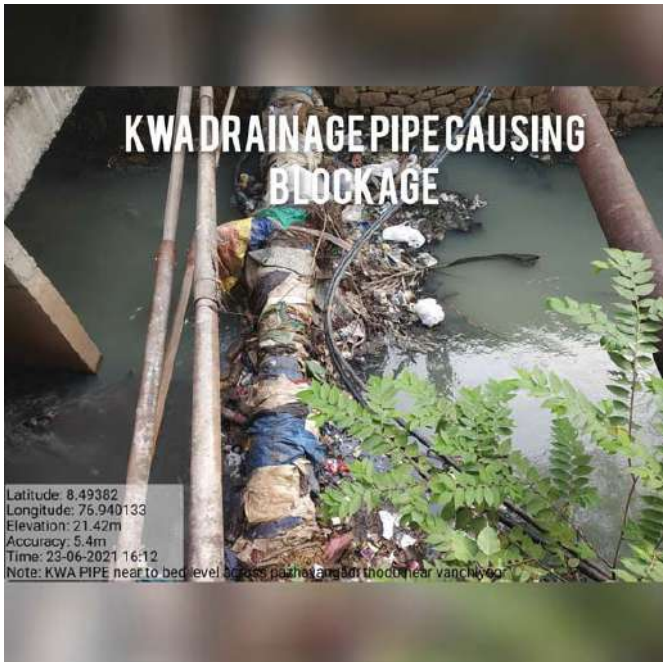

WASTE ACCUMULATED NEAR CUT AND
COVER PORTION
Thiruvananthapuram, Kerala, India
Convent Rd, Vanchiyoor, Thiruvananthapuram,
Kerala 695035, India
Lat N 8° 29' 27.0024" Long E 76° 56' 25.0188"
17/06/21 10:55 AM

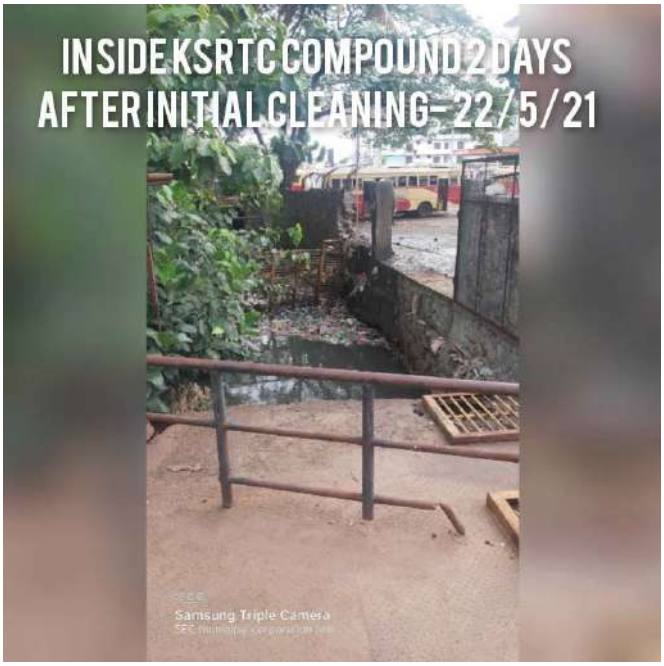

CROSS CULVERT WITH LOW CLEARANCE
Thiruvananthapuram, Kerala, India
Convent Rd, Vanchiyoor, Thiruvananthapuram,
Kerala 695035, India
Lat N 8° 29' 26.322" Long E 76° 56' 25.4076"
17/06/21 10:56 AM


COMPLETELY DAMAGED SIDE WALL AND ENCROACHMENT NEAR KSRTC COMPOUND
Latitude: 8.489084
Longitude: 76.952221
Elevation: 7.46m
Accuracy: 5.4m
Time: 23-06-2021 15:39
Note: pazhavangadi thodu in KSRTC compound


DAMAGED SIDE WALL
Latitude: 8.489006
Longitude: 76.942773
Elevation: 17.24m
Accuracy: 9.6m
Time: 11-06-2021 12:09
Note: pazhavangadi thodu in thakataparambu


DAMAGED SIDE WALL
Latitude: 8.487073
Longitude: 76.946183
Elevation: 8.95m
Accuracy: 9.6m
Time: 11-06-2021 12:15
Note: pazhavangadi thodu

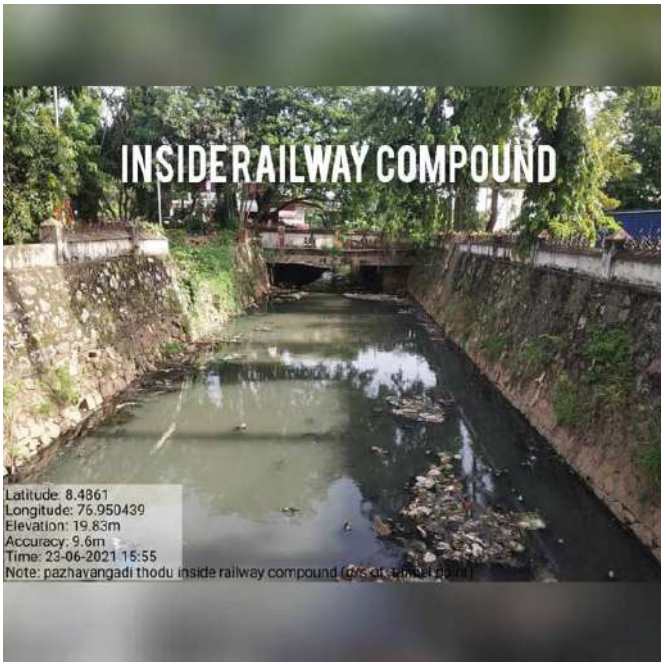

KWA DRAINAGE PIPE CAUSING BLOCKAGE
Latitude: 8.49382
Longitude: 76.940133
Elevation: 21.42m
Accuracy: 5.4m
Time: 23-06-2021 16:12


INSIDE KSRTC COMPOUND 2 DAYS AFTER INITIAL CLEANING- 22/5/21
Samsung Triple Camera


INSIDE KSRTC COMPOUND
Latitude: 8.489074
Longitude: 76.952212
Elevation: 10.98m
Accuracy: 3.2m
Time: 23-06-2021 15:39

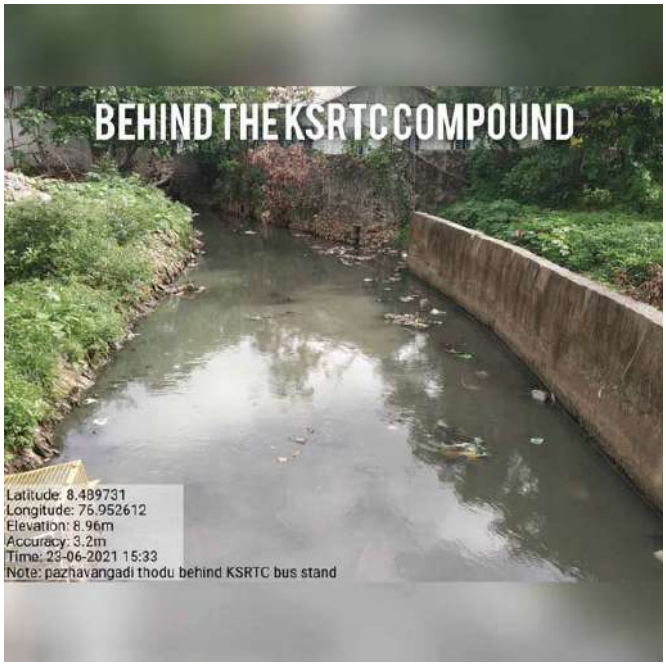

TREES ON SIDES RETAINING WALL
Latitude: 8.497412
Longitude: 76.936682
Elevation: 24.21m
Accuracy: 9.6m
Time: 23-06-2021 16:19


WASTES ACCUMULATED AFTER
INITIAL CLEANING NEAR
UPPULAAMOODU
Latitude: 8.488375
Longitude: 76.944468
Elevation: 21.53m
Accuracy: 3.2m
Time: 23-06-2021 16:08


INSIDE RAILWAY COMPOUND
Latitude: 8.4861
Longitude: 76.950439
Elevation: 19.83m
Accuracy: 9.6m
Time: 23-06-2021 15:55


D/S OF RAILWAY TUNNEL
Latitude: 8.486101
Longitude: 76.950442
Elevation: 19.34m
Accuracy: 5.4m
Time: 23-06-2021 15:55


U/S OF RAILWAY TUNNEL
Latitude: 8.48765
Longitude: 76.950603
Elevation: -84.48m
Accuracy: 4.4m
Time: 23-06-2021 15:48


BEHIND THE KSRTC COMPOUND
Latitude: 8.489731
Longitude: 76.952612
Elevation: 8.96m
Accuracy: 3.2m
Time: 23-06-2021 15:33
Note: pazhavangadi thodu behind KSRTC bus stand


ENCROACHMENTS
Latitude: 8.489722
Longitude: 76.952667
Elevation: 8.36m
Accuracy: 3.2m
Time: 23-06-2021 15:32
Note: pazhavangadi thodu behind KSRTC bus stand


DAMAGED SIDE WALLS
Latitude: 8.494609
Longitude: 76.953603
Elevation: 16.14m
Accuracy: 9.6m
Time: 23-06-2021 15:22
Note: pazhavangadi thodu near chenkalchoola colony


FLOATING WASTE NEAR
THAKARAPARAMBU
Latitude: 8.487639
Longitude: 76.945631
Elevation: 19.31m
Accuracy: 9.6m
Time: 11-06-2021 12:13
Note: pazhavangadi thodu


WASTE AND SILT NEAR
THAKARAPARAMBU
Latitude: 8.487052
Longitude: 76.946178
Elevation: 11.16m
Accuracy: 10.7m
Time: 11-06-2021 12:15
Note: pazhavangadi thodu


THAKARAPARAMBU STRETCH
BEFORE INITIAL CLEANING


KWA PIPE CAUSING BLOCKAGE
Latitude: 8.488488
Longitude: 76.944261
Elevation: 15.27m
Accuracy: 9.1m
Time: 15-05-2021 11:42
Note: UPPIDAMOODU PALAM-2


PIPES ACROSS THODU
Latitude: 8.487853
Longitude: 76.945313
Elevation: 12.85m
Accuracy: 9.6m
Time: 11-06-2021 12:12
Note: water authority pipe


HANGIGWIRE
Thiruvananthapuram, Kerala, India
Near, General Hospital Rd, Vanchiyoor,
Thiruvananthapuram, Kerala 695035, India
Lat N 8° 29' 37.8204" Long E 76° 56' 24.1692"
19/05/21 11:04 AM


U/S OF RAILWAY TUNNEL AFTER INITIAL CLEANING
Thiruvananthapuram, Kerala, India
Thampanoor Bus Stop, Salem - Kochi Hwy, Overbridge, Chalai Bazaar, Thampanoor, Thiruvananthapuram, Kerala 695014, India
Lat N 8° 29' 15.6624" Long E 76° 57' 2.808"
19/05/21 10:44 AM


AFTER INITIAL CLEANING
Thiruvananthapuram, Kerala, India
Tc 28/2166/2, Ground Floor, opposite Padma Store, East Fort, Pazhavangadi, Thiruvananthapuram, Kerala 695023, India
Lat N 8° 29' 5.1792" Long E 76° 56' 52.4184"
19/05/21 10:47 AM


THAKARAPARAMBU STRETCH AFTER INITIAL CLEANING
Thiruvananthapuram, Kerala, India
Thakaraparambu Rd, Pazhavangadi, Nalumukku, Pazhavangadi, Thiruvananthapuram, Kerala 695001, India
Lat N 8° 29' 8.1492" Long E 76° 56' 50.262"
19/05/21 10:49 AM


CROSSPIPES
Thiruvananthapuram, Kerala, India
TC 27/1652-2, Pattoor - Vanchiyoor Rd, Vanchiyoor,
Thiruvananthapuram, Kerala 695035, India
Lat N 8° 29' 42.3204" Long E 76° 56' 21.7032"
19/05/21 11:06 AM


THAKARAPARAMBU STRETCH
BEFORE INITIAL CLEANING
Latitude: 8.4856
Longitude: 76.947278
Elevation: 4.94m
Accuracy: 6.1m
Time: 15-05-2021 11:47
Note: THAKARAPARAMBU-


SILT DEPOSIT AND TRESS ON SIDE WALL
Thiruvananthapuram, Kerala, India
TC 27/1652-2, Pattoor - Vanchiyoor Rd, Vanchiyoor,
Thiruvananthapuram, Kerala 695035, India
Lat N 8° 29' 42.3168" Long E 76° 56' 21.4764"
19/05/21 11:06 AM


NEAR BAKERY JUNCTION
Latitude: 8.500799
Longitude: 76.95452
Elevation: 17.23m
Accuracy: 13.9m
Time: 23-06-2021 15:08
Note: pazhavangadi thodu near bakery junction


NEAR UPPULA AMOODU BRIDGE..END
OF CUT AND COVER PORTION
Latitude: 8.490933
Longitude: 76.940309
Elevation: 10.64m
Accuracy: 13.7m
Time: 15-05-2021 11:37
Note: UPPIDAMOODU PALAM


WASTE INSIDE THODU IN KSRTC
COMPOUND AFTER INTIAL CLEANING
Samsung Triple Camera

Amayizhanchan Thodu

Introduction:

Pattom thodu, Ulloor thodu and Pazhavangadi thodu converges near the U/S of Kannanmoola bridge and then the thodu takes the name Amayizhanchan. The thodu ends at Aakkulam lake and has a length of 5.40 km and an average width of 20 to 30m. During the heavy flood on August 2018 and 2019, large scale damages were occurred to the Amayizhanchan thodu side walls.

Importance of Amayizhanchan thodu

- A large chunk of the flood/ storm water from city/ corporation area is drained into Amayizhanchan thodu through Pattom, Pazhavangadi and Ulloor thodu. Hence it is highly necessary to ensure that Amayizhanchan thodu remains waste/ silt free in order to ensure smooth drain out of flood water from corporation area especially areas like Thamapanoor, East Fort, Pazhavangadi, Thakaraparambu, Murinjapalam, Gowreeshapattom, Puthenpalam, Kannanmoola, etc.
- Rejuvenation of Aakkulam lake is linked with the rejuvenation of Amayizhanchan thodu.

Problems identified:

- Heavy amount of silt deposition
- In the first 1.5km stretch, the thodu have side retaining walls, but these walls are in dilapidated condition. Beyond first 1.5km stretch, there are no side walls. At these stretches, surrounding lands are marshy land and these land get flooded up in every rainy season since thodu and surrounding lands are in almost in same level.
- The piers of three old bridges (Kakkodu, Pulikodu and Nellikuzhi- of average clear way of 2m) are aiding flooding, due to the blockages of wastes in between the piers of these bridges. These obstruction were

identified years before and in JNURUM project it was decided to remove these bridges but the project didn't takeoff due to local agitation.

Short term initial cleaning proposal: -

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl. No.	Vulnerable points	works to be arranged	Amount
1	Kannamoola Bridge to Pulikode Bridge	Small scale Desiltation , waste removal and jungle clearance	10 lakhs
2	pulikkode bridge to kakkodu bridge	Small scale Desiltation , waste removal and jungle clearance	4lakhs
3	kakkodu bridge to nellikuzhi bridge	Small scale Desiltation , waste removal and jungle clearance	7 lakhs
4	Nellikuzhi bridge to Edathara bridge	Small scale Desiltation , waste removal and jungle clearance	15lakhs
5	Edathara bridge to Akkulam mouth	Small scale Desiltation , waste removal and jungle clearance	12 lakhs

Total Amount:- 48 lakhs

Conclusion:

After studying the condition of Pazhavangadi thodu, it is understood that desiltation, removal of garbage and debris, cutting and removal of weeds, jungle growth etc. should be taken up and also the existing conditions required to be improved to meet the heavy discharges that occur during severe flood. However, the existing capacity of the thodu is not adequate to drain out flood water during flash and heavy floods. In view of this, it is necessary to construct the side retaining walls to prevent flooding in side banks. Also fencing in the side banks are requires especially at locations were bund roads are there in order to prevent the disposal of

wastes. Also it is highly necessary to reconstruct three old bridges to prevent the blockages inside the thodu.

Abstract Estimate

Cleaning of Amayizhanchan thodu- phase 1

(Cost Index Applied for this estimate is 37.93%)

1 cleaning		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	200.000 sqm
	Say 200.000 sqm @ Rs 9.93 / sqm	**Rs 1986.00**
2	2.32 Clearing grass and removal of the rubbish up to a distance of 50 m outside the periphery of the area cleared.	
	Net Total Quantity	10400.000 sqm
	Say 10400.000 sqm @ Rs 5.03 / sqm	**Rs 52312.00**
3	50.2.33.5 Cutting branches of trees overhanging above any structures of girth between 40cm to 60cm including stacking of serviceable materials and disposal of unserviceable material, cost of labour, hire charges of rope and pully etc without making any damages to nearby structures etc complete.	
	Net Total Quantity	40.000 each
	Say 40.000 each @ Rs 208.00 / each	**Rs 8320.00**
4	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	5.000 each
	Say 5.000 each @ Rs 302.34 / each	**Rs 1511.70**
5	od20438/2021_2022/IA Engaging labour for removing solid wastes, clearing waste and silt/clay from under side of slabs and for conveying waste from thodu to nearby road and labour for capping of unauthorized drainage lines to thodu etc	
	Net Total Quantity	365.000 each
	Say 365.000 each @ Rs 589.56 / each	**Rs 215189.40**

6	od20431/2021_2022/IA Removal of all floating organic and inorganic wastes such as cloth wastes, bottles, electronic wastes, electric wastes, wooden branches of trees, thermocols, hotel wastes, poultry waste, plastic wastes, kitchen utensils, leafs and other dumped wastes Using any type of departmental/ contractors own machinery including disposal of removed materials by the contractor at his own means without causing damage to environment and society including all leads lifts etc complete as departmental officers in charge.	
	Net Total Quantity	144.000 hour
	Say 144.000 hour @ Rs 2135.35 / hour	**Rs 307490.40**
7	od20432/2021_2022/IA Desiltation/ Excavation by mechanical means(department/contractors own machine) or manual means over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm in plan) in or under water including getting out and disposal of removed excavated material combined with all deposited debris which comprises a mixture of organic and inorganic waste mixed with liquid mud, silt in any form without causing damages to environment or society, to contractors own place of choice including all leads and lift upto 1.5m etc. complete as directed by departmental officers in charge.	
	Net Total Quantity	9370.000 cum
	Say 9370.000 cum @ Rs 394.30 / cum	**Rs 3694591.00**
8	od20439/2021_2022/IA Hire charges of country boat including boatman , conveyance , other incidental charges etc. complete 	
	Net Total Quantity	6.000 Day
	Say 6.000 Day @ Rs 637.66 / Day	**Rs 3825.96**

Total Amount	4285226.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**514227.12**
Total	**4799453.12**
Lumpsum for round off	**546.88**
TOTAL Rs	**4800000.00**
Rounded Total Rs	**48,00,000**
Rupees Forty Eight Lakh Only	

(Cost Index Applied for this estimate is 37.93%)


SILTATION AND TREES
Thiruvananthapuram, Kerala, India
Anamukham Bridge, Anamukham Bridge, Anayara,
Thiruvananthapuram, Kerala 695029, India
Lat N 8° 30' 49.1796" Long E 76° 54' 58.5288"
25/06/21 12:53 PM


SILTATION NEAR KANNANMOOLA BRIDGE
St.jospeh villa TC 15/2925, Kannammoola, Thiruvananthapuram, Kerala 695035, India
Latitude
8.5005927°
Longitude
76.9317163°
Local 11:47:49 AM
GMT 06:17:49 AM
Altitude 0 meters
Friday, 25-06-2021

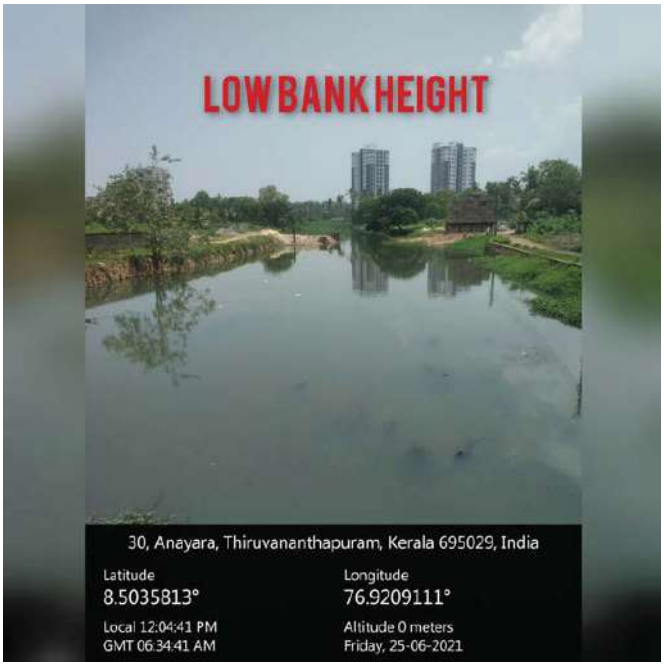

SILTATION AND TREES IN SILT BED
Bridge, Kannammoola Palam Rd, Kannammoola, Thiruvananthapuram, Kerala 695035, India
Latitude
8.50137562°
Longitude
76.93167402°
Local 11:46:34 AM
GMT 06:16:34 AM
Altitude -84.27 meters
Friday, 25-06-2021

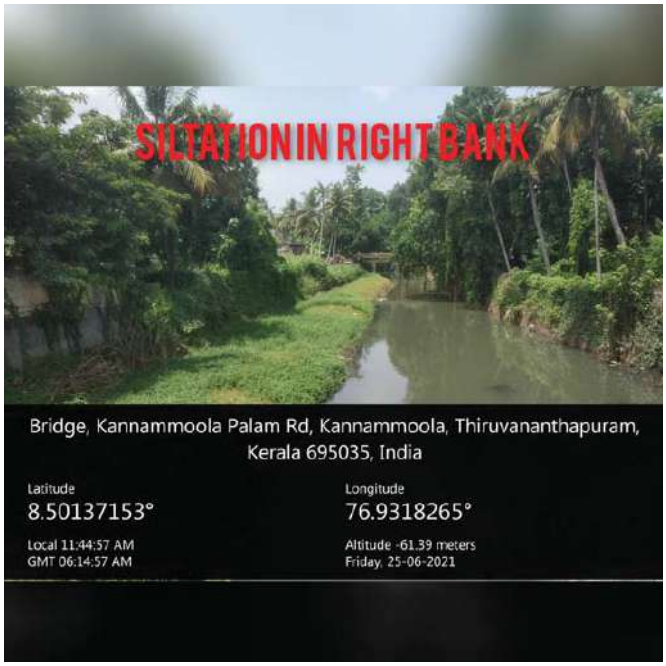

SILTATION OF BED NEAR CONFIDENT GOLD COAST FLAT
Thiruvananthapuram, Kerala, India
Kakkavila P.O. Pavara, Valley View Gardens,
Kumarapuram, Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 33.6168" Long E 76° 55' 6.294"
25/06/21 12:17 PM


SILTATION IN LEFT AND RIGHT BANK
B/W 2ND AND 3RD BRIDGE
Thiruvananthapuram, Kerala, India
First Cross Bridge Ln, Kannammoola,
Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 13.95" Long E 76° 55' 25.4388"
25/06/21 12:02 PM


SILTATION OF BED (U/S OF PULIKODU)
TC14/1923, Pothujanam Rd, Kannammoola, Thiruvananthapuram, Kerala 695033, India
Latitude
8.50190652°
Longitude
76.92790093°
Local 11:56:18 AM
GMT 06:26:18 AM
Altitude -79.32 meters
Friday, 25-06-2021


LOW BANK HEIGHTS NEAR NELLIKUZHI
First Cross Bridge Ln, Dreamland Avenue, Anayara,
Thiruvananthapuram, Kerala 695033, India
Latitude
8.50604653°
Longitude
76.92147377°
Local 12:04:59 PM
GMT 06:34:59 AM
Altitude -91.44 meters
Friday, 25-06-2021


LOW BANK HEIGHT
30, Anayara, Thiruvananthapuram, Kerala 695029, India
Latitude
8.5035813°
Longitude
76.9209111°
Local 12:04:41 PM
GMT 06:34:41 AM
Altitude 0 meters
Friday, 25-06-2021


SILTATION IN RIGHT BANK
Bridge, Kannammoola Palam Rd, Kannammoola, Thiruvananthapuram, Kerala 695035, India
Latitude
8.50137153°
Longitude
76.9318265°
Local 11:44:57 AM
GMT 06:14:57 AM
Altitude -61.39 meters
Friday, 25-06-2021


SILTATION D/S OF PULIKODU
61, Kallummoodu, Pettah, Thiruvananthapuram, Kerala 695029, India
Latitude
8.4962974°
Longitude
76.9237926°
Local 11:56:00 AM
GMT 06:26:00 AM
Altitude 0 meters
Friday, 25-06-2021

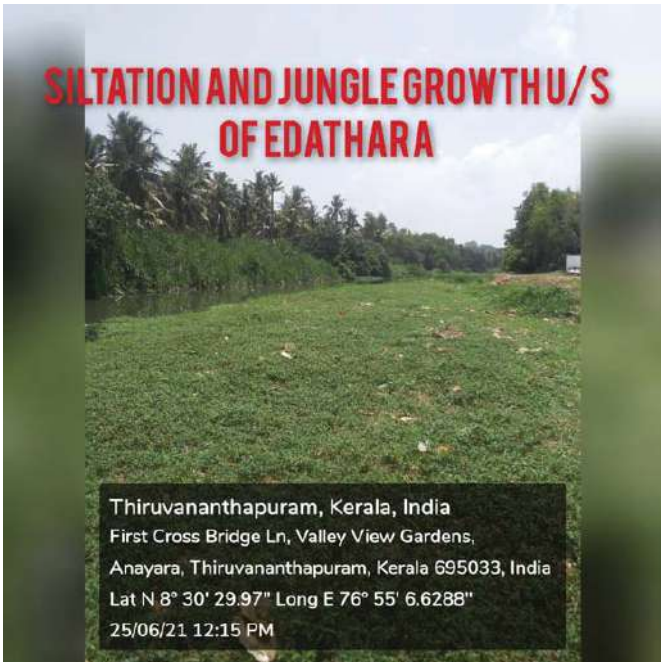

KAKKODU BRIDGE
Thiruvananthapuram, Kerala, India
Sudarsanam, KVRA 116 TC 14/1889(2), Kavuvila, Kannammoola
Medical College, Po, Kannammoola, Thiruvananthapuram, Kerala 695011, India
Lat N 8° 30' 6.516" Long E 76° 55' 34.2624"
25/06/21 11:59 AM


DELTA FORMATION, TREES TO BE REMOVED NEAR
K Cross Bhagathsingh Rd, Kannammoola, Thiruvananthapuram, Kerala 695024, India
Latitude
8.50154267°
Longitude
76.93152827°
Local 11:48:01 AM
GMT 06:18:01 AM
Altitude -84.9 meters
Friday, 25-06-2021


NELLIKUZHI BRIDGE
Thiruvananthapuram, Kerala, India
First Cross Bridge Ln, Dreamland Avenue, Anayara, Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 19.8972" Long E 76° 55' 18.6312"
25/06/21 12:03 PM


DELTA FORMATION NEAR CONFIDENT FLAT
Thiruvananthapuram, Kerala, India
First Cross Bridge Ln, Valley View Gardens, Anayara, Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 28.8468" Long E 76° 55' 9.3684"
25/06/21 12:14 PM


LOW BUND HEIGHT, SILTATION
Thiruvananthapuram, Kerala, India
Sudarsanam, KVRA 116 TC 14/1889(2), Kavuvila, Kannammoola Medical College, Po, Kannammoola, Thiruvananthapuram, Kerala 695011, India
Lat N 8° 30' 6.4548" Long E 76° 55' 33.276"
25/06/21 11:59 AM


SILTATION AND JUNGLE GROWTH U/S OF EDATHARA
Thiruvananthapuram, Kerala, India
First Cross Bridge Ln, Valley View Gardens, Anayara, Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 29.97" Long E 76° 55' 6.6288"
25/06/21 12:15 PM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Sudarsanam, KVRA 116 TC 14/1889(2), Kavuvila, Kannammoola
Medical College, Po, Kannammoola, Thiruvananthapuram, Kerala
695011, India
Lat N 8° 30' 6.444" Long E 76° 55' 33.2112"
25/06/21 12:00 PM


DELTA FORMATION AND TREES GROWN IN DELTA
Thiruvananthapuram, Kerala, India
First Cross Bridge Ln, Valley View Gardens,
Anayara, Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 24.8904" Long E 76° 55' 13.3464"
25/06/21 12:08 PM


SILTATION
Thiruvananthapuram, Kerala, India
First Cross Bridge Ln, Valley View Gardens,
Anayara, Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 28.8468" Long E 76° 55' 9.3684"
25/06/21 12:14 PM


PULIKODU BRIDGE
Thiruvananthapuram, Kerala, India
TC14/1923, Pothujanam Rd, Kannammoola,
Thiruvananthapuram, Kerala 695033, India
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25/06/21 11:55 AM


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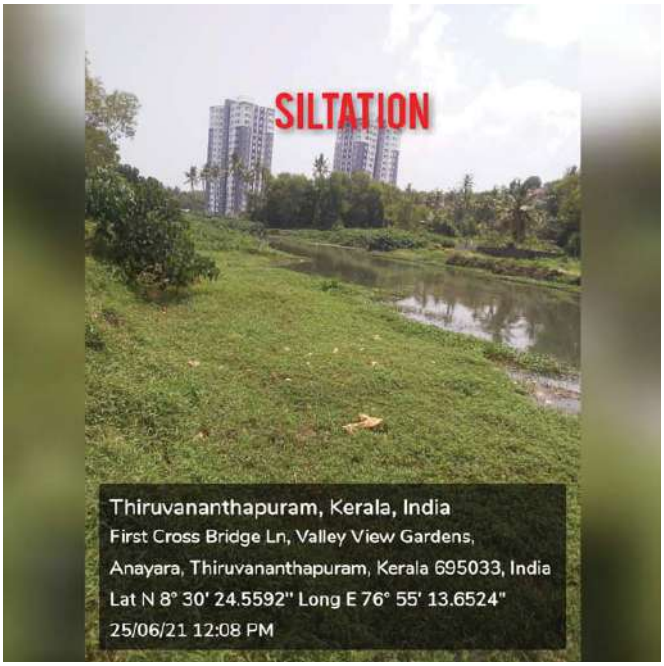
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25/06/21 12:08 PM


SILTATION NEAR EDATHARA
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Anamukham Bridge, Anamukham Bridge, Anayara,
Thiruvananthapuram, Kerala 695029, India
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25/06/21 12:54 PM


SILTATION AND TREES GROWN NEAR ANAYARA
Thiruvananthapuram, Kerala, India
40, Kumarapuram Rd, Friends Nagar, Kumarapuram,
Thiruvananthapuram, Kerala 695033, India
Lat N 8° 30' 51.3216" Long E 76° 55' 7.5576"
25/06/21 12:41 PM


DELTA FORMATION IN LEFT BANK
Thiruvananthapuram, Kerala, India
Blue Dale Arcade, Kumarapuram Kannanmoola Rd,
Kannammoola, Thiruvananthapuram, Kerala 695033, India
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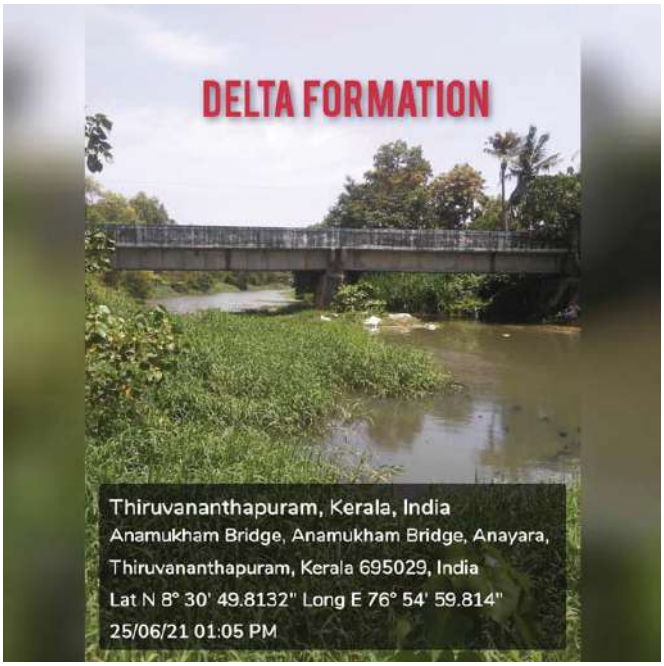
25/06/21 11:53 AM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25/06/21 01:05 PM


TREES TO BE PRUNED
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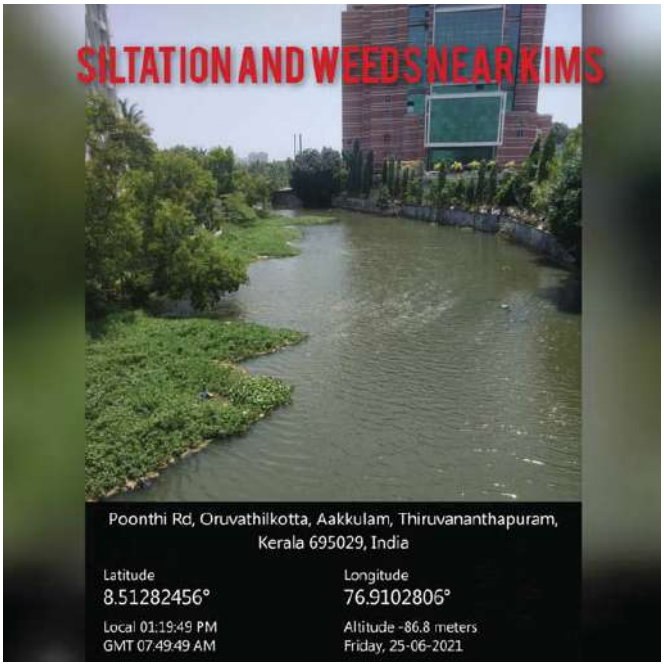
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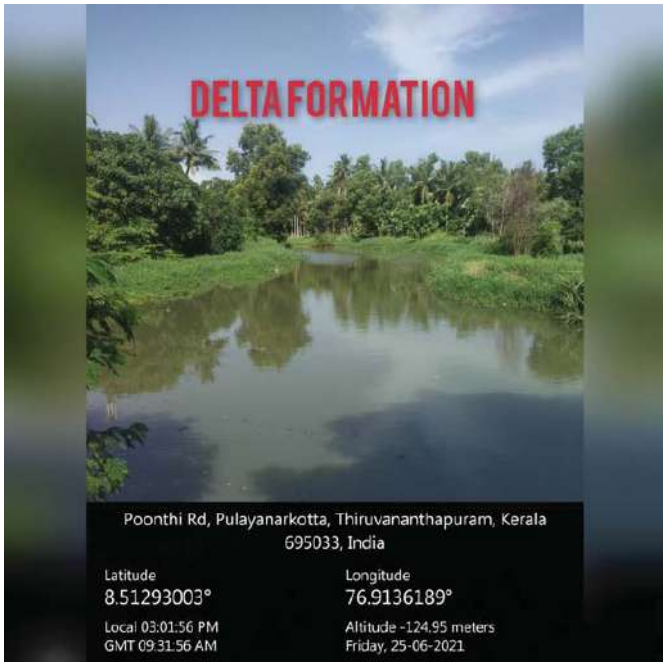
Friday, 25-06-2021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Friday, 25-06-2021


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Friday, 25-06-2021


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Friday, 25-06-2021


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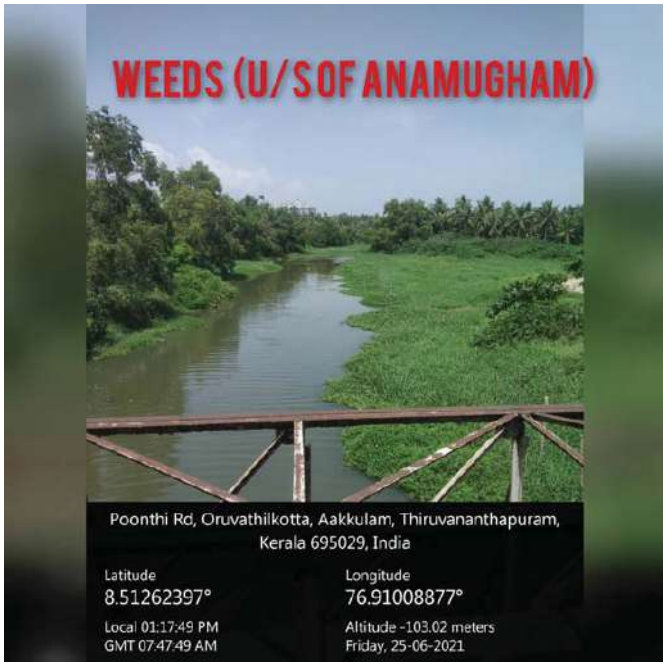
WEEDS (U/S OF ANAMUGHAM)
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Friday, 25-06-2021


WEED GROWTH AND VERY LOW BUND HEIGHT
Thiruvananthapuram, Kerala, India
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Thiruvananthapuram, Kerala 695029, India
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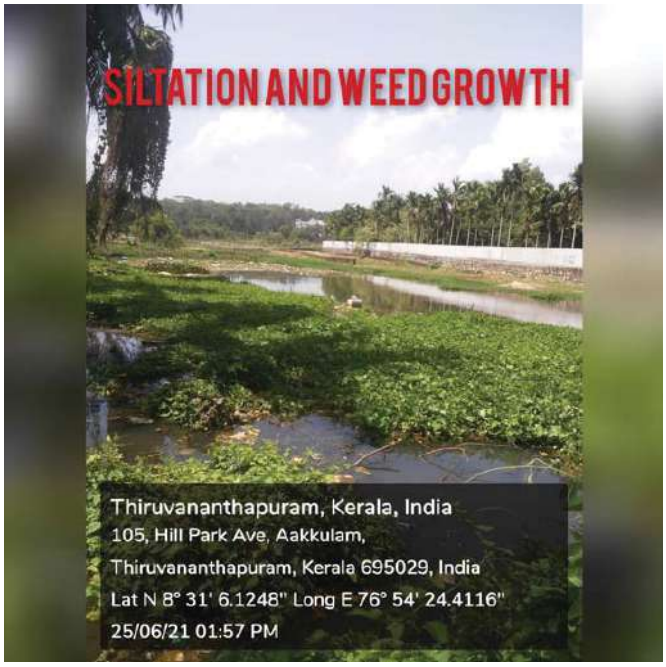
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Thiruvananthapuram, Kerala 695029, India
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THEKKENEKARA CANAL

Introduction:

Thekkanakkara canal was constructed in 1936 for draining out flood water from the East fort area to the Parvathi puthanar. Total length of the canal is about 2500 meters, out of which about 1460 meter length of the canal is running under ground. i.e. canal is running with a great slop and laid about 1.80 m to 3.00 m below the ground level (at underground stretches). The average width of the canal is 4.50m. The canal is constructed in a beautiful brick arch shaped structure using brick and surki mortar. From Karimadom pond to Vazhapalli junction the canal is running underground with great slope. After that the canal is made open (trapezoidal shaped open canal with stone pitching on both banks) up to Parvathy puthanar.

Problems identified:

Encroachments at various points:

Presently the canal area is heavily encroached by unauthorised constructions at many places in the East Fort and Sreevaraham areas and therefore canal is not serving its purposes fully. Width of the canal has been reduced from 4.50m to 1.50m near Vazhapally junction due to encroachments. If the authorities can remove all encroachments on the banks of the canal in a time bound manner then the canal can be rejuvenated to its full potential.

Silt-soil deposition in the canal and vegetation on the banks:

Silt and soil particles have been deposited along the stretches of the canal. Due to this deposition the canal is not running fully. Many places like Sreevaraham junction, Sangam nagar stretches, the canal is not flowing at

its full potential. So the silt and soil particles need to be removed to restore the canal. Moreover the banks of the canal is being covered with thick vegetation including small trees, shrubs etc.

An estimate amount of 15 Lakhs has been proposed for the first phase cleaning of the canal and an amount of Rs. 45 Lakhs is proposed for cleaning the Karimadom pond. The estimate includes cleaning of canal i.e. Removal of silt and soil particles and disposal off to a safe dumping yard identified by the corporation authorities. It also includes cutting of trees and other vegetations on the banks of the canal.

Short term initial cleaning proposal: -

The vulnerable points along the canal and the nature of works proposed for initial cleaning is as detailed below:-

Sl.no	**Vulnerable locations**	**Nature of work**	**Estimate amount (in lakhs)**	**Remarks**
1	Karimadom pond cleaning	For cleaning	45 lakhs	The pond is completely filled with garbages, vegetation , silt and soil . It has to be removed completely
2	Vazhapally junction to Parvathy Puthanar	Desiltation and jungle clearance	15 lakhs	Due to thick vegetation on the banks of the canal and the soil particles deposited at the bottom of the canal,the flow is heavily affected .So it has to be removed and disposed off to a safe dumping yard.
		Total	**60 lakhs**	

Conclusions:

1. Many corporation drains are connected to the canal at various points like East fort, Attakulangara area, Sreevaraham area etc . All drains have to be cleaned by the corporation authorities for ensuring smooth flow of water and thereby avoiding flooding problem in the East fort

area. Without cleaning the connecting drains, the flooding problems cannot be solved.

2. Due to urgency only first phase of the cleaning is proposed. Periodical cleaning is required to ensure the smooth flow of water through the canal i.e. once or twice in a month.
3. A detailed survey needs to be conducted at the earliest to demarcate the actual boundaries of the canal.
4. The encroachments should be removed completely to restore the canal to its maximum potential.
5. The government has to declare the canal as a heritage property.

Abstract Estimate

Cleaning of Thekkenakara canal- Phase 1

(Cost Index Applied for this estimate is 37.93%)

1 cleaning		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	2800.000 sqm
	Say 2800.000 sqm @ Rs 9.93 / sqm	**Rs 27804.00**
2	50.2.33.5 Cutting branches of trees overhanging above any structures of girth between 40cm to 60cm including stacking of serviceable materials and disposal of unserviceable material, cost of labour, hire charges of rope and pully etc without making any damages to nearby structures etc complete.	
	Net Total Quantity	60.000 each
	Say 60.000 each @ Rs 208.00 / each	**Rs 12480.00**
3	15.9.2 Demolishing stone rubble masonry manually / by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer -in-Charges:In cement mortar	
	Net Total Quantity	26.250 cum
	Say 26.250 cum @ Rs 1387.16 / cum	**Rs 36412.95**
4	od20445/2021_2022/IA Engaging labour to removing and refixing the fencing at various location for carrying out desiltation/ waste removal	
	Net Total Quantity	3.000 Day
	Say 3.000 Day @ Rs 1307.28 / Day	**Rs 3921.84**
5	od20450/2021_2022/IA Engaging labour for removing solid wastes, clearing waste and silt/clay from under side of slabs and for conveying waste from thodu to nearby road and labour for capping of unauthorized drainage lines to thodu etc 	
	Net Total Quantity	80.000 no
	Say 80.000 no @ Rs 589.56 / no	**Rs 47164.80**

6	od20446/2021_2022/IA Removal of all floating organic and inorganic wastes such as cloth wastes, bottles, electronic wastes, electric wastes, wooden branches of trees, thermocols, hotel wastes, poultry waste, plastic wastes, kitchen utensils, leafs and other dumped wastes Using any type of departmental/ contractors own machinery including disposal of removed materials by the contractor at his own means without causing damage to environment and society including all leads lifts etc complete as departmental officers in charge.	
	Net Total Quantity	64.000 hour
	Say 64.000 hour @ Rs 2135.35 / hour	**Rs 136662.40**
7	od20447/2021_2022/IA Desiltation/ Excavation by mechanical means/ manual means(department/contractors own machine) over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm in plan) in ir under water including getting out and disposal of removed excavated material combined with all deposited debris which comprises a mixture of organic and inorganic waste mixed with liquid mud, silt in any form without causing damages to environment or society, to contractors own place of choice including all leads and lift upto 1.5m etc. complete as directed by departmental officers in charge.	
	Net Total Quantity	2070.000 cum
	Say 2070.000 cum @ Rs 394.30 / cum	**Rs 816201.00**
8	7.1.1 Random rubble masonry with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12 (1 cement : 6 coarse sand : 12 graded stone aggregate 20 mm nominal size) up to plinth level with:Cement mortar 1:6 (1 cement : 6 coarse sand)	
	Net Total Quantity	6.563 cum
	Say 6.563 cum @ Rs 5470.10 / cum	**Rs 35900.27**
9	4.1.3 Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level:1:2:4 (cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	
	Net Total Quantity	18.750 cum
	Say 18.750 cum @ Rs 7561.25 / cum	**Rs 141773.44**
10	4.3.2 Centering and shuttering including strutting, propping etc. and removal of form work for:Retaining walls, return walls, (any thickness) including attached pilasters, buttresses, plinth and string courses fillets, kerbs and steps etc.	
	Net Total Quantity	150.000 sqm
	Say 150.000 sqm @ Rs 522.20 / sqm	**Rs 78330.00**

Total Amount	1336651.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**160398.12**

Total	**1497049.12**
Lumpsum for round off	**2950.88**
TOTAL Rs	**1500000.00**
Rounded Total Rs	**15,00,000**
Rupees Fifteen Lakh Only	

(Cost Index Applied for this estimate is 37.93%)


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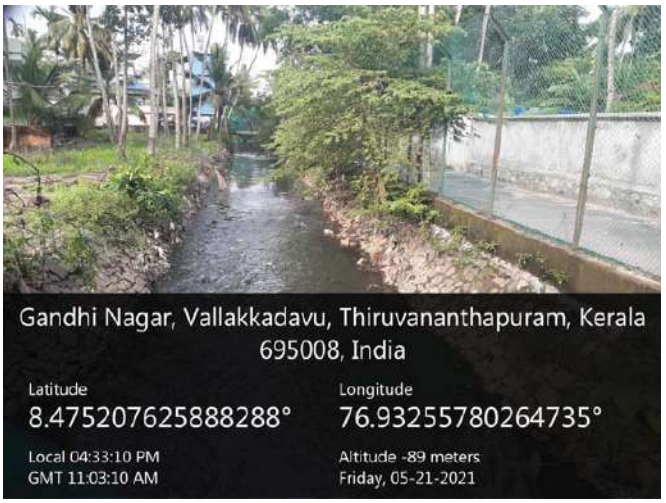
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Friday, 05-21-2021


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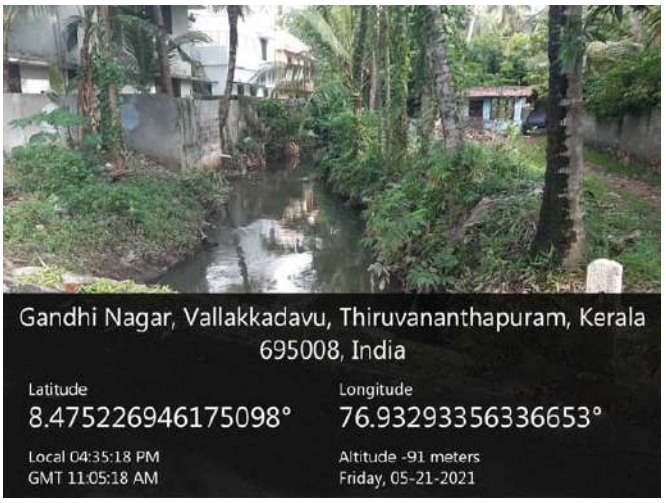
Friday, 05-21-2021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Friday, 05-21-2021


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Friday, 05-21-2021


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Friday, 05-21-2021


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Friday, 05-21-2021


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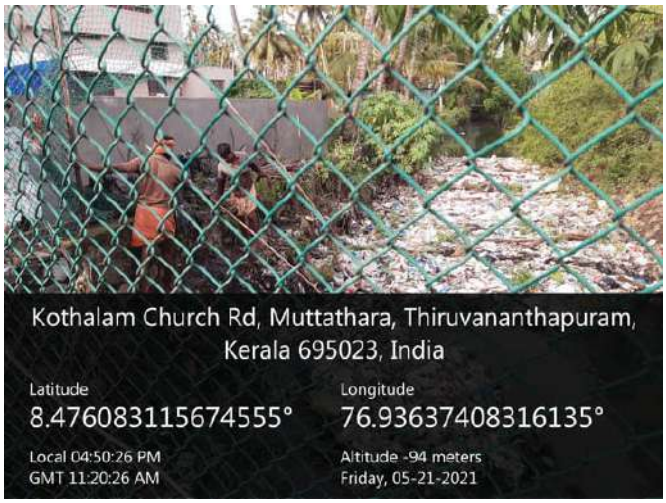
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Decimal DMS
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THETTIYAAR THODU

Introduction:

Thettiyaar thodu is a natural drain with top width varies from 4m to 15m (average width of approx. 10m). Thettiyaar thodu have 3 main tributaries. One tributary of thettiyaar thodu orginates from Aaanathazhchira, flows through Vetturoad, Kazhakootam NH and reaches Kulathoor, Moonnattumukku. Another tributary orginates from Greenfield stadium and reaches Moonnaattumukku. The third tributary orginates from Aniyoor and reaches Moonnattumukku. All three tributaries combines at moonnattumukku and flows towards Veli lake. The thodu has a length of 19.5kms. This thodu passes through Andoorkonam Panchayath, Vettu road, Kazhakuttom, Aniyoor ,Pangappara, Kulathoor, Karimanal and ends at Veli Lake. This is the major thodu which conveyance the entire flood water in Kazhakuttom Constituency. About 13.5kms of this thodu within the city.

Thettiyaar has a major role in controlling the flood in the City. But this thodu is now silted and become waste dumping location, it causes flooding in the City during monsoon. Several houses, private properties, including private companies are located on the banks of this thodu, mostly by encroachments

Problems identified:

- The drain is presently silted in a large scale which inturn reduces the actual water holding capacity.
- The width of the drain is also reduced at various locations due to encroachments.
- The large scale of waste dumping at various points along the drain especially from the bridges degrades the water quality and also causes blockages at bottleneck points.
- The sewage lines from domestic households which are let directly into the drains

- The low-lying service cables and lines passing across the drain which traps the floating materials during heavy inflow and causes flooding in the upstream.

Short term initial cleaning proposal: -

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl.no	Vulnerable locations	Nature of work	Estimate amount	Remarks
1	Near Kazhakkoottam Junction.	Clearing Jungle, cleaning silt, removing solid waste including plastic	2.5 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and down streamof bridges. Solution- cleaning of this portion of thodu once in a month
2	Kairali Nagar	Clearing Jungle, cleaning silt,cutting small trees, removing solid waste including plastic	2.5 lakhs	Problems- Dumping of all types of waste materials Solution- cleaning of this portion of thodu.
3	Near Paangappara old bridge	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwastes removal including plastics , sewage , organic waste etc	2 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in 6 months.
4	Near Vetturoad	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwastes removal including plastics , sewage , organic waste etc	1 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in a month

5	40 feet Bridge at near Railway track	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwastes removal including plastics , sewage , organic waste etc	2 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in a month
6	U/S & D/S of private bridge at Thampuraanmukku.	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwastes removal including plastics,sewage , organic waste etc	2 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in a month.
7	U/S & D/S of public bridge at Thampuraanmukku.	Clearing jungle, pruning of trees,cleaning silt from bottom of bridges,solidwastes removal including plastics,sewage , organic waste etc	2 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in a month.
8	U/S & D/S of bridge at TCS campus	Clearing jungle, cleaning silt, solid wastes including plastics and house hold wastes. Lifting and tying of loose and damaged cables across thodu	4 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in a month .

9	U/S & D/S of bridge at Technopark Phase-2 campus	Clearing jungle, cleaning silt, solid wastes including plastics and house hold wastes. Lifting and tying of loose and damaged cables across thodu	2 lakhs	Problems- Dumping of all types of waste materials to thodu and this waste is accumulated on the upstream and downstream of bridges. Solution- cleaning of this portion of thodu once in a month.
		Total	**20 lakhs**	

Conclusion:

After studying the condition of Thettiyaar thodu, it is understood that desiltation, removal of garbage and debris, cutting and removal of weeds, jungle growth etc. should be taken up and also the existing conditions required to be improved to meet the heavy discharges occur during severe flood. Fencing and CCTV cameras to be installed at vulnerable points to prevent the waste dumping.

Sl.no	Name of work	Amount
1	Emergency cleaning in Thettiyar thodu near Kairali nagar in Srekaryam ward of Thiruvananthapuram Corporation	3 Lakhs
2	Emergency work for cleaning of Thettiyar thodu (kochu thodu) near Kazhakkoottam junction in Thiruvananthapuram Coorporation to remove obstructions	3 Lakhs
3	Emergency cleaning in Thettiyar thodu at Naalpathadi paalam near railway track in Thiruvananthapuram Corporation	2 Lakhs
4	Emergency cleaning of Thettiyar thodu near Paangappara old bridge in Sreekaryam ward of Thiruvananthapuram Corporation	2 Lakhs
5	Emergency cleaning in Thettiyar thodu at U/S & D/S OF PRIVATE BRIDGE AT THAMPURAANMUKKU in Thiruvananthapuram Corporation	2 Lakhs
6	Emergency cleaning of Thettiyaar at U/S & D/S OF PUBLIC BRIDGE AT THAMPURAANMUKKU	2 Lakhs
7	Emergency cleaning of Thettiyaar at U/S & D/S OF BRIDGE AT TCS CAMPUS.	3 Lakhs
8	EMERGENCY CLEANING OF THETTIYAAR THODU AT U/S & D/S OF BRIDGE AT TECHNOPARK PHASE-2 CAMPUS IN THIRUVANANTHAPURAM CORPORATION	2 Lakhs
9	Emergency cleaning of Thettiyar thodu near Vetturoad in Kazhakkoottam ward ofThiruvananthapuram corporation	1 Lakh
	Total	**20 lakhs**

Abstract Estimate

Emergency cleaning in Thettiyar thodu near Kairali nagar in Srekaryam ward of Thiruvananthapuram Corporation

(Cost Index Applied for this estimate is 37.93%)

1 REACH 1		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	1350.000 sqm
	Say 1350.000 sqm @ Rs 9.93 / sqm	**Rs 13405.50**
2	od17777/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	125.000 hour
	Say 125.000 hour @ Rs 1281.65 / hour	**Rs 160206.25**
3	od17778/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	110.000 each
	Say 110.000 each @ Rs 589.56 / each	**Rs 64851.60**
4	od17779/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	10.000 Day
	Say 10.000 Day @ Rs 2883.70 / Day	**Rs 28837.00**

Total Amount	267300.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**32076.00**
Total	**299376.00**
Lumpsum for round off	**624.00**
TOTAL Rs	**300000.00**
Rounded Total Rs	**3,00,000**
Rupees Three Lakh Only	

Abstract Estimate

Emergency work for cleaning of Thettiyar thodu (kochu thodu) near Kazhakkoottam junction in Thiruvananthapuram Coorporation to remove obstructions

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	630.000 sqm
	Say 630.000 sqm @ Rs 9.93 / sqm	**Rs 6255.90**
2	od18077/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	120.000 hour
	Say 120.000 hour @ Rs 1281.65 / hour	**Rs 153798.00**
3	od18078/2021_2022/IA Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete. 	
	Net Total Quantity	8.000 Day
	Say 8.000 Day @ Rs 5767.41 / Day	**Rs 46139.28**
4	od18079/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc.... 	
	Net Total Quantity	104.000 each
	Say 104.000 each @ Rs 589.56 / each	**Rs 61314.24**

Total Amount	267507.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**32100.84**
Total	**299607.84**
Lumpsum for round off	**392.16**
TOTAL Rs	**300000.00**
Rounded Total Rs	**3,00,000**
Rupees Three Lakh Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Emergency cleaning in Thettiyar thodu at Naalpathadi paalam near railway track in Thiruvananthapuram Corporation

(Cost Index Applied for this estimate is 37.93%)

1 REACH 1		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	1350.000 sqm
	Say 1350.000 sqm @ Rs 9.93 / sqm	**Rs 13405.50**
2	od20262/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	80.000 hour
	Say 80.000 hour @ Rs 1281.65 / hour	**Rs 102532.00**
3	od20263/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	67.000 each
	Say 67.000 each @ Rs 589.56 / each	**Rs 39500.52**
4	od20264/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	8.000 Day
	Say 8.000 Day @ Rs 2883.70 / Day	**Rs 23069.60**

Total Amount	178508.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**21420.96**
Total	**199928.96**
Lumpsum for round off	**0.00**
TOTAL Rs	**199928.96**
Rounded Total Rs	**1,99,928**
Rupees One Lakh Ninety Nine Thousand Nine Hundred and Twenty Eight Only	

Abstract Estimate

Emergency cleaning of Thettiyar thodu near Paangappara old bridge in Sreekaryam ward of Thiruvananthapuram Corporation

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	600.000 sqm
	Say 600.000 sqm @ Rs 9.93 / sqm	**Rs 5958.00**
2	od18074/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	58.000 hour
	Say 58.000 hour @ Rs 1281.65 / hour	**Rs 74335.70**
3	od18075/2021_2022/IA Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete. 	
	Net Total Quantity	5.000 Day
	Say 5.000 Day @ Rs 5767.41 / Day	**Rs 28837.05**
4	od18076/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc.... 	
	Net Total Quantity	117.000 each
	Say 117.000 each @ Rs 589.56 / each	**Rs 68978.52**

Total Amount	178109.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**21373.08**
Total	**199482.08**
Lumpsum for round off	**517.92**
TOTAL Rs	**200000.00**
Rounded Total Rs	**2,00,000**
Rupees Two Lakh Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Emergency cleaning in Thettiyar thodu at U/S & D/S OF PRIVATE BRIDGE AT THAMPURAANMUKKU in Thiruvananthapuram Corporation

(Cost Index Applied for this estimate is 37.93%)

1 REACH 1		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	1350.000 sqm
	Say 1350.000 sqm @ Rs 9.93 / sqm	**Rs 13405.50**
2	od20266/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	70.000 hour
	Say 70.000 hour @ Rs 1281.65 / hour	**Rs 89715.50**
3	od20267/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	88.000 each
	Say 88.000 each @ Rs 589.56 / each	**Rs 51881.28**
4	od20268/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	8.000 Day
	Say 8.000 Day @ Rs 2883.70 / Day	**Rs 23069.60**

Total Amount	178072.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**21368.64**
Total	**199440.64**
Lumpsum for round off	**0.00**
TOTAL Rs	**199440.64**
Rounded Total Rs	**1,99,440**
Rupees One Lakh Ninety Nine Thousand Four Hundred and Forty Only	

Abstract Estimate

Emergency cleaning of Thettiyaar at U/S & D/S OF PUBLIC BRIDGE AT THAMPURAANMUKKU

(Cost Index Applied for this estimate is 37.93%)

1 REACH 1		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	900.000 sqm
	Say 900.000 sqm @ Rs 9.93 / sqm	**Rs 8937.00**
2	od20288/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	80.000 hour
	Say 80.000 hour @ Rs 1281.65 / hour	**Rs 102532.00**
3	od20289/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	75.000 each
	Say 75.000 each @ Rs 589.56 / each	**Rs 44217.00**
4	od20290/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	7.000 Day
	Say 7.000 Day @ Rs 2883.70 / Day	**Rs 20185.90**

Total Amount	175872.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**21104.64**
Total	**196976.64**
Lumpsum for round off	**0.00**
TOTAL Rs	**196976.64**
Rounded Total Rs	**1,96,976**
Rupees One Lakh Ninety Six Thousand Nine Hundred and Seventy Six Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Emergency cleaning of Thettiyaar at U/S & D/S OF BRIDGE AT TCS CAMPUS.

(Cost Index Applied for this estimate is 37.93%)

1 REACH 1		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	1350.000 sqm
	Say 1350.000 sqm @ Rs 9.93 / sqm	**Rs 13405.50**
2	od20291/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	125.000 hour
	Say 125.000 hour @ Rs 1281.65 / hour	**Rs 160206.25**
3	od20292/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	100.000 each
	Say 100.000 each @ Rs 589.56 / each	**Rs 58956.00**
4	od20293/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	12.000 Day
	Say 12.000 Day @ Rs 2883.70 / Day	**Rs 34604.40**

Total Amount	267172.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**32060.64**
Total	**299232.64**
Lumpsum for round off	**0.00**
TOTAL Rs	**299232.64**
Rounded Total Rs	**2,99,232**
Rupees Two Lakh Ninety Nine Thousand Two Hundred and Thirty Two Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

EMERGENCY CLEANING OF THETTIYAAR THODU AT U/S & D/S OF BRIDGE AT TECHNOPARK PHASE-2 CAMPUS IN THIRUVANANTHAPURAM CORPORATION

(Cost Index Applied for this estimate is 37.93%)

1 REACH 1		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	1350.000 sqm
	Say 1350.000 sqm @ Rs 9.93 / sqm	**Rs 13405.50**
2	od20294/2021_2022/IA :Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	67.000 hour
	Say 67.000 hour @ Rs 1281.65 / hour	**Rs 85870.55**
3	od20295/2021_2022/IA :Engaging man coolies for removing the solid wastes including slaughter house waste etc....complete as directed by the departmental officers at site.	
	Net Total Quantity	85.000 each
	Say 85.000 each @ Rs 589.56 / each	**Rs 50112.60**
4	od20296/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete.	
	Net Total Quantity	10.000 Day
	Say 10.000 Day @ Rs 2883.70 / Day	**Rs 28837.00**

Total Amount	178226.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**21387.12**
Total	**199613.12**
Lumpsum for round off	**0.00**
TOTAL Rs	**199613.12**
Rounded Total Rs	**1,99,613**
Rupees One Lakh Ninety Nine Thousand Six Hundred and Thirteen Only	

Abstract Estimate

Emergency cleaning of Thettiyar thodu near Vetturoad in Kazhakkoottam ward of Thiruvananthapuram corporation

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	450.000 sqm
	Say 450.000 sqm @ Rs 9.93 / sqm	**Rs 4468.50**
2	od18071/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of culvert for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	20.000 hour
	Say 20.000 hour @ Rs 1281.65 / hour	**Rs 25633.00**
3	od18072/2021_2022/IA Engaging tipper for removing the excavated wastes from various portions of the thodu during and after heaping at available places etc complete. 	
	Net Total Quantity	3.000 Day
	Say 3.000 Day @ Rs 5767.41 / Day	**Rs 17302.23**
4	od18073/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc.... 	
	Net Total Quantity	100.000 each
	Say 100.000 each @ Rs 589.56 / each	**Rs 58956.00**

Total Amount	106360.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**12763.20**
Total	**119123.20**
Lumpsum for round off	**876.80**
TOTAL Rs	**120000.00**
Rounded Total Rs	**1,20,000**
Rupees One Lakh Twenty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)


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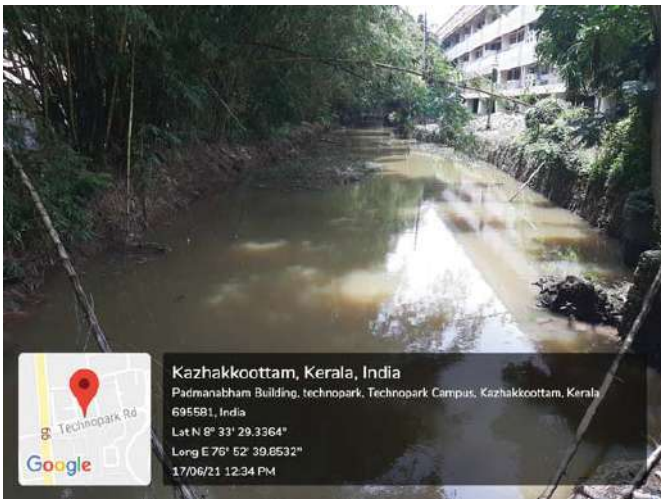
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Padmanabham Building, technopark, Technopark Campus, Kazhakkoottam, Kerala 695581, India
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Long E 76° 52' 39.8532"
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Long E 76° 52' 39.8496"
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Kazhakkoottam, Kerala, India
Padmanabham Building, technopark, Technopark Campus, Kazhakkoottam, Kerala 695581, India
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Long E 76° 52' 39.8496"
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Thiruvananthapuram, Kerala, India
Gandhi Ln, Pangappara, Thiruvananthapuram, Kerala
695581, India cleaning jungle removing solid waste plastic
silt
Lat N 8° 33' 32.8824" Long E 76° 53' 42.4104"
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105° E
Google


Thiruvananthapuram, Kerala, India
Gandhi Ln, Pangappara, Thiruvananthapuram, Kerala 695581,
India cleaning jungle removing solid waste plastic silt
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83° E
Google


Thiruvananthapuram, Kerala


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala
695581, India clearing jungle removing solid waste
plastic silt
Lat N 8° 33' 18.9972" Long E 76° 53' 29.076"
23/06/21 05:26 PM
113° SE
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram,
Kerala 695581, India clearing jungle, removing solid
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23/06/21 05:24 PM
330° NW
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala
695581, India clearing jungle removing solid waste plastic silt
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Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram,
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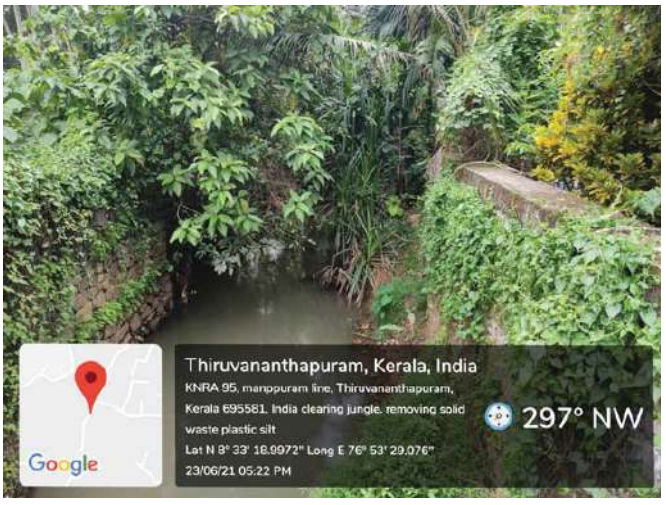
323° NW
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram,
Kerala 695581, India clearing jungle, removing solid
waste plastic silt
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23/06/21 05:22 PM
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Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala 695581, India clearing jungle. removing solid waste plastic silt
Lat N 8° 33' 18.9972" Long E 76° 53' 29.076"
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124° SE
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala 695581, India clearing jungle. removing solid waste plastic silt
Lat N 8° 33' 18.9972" Long E 76° 53' 29.076"
23/06/21 05:19 PM
129° SE
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala 695581, India clearing jungle. removing solid waste plastic silt
Lat N 8° 33' 18.9972" Long E 76° 53' 29.076"
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Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala 695581, India clearing jungle. removing solid waste plastic silt
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Google


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KNRA 95, manppuram line, Thiruvananthapuram, Kerala
695581, India clearing jungle. removing solid waste plastic
silt
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Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala
695581, India clearing jungle. removing solid waste plastic
silt
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23/06/21 05:17 PM
164° S
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala
695581, India clearing jungle. removing solid waste
plastic silt
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23/06/21 05:17 PM
271° W
Google


Thiruvananthapuram, Kerala, India
KNRA 95, manppuram line, Thiruvananthapuram, Kerala
695581, India clearing jungle. removing solid waste
plastic silt
Lat N 8° 33' 18.9972" Long E 76° 53' 29.076"
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270° W
Google

KARIYIL THODU

Introduction:

Kariyil thodu is one of the major thodu in Thiruvananthapuram Corporation. It flows in two directions i.e., one towards north and other towards south. The water from Ambalathara area flows through small drains in Panachikapalam, Vikas Nagar, Vedanthara and Kumarichantha .Then it reaches to Kariyil thodu at Kumarichantha and flows towards south and reaches Parvathyputhanar at Masalatheruvu by crossing NH bypass just before Moonnattumukku.

North flowing thodu starts from the mouth of Neelattinkara thodu (here water from Nilama Ela thodu at Paravankunnu flows through Nilama ela thodu and then it reaches to Kariyil thodu). This flows through Aryankuzhy, Ganga Nagar, behind of New Rajasthan marbles and MLA road and crossing NH Bypass just before Ardhanareeswara temple and again flows through secular garden , Asan Nagar and reaches to Thekkinikara canal. More over water from KBAC lane, Ganga Nagar, MLA road forms small drains and they also reaches to Kariyil thodu. Length of the thodu in both directions comes to 5.20 km).

Problems identified:

- This thodu passes through thickly populated areas of Thiruvananthapuram city.
- Local people living in nearby areas dispose off their house hold wastes directly into this thodu.
- Markets, restaurants etc. discharge sewage directly into the thodu resulting in increase of siltation leading to drastic reduction in water carrying capacity.
- On account of the reduction in the water carrying capacity of the thodu due to the reasons said above the nearby areas gets flooded when heavy rainfall occurs.

- The cleaning of the thodu was not carried out regularly over the years.
- The entire length of the thodu is filled with waste up to the water level and practically water flows only as a very narrow channel .
- The water is highly contaminated with plastic, non-biodegradable materials and other wastes which emits foul smell.
- People staying near are vulnerable to different types of diseases.
- Encroachment is also seen in almost all reaches of Kariyil thodu

Short term initial cleaning proposal :-

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl.no	Vulnerable locations	Nature of work	Estimate amount (in lakhs)	Remarks
1	Kariyil thodu and its distributaries	Clearing light jungleRemoval of garbage and debris Desilting the entire stretch of the thodu Capping of unauthorized drainage lines to the thodu	55.00	This thodu is fully stagnated and contaminated condition. Most of these portions are flowing through residential areas, which cause water born diseases for thepeople in the premises. CCTV camera and fencing is required at Vellarikonam market(Kamaleswaram market) Neelattinkara, AanaveenaKalunku, Aryankuzhy, KBAC lane, Secular Garden ,Ashan Nagar, Sangamam Nagar and both ends of Kariyil thodu crossing bypass road near Enchakkal junction

Abstract Estimate

Cleaning of Kariyil Thodu and its Tributaries phase -1

(Cost Index Applied for this estimate is 37.93%)

1 Cleaning of Kariyil Thodu and its Tributaries phase -1		
1	50.2.33.5 Cutting branches of trees overhanging above any structures of girth between 40cm to 60cm including stacking of serviceable materials and disposal of unserviceable material, cost of labour, hire charges of rope and pully etc without making any damages to nearby structures etc complete.	
	Net Total Quantity	85.000 each
	Say 85.000 each @ Rs 208.00 / each	**Rs 17680.00**
2	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	7300.000 sqm
	Say 7300.000 sqm @ Rs 9.93 / sqm	**Rs 72489.00**
3	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	13050.000 cum
	Say 13050.000 cum @ Rs 173.72 / cum	**Rs 2267046.00**
4	od20297/2021_2022/IA Engaging labour for removing solid wastes, clearing waste and silt/clay from under side of slabs and for conveying waste from thodu to nearby road and labour for capping of unauthorized drainage lines to thodu etc	
	Net Total Quantity	1275.000 each
	Say 1275.000 each @ Rs 589.56 / each	**Rs 751689.00**
5	od20283/2021_2022/IA :Engaging tipper for removing the excavated wastes from various portions of the thodu and disposing in availabile land within 5 km distance as per the direction of departmental officers at site, after heaping at available places etc complete	
	Net Total Quantity	320.000 Day
	Say 320.000 Day @ Rs 2883.70 / Day	**Rs 922784.00**
6	od20285/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency cleaning the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possible.	

	Net Total Quantity	640.000 hour
	Say 640.000 hour @ Rs 1281.65 / hour	**Rs 820256.00**
7	od20287/2021_2022/IA Hire charges of country boat including boatman , conveyance , other incidental charges etc. complete	
	Net Total Quantity	80.000 Day
	Say 80.000 Day @ Rs 637.66 / Day	**Rs 51012.80**

Total Amount	4902957.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**588354.84**
Total	**5491311.84**
Lumpsum for round off	**8688.16**
TOTAL Rs	**5500000.00**
Rounded Total Rs	**55,00,000**
Rupees Fifty Five Lakh Only	

(Cost Index Applied for this estimate is 37.93%)

Kariyil thodu @ Panachickappalam
(Huge SILTATION)

Kariyilthodu @ Neelattinkara
(Vegitation and Siltation)

Kariyil thodu @ near bypass
(Huge siltatition and Vegitation)

Kariyil thodu @ meeting point with Theckanakkara canal
(With waste and silt ,-flow obsructed)

U/s Kariyil thodu Joining with Parvathiputhanar @Moonattumukku (Stagnated due to siltation)

Kariyil thodu joints with Parvathiputhanar -@ Moonattumukku

Kariyil thodu – crossing Bypass Puthukkadu, @Thiruvallam(Narrow Width due to Encrochments)

Kariyilthodu @ Bilal nagar (Narrow and silted)

Kariyil thodu@ Kumarichantha
(Siltation & Waste dumping is main problem)

Kariyil thodu@ Kumarichantha south side
(Encrochments & high siltation)

Kariyil thodu@ Kumarichantha
(Encrochments&siltation)

Kariyil thodu @South of Kumarichantha
(Siltation & Vegitation to be removed)

Kariyil thodu @ south ofKumarichantha (Narrow width due to encrochments)

Kariyil thodu@ South of Kumarichantha

Kariyil thodu @ South of Kumarichantha (narrow due to encrochments)

Kariyil thodu @ Kumarichantha (U/S of crossing portion, at east of bypass)

Kariyil thodu @ Kumarichantha joining with the thodu connecting to Karamana river

Kariyil thodu near Kumarichantha @connecting thodu to Karamana river (High vegitation & siltation)

Kariyil thodu @ Corporation Market, Kumarichantha

Kariyil thodu @ Kumarichantha - narrow and silted (In side the Korodova School compound near bypass east side)

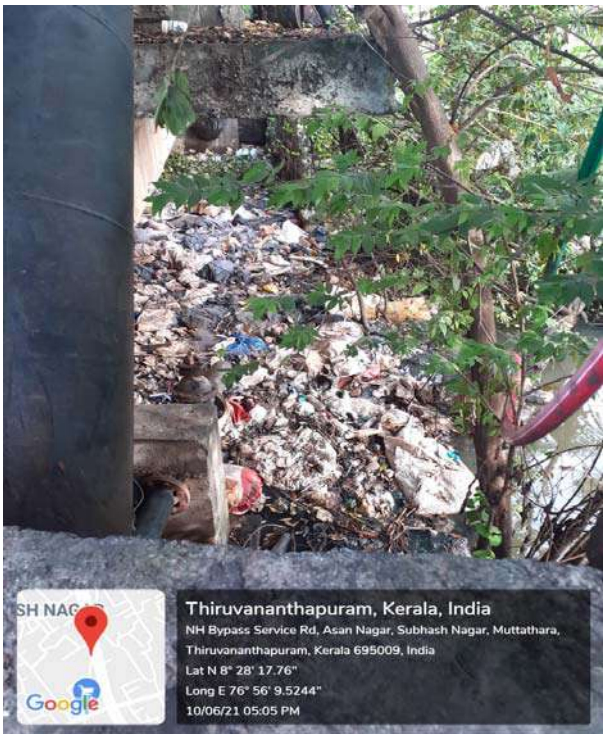
Kariyil thodu Kumarichantha @in side of Korodova School compound

Kariyil thodu @ Anaveena Kalungu nearParavankunnu (High siltation and Vegitation)

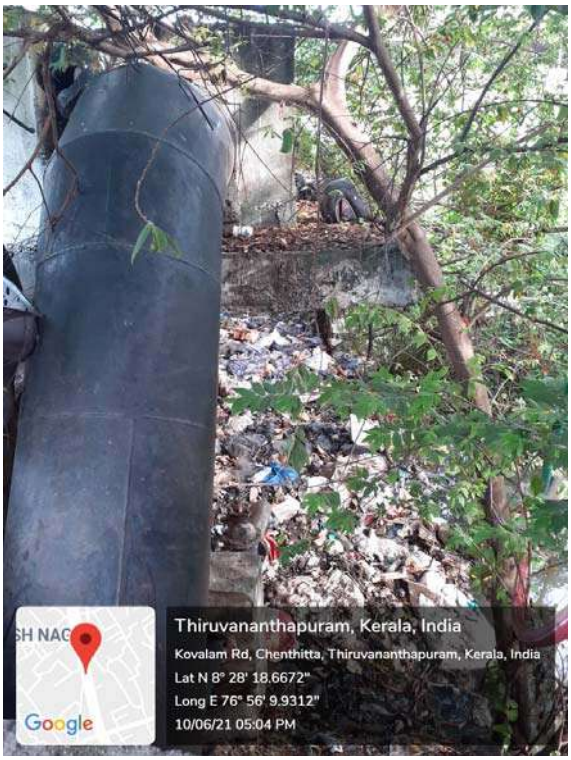
Kariyil thodu Paravankunnu @ Anaveena Kalungu (solution - Desiltation & Widening & rising of culvert)

Kariyil thodu @ Anaveena Kalunku near Paravankunnu (Rising of culvert and Desiltation – solution)

**Kariyil thodu @ Paravankunnu,
near Anaveena Kalunku**



**KariyilThodu -@ NH Bypass, Service Road,
near Asan Nagar, Muttathara
(Main waste dumping area west side of bypass service road)**



**KariyilThodu@ N H Crossing portion of
Thodu, Asan Nagar, Muttathara
(waste dumping including plastic wastes -
west side of bypass service road)**

PARVATHY PUTHANAR

Introduction:

Parvathi Puthanarruns through the west coast of Thiruvananthapuram district. It was named after Rani Parvathi Bai who reigned as the queen of Travancore in 1815 and 1829 when the canal was created. It was created primarily for connecting the Travancore capital to Kadinamkulam and finally to Kochi. This canal also has access to the king's boat landing place, Vallakadavu. At first, the water in the canal was very clear, reportedly, more than any river or other man-made canal in India. However with the presence of encroachments among other reasons, the canal is now polluted and most portions are not navigable. Now Parvathy Puthanar is a part of WCC.

Problems identified:

Thiruvananthapuram city face floods every year during rainy seasons. It is mainly due to obstructions to the flowing water through thodu, rivers and manmade Parvathy puthanar in the city. The Amayizhanjan thodu and Thetiyarthode joins Akkulam lake. Hence to reach the water from these thodu to the sea through Veli pozhi, the obstructions in the Akkulam and Veli lakes has to be removed. Thekkanakara thodu joins Parvathi Puthenar near Vallakkadavu bridge, The water from Thekkenakkara thodu, reach the sea mainly through Poonthura pozhy. Hence the portion of Parvathi Puthenar from Vallakkadavu to Poonthura pozhy should be free from obstructions.

The state government has entrusted the cleaning and dredging work of Parvathi Puthenar from Kovalam (Ch.0.00km) to Veli(Ch.16.045km) to Kerala Waterways and Infrastructures Ltd (KWIL), an SPV formed by the state government and the Cochin International Airport Ltd (CIAL). Hence the area from Vallakadavu bridge to Poonthura come under the area

entrusted with KWIL. While inspecting the site, lot of areas where noticed for urgent cleaning and desilting to avoid city flood from Vallakadavu to Edayar near Poonthura pozhi.

Short term initial cleaning proposal: -

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl.no	Vulnerable locations	Nature of work	Estimate amount (in lakhs)	Remarks
1	Vallakkadavu bridge to Edayar	Cleaning and desilting are required for ensuring smooth flow of water through the canal	20 lakhs	Flow is stagnant at many stretches of parvathyputhanar towards Kovalam Problems identified are silt and soil deposition at many points, water hyacinth population identified at many places on the said stretch
2	Veli railway bridge to Akkulam bridge	CSIND-Urgent cleaning /removal of water hyacinth in Velikayal from u/s of veli rail bridge (CH 16.045 km)	5 lakhs	Water hyacinth removal
3	At Veli railway bridge	For annual cleaning	20 lakhs	Periodic removal of water hyacinth is required 4 times a year as this gets accumulated under veli railway bridge from Akkulamkayal.Hence an annual maintenance amount of 20 lakhs shall be provided for this.
		Total	**45 lakhs**	

The estimate include cleaning and desilting from Vallakadavu to Edayar for Rs. 20.00 lakhs and cleaning from Veli bridge to Akkulam bridge in Veli and Akkuam lake for , Rs. 25.00 lakhs. The flow of water through the Akkulam and Veli lake is obstructed mainly due to water hyacinth. The water hyacinth formed in the lakes has to be cleaned initially and has to be continued fortnightly to keep it free from obstructions.

Sl.no	Name of work	Amount
1	Cleaning ,removal of water hyacinth,cutting of trees/branches of Parvathy Puthanar from CH 9.98 km to 16 km as part of city floods	10 lakhs
2	Cleaning of parvathy puthanar from Ch. 5.43 to 9.98 Kms	35 lakhs
	Total	45 lakhs

Abstract Estimate

Cleaning of parvathy puthanar from Ch. 5.43 to 9.98 Kms

(Cost Index Applied for this estimate is 37.93%)

1 Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	18200.000 sqm
	Say 18200.000 sqm @ Rs 9.93 / sqm	**Rs 180726.00**
2	od20389/2021_2022/IA Earthwork excavation by mechanical means (hydraulic excavator) or manual means over areas (exceeding 30cm in deapth ,1.5m width as will as 10sqm on plan including getting out and disposal of excavator earth lead up to 50m and lift upto 1.5m,as directed by the Engineering in charge all kinds of soil,conveyance of waste materials(contaminated sludge etc from site to dumping yard 5km lorry	
	Net Total Quantity	3454.500 cum
	Say 3454.500 cum @ Rs 346.99 / cum	**Rs 1198676.96**
3	od20397/2021_2022/IA Hiring a 4 seated boat for inspecting the canal	
	Net Total Quantity	3.000 each
	Say 3.000 each @ Rs 5226.75 / each	**Rs 15680.25**
2 LS amount for cleaning the canal three times in an year@ Rs. 5.50 lakhs per cleaning		
	Lump-Sum Total	**Rs 1650000.00**
	Total Amount	3045083.00
	Provision for GST payments (in %) @	**12.0%**
	Amount reserved for GST payments	**365409.96**
	Total	**3410492.96**
	Lumpsum for round off	**89507.04**
	TOTAL Rs	**3500000.00**
	Rounded Total Rs	**35,00,000**
		Rupees Thirty Five Lakh Only

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

Cleaning ,removal of water hyacinth,cutting of trees/branches of Parvathy Puthanar from CH 9.98 km to 16 km as part of city floods

(Cost Index Applied for this estimate is 37.93%)

1 Detailed estimate		
1	od20337/2021_2022/IA od25179/2018_2019/IA :Cleaning of waterway/ canal with suitable aquatic/amphibian cleaning equipment (preferably with aquatic weed cutter and weed harvestor of capacity 4.5 tonne & power 248hp) or similar mechanical equipment with necessary accessories for the entire existing width of TS canal, removing all the debris, rooted water plants, floating hyacinth and all other rubbish, solid waste etc., sorting out the decomposable and recycleable materials, temporary storage on the banks or other suitable locations for drying/reduction of volume, segregation of recyclable plastic waste so as to transport them to the recycling unit, transportation of recycleable materials to their respective recycling plants/ collection points and decomposable materials to identified and suitable locations for final disposal of the waste material by means of loaders / trucks / mechanized boats/ pontoons/ country boats etc., and final disposal of decomposable materials at suitable/identified locations in excavated trenches or otherwise and and providing a suitable soil cover of appropriate thickness including the cost, conveyance of all materials, hire charges for equipment, labour, incidentals etc., complete, for fulfilling the final objective of removing all floating obstructions and to ensure free flow of water in the canal as directed by the Engineer-in-charge.	
	Net Total Quantity	42000.000 sqm
	Say 42000.000 sqm @ Rs 13.66 / sqm	**Rs 573720.00**
2	od20451/2021_2022/IA Earthwork excavation by mechanical means (hydraulic excavator) or manual means over areas (excavating the soil which hinder the flow of water through the canal, exceeding 1 mtr in depth) , on plan including getting out and disposal of excavated earth lead up to 50m and lift upto 1.5m,as directed by the Engineering in charge all kinds of soil,conveyance of waste materials(contaminated sludge etc) to dumping yard from the site(5km)by lorry.	
	Net Total Quantity	300.000 cum
	Say 300.000 cum @ Rs 346.99 / cum	**Rs 104097.00**
3	od20452/2021_2022/IA Supplying additional coolie for removing and collecting the contaminated waste from the canal and loading it in the vehicle	
	Net Total Quantity	200.000 each
	Say 200.000 each @ Rs 589.56 / each	**Rs 117912.00**
4	od20338/2021_2022/IA od25212/2018_2019/IA :Hiring a 4 seated fibre boat with outboard engine as and when directed by the Engineer- in-charge for inspection/ survey of canal	
	Net Total Quantity	3.000 Day
	Say 3.000 Day @ Rs 6388.25 / Day	**Rs 19164.75**

5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	10.000 each
	Say 10.000 each @ Rs 302.34 / each	**Rs 3023.40**
6	2.33.2 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 60 cm girth up to and including 120 cm girth	
	Net Total Quantity	4.000 each
	Say 4.000 each @ Rs 1341.65 / each	**Rs 5366.60**

Total Amount	823284.00
Provision for GST payments (in %) @	**12.0%**
Amount reserved for GST payments	**98794.08**
Total	**922078.08**
Lumpsum for round off	**77921.92**
TOTAL Rs	**1000000.00**
Rounded Total Rs	**10,00,000**
	Rupees Ten Lakh Only

(Cost Index Applied for this estimate is 37.93%)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Kerala
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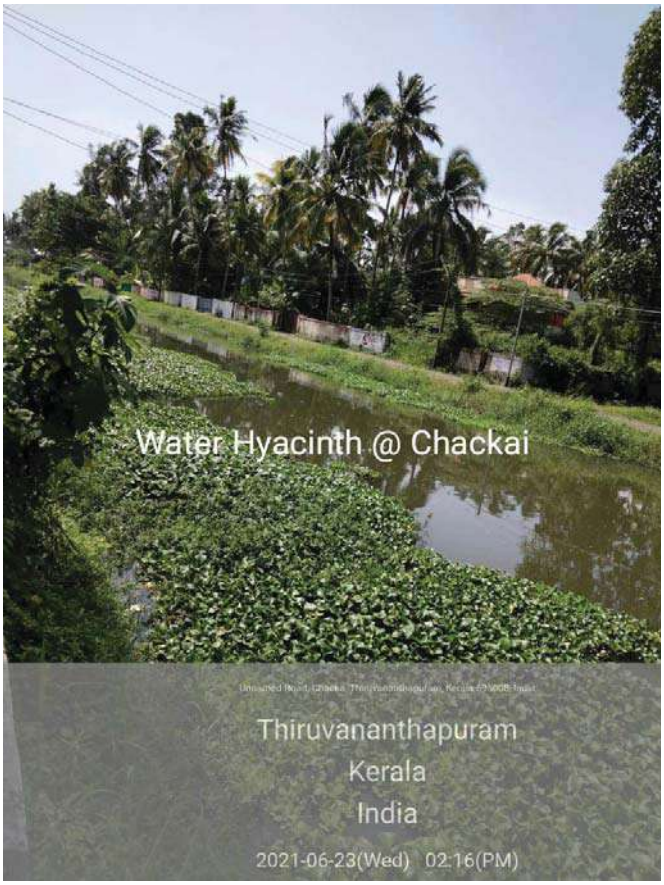
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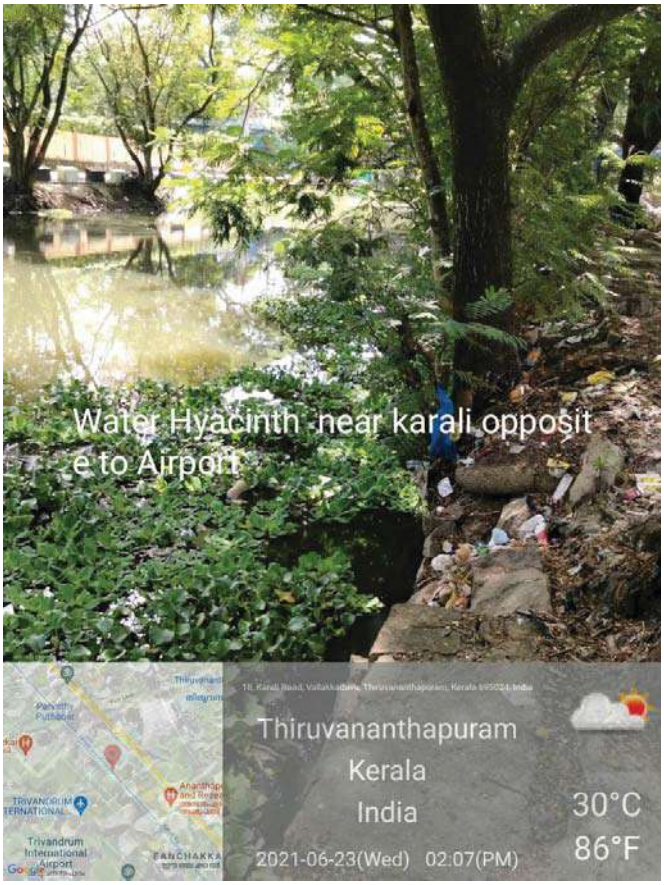
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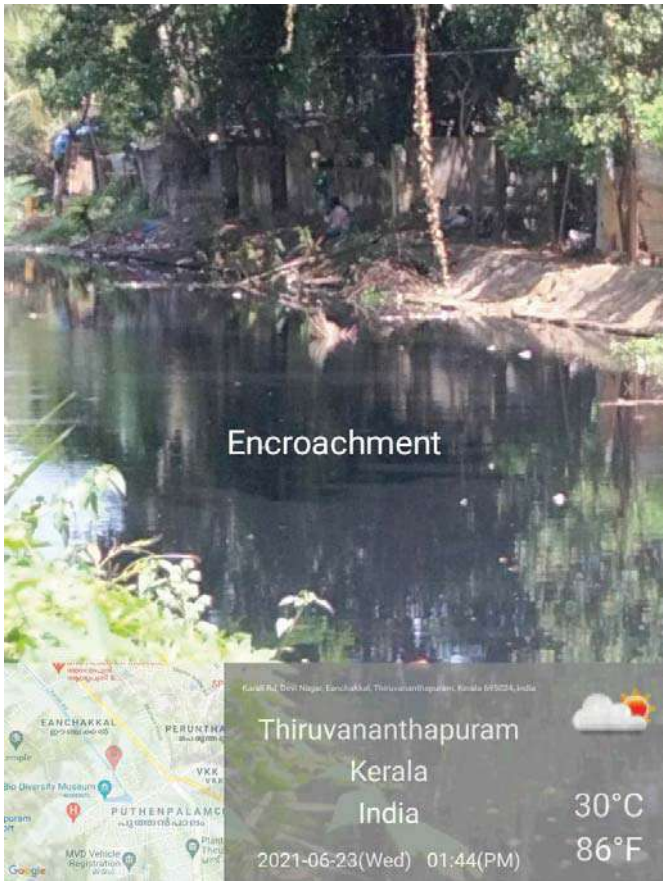
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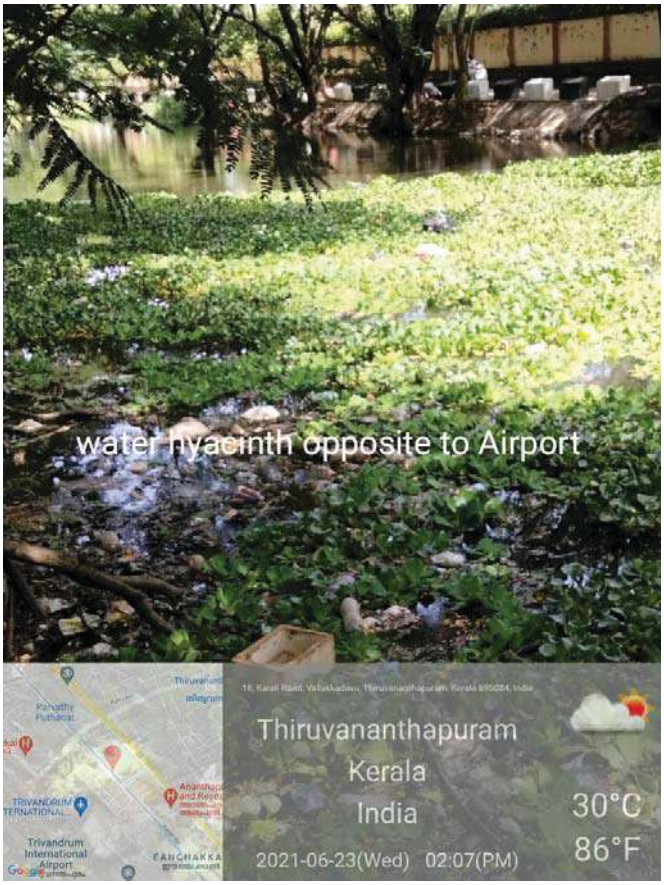
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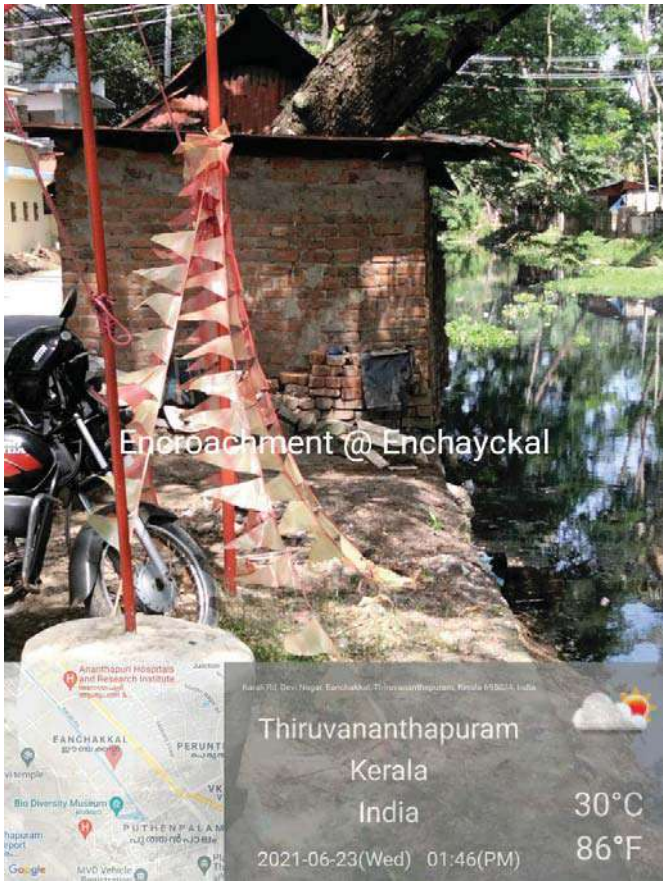
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water Hyacinth @ Chackai
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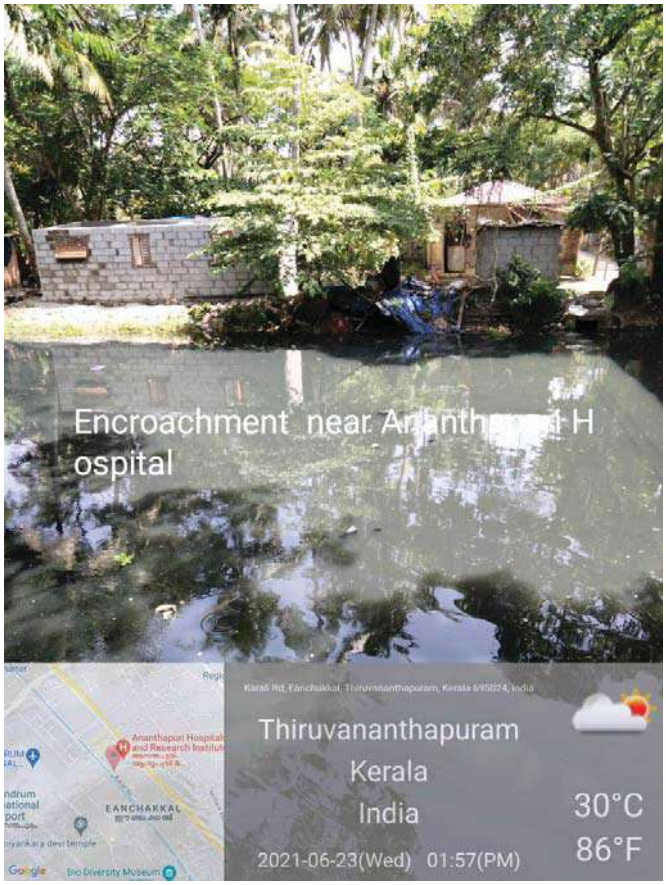
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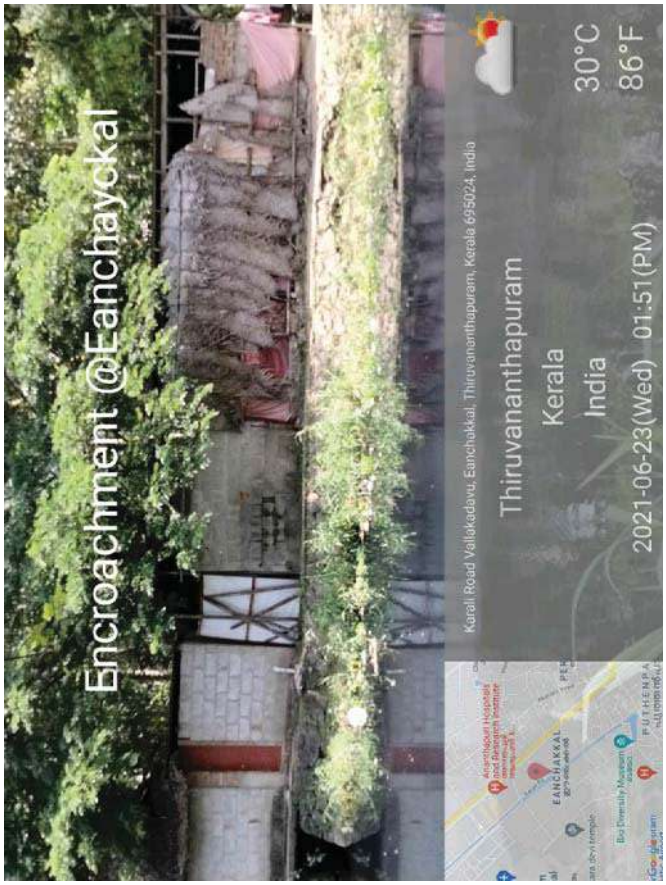
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Encroachment @ Vallakadavu
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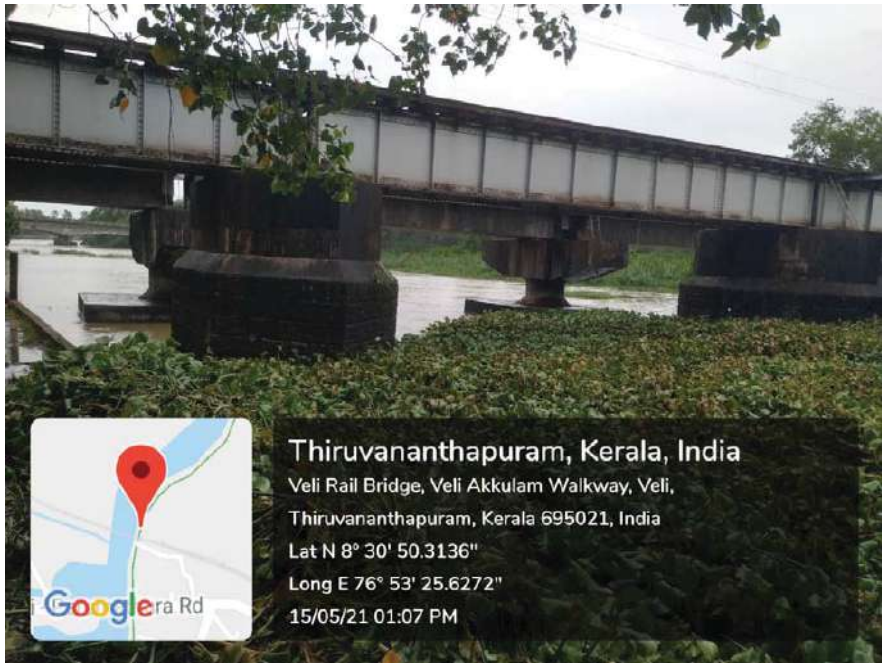
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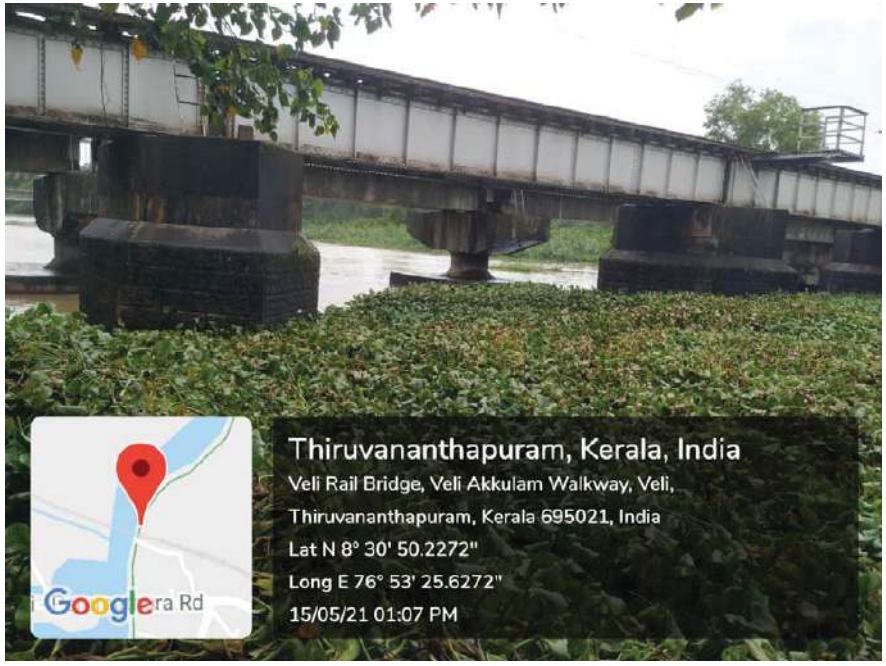
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15/05/21 01:07 PM


Thiruvananthapuram
Kerala
India
31°C
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2021-06-10(Thu) 12:04(pm)


Thiruvananthapuram, Kerala, India
veli tourist village, veli beach,veli lake Thiruvananthapuram,
Kerala 695021, India
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Long E 76° 53' 13.668"
24/05/21 10:02 AM
Google


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Thiruvananthapuram
Kerala
India
31°C
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2021-06-10(Thu) 11:52(am)


Thiruvananthapuram
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Kerala
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Kerala
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Kerala
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Kerala
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88°F

Moonnattumukku Rd, Poonthura, Thiruvananthapuram, Kerala 695026, India
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Longitude
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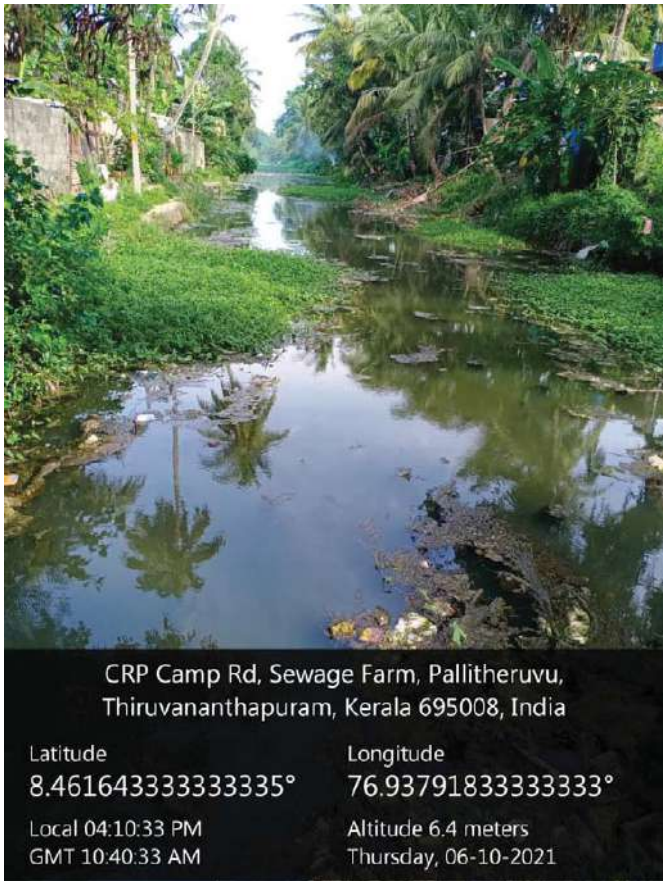
Local 04:39:41 PM
GMT 11:09:41 AM
Altitude -8.5 meters
Thursday, 06-10-2021


CRP Camp Rd, Sewage Farm, Pallitheruvu,
Thiruvananthapuram, Kerala 695008, India
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Longitude
76.93791833333333°
Local 04:10:33 PM
GMT 10:40:33 AM
Altitude 6.4 meters
Thursday, 06-10-2021


CRP Camp Rd, Sewage Farm, Pallitheruvu,
Thiruvananthapuram, Kerala 695008, India
Latitude
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Longitude
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Local 04:10:24 PM
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Altitude 6.4 meters
Thursday, 06-10-2021


CRP Camp Rd, Sewage Farm, Pallitheruvu,
Thiruvananthapuram, Kerala 695008, India
Latitude
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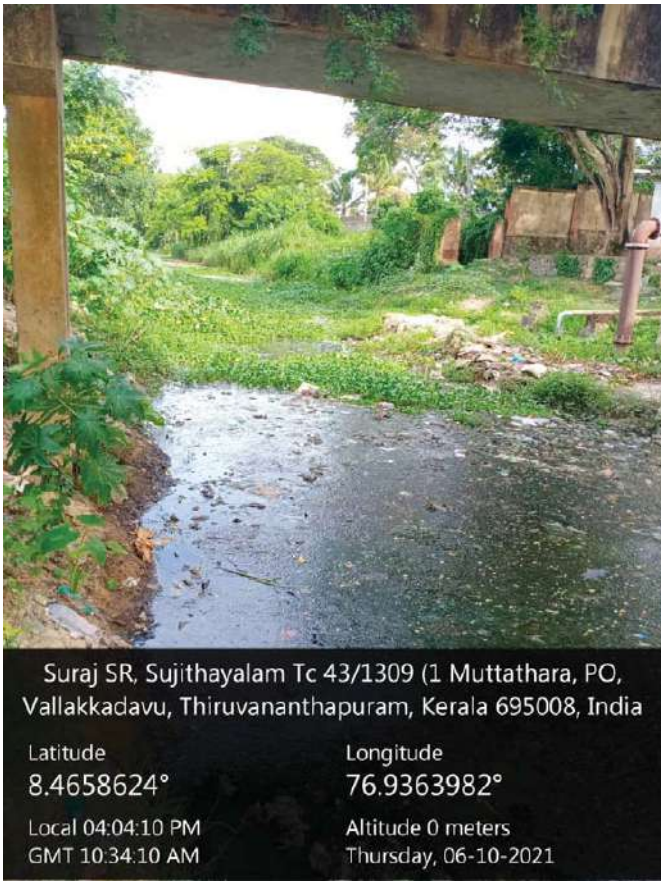
Thursday, 06-10-2021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Longitude
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GMT 10:34:10 AM
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Thursday, 06-10-2021


CRP Camp Rd, Sewage Farm, Pallitheruvu,
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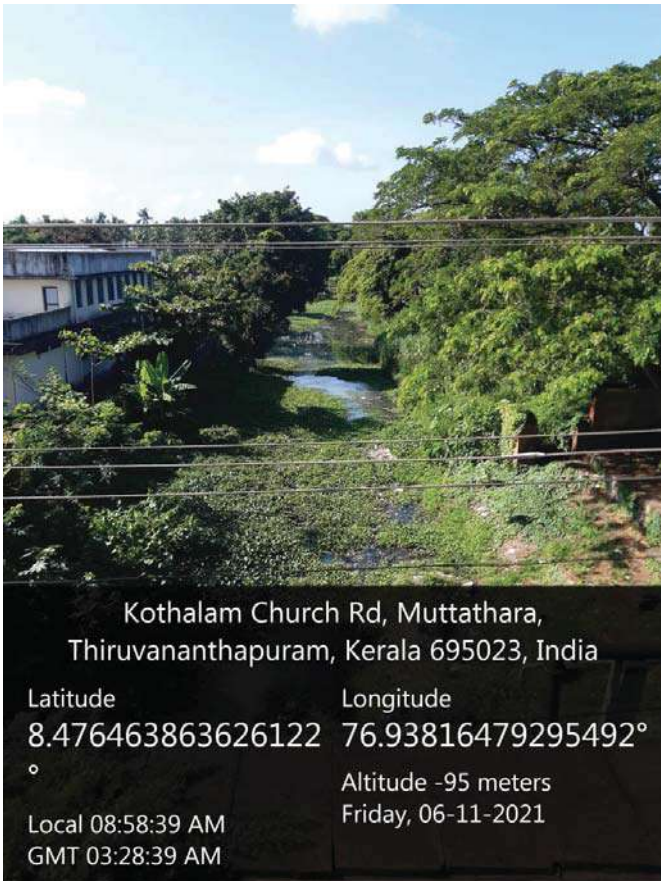
Thursday, 06-10-2021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Thiruvananthapuram, Kerala 695023, India
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GMT 03:28:39 AM
Altitude -95 meters
Friday, 06-11-2021

KARAMANA RIVER

Introduction:

The Karamana River originates from the southern tip of the Western Ghats at Agastyarkoodam. The river flows westward and flows through Aruvikkara, Vilavoorkal, Mangottukadav, Karamana and merges into the Arabian Sea through Poonthura estuary traversing a distance of 66 km.. The river enters city limit at Kundamonkadavu and confluences with Killi river at Pallathukadavu. The stretch of Karamana river flowing through the city is 21 km out of 66 km.

Problems identified:

- The low bund height at various locations along the river which causes flooding to nearby areas during monsoon.
- The damaged bunds which are about to breach which may cause bund failure and damage to life and property of public living nearby.
- The formation of deltas due to siltation at various points which affects the smooth flow of river course.
- The dumping of wastes through the bridges across the rivers which causes blockages in downstream.

Short term initial cleaning proposal :-

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl. No.	Vulnerable locations	Nature of work	Estimate amount (in lakhs)	Remarks
1		For annual cleaningEmergency removal of deltas, vegetation , blockages in city limits for the entire year	25 lakhs	An amount of 3 lakhs is earmarked for urgent cleaning of Karamana river as part of premonsoon works till Aug 2021. For continuation of the same an additional amount of 25 lakhs is required
Emergency Side protection works to be done :				
Damged bund locations				
3	Near Azhankal walkway	Construction of protection wall on the left bank of Karamana river along the Azhankal bund downstream of Kalady check dam	30 L	The existing bund is presently breached and temporarily protected with sack bunds
7	Near Sasthri nagar , Karamana	Protection wall for the breached portion on the right bank of Karamana river near Sasthrinagar - Phase III	25 L	The existing bund height is not enough to hold flood water. The 3rd reach is essential to fulfil the scope of 1st and 2nd reach.
8	Near Kundaman kadav bridge	Side protection wall in the left bank of Karamana river downstream of Kundamankadavu check dam Samrithi lane at Vilavoorkal Panchayat ,Kattakada LA Constituency .	47 L	To be arranged
9	Near Chullamuk k , Pappanamc ode	Urgent Protection of side wall on the breached portion of Right bank of Karamana River upstream of Pappanamcode Iron Bridge near Chullamukku,NearThamalam in Thiruvananthapuram Corporation	40 L	The existing low height bund is not enough to hold flood water.

Conclusion:

For annual cleaning an amount of Rs.25 lakhs per annum will be required for urgent cleaning, blockage removal near bridges, cutting and pruning of trees if any across the river, removal of deltas formed by silt deposits etc.

The fund requirement for annual cleaning = 25 lakhs
The fund requirement for emergency side protection = 142 lakhs

Sl.no	Name of work	Amount
1	City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenKaramana bridge and Madhupalam	5.0 lakhs
2	City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river between Kundamankadav bridge and Thrikannapuram bridge	4.80 lakhs
3	City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river between Madhupalam and Thiruvallam bridge	4.50 lakhs
4	City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenPappanamcode iron bridge and Karamana bridge	4.50 lakhs
5	City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenThrikannapuram bridge and Pappanamcode iron bridge	4.70 lakhs
6	City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenThiruvallam bridge Poonthura estuary	1.50 lakhs
	Total	25 lakhs

Abstract Estimate

City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenKaramana bridge and Madhupalam

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	8800.000 sqm
	Say 8800.000 sqm @ Rs 9.93 / sqm	**Rs 87384.00**
2	od20416/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	129.000 hour
	Say 129.000 hour @ Rs 1281.65 / hour	**Rs 165332.85**
3	od20417/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	280.000 each
	Say 280.000 each @ Rs 589.56 / each	**Rs 165076.80**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	297.000 cum
	Say 297.000 cum @ Rs 173.72 / cum	**Rs 51594.84**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	22.000 each
	Say 22.000 each @ Rs 302.34 / each	**Rs 6651.48**

Total Amount	476040.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**23802.00**

Total	**499842.00**
Lumpsum for round off	**158.00**
TOTAL Rs	**500000.00**
Rounded Total Rs	**5,00,000**
	Rupees Five Lakh Only

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river between Kundamankadav bridge and Thrikannapuram bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	8800.000 sqm
	Say 8800.000 sqm @ Rs 9.93 / sqm	**Rs 87384.00**
2	od20399/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	114.000 hour
	Say 114.000 hour @ Rs 1281.65 / hour	**Rs 146108.10**
3	od20400/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	280.000 each
	Say 280.000 each @ Rs 589.56 / each	**Rs 165076.80**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	297.000 cum
	Say 297.000 cum @ Rs 173.72 / cum	**Rs 51594.84**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	22.000 each
	Say 22.000 each @ Rs 302.34 / each	**Rs 6651.48**

Total Amount	456815.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**22840.75**

Total	**479655.75**
Lumpsum for round off	**344.25**
TOTAL Rs	**480000.00**
Rounded Total Rs	**4,80,000**
Rupees Four Lakh Eighty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river between Madhupalam and Thiruvallam bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	8800.000 sqm
	Say 8800.000 sqm @ Rs 9.93 / sqm	**Rs 87384.00**
2	od20426/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	98.000 hour
	Say 98.000 hour @ Rs 1281.65 / hour	**Rs 125601.70**
3	od20427/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	267.000 each
	Say 267.000 each @ Rs 589.56 / each	**Rs 157412.52**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	297.000 cum
	Say 297.000 cum @ Rs 173.72 / cum	**Rs 51594.84**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	21.000 each
	Say 21.000 each @ Rs 302.34 / each	**Rs 6349.14**

Total Amount	428342.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**21417.10**

Total	**449759.10**
Lumpsum for round off	**240.90**
TOTAL Rs	**450000.00**
Rounded Total Rs	**4,50,000**
Rupees Four Lakh Fifty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenPappanamcode iron bridge and Karamana bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	7750.000 sqm
	Say 7750.000 sqm @ Rs 9.93 / sqm	**Rs 76957.50**
2	od20411/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	114.000 hour
	Say 114.000 hour @ Rs 1281.65 / hour	**Rs 146108.10**
3	od20412/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	250.000 each
	Say 250.000 each @ Rs 589.56 / each	**Rs 147390.00**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	297.000 cum
	Say 297.000 cum @ Rs 173.72 / cum	**Rs 51594.84**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	21.000 each
	Say 21.000 each @ Rs 302.34 / each	**Rs 6349.14**

Total Amount	428400.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**21420.00**

Total	**449820.00**
Lumpsum for round off	**180.00**
TOTAL Rs	**450000.00**
Rounded Total Rs	**4,50,000**
Rupees Four Lakh Fifty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenThrikannapuram bridge and Pappanamcode iron bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	8800.000 sqm
	Say 8800.000 sqm @ Rs 9.93 / sqm	**Rs 87384.00**
2	od20406/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	107.000 hour
	Say 107.000 hour @ Rs 1281.65 / hour	**Rs 137136.55**
3	od20407/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	280.000 each
	Say 280.000 each @ Rs 589.56 / each	**Rs 165076.80**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	297.000 cum
	Say 297.000 cum @ Rs 173.72 / cum	**Rs 51594.84**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	21.000 each
	Say 21.000 each @ Rs 302.34 / each	**Rs 6349.14**

Total Amount	447541.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**22377.05**

Total	**469918.05**
Lumpsum for round off	**81.95**
TOTAL Rs	**470000.00**
Rounded Total Rs	**4,70,000**
Rupees Four Lakh Seventy Thousand Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021 - Emergency jungle clearance and removal of deltas in Karamana river betweenThiruvallam bridge Poonthura estuary

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	3000.000 sqm
	Say 3000.000 sqm @ Rs 9.93 / sqm	**Rs 29790.00**
2	od20429/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	35.000 hour
	Say 35.000 hour @ Rs 1281.65 / hour	**Rs 44857.75**
3	od20430/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	65.000 each
	Say 65.000 each @ Rs 589.56 / each	**Rs 38321.40**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	151.200 cum
	Say 151.200 cum @ Rs 173.72 / cum	**Rs 26266.46**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	11.000 each
	Say 11.000 each @ Rs 302.34 / each	**Rs 3325.74**

Total Amount	142561.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**7128.05**

Total	**149689.05**
Lumpsum for round off	**310.95**
TOTAL Rs	**150000.00**
Rounded Total Rs	**1,50,000**
Rupees One Lakh Fifty Thousand Only	

(Cost Index Applied for this estimate is 37.93%)


DELTA FORMATION & JUNGLE CLEARANCE
Peyad, Kerala, India
Lael, N7, grandtech villas, Aruvippuram, Peyad, Kerala 695573, India
Lat 8.525357 Long 77.011752
24/06/21


TREES TO BE PRUNED
THIRUVALLAM TEMPLE 22.06.2021


TREE BRANCHES TO BE REMOVED
Thiruvananthapuram, Kerala, India
T.C.20/2939(1 S.M.R.V. lane, Karamana P.O, Mither Nagar, Karamana, Thiruvananthapuram, Kerala 695002, India
Lat N 8° 28' 42.15"
Long E 76° 58' 9.0804"
24/06/21 12:40 PM
Google


DELTA FORMATION & TREES TO BE PRUNED
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Long E 76° 58' 9.5268"
24/06/21 12:41 PM
Google


FALLEN DOWN TREES TO BE REMOVED
Thiruvananthapuram, Kerala, India
Devikripa, KNRA 14, River View Road, Mither Nagar, Neeramankara, Karamana, Thiruvananthapuram, Kerala 695002, India
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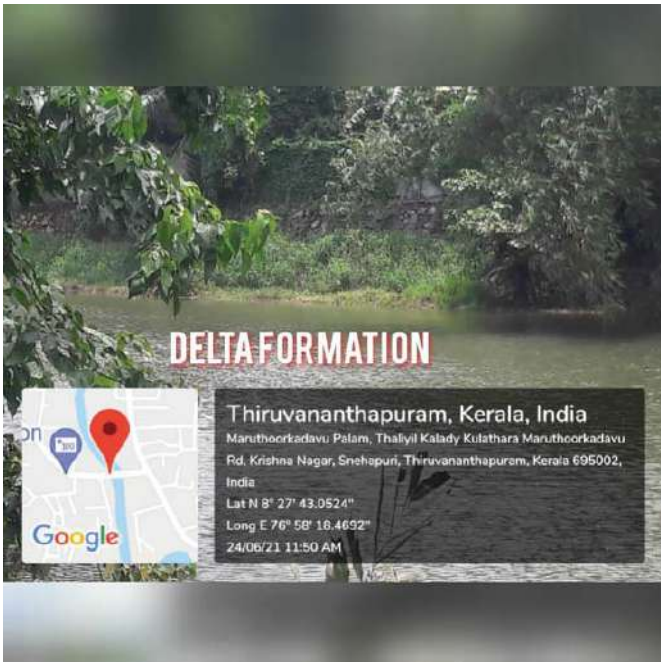
Google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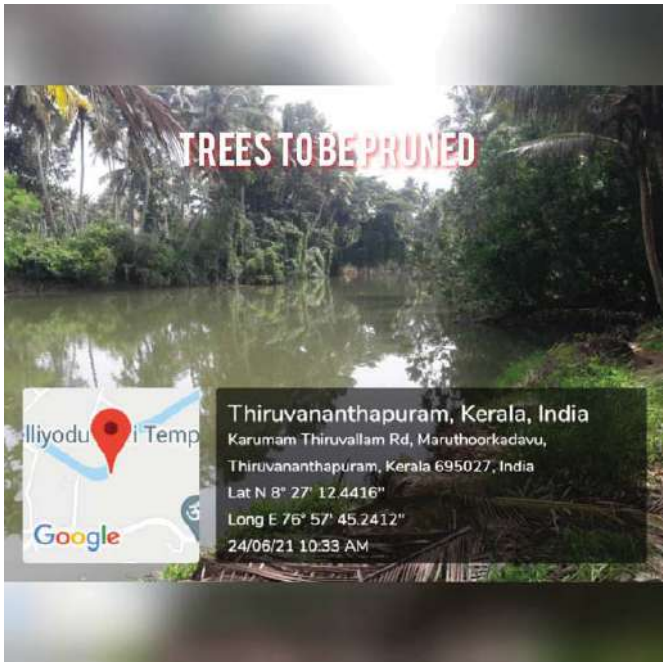
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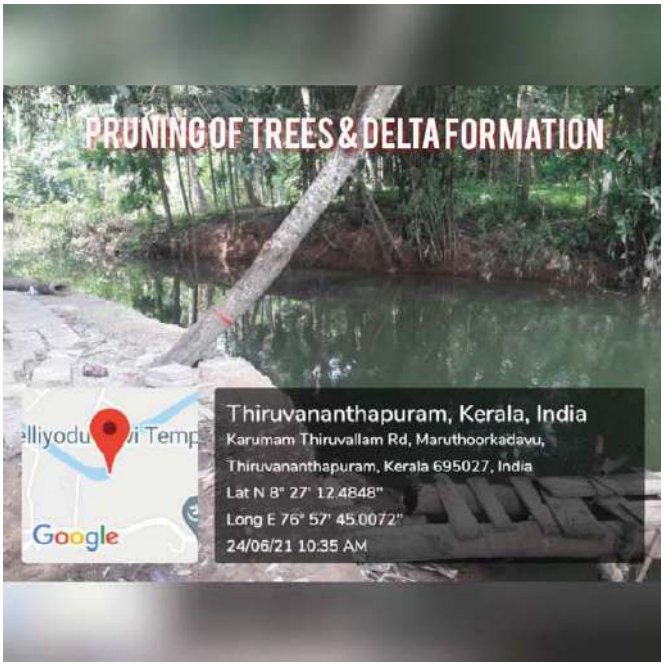
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Lat N 8° 27' 12.4848"
Long E 76° 57' 45.0072"
24/06/21 10:35 AM
Google


KANNUKALI CHAAL JOINING KARAMANA
DELTA FORMATION
Thiruvananthapuram, Kerala, India
Karumam Thiruvallam Rd, Maruthoorkadavu,
Thiruvananthapuram, Kerala 695027, India
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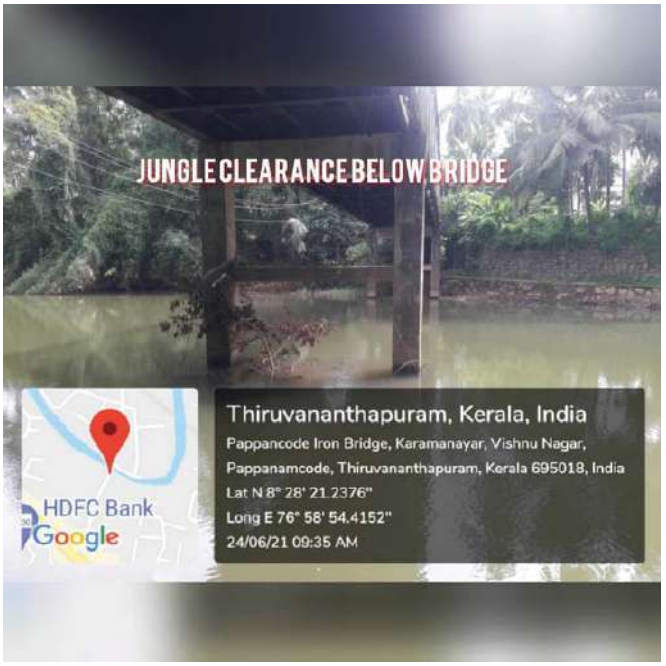
JUNGLE CLEARANCE BELOW BRIDGE
Thiruvananthapuram, Kerala, India
Pappancode Iron Bridge, Karamanayar, Vishnu Nagar,
Pappanamcode, Thiruvananthapuram, Kerala 695018, India
Lat N 8° 28' 21.2376"
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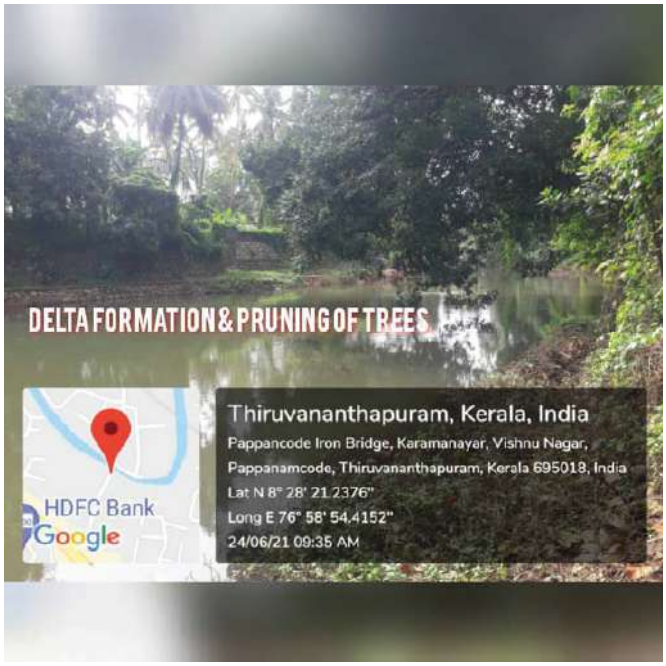
HDFC Bank
Google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Thiruvananthapuram, Kerala, India
Pappancode Iron Bridge, Karamanayar, Vishnu Nagar,
Pappanamcode, Thiruvananthapuram, Kerala 695018, India
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HDFC Bank
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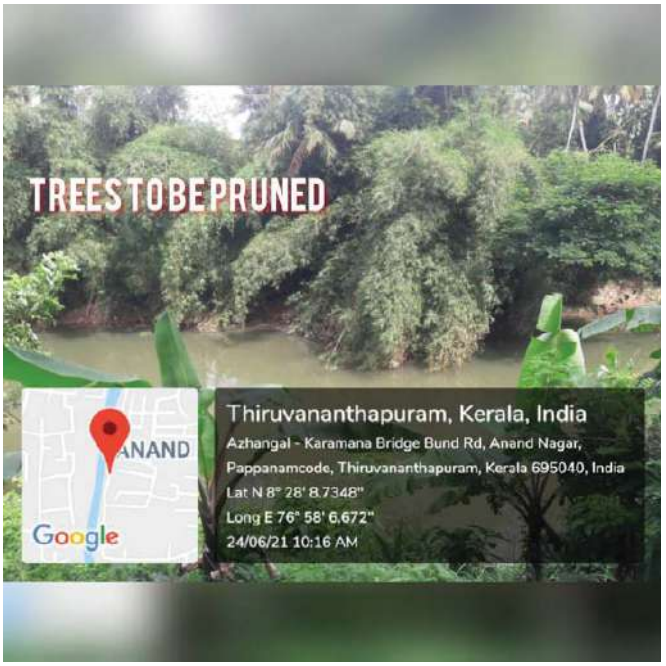
TREES TO BE PRUNED
Thiruvananthapuram, Kerala, India
Azhangal - Karamana Bridge Bund Rd, Anand Nagar,
Pappanamcode, Thiruvananthapuram, Kerala 695040, India
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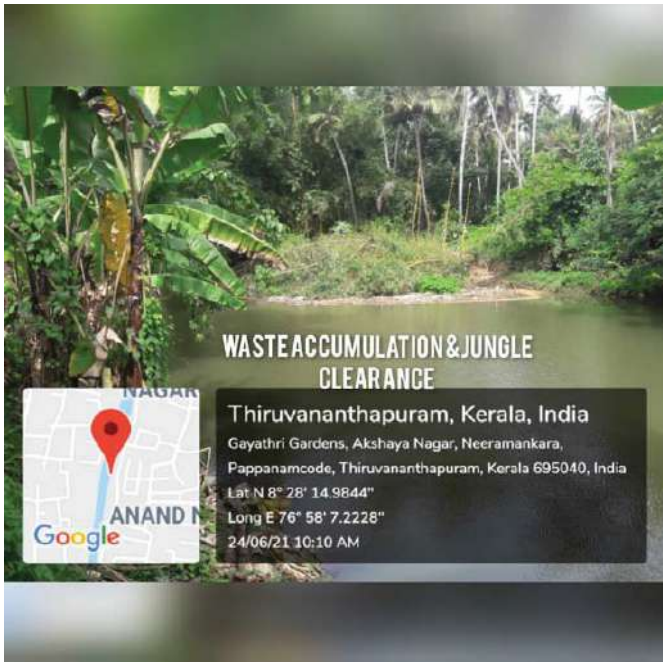
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Thiruvananthapuram, Kerala, India
Gayathri Gardens, Akshaya Nagar, Neeramankara, Pappanamcode, Thiruvananthapuram, Kerala 695040, India
Lat N 8° 28' 14.9844"
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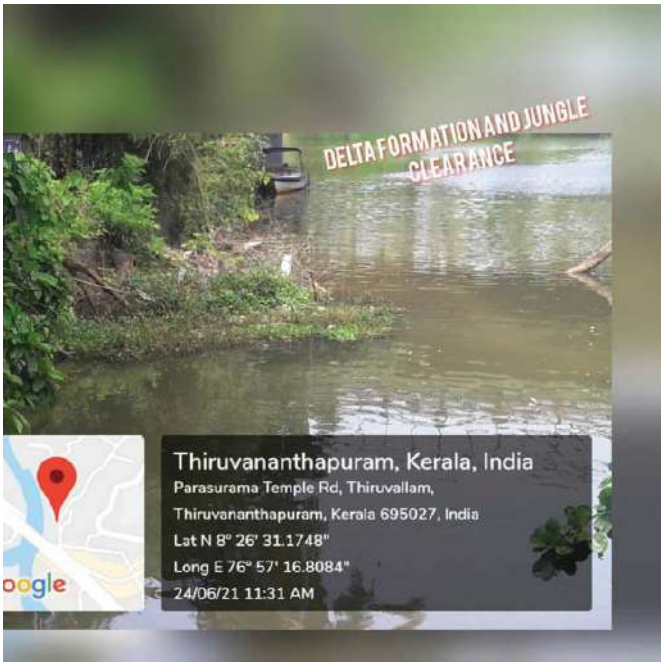
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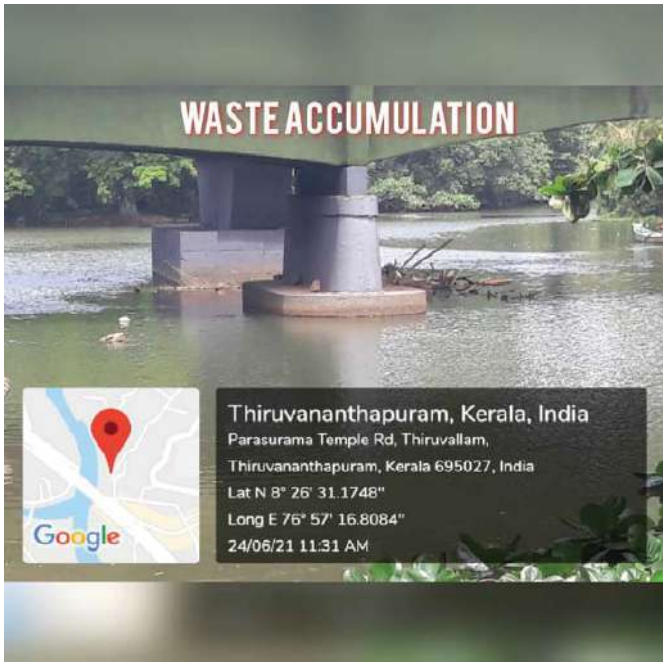
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Thiruvananthapuram, Kerala, India
Parasurama Temple Rd, Thiruvallam, Thiruvananthapuram, Kerala 695027, India
Lat N 8° 26' 31.1748"
Long E 76° 57' 16.8084"
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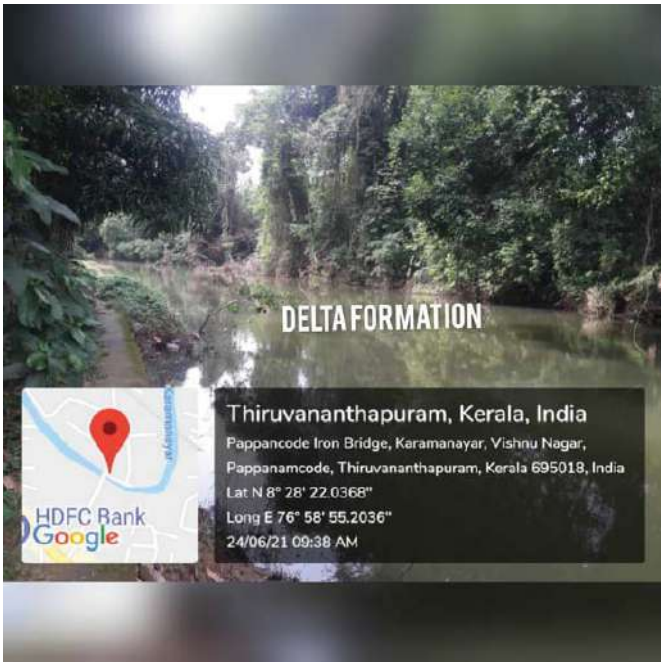
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HDFC Bank
Google


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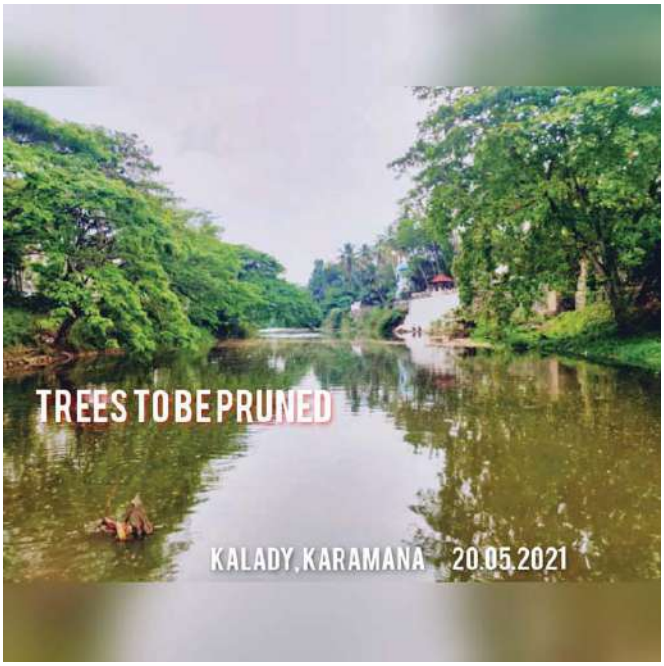
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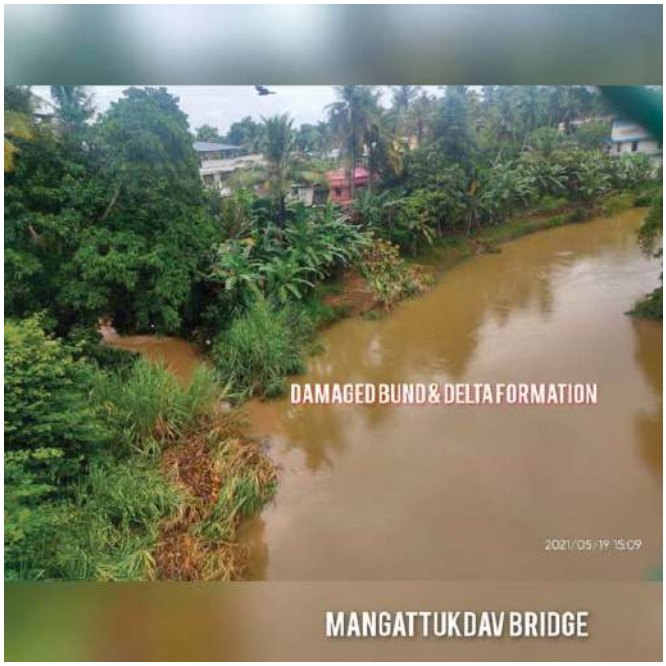
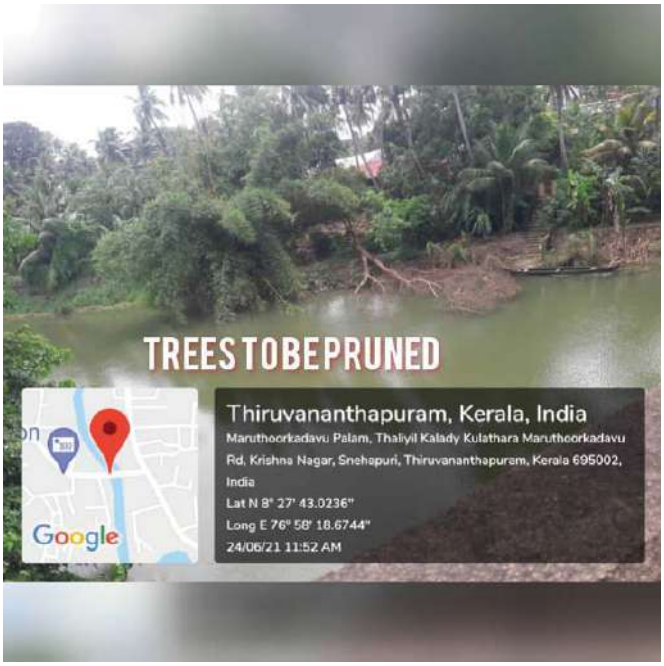
KALADY, KARAMANA 20.05.2021


DAMAGED BUND & DELTA FORMATION
2021/05/19 15:09
MANGATTUKDAV BRIDGE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Thiruvananthapuram, Kerala, India
Maruthoorkadavu Palam, Thaliyil Kalady Kulathara Maruthoorkadavu Rd, Krishna Nagar, Snehapuri, Thiruvananthapuram, Kerala 695002, India
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24/06/21 11:52 AM
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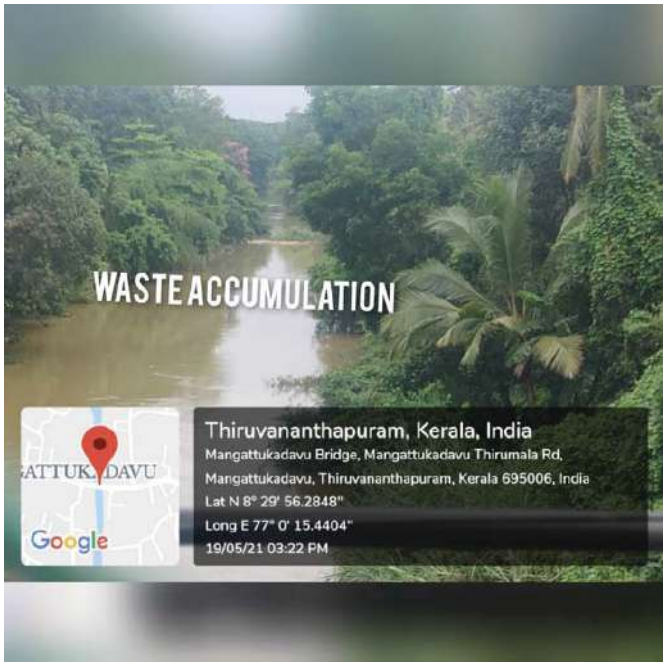
PERUKAVU
DELTA FORMATION
03.06.2021


SASTHRINAGAR
UPROOTED TREE ACROSS RIVER
09.06.2021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Mangattukadavu Bridge, Mangattukadavu Thirumala Rd,
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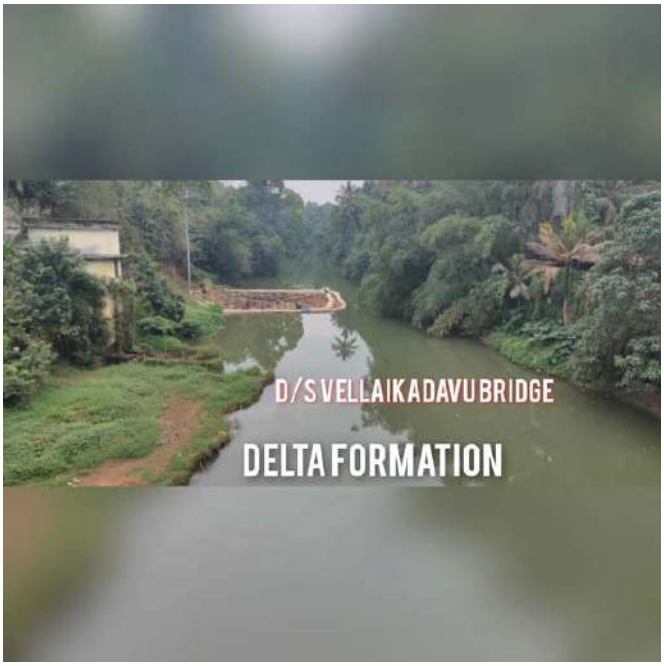
D/S VELLAIKADAVU BRIDGE
DELTA FORMATION


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Thiruvananthapuram, Kerala, India
Unnamed Road, Kesari Nagar, Poojapura, Thiruvananthapuram, Kerala 695012, India
Lat N 8° 29' 6.864"
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19/05/21 03:48 PM
Google


DAMAGED BUND & DELTA FORMATION
Peyad, Kerala, India
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Lat N 8° 30' 17.5932"
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24/05/21 02:55 PM
JUDE NAGAR
Google


WASTE ACCUMULATION
Peyad, Kerala, India
St Jude Nagar Rd, Jude Nagar, Mangattukadavu, Peyad, Kerala 695573, India
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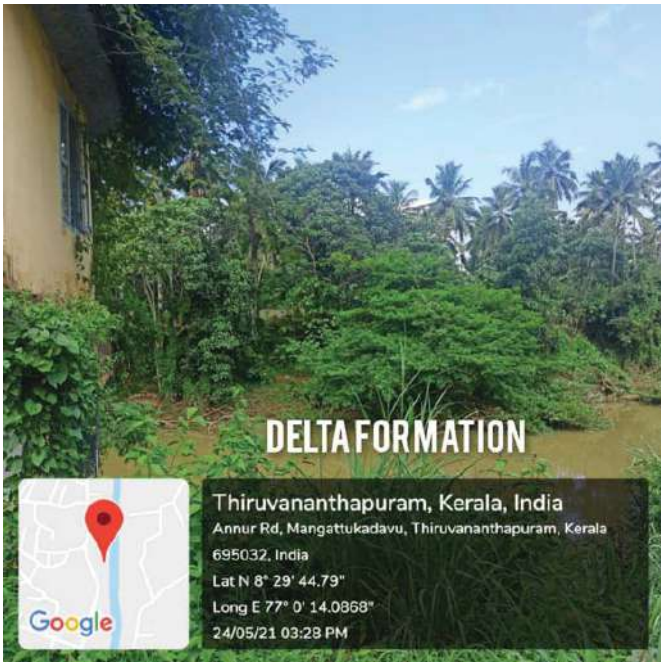
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Thiruvananthapuram, Kerala, India
Annur Rd, Mangattukadavu, Thiruvananthapuram, Kerala 695032, India
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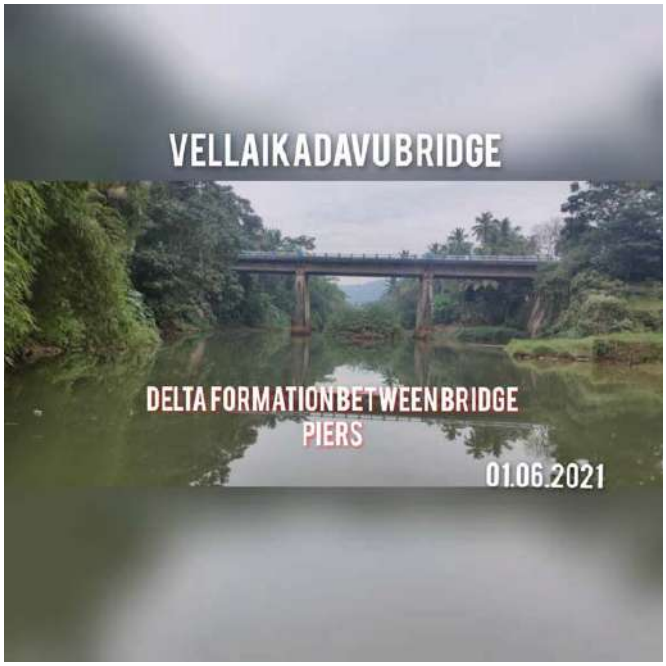
VELLAIKADAVU BRIDGE
DELTA FORMATION BETWEEN BRIDGE PIERS
01.06.2021


WASTE DUMPING
Thiruvananthapuram, Kerala, India
Old Kundamankadav Bridge, 1/2, Kundamankadavu Bridge,
Thiruvananthapuram, Kerala 695573, India
Lat N 8° 30' 30.4308"
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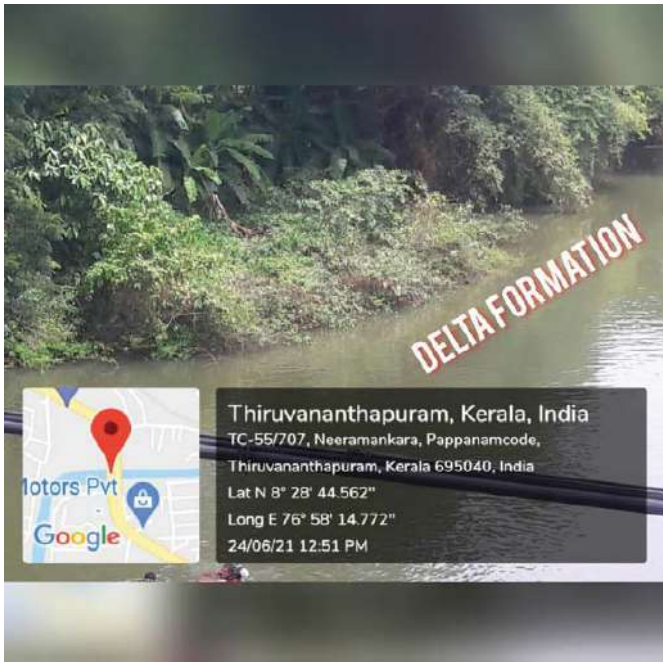
DELTA FORMATION
Thiruvananthapuram, Kerala, India
TC-55/707, Neeramankara, Pappanamcode,
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24/06/21 12:51 PM
Google

KILLI RIVER

Introduction:

Killi River, also called Killiyar, originates at Panavur in Nedumangad Taluk. The river enters the city at Vazhayila and flows through Mannammoola, Maruthankuzhi, Edapazhinji, Jagathi,Killippalam, Attukal, Kalady South and merges with Karamana River at Pallathukadavu traversing a length of 33 km. The stretches of Killi river flowing through the city is 14 km out of 33 km.

Problems identified:

- The low bund height at various locations along the river which causes flooding to nearby areas during monsoon.

- The encroachments along the river which in turns reduces the actual river width and reduces the water holding capacity of the river.

- The formation of deltas due to siltation at various points which affects the smooth flow of river course.

- The dumping of wastes through the bridges across the rivers which causes blockages in downstream.

- The direct inlet of sewage lines from various domestic households reduces the water quality. Various drains joining the river are also a source of pollution.

Short term initial cleaning proposal: -

The vulnerable points along the thodu and the nature of works proposed for initial cleaning is as detailed below:-

Sl.no	Vulnerable locations	Nature of work	Estimate amount (in lakhs)	Remarks
1		For annual cleaning Emergency removal of deltas, vegetation , blockages in city limits for the entire year	25 lakhs	An amount of 5 lakhs is earmarked for urgent cleaning of Killi river as part of premonsoon works till Aug 2021. For continuation of the same an additional amount of 25 lakhs is required
Emergency Side protection works to be done :				
Low bund height				
3	Near Cherupalodu ,Manikandeswaram	Protection work on the left bank of Killi river near Cherupalode third reach in TVM district	25 L	There is no river bund in this stretch which causes flooding the nearby areas.
4	Near Thozhuvancode bridge	Urgent protection works to the left bank of Killi River from downstream of Thozhuvancode Bridge - Phase I	40 L	The bund height in this stretch is not sufficient to hold the flood waters
5		Urgent protection works to the left bank of Killi River from downstream of Thozhuvancode Bridge - Phase II	40 L	The bund height in this stretch is not sufficient to hold the flood waters
6		Urgent protection works to the left bank of Killi River from downstream of Thozhuvancode Bridge - Phase III	40 L	The bund height in this stretch is not sufficient to hold the flood waters
7	Upstream of Mannamoola bridge	Urgent side protection to left bank of Killi river upstream of Mannamoola bridge	25 L	The bund height in this stretch is not sufficient to hold the flood waters
8	Near Soorya Lane - Sasthamangalam	Removal of island portion near Soorya gardens in Killi river	15 L	The big delta formed in the middle of river obstructs the smooth flow
9	Near Madathilvila - Jagathy	Protection works to left bank of Killi river down stream of Parachira bridge Thengakoodu in TVM Corporation - Phase 2	25 L	The bund height in this stretch is not sufficient to hold the flood waters.

Conclusion:

For annual cleaning an amount of Rs. 25 lakhs per annum will be required for urgent cleaning, blockage removal near bridges, cutting and pruning of trees if any across the river, removal of deltas formed by silt deposits etc.

The fund requirement for annual cleaning = 25 lakhs
The fund requirement for emergency side protection = 195 lakhs

Sl.no	Name of work	Amount
1	City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Vazhayila bridge and Thozhuvancode bridge	4 lakhs
2	City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Thozhuvancode bridge and Heera iron bridge	4 lakhs
3	City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Jagathy bridge and Attukal bridge	6 lakhs
4	City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Heera iron bridge and Pangode bridge	5 lakhs
5	City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Pangode bridge and Jagathy bridge	4 lakhs
6	City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Attukal bridge and Pallathkadavu bridge	2 lakhs
	Total	25 lakhs

Abstract Estimate

City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Heera iron bridge and Pangode bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	11250.000 sqm
	Say 11250.000 sqm @ Rs 9.93 / sqm	**Rs 111712.50**
2	od20418/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	144.000 hour
	Say 144.000 hour @ Rs 1281.65 / hour	**Rs 184557.60**
3	od20419/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	320.000 each
	Say 320.000 each @ Rs 589.56 / each	**Rs 188659.20**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	469.800 cum
	Say 469.800 cum @ Rs 173.72 / cum	**Rs 81613.66**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	16.000 each
	Say 16.000 each @ Rs 302.34 / each	**Rs 4837.44**

Total Amount	571380.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**28569.00**

Total	**599949.00**
Lumpsum for round off	**0.00**
TOTAL Rs	**599949.00**
Rounded Total Rs	**5,99,949**
Rupees Five Lakh Ninety Nine Thousand Nine Hundred and Forty Nine Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Jagathy bridge and Attukal bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	11250.000 sqm
	Say 11250.000 sqm @ Rs 9.93 / sqm	**Rs 111712.50**
2	od20312/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	144.000 hour
	Say 144.000 hour @ Rs 1281.65 / hour	**Rs 184557.60**
3	od20313/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	320.000 each
	Say 320.000 each @ Rs 589.56 / each	**Rs 188659.20**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	469.800 cum
	Say 469.800 cum @ Rs 173.72 / cum	**Rs 81613.66**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	16.000 each
	Say 16.000 each @ Rs 302.34 / each	**Rs 4837.44**

Total Amount	571380.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**28569.00**

Total	**599949.00**
Lumpsum for round off	**51.00**
TOTAL Rs	**600000.00**
Rounded Total Rs	**6,00,000**
	Rupees Six Lakh Only

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Pangode bridge and Jagathy bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	7500.000 sqm
	Say 7500.000 sqm @ Rs 9.93 / sqm	**Rs 74475.00**
2	od20421/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	90.000 hour
	Say 90.000 hour @ Rs 1281.65 / hour	**Rs 115348.50**
3	od20422/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	250.000 each
	Say 250.000 each @ Rs 589.56 / each	**Rs 147390.00**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	229.500 cum
	Say 229.500 cum @ Rs 173.72 / cum	**Rs 39868.74**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	12.000 each
	Say 12.000 each @ Rs 302.34 / each	**Rs 3628.08**

Total Amount	380710.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**19035.50**

Total	**399745.50**
Lumpsum for round off	**254.50**
TOTAL Rs	**400000.00**
Rounded Total Rs	**4,00,000**
Rupees Four Lakh Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Thozhuvancode bridge and Heera iron bridge

(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	7500.000 sqm
	Say 7500.000 sqm @ Rs 9.93 / sqm	**Rs 74475.00**
2	od20414/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	90.000 hour
	Say 90.000 hour @ Rs 1281.65 / hour	**Rs 115348.50**
3	od20415/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	250.000 each
	Say 250.000 each @ Rs 589.56 / each	**Rs 147390.00**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	229.500 cum
	Say 229.500 cum @ Rs 173.72 / cum	**Rs 39868.74**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	12.000 each
	Say 12.000 each @ Rs 302.34 / each	**Rs 3628.08**

Total Amount	380710.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**19035.50**

Total	**399745.50**
Lumpsum for round off	**254.50**
TOTAL Rs	**400000.00**
Rounded Total Rs	**4,00,000**
Rupees Four Lakh Only	

(Cost Index Applied for this estimate is 37.93%)

Abstract Estimate

City floods 2021- Emergency jungle clearance and removal of deltas in Killi river between Vazhayila bridge and Thozhuvancode bridge

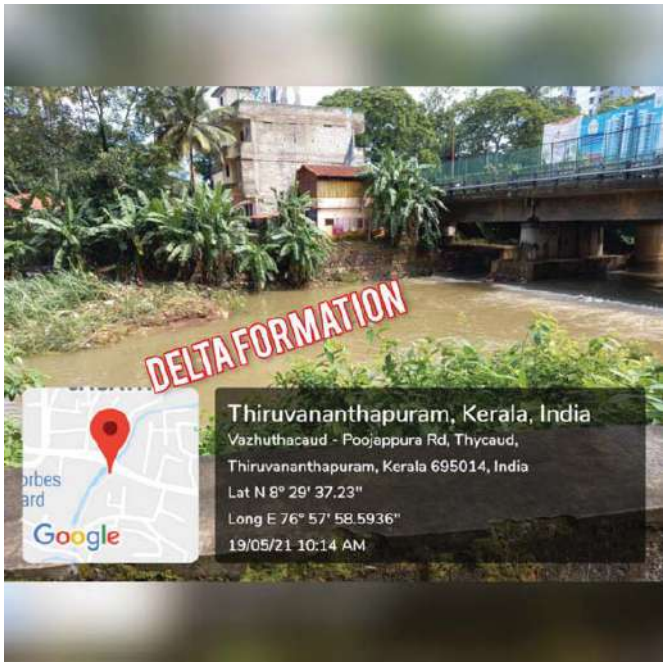
(Cost Index Applied for this estimate is 37.93%)

1 Detailed Estimate		
1	2.31 Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of 50 m outside the periphery of the area cleared	
	Net Total Quantity	7500.000 sqm
	Say 7500.000 sqm @ Rs 9.93 / sqm	**Rs 74475.00**
2	od20404/2021_2022/IA Engaging Hydraulic excavator of 1cum bucket for emergency clearing at u/s and d/s of Bridge for clearing the accumulated silt to avoid block during flood and for pre-monsoon preparation to avoid flooding as far as possble.	
	Net Total Quantity	90.000 hour
	Say 90.000 hour @ Rs 1281.65 / hour	**Rs 115348.50**
3	od20405/2021_2022/IA Engaging man coolies for removing the solid wastes including slaughter house waste etc....	
	Net Total Quantity	250.000 each
	Say 250.000 each @ Rs 589.56 / each	**Rs 147390.00**
4	2.6.1 Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead up to 50 m and lift up to 1.5 m, disposed earth to be levelled and neatly dressed.All kinds of soil	
	Net Total Quantity	229.500 cum
	Say 229.500 cum @ Rs 173.72 / cum	**Rs 39868.74**
5	2.33.1 Felling trees of the girth (measured at a height of 1 m above ground level) including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.Beyound 30 cm girth up to and including 60 cm girth	
	Net Total Quantity	12.000 each
	Say 12.000 each @ Rs 302.34 / each	**Rs 3628.08**

Total Amount	380710.00
Provision for GST payments (in %) @	**5.0%**
Amount reserved for GST payments	**19035.50**

Total	**399745.50**
Lumpsum for round off	**254.50**
TOTAL Rs	**400000.00**
Rounded Total Rs	**4,00,000**
Rupees Four Lakh Only	

(Cost Index Applied for this estimate is 37.93%)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Long E 76° 57' 58.5936"
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Google


DELTA FORMATION UNDER BRIDGE
Thiruvananthapuram, Kerala, India
Attukal Temple Road Bridge, Attukal Temple Rd, C Block,
Attukal, Manacaud, Thiruvananthapuram, Kerala 695009, India
Lat N 8° 28' 24.7908"
Long E 76° 57' 26.8956"
19/05/21 11:03 AM
Google


WASTE ACCUMULATION & DELTA FORMATION
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Thiruvananthapuram, Kerala, India
Jagathy Bridge, Vazhuthacaud - Poojappura Rd, Sudarshan Nagar,
Thycaud, Thiruvananthapuram, Kerala 695012, India
Lat N 8° 29' 38.5008"
Long E 76° 57' 59.0868"
19/05/21 12:25 PM
Google


DELTA FORMATION
JAGATHY
Thiruvananthapuram, Kerala, India
Jagathy Bridge, Vazhuthacaud - Poojappura Rd, Sudarshan Nagar, Thycaud,
Thiruvananthapuram, Kerala 695012, India
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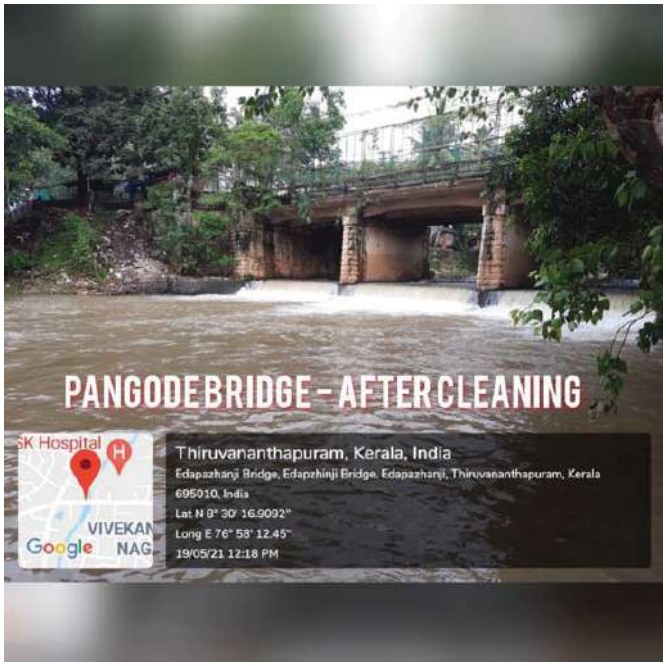
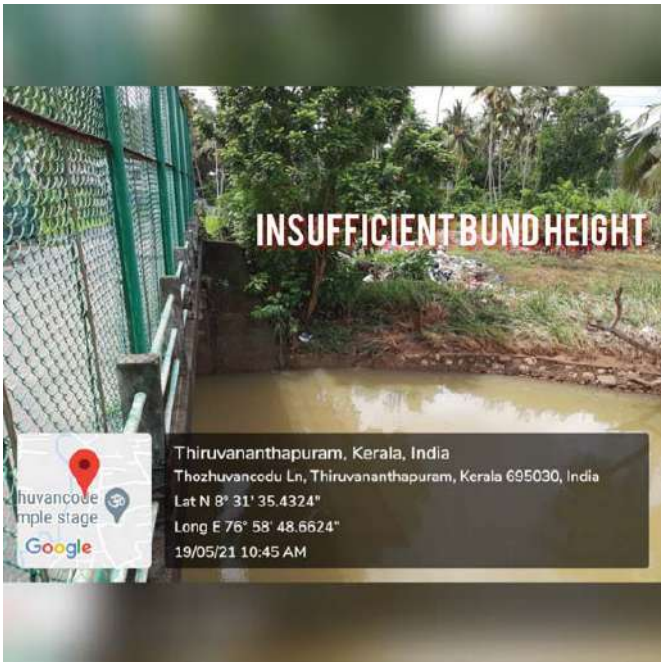

PANGODE BRIDGE – AFTER CLEANING
Thiruvananthapuram, Kerala, India
Edapazhanji Bridge, Edapzhinji Bridge, Edapazhanji, Thiruvananthapuram, Kerala 695010, India
Lat N 8° 30' 16.9092"
Long E 76° 58' 12.45"
19/05/21 12:18 PM


DELTA FORMATION
Thiruvananthapuram, Kerala, India
Edapazhanji Bridge, Edapzhinji Bridge, Edapazhanji, Thiruvananthapuram, Kerala 695010, India
Lat N 8° 30' 16.9092"
Long E 76° 58' 12.45"
19/05/21 12:18 PM

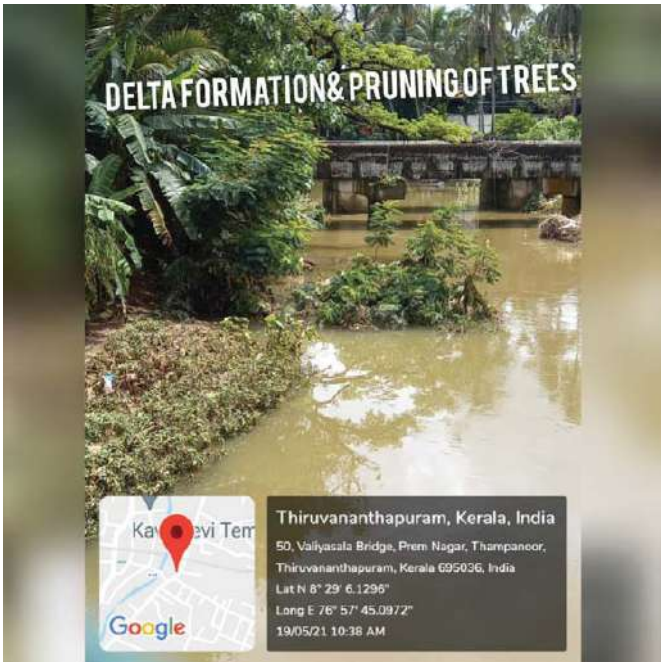

Thiruvananthapuram, Kerala, India
Edapazhanji Bridge, Edapzhinji Bridge, Edapazhanji, Thiruvananthapuram, Kerala 695010, India
Lat N 8° 30' 16.9092"
Long E 76° 58' 12.45"
19/05/21 12:18 PM

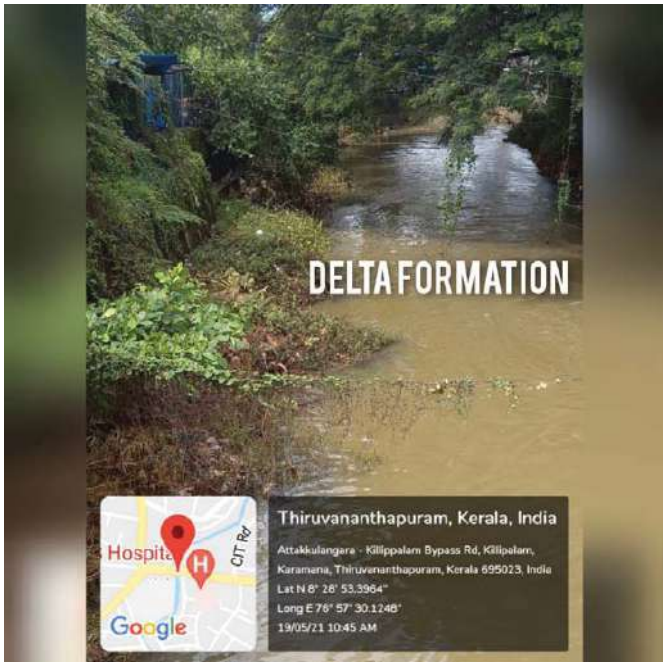

WASTE DUMPING
Thiruvananthapuram, Kerala, India
KESAVA BRIDGE, NEAR, Maruthankuzhi Bridge, Kanjirampara, Thiruvananthapuram, Kerala 695030, India
Lat N 8° 30' 50.1084"
Long E 76° 58' 31.4292"
19/05/21 11:11 AM

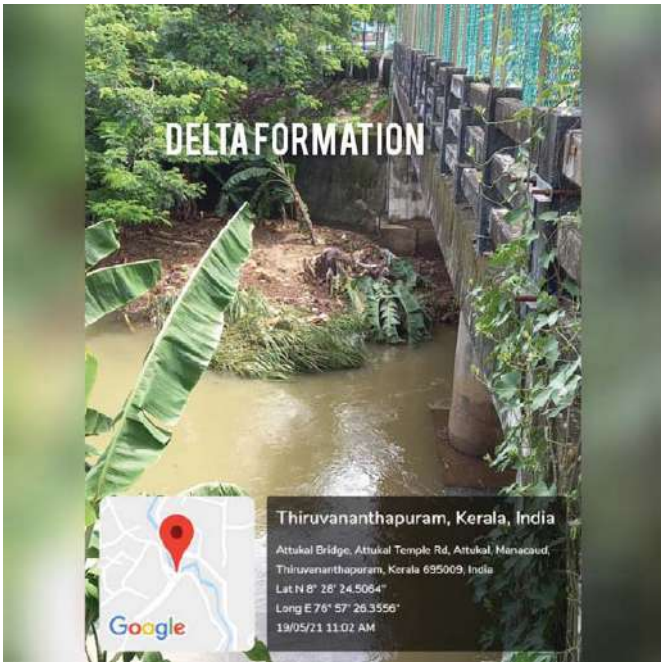

DELTA FORMATION
Thiruvananthapuram, Kerala, India
Thozhuvancodu Ln, Thiruvananthapuram, Kerala 695030, India
Lat N 8° 31' 35.4324"
Long E 76° 58' 48.6624"
19/05/21 10:45 AM
Google


INSUFFICIENT BUND HEIGHT
Thiruvananthapuram, Kerala, India
Thozhuvancodu Ln, Thiruvananthapuram, Kerala 695030, India
Lat N 8° 31' 35.4324"
Long E 76° 58' 48.6624"
19/05/21 10:45 AM
Google

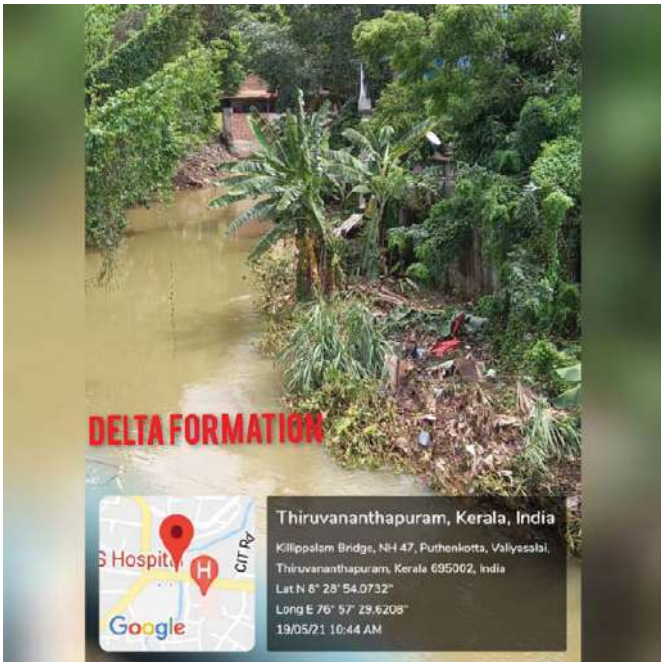

WASTES ACCUMULATED ON BUNDS BY OVERFLOWED WATER
Thiruvananthapuram, Kerala, India
Thozhuvancodu Ln, Thiruvananthapuram, Kerala 695030, India
Lat N 8° 31' 35.4324"
Long E 76° 58' 48.6624"
19/05/21 10:44 AM
Google

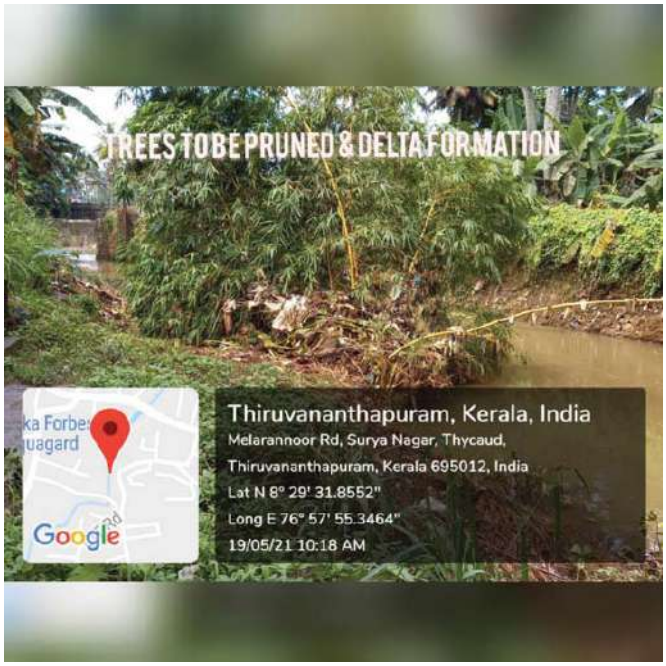

DELTA FORMATION& PRUNING OF TREES
Thiruvananthapuram, Kerala, India
50, Valiyasala Bridge, Prem Nagar, Thampanoor,
Thiruvananthapuram, Kerala 695036, India
Lat N 8° 29' 6.1296"
Long E 76° 57' 45.0972"
19/05/21 10:38 AM
Google

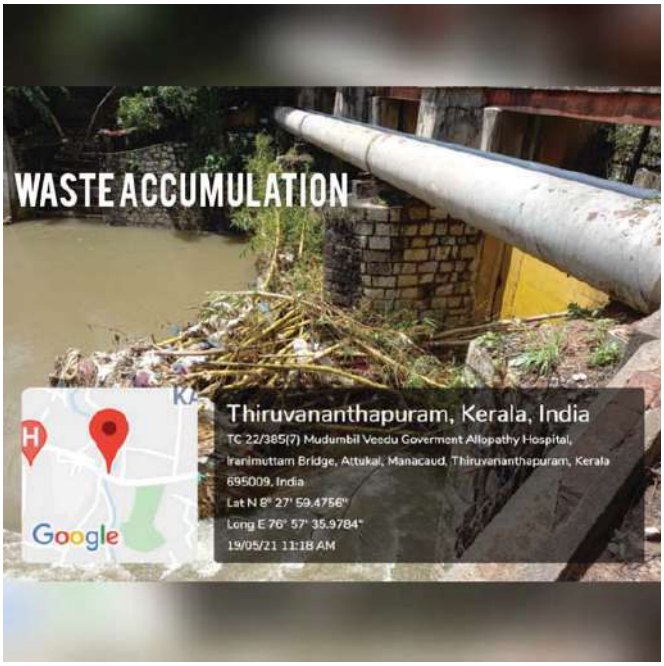

DELTA FORMATION
Thiruvananthapuram, Kerala, India
Attakkulangara - Killippalam Bypass Rd, Killipalam, Karamana, Thiruvananthapuram, Kerala 695023, India
Lat N 8° 28' 53.3964"
Long E 76° 57' 30.1248"
19/05/21 10:45 AM
Google


DELTA FORMATION
Thiruvananthapuram, Kerala, India
Attukal Bridge, Attukal Temple Rd, Attukal, Manacaud, Thiruvananthapuram, Kerala 695009, India
Lat N 8° 28' 24.5064"
Long E 76° 57' 26.3556"
19/05/21 11:02 AM
Google

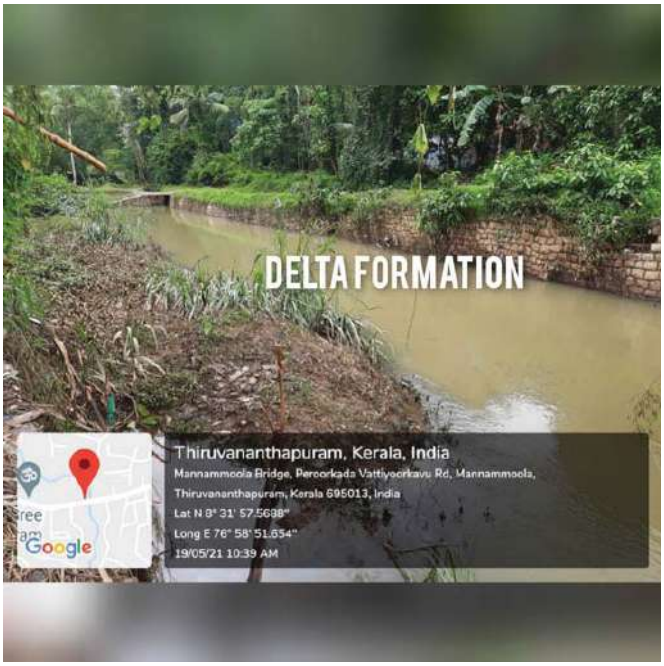

HUGE MASS OF WASTE TOBEREMOVED
Thiruvananthapuram, Kerala, India
Melarannoor Rd, Surya Nagar, Thycaud, Thiruvananthapuram, Kerala 695012, India
Lat N 8° 29' 29.526"
Long E 76° 57' 54.63"
19/05/21 10:22 AM
Google

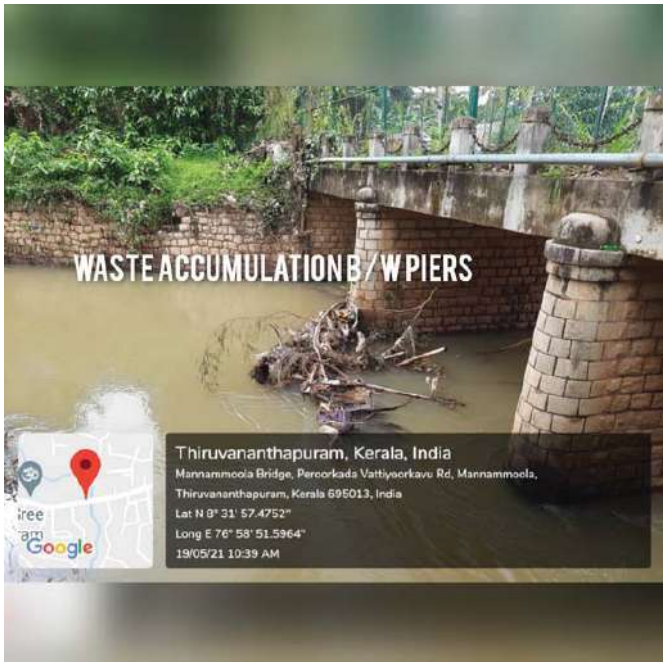

DELTA FORMATION
Thiruvananthapuram, Kerala, India
Killippalam Bridge, NH 47, Puthenkotta, Valiyasalai, Thiruvananthapuram, Kerala 695002, India
Lat N 8° 28' 54.0732"
Long E 76° 57' 29.6208"
19/05/21 10:44 AM
Google


TREES TO BE PRUNED & DELTA FORMATION
Thiruvananthapuram, Kerala, India
Melarannoor Rd, Surya Nagar, Thycaud,
Thiruvananthapuram, Kerala 695012, India
Lat N 8° 29' 31.8552"
Long E 76° 57' 55.3464"
19/05/21 10:18 AM
Google


WASTE ACCUMULATION
Thiruvananthapuram, Kerala, India
TC 22/385(7) Mudumbil Veedu Goverment Allopathy Hospital,
Iranimuttam Bridge, Attukal, Manacaud, Thiruvananthapuram, Kerala
695009, India
Lat N 8° 27' 59.4756"
Long E 76° 57' 35.9784"
19/05/21 11:18 AM
Google

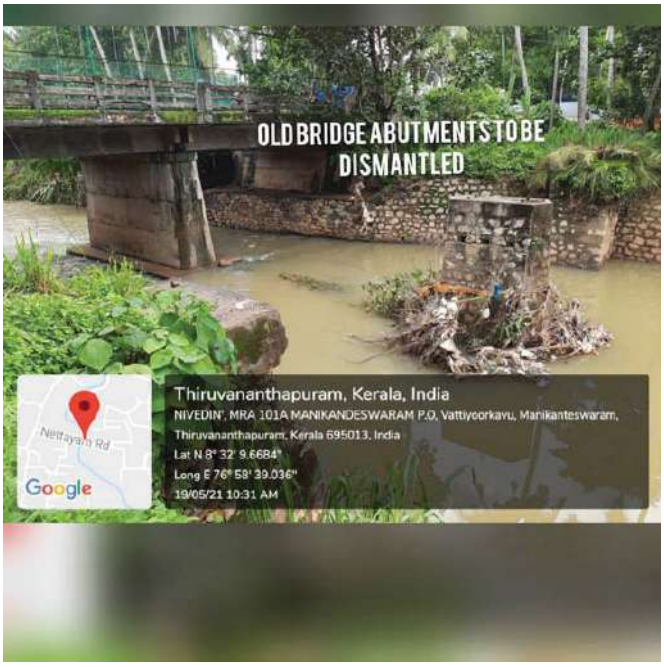

NEAR KILLIPALAM
TREES TO BE PRUNED & DELTA FORMATION


DELTA FORMATION
Thiruvananthapuram, Kerala, India
Mannammoola Bridge, Peroorkada Vattiyoorkavu Rd, Mannammoola,
Thiruvananthapuram, Kerala 695013, India
Lat N 8° 31' 57.5688"
Long E 76° 58' 51.654"
19/05/21 10:39 AM
Google


WASTE ACCUMULATION B/W PIERS
Thiruvananthapuram, Kerala, India
Mannammoola Bridge, Percorkada Vattiyoorkavu Rd, Mannammoola, Thiruvananthapuram, Kerala 695013, India
Lat N 8° 31' 57.4752"
Long E 76° 58' 51.5964"
19/05/21 10:39 AM
Google


DELTA FORMATION
Thiruvananthapuram, Kerala, India
MRA 186(A), Dr Hedgewar Road, Manikanteswaram, Manikanteswaram, Thiruvananthapuram, Kerala 695013, India
Lat N 8° 32' 12.0624"
Long E 76° 58' 39.3168"
19/05/21 10:33 AM
Nettayam Rd
Google


DELTA FORMATION
Thiruvananthapuram, Kerala, India
Vazhayila, Padmanabha Nagar, Vazhayila, Padmanabha Nagar, Thiruvananthapuram, Kerala 695043, India
Lat N 8° 32' 49.8408"
Long E 76° 58' 28.9524"
19/05/21 10:25 AM
Google


OLD BRIDGE ABUTMENTS TO BE DISMANTLED
Thiruvananthapuram, Kerala, India
NIVEDIN', MRA 101A MANIKANDESWARAM P.O, Vattiyoorkavu, Manikanteswaram, Thiruvananthapuram, Kerala 695013, India
Lat N 8° 32' 9.6684"
Long E 76° 58' 39.036"
19/05/21 10:31 AM
Nettayam Rd
Google

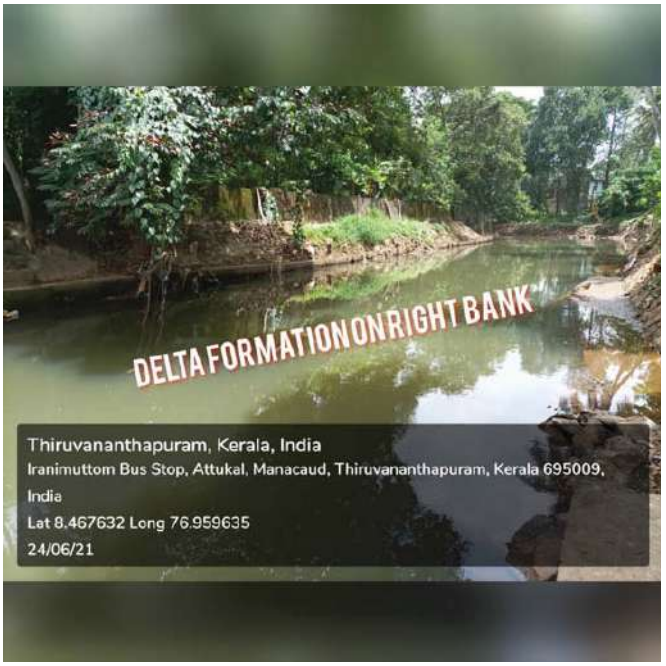

KILLIRIVER - MANNAMOOLA BRIDGE
BEFORE CLEANING
AFTER CLEANING
10.06.2021


DELTA FORMATION
Thiruvananthapuram, Kerala, India
Attukal Bund Rd, Puthenkotta, Karamana, Thiruvananthapuram, Kerala 695002, India
Lat 8.47663 Long 76.95793
24/06/21


NEAR ATTUMUDUMB
WASTE ACCUMULATION
25.05.2021

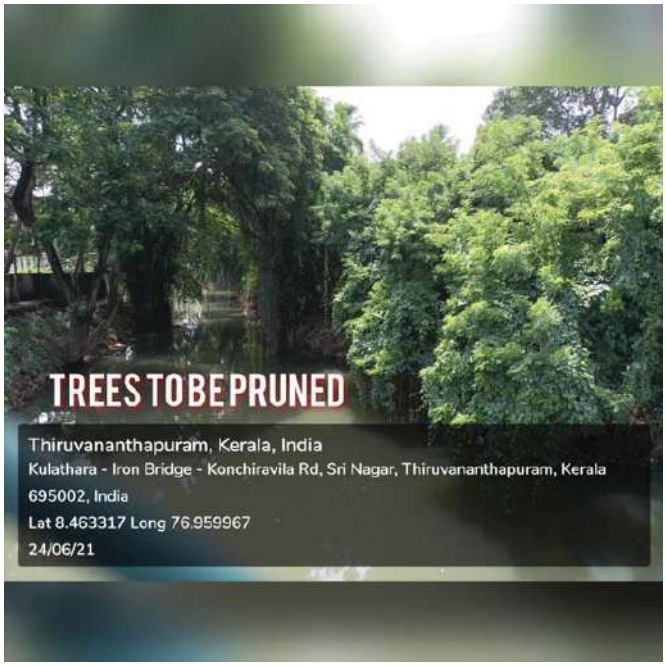

JUNGLE TO BE CLEARED
01.06.2021
Souhirdha Nagar,Cherupalodu,Manikanteswarm, Manikanteswaram, Thiruvananthapuram, Kerala 695013, India
Latitude
8.5398244°
Longitude
76.978414°

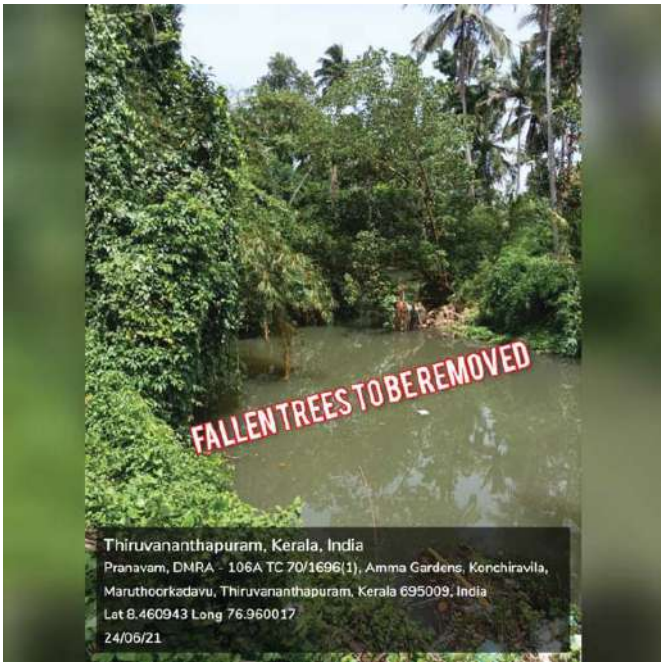

WASTE DUMPING & DELTA FORMATION
Thiruvananthapuram, Kerala, India
Chiramukku - Maruthoorkadavu Rd, Kalady, Attukal, Soman Nagar, Thiruvananthapuram, Kerala 695009, India
Lat 8.466362 Long 76.960694
24/06/21


DELTA FORMATION ON RIGHT BANK
Thiruvananthapuram, Kerala, India
Iranimuttom Bus Stop, Attukal, Manacaud, Thiruvananthapuram, Kerala 695009, India
Lat 8.467632 Long 76.959635
24/06/21


TREES TO BE PRUNED & DAMAGED BUND
Thiruvananthapuram, Kerala, India
Kulathara - Iron Bridge - Konchiravila Rd, Sri Nagar, Thiruvananthapuram, Kerala 695002, India
Lat 8.463333 Long 76.959873
24/06/21


WASTE DUMPING & REMOVAL OF BRANCHES
Thiruvananthapuram, Kerala, India
Pranavam, DMRA - 106A TC 70/1696(1), Amma Gardens, Konchiravila, Maruthoorkadavu, Thiruvananthapuram, Kerala 695009, India
Lat 8.460693 Long 76.960195
24/06/21


TREES TO BE PRUNED
Thiruvananthapuram, Kerala, India
Kulathara - Iron Bridge - Konchiravila Rd, Sri Nagar, Thiruvananthapuram, Kerala 695002, India
Lat 8.463317 Long 76.959967
24/06/21


FALLEN TREES TO BE REMOVED
Thiruvananthapuram, Kerala, India
Pranavam, DMRA - 106A TC 70/1696(1), Amma Gardens, Konchiravila, Maruthoorkadavu, Thiruvananthapuram, Kerala 695009, India
Lat 8.460943 Long 76.960017
24/06/21

CONCLUSION

The proposed works in **Phase I** includes removal of floating bodies like water hyacinths, blockages between bridges, uprooting of trees on river bunds, removal of fallen down trees into water bodies, cutting of tree branches, removal of accumulated silt which will ensure smooth flow of water through these water bodies to an extent. However after this initial cleaning works the cleaning process should be taken up monthly/fortnightly. The frequency of the cleaning will depend upon the extent of waste accumulation in particular drain. Once these frequent cleanings are taken up the intensity of flood in the city can be reduced considerably.. The installation of CCTV cameras on vulnerable points of waste dumping is to be ensured by Trivandrum Municipal Corporation. There are lot of sagging cables and low-lying pipes inside the thodus which affect the smooth flow of water. This should be taken up with the concerned departments for lifting those cables/pipes above the HFL (High flood level) of the thodu. There are lot of encroachments on both banks of the thodu which reduces the actual width and flood holding capacity. The steps to be taken up with revenue department for demarcation of the entire stretch of water bodies from origin to end point, so that eviction process can be initiated. Strict control should be ensured to prevent dumping of wastes into water bodies and offenders should be punished accordingly. Most of the major bridges across the water bodies are presently fenced securely to prevent dumping of wastes. The same should be done on footbridges also to prevent waste dumping.

The Phase 2 works includes emergency side protection works to be taken up to prevent flooding due to overflow. Also the desiltation works in the water bodies to be taken up simultaneously for removal of huge masses of deltas formed over the years. This will ensure more water carrying capacity for water bodies and will prevent overflow.