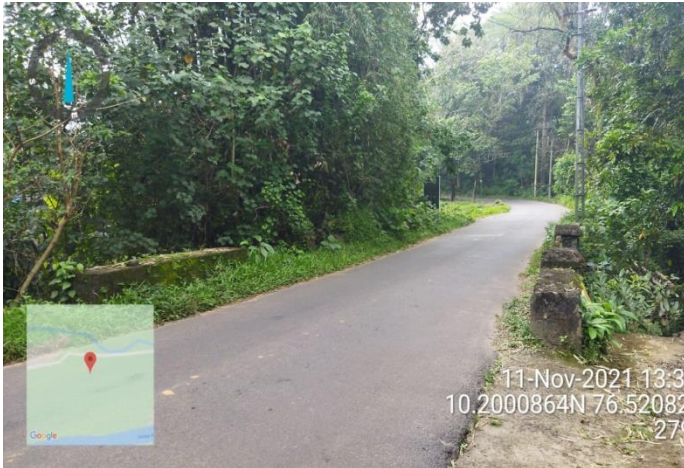


MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY



DECEMBER 2021

Submitted to
PROJECT MANAGEMENT UNIT
KERALA ROAD FUND BOARD

MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY – KANNUR

December 2021

**Submitted to
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KERALA ROAD FUND BOARD**



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KSCSTE - NATIONAL TRANSPORTATION PLANNING AND RESEARCH CENTRE
An Institution of Kerala State Council for Science, Technology and Environment

DETAILS OF FOREST SECTION TO BE DIVERTED FOR HILL HIGHWAY IN KANNUR DISTRICT

In Kannur district, the forest section in the hill highway runs from Ambayathodu to Boys town, further down the Hill Highway enters Wayanad District. The total length of the stretch is 5.8 km in which 1.617 km is traversing through forest lands, under Kumanmala forest range. Of this 173m is under Wayanad division and the remaining stretch is under Kannur division. The stretch is characterized by the presence of the Bavali River running almost parallel to the corridor. The presence of deep valley and high cuts is also another character of this stretch. The stretch is also prone to landslides and land slips.

The available ROW of the highway at forest sections varies from 5.9 to 9.6m. To have the mandated ROW of 12m, the forest land required is 0.69 Ha as given in Table 1. Considering the existing road including the carriageway to be falling on the forest land, the forest area to be diverted for 12m ROW is 1.9Ha.

Table 1: Forest Area to be diverted in Ambayathodu to Boys town stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N11.85172, E75.911	N11.852, E75.91127	76	8.1 – 9.6	239.4	Forest land on both sides
2	N11.852, E75.91127	N11.85222, E75.91172	51	7.7 – 8.1	209.1	Forest land on both sides
3	N11.85222, E75.91172	N11.85211, E75.91225	75	7.7 – 9.3	262.5	Forest land on both sides
4	N11.85211, E75.91225	N11.8518, E75.91191	69	8.1 – 9.3	227.7	Forest land on both sides
5	N11.8518, E75.91191	N11.8499, E75.91293	300	7.3 – 8.1	1290	Forest land on both sides
6	N11.8499, E75.91293	N11.84925, E75.91349	99	7.3 – 9.5	356.4	Forest land on both sides
7	N11.84925, E75.91349	N11.84811, E75.9145	180	6.8 – 9.5	693	Forest land on both sides
8	N11.84811, E75.9145	N11.84819, E75.91531	88	6.8 – 7.3	435.6	Forest land on both sides

9	N11.84819, E75.91531	N11.84766, E75.91559	98	5.9 - 7.3	529.2	Forest land on both sides
10	N11.84766, E75.91559	N11.84699, E75.91538	81	5.9 – 7.9	413.1	Forest land on both sides
11	N11.84699, E75.91538	N11.84613, E75.91585	110	7 – 7.9	500.5	Forest land on both sides
12	N11.84613, E75.91585	N11.8455, E75.9161	74	7 – 8.1	329.3	Forest land on both sides
13	N11.8455, E75.9161	N11.84508, E75.91622	48	6.8 – 8.1	218.4	Forest land on both sides
14	N11.84508, E75.91622	N11.84454, E75.91641	66	6.8 – 8.2	297	Forest land on both sides
15	N11.84454, E75.91641	N11.8444, E75.9166	29	7.6 – 8.2	118.9	Forest land on both sides
16	N11.8444, E75.9166	N11.84411, E75.91674	30	7.6	132	Forest land on both sides
17	N11.84411, E75.91674	N11.84375, E75.91683	47	7.1 – 7.6	218.55	Forest land on both sides
18	N11.84375, E75.91683	N11.84316, E75.91692	62	7.1 – 7.2	300.7	Forest land on both sides
19	N11.84316, E75.91692	N11.84285, E75.91689	34	7.2 – 8.6	139.4	Forest land on both sides
Total Forest area to be diverted in sq.m						6910.75
Total Forest area to be diverted in Ha						0.69

Considering that the present ROW is belonging to forest, the total forest area to be diverted for 12m ROW will be $19404m^2$ (1.9Ha).

The Ambayathodu to Boys town stretch alignment is shown in Figure 1. Figure 2 shows some snaps from the stretch.

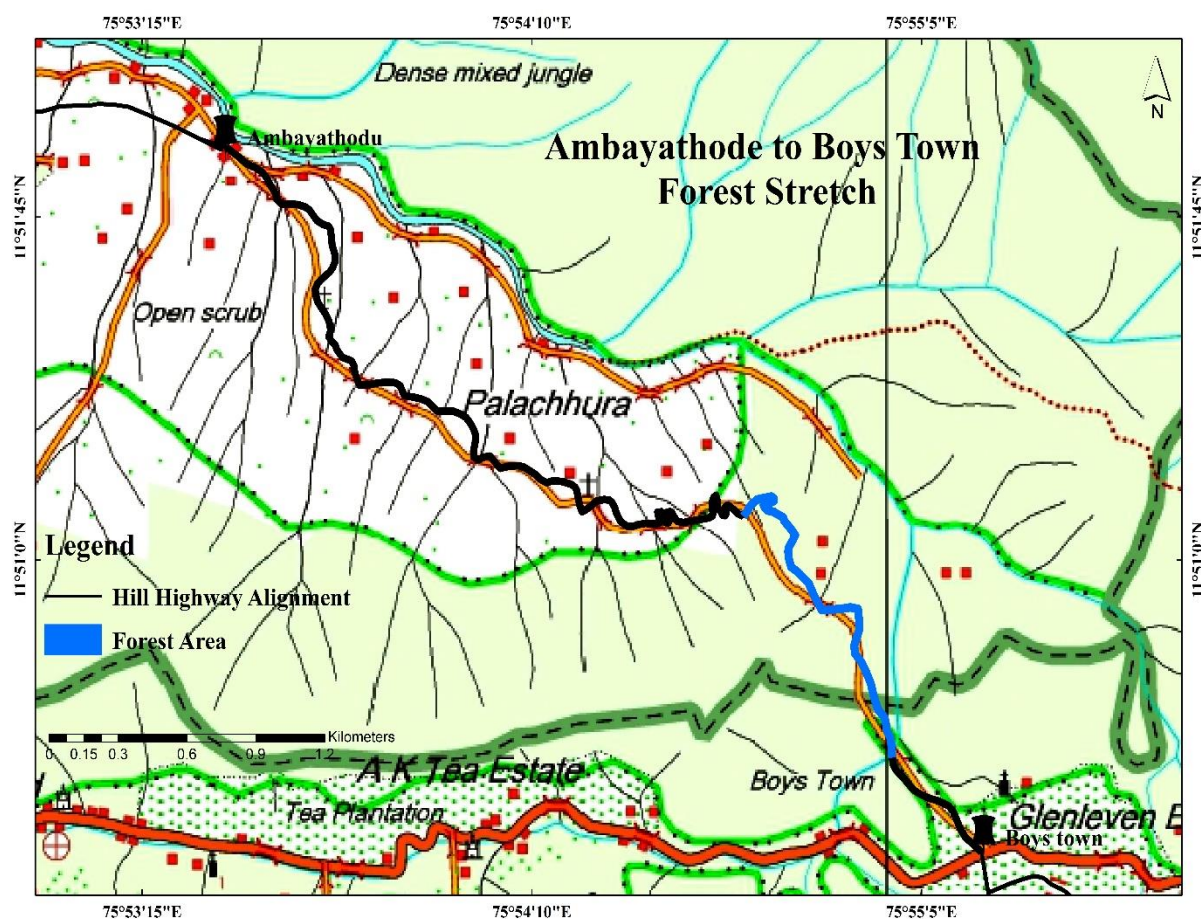
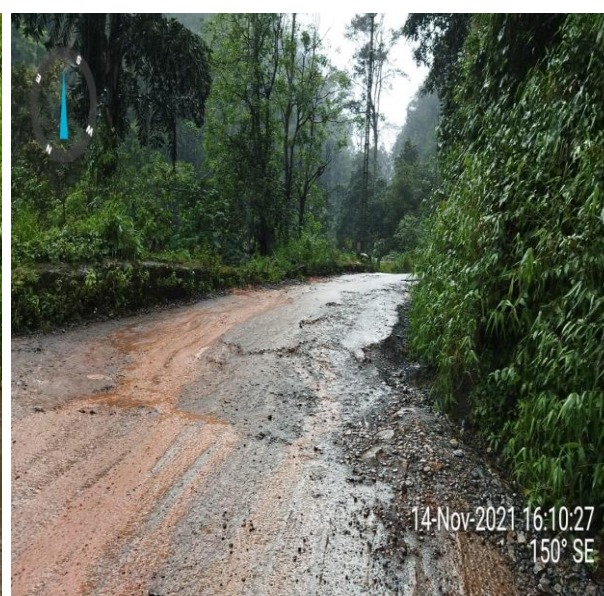


Fig 1: Alignment of Ambayathodu to Boys town stretch



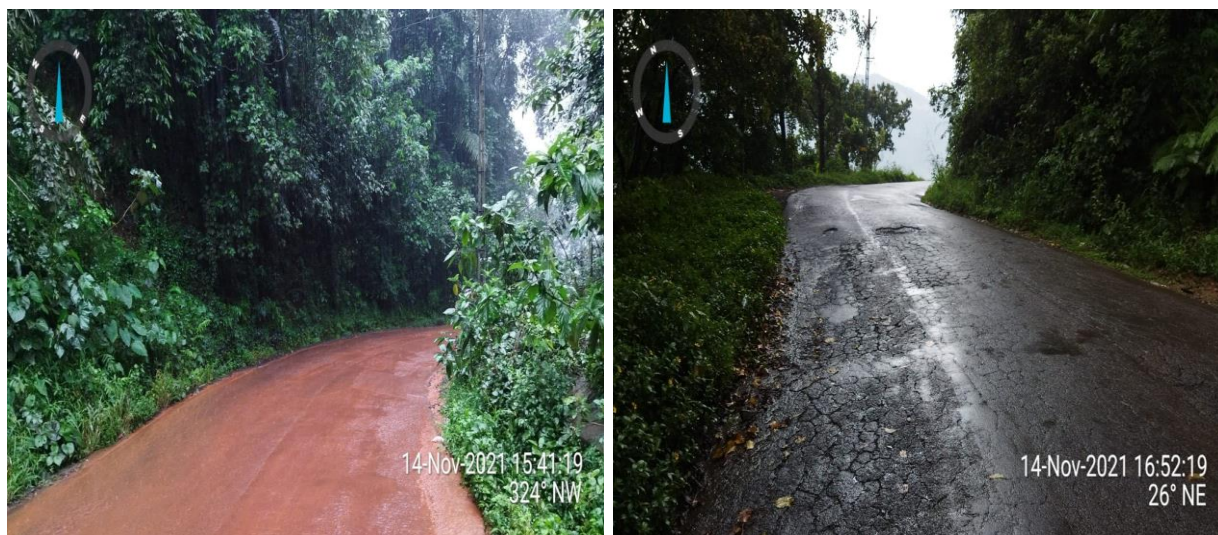


Fig 2: Ambayathodu to Boys town stretch

Summary

In Kannur District, a total of 0.69Ha is estimated as the forest land requirement for the construction of Hill Highway. This calculation considers widening of the existing ROW to 12 m. The calculations are based on the assumption that road widening will be carried out concentrically from the center line. The calculated area may change when the alignment is designed to meet with the geometric standards, especially with regard to the side slopes required. The exact area can be determined only after the preparation of the Detailed Project Report of the alignment.

MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY – KOZHIKODE

December 2021

**Submitted to
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KSCSTE - NATIONAL TRANSPORTATION PLANNING AND RESEARCH CENTRE
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DETAILS OF FOREST SECTION TO BE DIVERTED FOR HILL HIGHWAY IN KOZHIKODE DISTRICT

In Kozhikode district, the forest section in the hill highway lies in the Kuttyady Churam stretch which is a connecting link between Wayanad and Kozhikode districts. The left of this section is under Manathavadi-Makkiyad Forest Range under North Wayanad forest division and Peria Forest Range under Kozhikode forest division falls on the left and right of the stretch respectively.

The forest stretch has a length of 2.759 km with the ROW varying from 6.8 to 11.5m. For a 12 m ROW, the forest land required is 0.50 Ha as given in Table 1.

Table 1: Forest Area to be diverted in Kuttyady Churam stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N11.73405, E75.82672	N11.73353, E75.82514	200	7.2 – 7.3	535	Forest land on LHS
2	N11.73353, E75.82514	N11.73287, E75.82415	130	7.3 – 7.9	305.5	Forest land on LHS
3	N11.73287, E75.82415	N11.7322, E75.82319	140	7.9 – 8.1	325.5	Forest land on LHS
4	N11.7322, E75.82319	N11.73324, E75.82295	150	8.1 – 8.4	266.25	Forest land on LHS
5	N11.73324, E75.82295	N11.73241, E75.82259	89	8.4	320.4	Forest land on both sides
6	N11.73241, E75.82259	N11.73167, E75.822	110	8.1 – 8.4	412.5	Forest land on both sides
7	N11.73167, E75.822	N11.73246, E75.82137	120	8 – 8.2	228	Forest land RHS
8	N11.73246, E75.82137	N11.73245, E75.81903	270	7.3 – 8	513	Forest land RHS
9	N11.73245, E75.81903	N11.73308, E75.8184	97	7.3 -7.7	436.5	Forest land on both sides
10	N11.73308, E75.8184	N11.73271, E75.81735	120	7.7 -8.7	456	Forest land on both sides
11	N11.73271, E75.81735	N11.73269, E75.8169	47	7.8 – 8.7	88.125	Forest land on LHS
12	N11.73269, E75.8169	N11.73235, E75.81696	36	7.4 – 7.8	158.4	Forest land on both sides
13	N11.73235, E75.81696	N11.73208, E75.81664	48	7.4	220.8	Forest land on both sides
14	N11.73208, E75.81664	N11.73208, E75.81611	57	7 – 7.4	141.075	Forest land on RHS

15	N11.73206, E75.81576	N11.73204, E75.81545	31	6.8 – 8.5	72.075	Forest land on RHS
16	N11.73204, E75.81545	N11.73199, E75.81499	54	8.2 – 8.5	108	Forest land on RHS
17	N11.7313, E75.8144	N11.73097, E75.81433	39	9.1 – 9.6	50.7	Forest and on LHS
18	N11.73097, E75.81433	N11.73065, E75.81379	78	9.1 – 9.4	105.3	Forest and on LHS
19	N11.73045, E75.81299	N11.73018, E75.81238	65	8.4 – 11.5	73.125	Forest land on RHS
20	N11.73018, E75.81238	N11.72948, E75.81224	74	8.4 -8.7	135.05	Forest land on RHS
21	N11.72847, E75.81131	N11.7283, E75.81103	29	8.7 – 8.8	40.6	Forest land on RHS
Total Forest area to be diverted in sq.m						4991.9
Total Forest area to be diverted in Ha						0.50

The Hill Highway alignment along Kuttyadi stretch is shown in Figure 1. Figure 2 shows some snaps from the stretch.

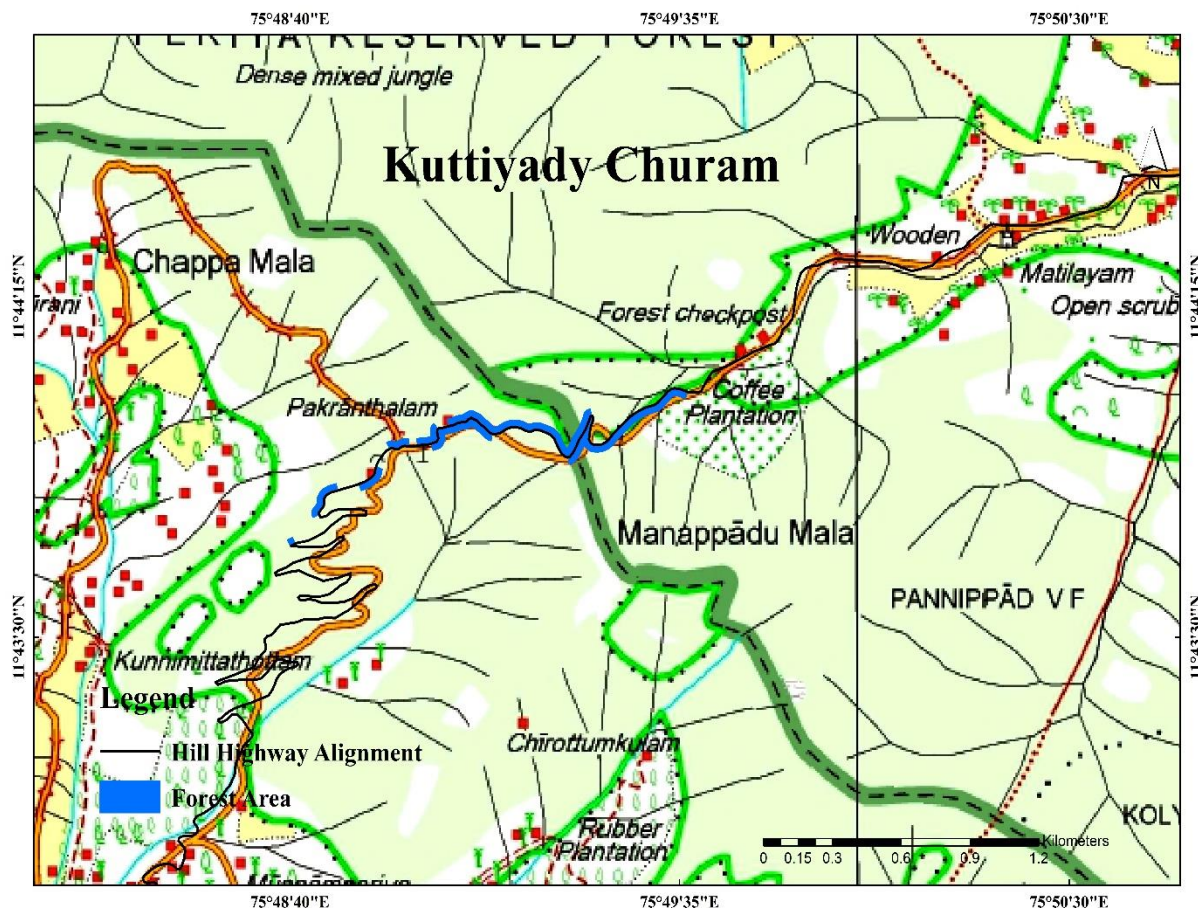


Fig 1: Alignment of Hill Highway along Kuttyady stretch



Fig 2: Kuttady stretch

Summary

In Kozhikode District, a total of 0.50Ha is estimated as the forest land requirement. The calculations are based on the assumption that road widening will be carried out concentrically from the center line. The calculated area may change when the alignment is designed to meet with the geometry.

MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY – MALAPPURAM

December 2021

**Submitted to
PROJECT MANAGEMENT UNIT
KERALA ROAD FUND BOARD**



natpac

KSCSTE - NATIONAL TRANSPORTATION PLANNING AND RESEARCH CENTRE
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DETAILS OF FOREST SECTION TO BE DIVERTED FOR HILL HIGHWAY IN MALAPPURAM DISTRICT

As per the latest approved alignment, the Hill Highway in Malappuram district passes through one forest section *viz.* from Kakkadampoyil to Veliyamthode (Nilambur) which is under Akampadam Forest Range and Edakkode Forest Range both belonging to Nilambur North Division.

The Kakkadampoyil to Veliyamthode stretch has a length of 23.3km out of which 4.766km passes through forest area with the available ROW varying from a minimum of 5.6 m to a maximum of 15.2m. Out of this, 610m (N11.33505, E76.11862 to N11.33444, E76.12069) of Hill Highway alignment passes through forest road and the entire 12m ROW is to be acquired for forest area diversion. The forest land required in this case is estimated as 1.65 Ha as given in Table 1.

**Table 1: Forest Area to be diverted in Kakkadampoyil to Nilambur Stretch
in Malappuram**

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N11.3357, E76.11621	N11.33535, E76.11711	110	7.6 – 9.5	379.5	Forest land on both sides
2	N11.33535, E76.11711	N11.33522, E76.11776	71	7.6 – 8	156.2	Forest land on RHS
3	N11.33505, E76.11862	N11.33518, E76.11999	350	0	4200	Forest land on both sides
4	N11.33518, E76.11999	N11.33444, E76.12069	260	0	3120	Forest land on both sides
5	N11.34163, E76.12467	N11.33981, E76.12677	350	8 – 8.8	568.75	Forest land on LHS
6	N11.33736, E76.13574	N11.3374, E76.13501	78	9.8 – 9.9	78	Forest land on RHS
7	N11.33647, E76.13986	N11.33551, E76.14196	350	7.8 – 8.2	717.5	Forest land on RHS
8	N11.3306, E76.15605	N11.33009, E76.15764	190	7.6 – 8	346.75	Forest land on RHS
9	N11.33009, E76.15764	N11.32876, E76.16166	500	7.6	1012.5	Forest land on LHS
10	N11.32829, E76.16439	N11.32791, E76.16482	66	7.4 -8.1	141.9	Forest land on both sides
11	N11.32791, E76.16482	N11.328, E76.16665	220	7.2 – 8.1	957	Forest land on both sides

12	N11.328, E76.16665	N11.32779, E76.17029	450	7.2 – 8	1980	Forest land on RHS
13	N11.32779, E76.17029	N11.32757, E76.17071	52	7.6 - 8	117	Forest land on RHS
14	N11.3256, E76.17612	N11.32779, E76.17707	270	9.5 – 10.3	310.5	Forest land on both sides
15	N11.32835, E76.17711	N11.32865, E76.17728	38	9.5 – 9.6	93.1	Forest land on both sides
16	N11.32865, E76.17728	N11.32887, E76.17733	25	9.5 – 10.7	47.5	Forest land on LHS
17	N11.30967, E76.2122	N11.30959, E76.21239	28	6.6 – 6.9	88.9	Forest land on both sides
18	N11.30959, E76.21239	N11.30706, E76.21491	650	5.6 – 5.8	4095	Forest land on both sides
19	N11.30669, E76.22016	N11.30521, E76.22074	200	5.8 – 7.3	1090	Forest land on LHS
20	N11.30521, E76.22074	N11.30382, E76.22404	450	7.3 – 8	1012.5	Forest land on both sides
21	N11.29819, E76.23669	N11.2977, E76.23688	58	8.8 – 9.9	153.7	Forest land on both sides
Total			4766		20666.3	
Total Forest area to be diverted in sq.m						20666.3
Total Forest area to be diverted in Ha						2.06663

The Kakkadampoyil to Nilambur alignment is shown in Figure 1. Figure 2 shows some snaps from the stretch



Fig 1: Alignment from Kakkadampoyil to Nilambur



Fig 2: Kakkadampoyil to Nilambur stretch

Summary

In Malappuram District, a total of 2.0663 Ha is estimated as the forest land requirement. The calculations are based on the assumption that road widening will be carried out concentrically from the centre line. The calculated area may change when the alignment is designed to meet with the geometric standards.

MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY – THRISSUR

December 2021

**Submitted to
PROJECT MANAGEMENT UNIT
KERALA ROAD FUND BOARD**



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DETAILS OF FOREST SECTION TO BE DIVERTED FOR HILL HIGHWAY IN THRISSUR DISTRICT

The Hill Highway in Thrissur starts from Pattikad and ends at Aroormuzhi. As per the latest approved alignment, the Hill Highway in Thrissur district passes through four forest sections which are as listed below.

1. Pattikad to Vilangannur stretch
2. Kallayi to Pulikkanny stretch under Chalakudy division
3. Pulikkanny to Vellikulangara stretch under Chalakudy division
4. Vellikulangara to Aroormuzhi stretch under Pariyaram range, Chalakudy division

The details of the forest area to be diverted for the different stretches are tabulated in the following sections. In most of these stretches, it has been reported that the entire road is falling under forest except the carriageway and the calculations have been carried out accordingly.

1. Pattikad to Vilangannur Stretch

The Pattikad to Vilangannur stretch has a length of 5.4km is passing through forest for a length of 1.729 km with the ROW varying from 14 to 16.4m. Though there is no need of any forest land diversion, trees are present on RHS near to pavement edge, for a length of 130m adjacent to the Kerala Forest Research Institute (KFRI) lands, this may mandate clearance from the Forest Department.

Figure 1 shows some snaps from the stretch.



Fig 1: Trees present near KFRI in Pattikad to Vilangannur stretch

2. Kallayi to Pulikkanny Stretch

The Kallayi to Pulikkanny stretch has a length of 2.8km out of which 0.273km is passing through forest lands. The entire 12m ROW is to be acquired from the forest land for the construction of Hill Highway. The total forest area to be diverted is 0.3276 Ha as given in Table 1.

Table 1: Forest Area to be diverted in Kallayi to Pulikkanny Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.45254, E76.35697	N10.45218, E76.35788	110	1320	Forest land on RHS
2	N10.45218, E76.35788	N10.45177, E76.35831	65	780	Forest land on RHS
3	N10.43729, E76.36328	N10.43693, E76.36315	42	504	Forest land on RHS
4	N10.43693, E76.36315	N10.43643, E76.36315	56	672	Forest land on RHS
Total			273	3276	
Total Forest area to be diverted in sq.m					3276
Total Forest area to be diverted in Ha					0.3276

Figure 2 and 3 shows the Kallayi to Pulikkanny alignment and the snaps from the section respectively.

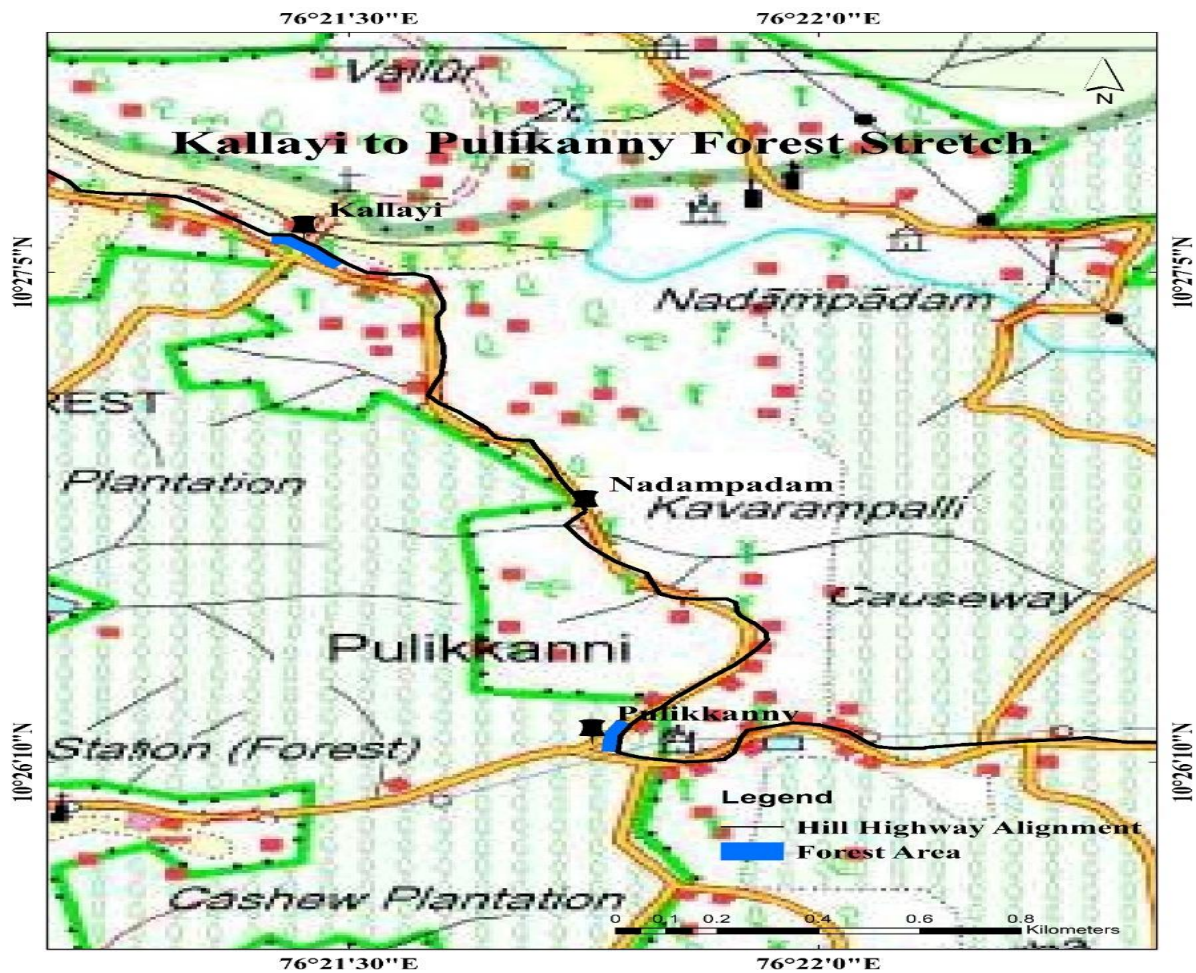


Fig 2: Alignment from Kallayi to Pulikkanny



Fig 3: Kallayi to Pulikkanny stretch

3. Pulikkanny to Vellikulangara Stretch

This stretch has a length of 17.1km out of which 13.647km is passing through forest. In this case, the adjacent lands are under control by the HML Estate through lease from the Forest Department. The forest land required is for the entire 12m ROW in this stretch. The area required to be diverted is 16.38 Ha and is given in Table 2.

Table 2: Forest Area to be diverted for Pulikkanny to Vellikulangara Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.43736, E76.36657	N10.43714, E76.36704	56	672	Forest land on both sides
2	N10.43714, E76.36704	N10.43658, E76.36784	110	1320	Forest land on both sides
3	N10.43658, E76.36784	N10.43677, E76.37321	600	7200	Leased Forest land on both sides (HML estate)
4	N10.43677, E76.37321	N10.43631, E76.38108	900	10800	Leased Forest land on both sides (HML estate)
5	N10.43631, E76.38108	N10.42945, E76.38194	1000	12000	Leased Forest land on both sides (HML estate)
6	N10.42945, E76.38194	N10.42841, E76.38564	450	5400	Leased Forest land on both sides (HML estate)
7	N10.42841, E76.38564	N10.42437, E76.38566	500	6000	Leased Forest land on both sides (HML estate)
8	N10.42437, E76.38566	N10.41731, E76.38933	950	11400	Leased Forest land on both sides (HML estate)
9	N10.41731, E76.38933	N10.41111, E76.39465	1000	12000	Leased Forest land on both sides (HML estate)
10	N10.41111, E76.39465	N10.40601, E76.40126	950	11400	Leased Forest land on both

					sides (HML estate)
11	N10.40601, E76.40126	N10.40123, E76.40606	1000	12000	Leased Forest land on both sides (HML estate)
12	N10.40123, E76.40606	N10.39744, E76.41147	1000	12000	Leased Forest land on both sides (HML estate)
13	N10.39744, E76.41147	N10.39306, E76.41674	1200	14400	Leased Forest land on both sides (HML estate)
14	N10.39306, E76.41674	N10.38917, E76.42251	950	11400	Leased Forest land on both sides (HML estate)
15	N10.38917, E76.42251	N10.38271, E76.42658	1000	12000	Leased Forest land on both sides (HML estate)
16	N10.38271, E76.42658	N10.37956, E76.42613	350	4200	Forest land on both sides
17	N10.37438, E76.42087	N10.37072, E76.42261	650	7800	Forest land on both sides
18	N10.37072, E76.42261	N10.36752, E76.42404	450	5400	Forest land on both sides
19	N10.36752, E76.42404	N10.3663, E76.42238	300	3600	Forest land on both sides
20	N10.3663, E76.42238	N10.36639, E76.42202	35	420	Forest land on LHS
21	N10.36639, E76.42202	N10.36655, E76.42091	120	1440	Forest land on LHS
22	N10.36293, E76.41047	N10.36282, E76.4104	14	168	Forest land on LHS
23	N10.36282, E76.4104	N10.36234, E76.4101	62	744	Forest land on LHS
Total			13647	163764	
Total Forest area to be diverted in sq.m					163764
Total Forest area to be diverted in Ha					16.38

Figure 4 and 5 shows the snaps from the section and the Pulikkanny to Vellikulangara alignment the respectively.



Fig 4: Pulikkanny to Vellikulangara stretch



Fig 5: Alignment from Pulikkanny to Vellikulangara

4. Vellikulangara to Aroormuzhi Stretch

The Vellikulangara to Aroormuzhi stretch has a length of 1.6km out of which 1.35km is passing through forest. The land use on RHS is characterised by the Koottukrishi Farm, the ownership being with the Forest Department. The entire 12m ROW is to be acquired from the forest land for the construction of Hill Highway. This stretch requires 1.62 Ha of forest land diversion for the development of Hill Highway as per the Table 3.

Table 3: Forest Area to be diverted for Vellikulangara to Aroormuzhi Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.31279, E76.46338	N10.31251, E76.4647	150	1800	Forest on both sides
2	N10.31251, E76.4647	N10.31123, E76.4667	270	3240	Forest on both sides
3	N10.31123, E76.4667	N10.31071, E76.46882	240	2880	Forest on both sides
4	N10.31071, E76.46882	N10.30968, E76.47107	280	3360	Forest on both sides
5	N10.30968, E76.47107	N10.30872, E76.47285	230	2760	Forest on both sides
6	N10.30872, E76.47285	N10.30719, E76.47333	180	2160	Forest on both sides
Total			1350	16200	
Total Forest area to be diverted in sq.m					16200
Total Forest area to be diverted in Ha					1.62

Figure 6 and Figure 7 shows respectively the snaps of Vellikulangara to Aroormuzhi forest section and the alignment.



Fig 6: Vellikulangara to Aroormuzhi stretch



Fig 7: Alignment of Vellikulangara to Aroormuzhi forest section.

Summary

In Thrissur District, a total of four stretches are passing through forest lands. Of these, three stretches require additional land for widening to meet with the stipulated standards for the Hill Highway.

Table 4: Summary of Forest Area Requirement in Thrissur District

Sl. No.	Stretch	Forest area to be diverted (sq. m)
1	Pattikad to Vilangannur	-
2	Kallayi to Pulikkanny	3276
3	Pulikkanny to Vellikulangara	163764
4	Vellikulangara to Aroormuzhi	16200
Total Forest area to be diverted in sq.m		183240
Total Forest area to be diverted in Ha		18.324

A total of 18.324 Ha is estimated as the forest land requirement for development of Hill Highway in Thrissur District. The calculated area may change when the alignment is designed to meet with the geometric standards.

MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY – ERNAKULAM

December 2021

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An Institution of Kerala State Council for Science, Technology and Environment

DETAILS OF FOREST SECTIONS TO BE DIVERTED FOR HILL HIGHWAY IN ERNAKULAM DISTRICT

The Hill Highway in Ernakulam starts from Vettilappara at Thrissur-Ernakulam boundary and ends at Neryamangalam, which is at the Idukki boundary. As per the latest approved alignment, the Hill Highway in Ernakulam district passes through eight forest sections, of which one is a greenfield viz, the one connecting Illithode and Chettinada *via* Vadakkambilly and Abhayaranyam.

The forest sections of Hill Highway in Ernakulam are as listed below;

1. Vettilappara to Kappela junction stretch under Vazhachal Division.
2. Kappela junction to Ayyampuzha stretch - the left side under Kalady range, Malayattoor division and the right side under Athirapilly range, Vazhachal division.
3. Manjapra to Eucaly junction stretch under Kalady range, Malayattoor division.
4. Eucaly junction to Kadappara stretch under Kalady range Malayattoor division and under Research range Kodanad, NSC division.
5. Kadappara to Illithode stretch under Research range Kodanad, NSC division and under Kalady range, Malayattor division.
6. Vadakkambilly to Chettinada *via* Abhayaranyam under Research range Kodanad, NSC division (Greenfield)
7. Mekkapala to Cheranganal stretch under Mekapala range, Malayattor division
8. Thadikulam to Avolichal stretch under Kothamangalam range, Kothamangalam division.

The details of the forest area to be diverted for the different stretches are tabulated in the following sections. In some of these stretches, it has been reported that the entire road is falling under forest except the carriageway while certain stretches falls entirely under forest land including the carriageway and the calculations have been carried out accordingly.

1. Vettilappara to Kappela Junction Stretch

The Vettilappara – Kappela stretch is passing through the estates of Plantation Corporation of Kerala, which are on leased lands of the forest department. The 8.5 km road is passing through forest land and 12m width is needed to be acquired for Hill Highway. The forest land required in this stretch is 10.2 Ha as given in Table 1.

Table 1: Forest Area to be diverted in Vettilappara to Kappela Junction

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.29017, E76.47914	N10.25407, E76.51403	8500	102000	Forest land on both sides
Total Forest area to be diverted in sq.m					102000
Total Forest area to be diverted in Ha					10.2

The Vettilappara-Kappela alignment is shown in Figure 1. Figure 2 shows some snaps from the stretch.

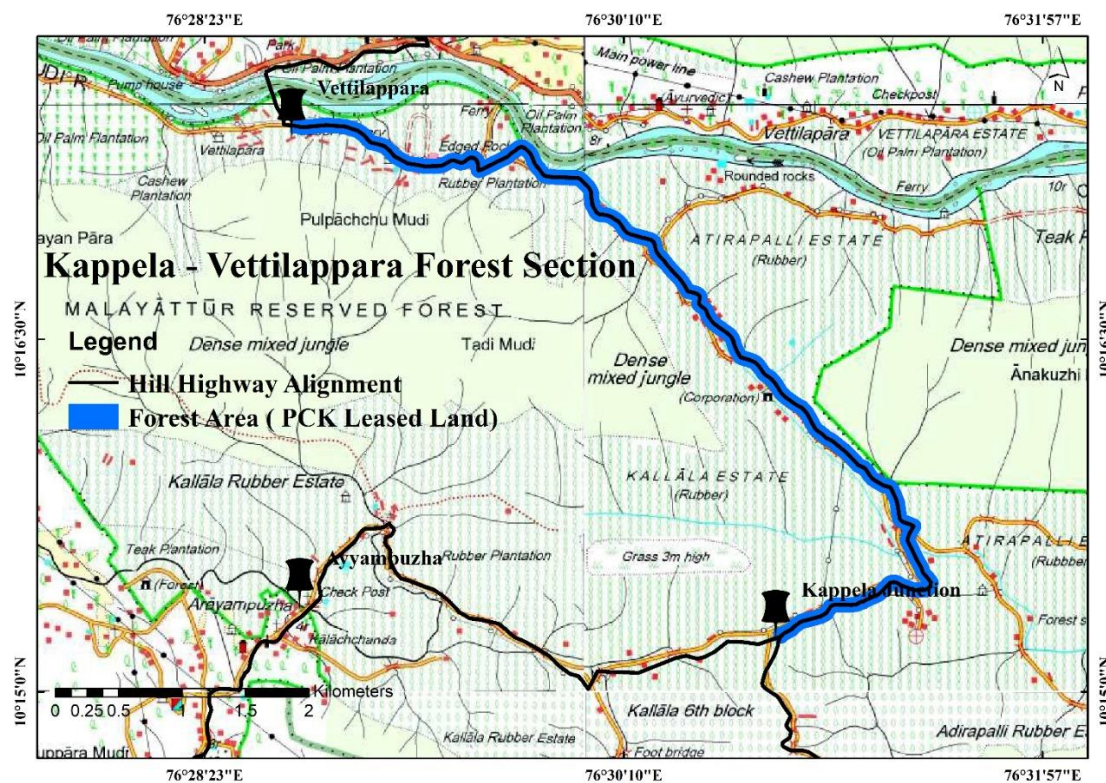


Fig 1: Alignment from Vettilappara to Kappela

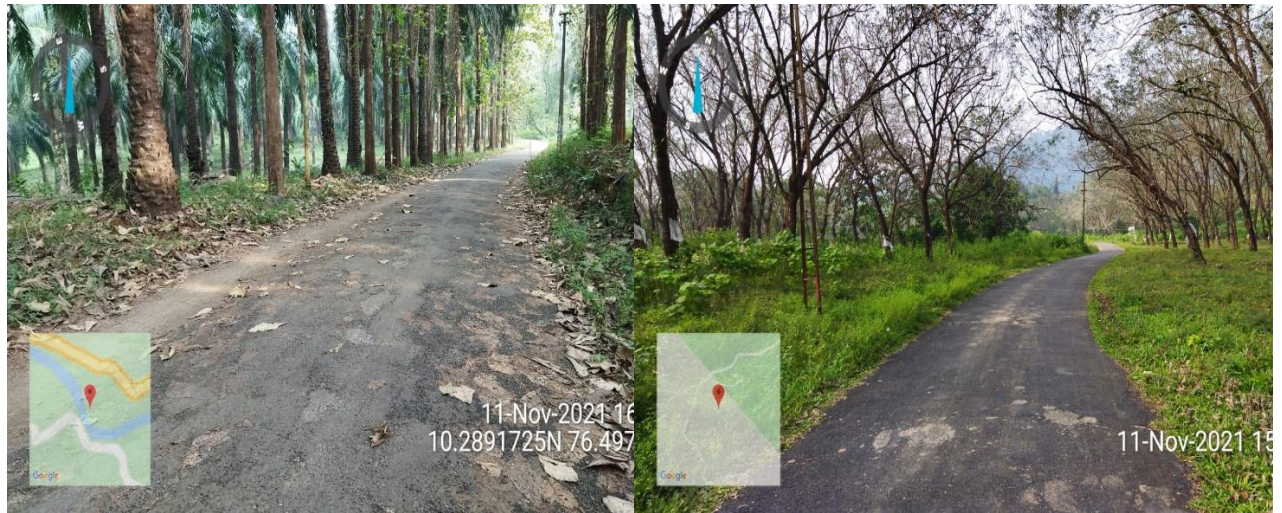


Fig 2: Vettilapara – Kappela stretch

2. Kappela Junction to Ayyampuzha Stretch

The Kappela to Ayyampuzha stretch, with a length of 4.96 km is also passing through the estates of Plantation Corporation of Kerala. This 4.96 km road passing through forest land and 12m width is needed to be acquired for the construction of Hill Highway. The forest land required in this stretch is 5.95 Ha as given in Table 2.

Table 2: Forest Area to be diverted in Kappela to Ayyampuzha Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.25407, E76.51394	N10.25584, E76.48055	4960	59520	Forest land on both sides
Total Forest area to be diverted in sq.m					59520
Total Forest area to be diverted in Ha					5.95

Figure 3 and 4 shows the Kappela - Ayyampuzha alignment and the snaps from the section respectively.



Fig 3: Alignment from Kappela to Ayyampuzha



Fig 4: Kappela to Ayyampuzha stretch

3. Manjapra Junction to Eucaly Junction Stretch

This stretch is passing through forest for a length of 1.25 km with the ROW varying from 7.3 to 10.4m. The forest land required in this case is 0.53 Ha as given in Table 3.

Table 3: Forest Area to be diverted for Manjapra to Eucaly Junction Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.20305, E76.47579	N10.20331, E76.47616	50	7.3 – 10.4	87.5	Forest land on RHS
2	N10.20331, E76.47616	N10.2063, E76.48117	700	7.3 – 7.4	3255	Forest land on both sides
3	N10.2063, E76.48117	N10.20801, E76.48208	270	7.4 – 7.5	1228.5	Forest land on both sides
4	N10.20801, E76.48208	N10.2092, E76.48164	140	7.5 – 8.4	567	Forest land on both sides
5	N10.2092, E76.48164	N10.20999, E76.48151	88	8.4	149.6	Forest land on RHS
Total			1248		5287.6	
Total Forest area to be diverted in sq.m						5287.6
Total Forest area to be diverted in Ha						0.53

4. Eucaly Junction to Kadappara Stretch

The Eucaly to Kadappara stretch has a length of 1.59km and requires 1.08 Ha of forest land diversion for the development of Hill Highway as per the 12m ROW stipulated.

Table 4: Forest Area to be diverted for Eucaly Junction to Kadappara Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.21013, E76.48162	N10.20964, E76.48361	220	4.5 – 4.7	1628.00	Forest land on both sides
2	N10.20964, E76.48361	N10.20801, E76.48773	500	4.2 – 4.5	3825.00	Forest land on both sides
3	N10.20761, E76.48898	N10.20708, E76.48986	250	3.5 – 5.9	1018.75	Forest land on LHS
4	N10.20708, E76.48986	N10.20523, E76.4944	550	3.5 – 5.6	4097.50	Forest land on both sides
5	N10.20523, E76.4944	N10.20479, E76.49483	68	5.5 – 5.6	270.30	Forest land on LHS
Total			1588		10840	
Total Forest area to be diverted in sq.m						10840
Total Forest area to be diverted in Ha						1.08

Figure 5 and Figure 6 shows respectively the alignment and snaps of Manjapra - Eucaly- Kadappara forest section.

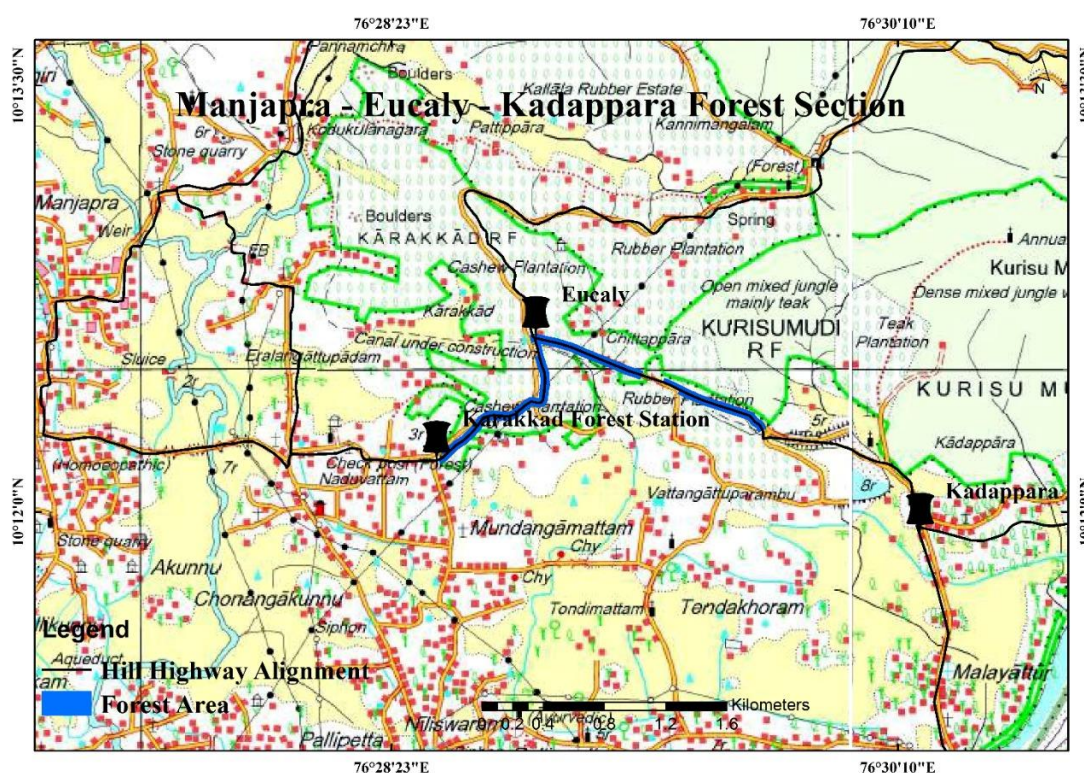


Fig 5: Alignment of Manjapra - Eucaly- Kadappara forest section.



Fig 6: Manjapra - Eucaly- Kadappara stretch

5. Kadappara to Illithode Stretch

A length of 853m of the Kadappara – Illithode stretch is passing through forest lands. Here also the forest land diversion is required for the total 12m ROW. This necessitates an area of 1.023 Ha of forest land to be diverted for Hill Highway development.

Table 5: Forest Area to be diverted for Kadappara to Illithode Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Forest area to be diverted (sq.m)
1	N10.19937, E76.51299	N10.19945, E76.51304	10	120
2	N10.19945, E76.51304	N10.20163, E76.51904	750	9000
3	N10.20163, E76.51904	N10.20175, E76.51944	50	600
4	N10.20185, E76.52613	N10.2019, E76.52651	43	516
Total			853	10236
Total Forest area to be diverted in sq.m				10236
Total Forest area to be diverted in Ha				1.023

Figure 7 and Figure 8 show respectively the alignment and snaps from Kadappara to Illithode stretch.

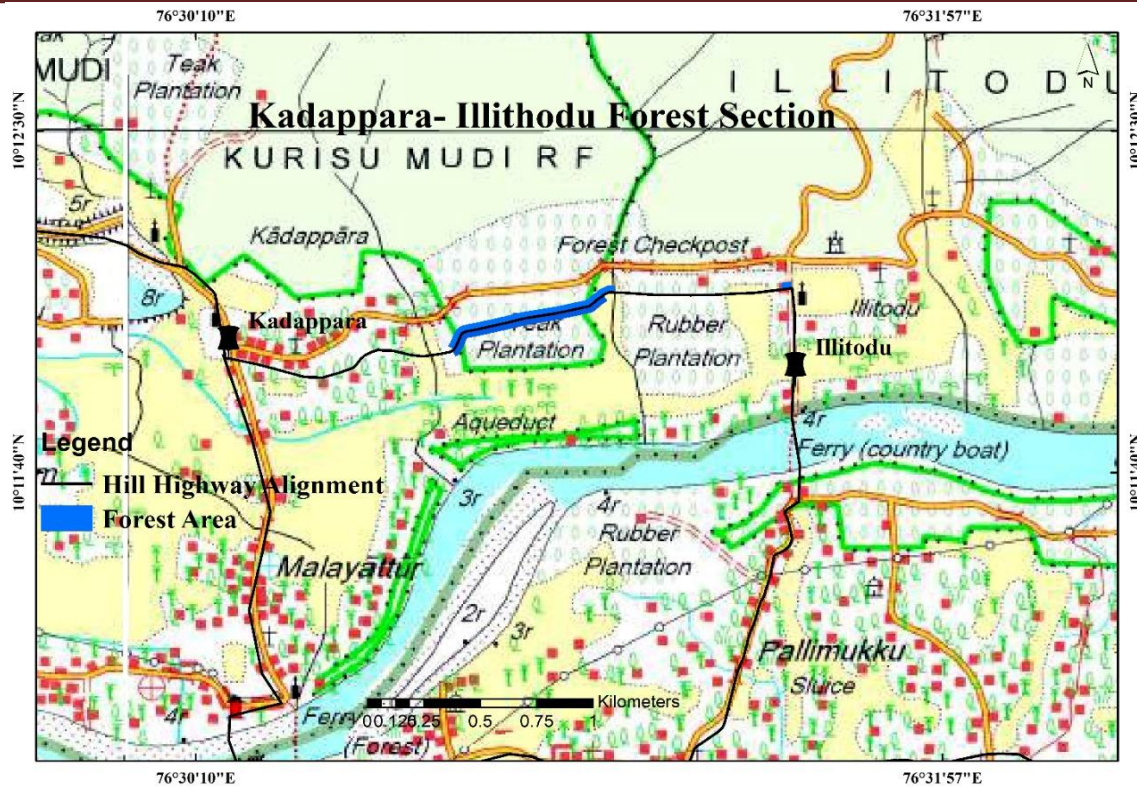


Fig 7: Alignment of Kadappara to Illithode forest section

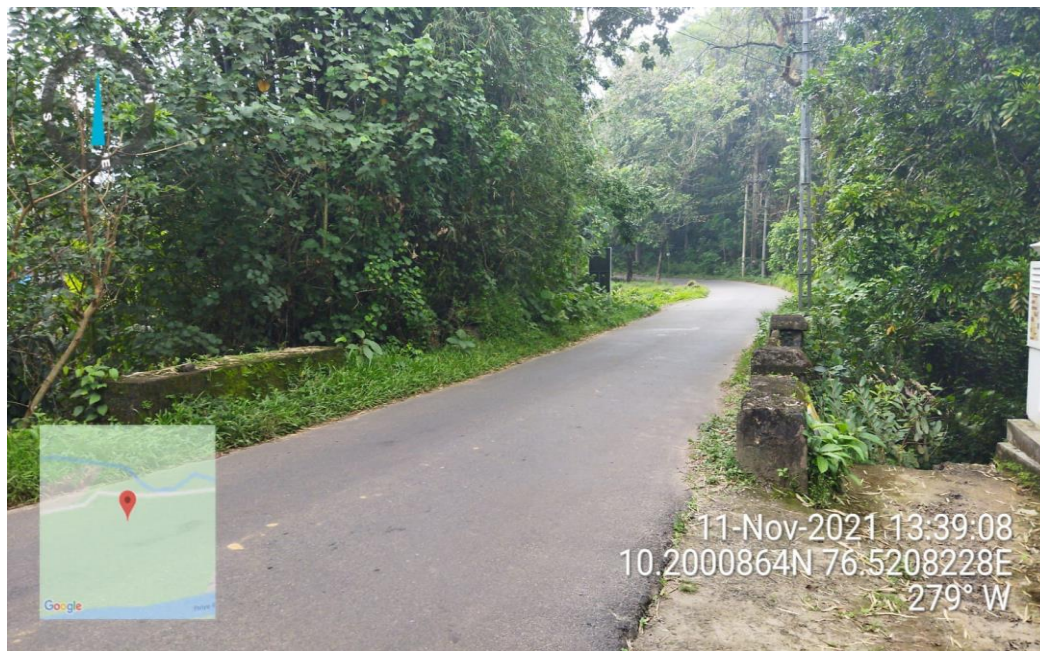


Fig 8: Kadappara to Illithode stretch

6. Vadakkambilly to Chettinada Stretch

This is a greenfield alignment in which an elevated bridge over Abhayaranyam is proposed as a continuation of bridge across the Periyar River. The approximate length of the section is 230m (except the river bridge) with starting and ending coordinates as N10.19501, E 76.5269 and N10.193, E 76.5265 respectively. The corresponding forest land diversion required is 0.276 Ha.

The snaps of the section are shown in Figure 9 whereas Figure 10 shows the alignment plotted in the toposheet.



Fig 9: Vadakkambilly to Chettinada stretch

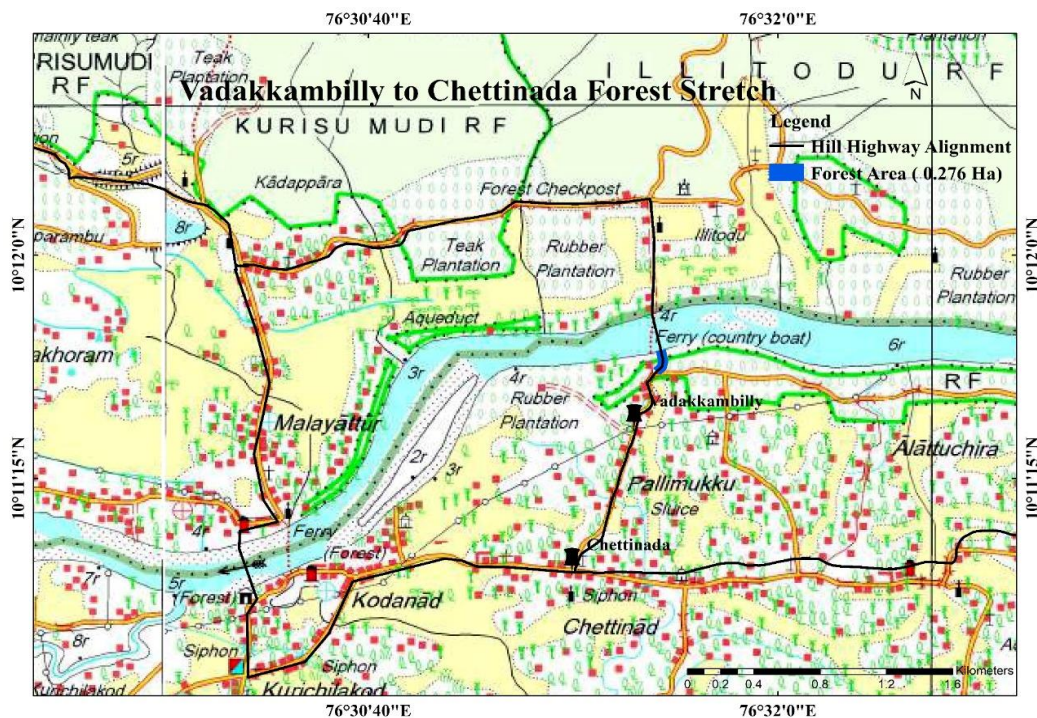


Fig 10: Alignment of Vadakkambilly to Chettinada forest section

7. Mekkapala to Cheranganal Stretch

The Mekkapala – Cheranganal stretch has 550 m of its length passing through forest with the ROW varying from 4.3 to 5.5 m. Only the carriageway is reported to be considered as ROW and accordingly a total of 0.35 Ha of forest land is to be diverted for the construction of Hill Highway with a ROW of 12 m and is shown in Table 6.

Table 6: Forest Area to be diverted for Mekkapala to Cheranganal Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.16258, E76.57274	N10.16189, E76.57292	85	4.5 – 4.9	310.25	Forest land on LHS
2	N10.15191, E76.57282	N10.15148, E76.57295	50	4.3 – 4.5	190	Forest land on RHS
3	N10.15148, E76.57295	N10.15088, E76.57308	70	4.3 – 4.5	532	Forest land on both sides
4	N10.15088, E76.57308	N10.14954, E76.57336	150	4.5 – 5.3	1065	Forest land on both sides
5	N10.14954, E76.57336	N10.14801, E76.57331	172	5 – 5.3	1178.2	Forest land on both sides
6	N10.14801, E76.57331	N10.14781, E76.57336	28	5 – 5.5	189	Forest land on both sides
Total			550		3464.5	
Total Forest area to be diverted in sq.m						3464.5
Total Forest area to be diverted in Ha						0.35

Figure 11 and Figure 12 shows respectively the alignment and snaps of the Hill Highway stretch from Mekkapala to Cheranganal.

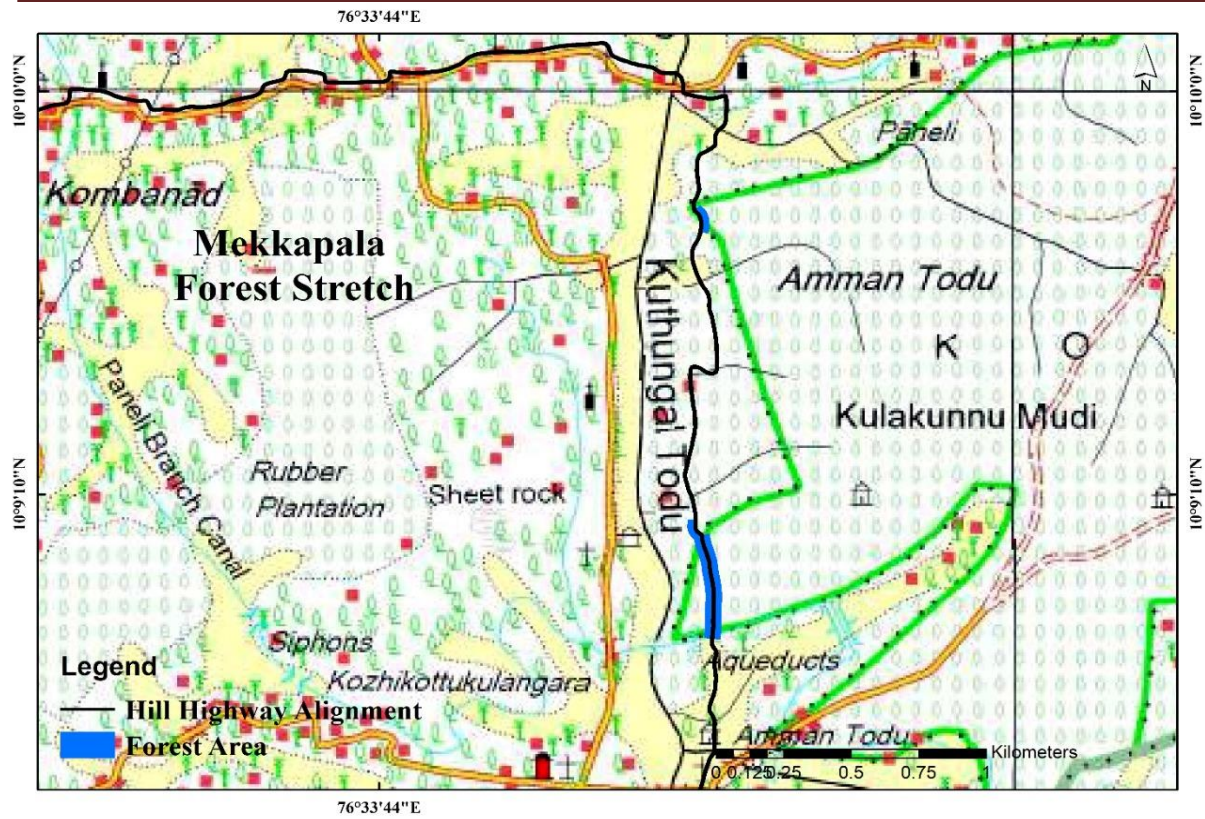


Fig 11: Alignment of Mekkapa to Cheranganal forest section



Fig 12: Mekkapa to Cheranganal stretch

8. Thadikulam to Avolichal Stretch

The Thadikulam – Aavolichal stretch is 3.8 km long and out of this 2.903 km road is passing entirely through forest land including the carriageway and 12m width is needed to be acquired for Hill Highway. The forest land required in this stretch is 3.48 Ha as given in Table 7.

Table 7: Forest Area to be diverted for Thadikulam to Avolichal Stretch

Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Required ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N10.0594, E76.72519	N10.07069, E76.74686	2903	12	34836	Forest land on both sides
Total Forest area to be diverted in sq.m						34836
Total Forest area to be diverted in Ha						3.48

Figure 13 and Figure 14 shows respectively the alignment and snaps of the Hill Highway stretch from Thadikulam to Avolichal.

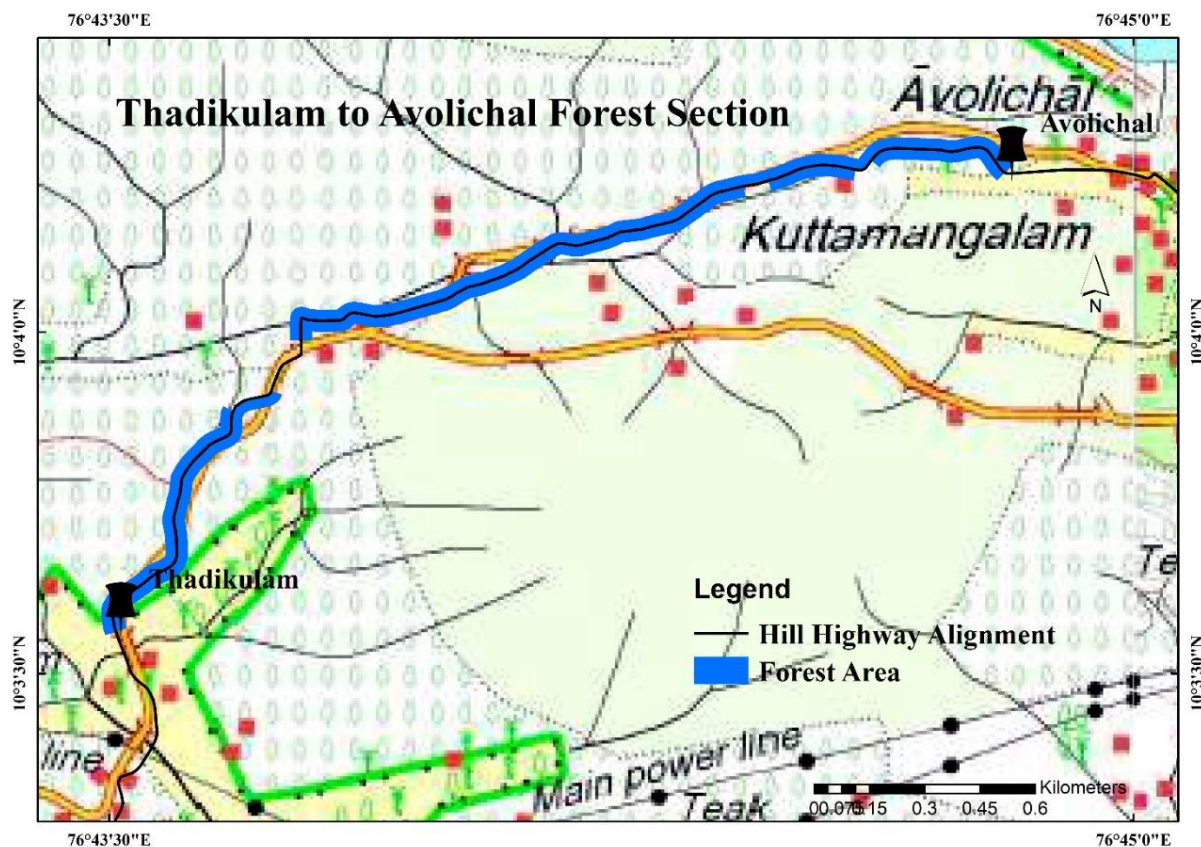


Fig 13: Alignment of Thadikulam to Avolichal forest section



Fig 14: Thadikulam to Avolichal stretch

Summary

In Ernakulam District, a total of eight stretches are passing through forest land, all of which require additional land for widening to meet with the stipulated standards for the Hill Highway.

Table 8: Summary of Forest Area Requirement in Ernakulam District

Sl. No.	Stretch	Forest area to be diverted (sq. m)
1	Vettilappara-Kappela	102000
2	Kappela-Ayyampuzha	59520
3	Manjapra-Eukali jn.	5287.60
4	Eukali jn. - Kadappara	10840
5	Kadappara-Illithodu	10236
6	Vadakkambilly - Chettinada	2760
7	Mekkapala-Cheranganal	3464.5
8	Oonukal-Neriamangalam	34836
Total Forest area to be diverted in sq.m		228944.1
Total Forest area to be diverted in Ha		22.894

A total of 22.90 Ha is estimated as the forest land requirement, which includes a greenfield alignment in the form of an elevated bridge at Abhayaranyam. The calculations are based on the assumption that road widening will be carried out concentrically from the center line. The calculated area may change when the alignment is designed to meet with the geometric standards.

MAPPING OF FOREST AREA TO BE DIVERTED FOR HILL HIGHWAY – KOTTAYAM

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KERALA ROAD FUND BOARD**



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KSCSTE - NATIONAL TRANSPORTATION PLANNING AND RESEARCH CENTRE
An Institution of Kerala State Council for Science, Technology and Environment

DETAILS OF FOREST SECTION TO BE DIVERTED FOR HILL HIGHWAY IN KOTTAYAM DISTRICT

The Hill Highway alignment in the district of Kottayam runs through the forest section from Karingalmoozhi to Plachery, for a total length of 5.75km. This forest section falls under Plachery forest station, Erumeli Range, Kottayam division.

The forest land is present on both sides of the Hill Highway in some of the sections, while the same is present on one side only at some lengths. The available Right of Way in the concerned section is varying from a minimum of 9.7 to a maximum of 15.9m, which demands diversion of forest land at some portions to meet up with the stipulated width of 12m for the Hill Highway. The details of the forest sections are as follows:

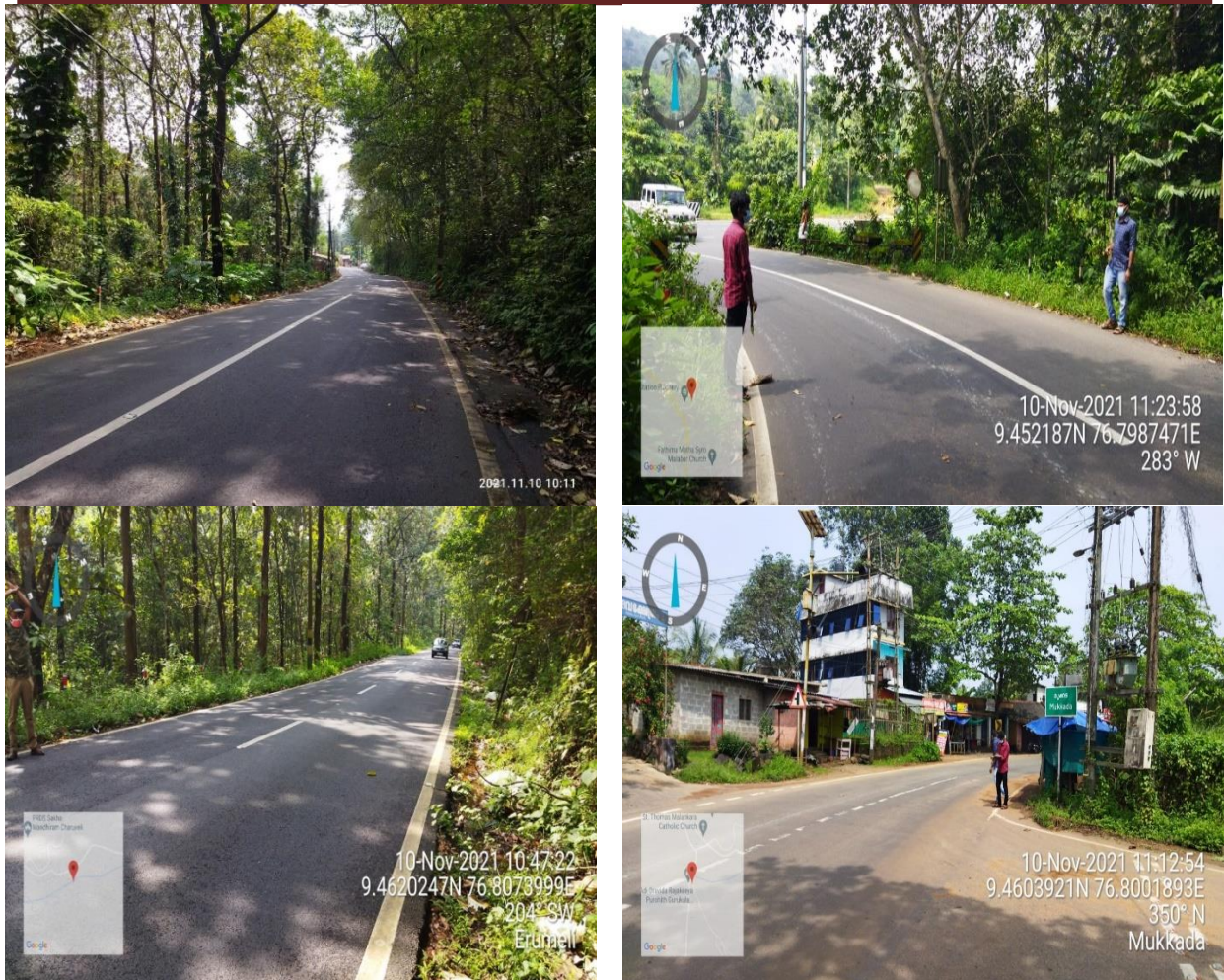
Sl. No.	Starting coordinates	Ending coordinates	Length (m)	Existing ROW (m)	Forest area to be diverted (sq.m)	Remarks
1	N9.46346, E76.8373	N9.4635, E76.83646	94	10.8 – 12	7.52	Forest area on LHS
2	N9.4635, E76.83646	N9.46352, E76.83616	32	10.8– 11.8	0.40	Forest area on LHS
3	N9.46352, E76.83616	N9.46349, E76.83567	53	10.7-11.8	41.075	Forest area on both sides
4	N9.46349, E76.83567	N9.46362, E76.83526	47	10.7-12.7	37.25	Forest area on both sides
5	N9.46362, E76.83526	N9.46365, E76.8348	51	11.9-12.7	30.60	Forest on both sides
6	N9.46365, E76.8348	N9.46409, E76.83292	240	11.4-11.9	146.4	Forest on both sides
7	N9.46409, E76.83292	N9.46397, E76.82854	500	11.4-11.8	237.5	Forest on both sides
8	N9.46397, E76.82854	N9.46519, E76.82299	650	11.8	34.903	Forest area on LHS
9	N9.46519, E76.82299	N9.46542, E76.8202	300	9.7-11.8	375.00	Forest on both sides
10	N9.46542, E76.8202	N9.46544, E76.81621	450	9.7-10.1	945.00	Forest on both sides
11	N9.46544, E76.81621	N9.46463, E76.81111	600	9.9-10.1	1200.00	Forest on both sides
12	N9.46463, E76.81111	N9.4645, E76.80895	260	9.9-11	253.50	Forest area on LHS
13	N9.4645, E76.80895	N9.46341, E76.80785	170	10.9-11	178.50	Forest on both sides

Mapping of Forest Area to be Diverted for Hill Highway –Kottayam

14	N9.46341, E76.80785	N9.4626, E76.80389	500	10.9-11.5	330.00	Forest area on LHS
15	N9.4626, E76.80389	N9.46337, E76.80179	250	11.5-15.9	8.75	Leased forest land (LHS) to central government (Rubber Nursery), place is Mukkada Junction
18	N9.45924, E76.79977	N9.45434, E76.79938	550	11.2-11.8	275.00	Forest on both sides
19	N9.45434, E76.79938	N9.45175, E76.79761	400	10.1-11.2	540.00	Forest on both sides
Total Forest area to be diverted in sq.m						4641.398
Total Forest area to be diverted in Ha						0.4641 ¹

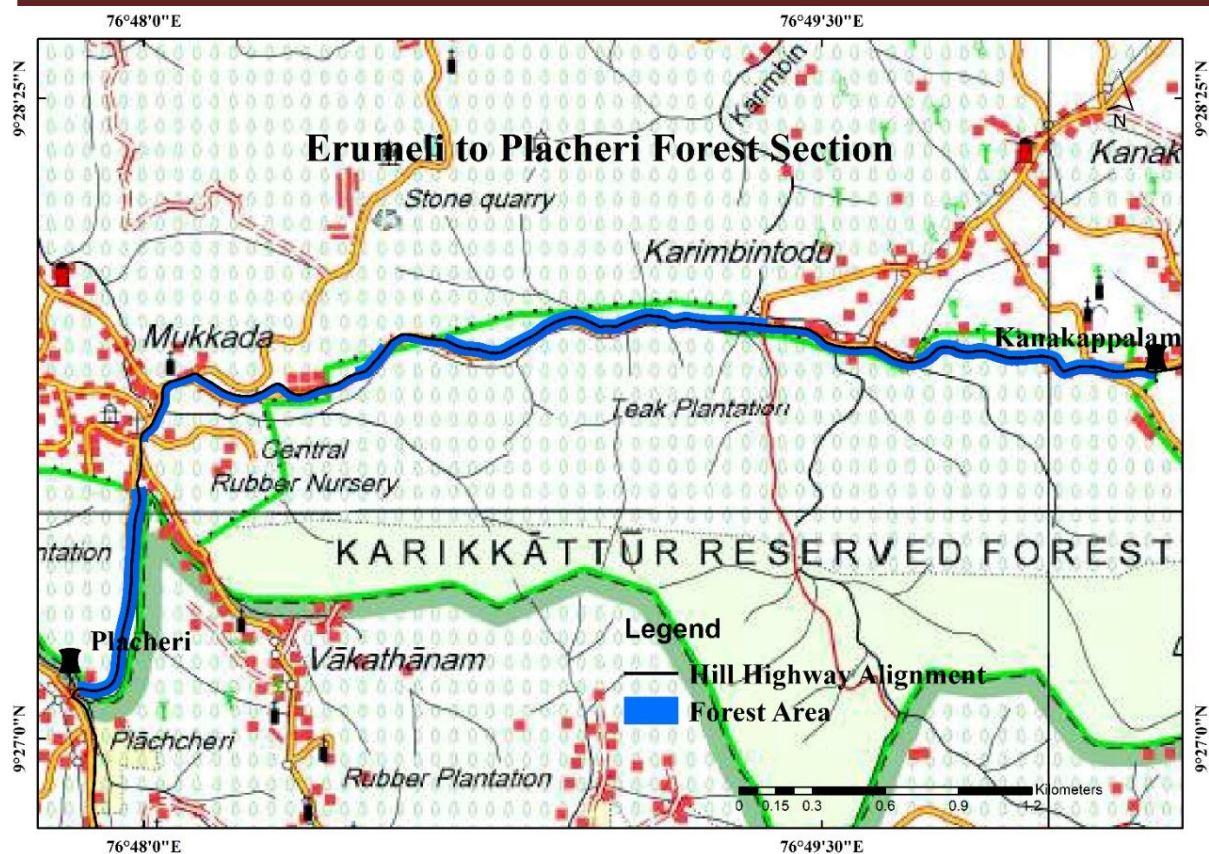
A total of **0.46 Ha** of forest land needs to be diverted for the development of Hill Highway in Karingalmoozhi to Placheri section in Kottayam district.

¹ The calculation is based on the assumption that road widening will be carried out concentrically from the centre line. The calculated area may change when the alignment is designed to meet with the geometric standards.



Karingalmoozhi to Placheri section

The alignment showing the forest sections are shown in the following toposheet map.



Karingalmoozhi to Placheri section shown in Toposheet