

CHAPTER - 8

Cost Estimates

CHAPTER 8 : COST ESTIMATES

8.1 The cost estimating had been done on the following lines.

8.1.1 RATES

❖ The rates are based on:

- Arunachal Pradesh Schedule of Rates 2007 for earthwork.
- Analysis of rates based on Arunachal Pradesh Analysis of Rates 2007, which is based on the standard data book of the Ministry of Shipping Road Transport & Highways, New Delhi.
The analysis has been done with cartage rates upto works site.
- Average lead of 25.00 kms has been adopted for forest products like stone aggregates, sand, shingles etc.
- Average lead of 55.00 km from Seppa has been adopted for items like cement, steel, bitumen etc.
- The present market rates of cement, steel and bitumen have been adopted. However, these rates have been observed to be fluctuating and may vary at the time of execution.
- The present market rates of labour for RCC and bituminous works have been taken as:

▪	Unskilled	-	Rs. 100.00 per day
▪	Skilled	-	Rs. 180.00 per day
▪	Semi Skilled	-	Rs. 140.00 per day

8.1.2 QUANTITIES

- For earthwork, the quantities have been computed as per the typical cross section attached, wherein the existing formation width and hill slope have been taken, and interpolated to arrive at the proposed earthwork quantities to be executed.
- RCC slab culverts of various spans for double lane have been based on the standard drawings as per IRC : SP 13.
- Pavement quantities have been worked out as per the proposed thickness, mentioned in chapter:6. A typical cross-section is attached.

- The costing of bridges have been adopted at a unit rate of Rs 6.50 lakhs per metre, in the absence of detailed design and drawings. This may undergo minor changes at the time of DPR.
- Retaining and Breast walls have been based on specification as per IRC: SP: 20 for heights of 4 mtr and 3 mtr respectively for length of 10 mtr, to arrive at the unit cost.
- Provision for road furnitures @ 1% of total cost of works has been taken.

8.1.3 COSTING

- ❖ The total costing, with the above parameters, are as follows.
 - Upgradation of existing alignment (110.45 km) : Rs. 46360.90 lakhs.
 - Upgradation of existing alignment with proposed new alignment (94.15 km) Rs. 39071.24 lakhs.

A Comparative study of the cost of the two alignments is attached. It will be seen that there is a savings of Rs. 7289.66 lakhs, if the route with new alignment is followed.

**SUMMARY OF COST ESTIMATE
COMPARATIVE STATEMENT**

Name of work : Pre-Feasibility of Trans- Arunachal Highway From Seppa To Sagalee-170km

Sector : Seppa to Khodaso-94.150 km

a) Existing Alignment = 110.45 Km.

b) New Alignment = 94.15 Km.

(Financial figure in lakhs)

Item No.	Sub-heads and items of work	Costing(Existing)				Costing (New Alignment)				Remarks
		Quantity	Rate	Unit	Amount	Quantity	Rate	Unit	Amount	
A.	<u>Earth Work</u>									
	I. Widening of formation (0.00 - 20.00 Km)	20.00	75.59	km	1511.80	20.00	75.59	km	1511.80	
	II. Widening of formation (20.00 - 59.30 Km)	39.30	80.40	km	3159.72	-	0.00	km	0.00	
	III. Widening of formation (59.30 - 110.45 Km)	51.15	92.17	km	4714.50	51.15	92.17	km	4714.50	
	IV. New Formation (20.00 - 43.00 Km)	0.00	-	km	-	23.00	66.08	km	1519.84	
B.	<u>Pavement</u>									
	I. Preparation of Sub-grade	110.45	2.48	km	273.92	94.15	2.48	km	233.49	
	II. Granular Sub-Base	110.45	31.82	km	3514.52	94.15	31.82	km	2995.85	
	III. Wet Mix Macadam	110.45	26.3	km	2904.84	94.15	26.38	km	2483.68	
	IV. Dense Mixed Bituminous Macadam	110.45	44.34	km	4897.35	94.15	44.34	km	4174.61	
	V. Bituminous Macadam & Seal Coat	110.45	28.92	km	3194.21	94.15	28.92	km	2722.82	
	VI. Construction of paved shoulder	110.45	38.61	km	4264.47	94.15	38.61	km	3635.13	
C.	<u>RCC Slab Culverts</u>									
	I. 1.50m span	321	10.78	No	3460.38	256	10.78	No	2759.68	
	II. 2.00m span	255	11.09	No	2827.95	174	11.09	No	1929.66	
	III. 3.00m span	32	13.38	No	428.16	21	13.38	No	280.98	
	IV. 4.00m span	3	16.9	No	50.70	8	16.9	No	135.20	
	V. 5.00m span	1	18.22	No	18.22	4	18.22	No	72.88	
	VI. 6.00m span	4	19.32	No	77.28	7	19.32	No	135.24	

**SUMMARY OF COST ESTIMATE
COMPARATIVE STATEMENT**

Name of work : Pre-Feasibility of Trans- Arunachal Highway From Seppa To Sagalee-170km

Sector : Seppa to Khodaso-94.150 km

a) Existing Alignment = 110.45 Km.

b) New Alignment = 94.15 Km.

(Financial figure in lakhs)

Item No.	Sub-heads and items of work	Costing(Existing)				Costing (New Alignment)				Remarks
		Quantity	Rate	Unit	Amount	Quantity	Rate	Unit	Amount	
D.	<u>Road Side Drain</u>									
	I. CC Drain	108.60	18.42	Km	2000.41	93.10	18.42	km	1714.90	
E.	<u>Protection Work</u>									
	I. Retaining wall 4.0 m height	6627.00	0.21	m	1391.67	5649.00	0.21	m	1186.29	
	II. Breast wall 3.0 m height	4418.00	0.15	m	662.70	3766.00	0.15	m	564.90	
F.	<u>Bridges</u>	170.88	6.50	m	1110.72	191.51	6.5	m	1244.82	
				Total:-	40463.52				34016.27	----- A
G.	I. Cost of afforestation	220.90	0.85	Hect	187.77	211.30	0.85	Hect	179.61	
	II. Net Present Value (NPV)	110.45	5.90	Hect	651.66	105.65	5.9	Hect	623.34	
					41302.95				34819.22	
	Add 1 % for Quality Control on "A"				404.64				340.16	
	Add 1 % for Road Furnitures on "A"				404.64				340.16	
	Add 1.5 % for WC Estt.Charges on "A"				606.95				510.24	
	Add 9 % for Supervision Charges on "A"				3641.72				3061.46	
	GRAND TOTAL =				46360.90				39071.24	

ANNEXURE - I

GENERAL ABSTRACT OF COST

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 0.00 TO 20.00 KM

(Financial figures are Rs. in lakh)

Item No.	Sub-heads and items of work	Quantity or No.	Rate	Per	Amount	Remarks
A.	<u>Earth Work</u>					
I.	Widening of formation	20.000 km	75.59	km	Rs. 1,511.81	Appendix - A
B.	<u>Pavement</u>					
	<u>a) Carriageway</u>					
I.	Preparation of Sub-grade	20.000 Km	2.48	km	Rs. 49.60	Appendix - B
II.	Granular Sub-Base	20.000 Km	31.82	km	Rs. 636.40	---do---
III.	Wet Mix Macadam	20.000 Km	26.30	km	Rs. 526.00	---do---
IV.	Dense Mixed Bituminous Macadam	20.000 Km	44.34	km	Rs. 886.80	---do---
V.	Bituminous Macadam & Seal Coat	20.000 km	28.92	km	Rs. 578.40	---do---
	Total of carriageway=				Rs. 2,677.20	
	<u>b) Shoulder</u>					
I.	Construction of paved shoulder	20.000 Km	38.61	km	Rs. 772.20	Appendix - B1
	Total of Pavement=				Rs. 3,449.40	
C.	<u>Cross Drainage Structures</u>					
I.	RCC Slab Culvert 1.50m span	39 No.	10.78	Each	Rs. 420.55	Appendix - C1
II.	RCC Slab Culvert 2.00m span	61 No.	11.09	Each	Rs. 676.68	Appendix - C2
III.	RCC Slab Culvert 3.00m span	7 No.	13.38	Each	Rs. 93.69	Appendix- C3
IV.	RCC Slab Culvert 4.00m span	0 No.	16.90	Each	Rs. -	Appendix- C4
V.	RCC Slab Culvert 5.00m span	1 No.	18.22	Each	Rs. 18.22	Appendix- C5
VI.	RCC Slab Culvert 6.00m span	2 No.	19.32	Each	Rs. 38.64	Appendix- C6
	Total of CD Structures=				Rs. 1,247.78	
D.	<u>Road Side Drain</u>					
I.	CC Drain	19.800 km	18.42	km	Rs. 364.72	Appendix - D
E.	<u>Protection Work</u>					
I.	Retaining wall 4.0 m height	1200.00 m	0.21	m	Rs. 252.00	Appendix - E
II.	Breast wall 3.0 m height	800.00 m	0.15	m	Rs. 120.00	Appendix - F
	Total of Protection work=				Rs. 372.00	
F.	<u>Bridges</u>					
		0 No.	-	Each	Rs. -	
	Total				Rs. 6,945.71	

Appendix- "A"

ABSTRACT OF COST

State :- A.P
Branch :- B & R

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 0.00 TO 20.00 KM

SH:- WIDENING OF FORMATION

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
SITE CLEARANCE						
1	Clearing and Grubbing Road Land. (Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking (ii) By Manual means (A) In area of light jungle	20.00	19594.00	Hectare	391880.00	APSR'2007, Item No.2.3 , Page - 21
EARTH WORK						
2	Excavation in Hill Area in Soil by Mechanical Means (Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres)	608839.80	121.00	Cum	73669616.00	APSR'2007, Item No.3.32(i) , Page - 28
3	Excavation in Hilly Area in Ordinary Rock by Mechanical Means not Requiring Blasting. (Excavation in hilly area in ordinary rock not requiring ballasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres)	304419.90	176.00	Cum	53577902.00	APSR'2007, Item No.3.33(i) , Page - 28
4	Excavation in Hilly Areas in Hard Rock Requiring Blasting (Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 metres.)	101473.30	232.00	Cum	23541806.00	APSR'2007, Item No.3.34 , Page - 28
COST PER KM =					151181204.00 7559060.00	
					Say Rs.	75.59 lakh

DETAILS OF MEASUREMENT / ABSTRACT OF QUANTITIES**Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 0.00 TO 20.00 KM**

Sl.No	Chainage (in Km)		L 1 (in Mtrs)	L2 (in Mtrs)	Height (H 1) (in Mtrs)	Height (H 2) (in Mtrs)	Height (H) (H1+H2) (in Mtr)	Area (H+H1)/2xL 2	Length (in Mtr)	Volume (in Cum)
	From	To								
1	2	3		4	6	7	8	9	10	11
1	0.00	1.00	7.70	4.30	6.30	5.60	11.90	39.130	1000.00	39130.00
2	1.00	2.00	6.15	5.85	6.05	3.20	9.25	44.753	1000.00	44752.50
3	2.00	3.00	6.70	5.30	14.25	9.00	23.25	99.375	1000.00	99375.00
4	3.00	4.00	7.80	4.20	5.75	5.30	11.05	35.280	1000.00	35280.00
5	4.00	5.00	7.20	4.80	7.37	5.60	12.97	48.816	1000.00	48816.00
6	5.00	6.00	6.90	5.10	7.10	4.80	11.90	48.450	1000.00	48450.00
7	6.00	7.00	6.80	5.20	7.78	5.00	12.78	53.456	1000.00	53456.00
8	7.00	8.00	7.05	4.95	5.34	3.80	9.14	35.838	1000.00	35838.00
9	8.00	9.00	6.80	5.20	7.60	4.90	12.50	52.260	1000.00	52260.00
10	9.00	10.00	6.70	5.30	6.80	4.20	11.00	47.170	1000.00	47170.00
11	10.00	11.00	7.75	4.25	7.70	7.00	14.70	47.600	1000.00	47600.00
12	11.00	12.00	6.75	5.25	8.15	5.20	13.35	56.438	1000.00	56437.50
13	12.00	13.00	6.70	5.30	8.25	5.20	13.45	57.505	1000.00	57505.00
14	13.00	14.00	7.45	4.55	9.06	7.40	16.46	58.058	1000.00	58058.00
15	14.00	15.00	6.90	5.10	8.20	5.50	13.70	55.845	1000.00	55845.00
16	15.00	16.00	7.65	4.35	7.59	6.60	14.19	47.372	1000.00	47371.50
17	16.00	17.00	6.60	5.40	6.82	4.10	10.92	47.898	1000.00	47898.00
18	17.00	18.00	7.05	4.95	7.41	5.20	12.61	49.550	1000.00	49549.50
19	18.00	19.00	6.45	5.55	5.77	3.30	9.07	41.181	1000.00	41181.00
20	19.00	20.00	6.70	5.30	7.00	4.40	11.40	48.760	1000.00	48760.00
Total =									20000.00	1014733.00

SOIL CLASSIFICATION.**Ch.0.0 to 20.0 km**

Ordinary Soil	=	60%	=	608839.8
Ordinary Rock	=	30%	=	304419.9
Hard Rock	=	10%	=	101473.3
1014733.0				

DETAILS OF MEASUREMENT

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

CHAINAGE:- 0.00 TO 20.00 KM

SITE CLEAREANCE

- 1 Clearing and grubbing road land. (Clearing and grabbing road land i/c uprooting rank vegetation grass)

II) by manual means

B) in area of light jungle

$$\begin{aligned} 1 \times 20000.00 \times 10 &= 200000.00 \text{ Sqm} \\ &= 20.0 \text{ Hact.} \end{aligned}$$

ANNEXURE - II

GENERAL ABSTRACT OF COST

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 20.00 TO 59.30 KM

(Financial figures are Rs. in lakh)

Item No.	Sub-heads and items of work	Quantity or No.	Rate	Per	Amount	Remarks
A.	<u>Earth Work</u>					
I.	Widening of formation	39.300 km	80.40	km	Rs. 3,159.85	Appendix - A 1
B.	<u>Pavement</u>					
	<u>a) Carriageway</u>					
I.	Preparation of Sub-grade	39.300 Km	2.48	km	Rs. 97.46	Appendix - B
II.	Granular Sub-Base	39.300 Km	31.82	km	Rs. 1,250.53	---do---
III.	Wet Mix Macadam	39.300 Km	26.30	km	Rs. 1,033.59	---do---
IV.	Dense Mixed Bituminous Macadam	39.300 Km	44.34	km	Rs. 1,742.56	---do---
V.	Bituminous Macadam & Seal Coat	39.300 km	28.92	km	Rs. 1,136.56	---do---
	Total of carriageway=				Rs. 5,260.70	
	<u>b) Shoulder</u>					
I.	Construction of paved shoulder	39.300 Km	38.61	km	Rs. 1,517.37	Appendix - B1
	Total of Pavement=				Rs. 6,778.07	
C.	<u>Cross Drainage Structures</u>					
I.	RCC Slab Culvert 1.50m span	117 No.	10.78	Each	Rs. 1,261.66	Appendix - C1
II.	RCC Slab Culvert 2.00m span	119 No.	11.09	Each	Rs. 1,320.09	Appendix - C2
III.	RCC Slab Culvert 3.00m span	20 No.	13.38	Each	Rs. 267.68	Appendix- C3
IV.	RCC Slab Culvert 4.00m span	3 No.	16.90	Each	Rs. 50.69	Appendix- C4
V.	RCC Slab Culvert 5.00m span	0 No.	18.22	Each	Rs. -	Appendix- C5
VI.	RCC Slab Culvert 6.00m span	1 No.	19.32	Each	Rs. 19.32	Appendix- C6
	Total of CD Structures=				Rs. 2,919.43	
D.	<u>Road Side Drain</u>					
I.	CC Drain	38.200 km	18.42	km	Rs. 703.64	Appendix - D
E.	<u>Protection Work</u>					
I.	Retaining wall 4.0 m height	2358.00 m	0.21	m	Rs. 495.18	Appendix - E
II.	Breast wall 3.0 m height	1572.00 m	0.15	m	Rs. 235.80	Appendix - F
	Total of Protection work=				Rs. 730.98	
F.	<u>Bridges</u>					
		62.370 m	6.50	Each	Rs. 405.41	Appendix - G
	Total				Rs. 14,697.39	

ABSTRACT OF COST

State :- A.P

Branch :- B & R

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 20.00 TO 59.30 KM

SH:- WIDENING OF FORMATION

Sl. No	Description of item	Quantity	Rate	Unit	Amount	Remarks
SITE CLEARANCE						
1	Clearing and Grubbing Road Land. (Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking (ii) By Manual means (A) In area of light jungle	39.30	19594.00	Hectare	770044.00	APSR'2007, Item No.2.3 , Page - 21
EARTH WORK						
2	Excavation in Hill Area in Soil by Mechanical Means (Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres)	1272739.50	121.00	Cum	154001480.00	APSR'2007, Item No.3.32(i), Page - 28
3	Excavation in Hilly Area in Ordinary Rock by Mechanical Means not Requiring Blasting. (Excavation in hilly area in ordinary rock not requiring ballasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres)	636369.75	176.00	Cum	112001076.00	APSR'2007, Item No.3.33(i), Page - 28
4	Excavation in Hilly Areas in Hard Rock Requiring Blasting (Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 metres.)	212123.25	232.00	Cum	49212594.00	APSR'2007, Item No.3.34 , Page - 28
COST PER KM =					315985194.00 8040336.00	Say Rs: 80.40 lakh

DETAILS OF MEASUREMENT / ABSTRACT OF QUANTITIES

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 20.00 TO 59.30 KM

Sl.No	Chainage (in Km)		L 1 (in Mtrs)	L2 (in Mtrs)	Height (H 1) (in Mtrs)	Height (H 2) (in Mtrs)	Height (H) (H1+H2) (in Mtr)	Area (H+H1)/2xL 2	Length (in Mtr)	Volume (in Cum)
	From	To								
1	2	3		4	6	7	8	9	10	11
1	20.00	21.00	6.85	5.15	7.20	4.80	12.00	49.440	1000.00	49440.00
2	21.00	22.00	7.85	4.15	7.80	7.30	15.10	47.518	1000.00	47517.50
3	22.00	23.00	7.30	4.70	7.00	5.40	12.40	45.590	1000.00	45590.00
4	23.00	24.00	6.60	5.40	7.90	4.80	12.70	55.620	1000.00	55620.00
5	24.00	25.00	4.40	7.60	8.80	14.10	22.90	120.460	1000.00	120460.00
6	25.00	26.00	7.10	4.90	8.50	6.00	14.50	56.350	1000.00	56350.00
7	26.00	27.00	6.90	5.10	7.00	4.70	11.70	47.685	1000.00	47685.00
8	27.00	28.00	7.25	4.75	4.60	6.50	11.10	37.288	1000.00	37287.50
9	28.00	29.00	6.60	5.40	5.20	5.10	10.30	41.850	1000.00	41850.00
10	29.00	30.00	6.60	5.40	5.60	4.20	9.80	41.580	1000.00	41580.00
11	30.00	31.00	6.85	5.15	5.80	5.80	11.60	44.805	1000.00	44805.00
12	31.00	32.00	6.80	5.20	4.30	6.80	11.10	40.040	1000.00	40040.00
13	32.00	33.00	7.10	4.90	4.30	4.10	8.40	31.115	1000.00	31115.00
14	33.00	34.00	6.95	5.05	9.60	6.60	16.20	65.145	1000.00	65145.00
15	34.00	35.00	7.15	4.85	8.10	6.00	14.10	53.835	1000.00	53835.00
16	35.00	36.00	7.25	4.75	5.30	4.00	9.30	34.675	1000.00	34675.00
17	36.00	37.00	7.10	4.90	6.90	5.00	11.90	46.060	1000.00	46060.00
18	37.00	38.00	7.45	4.55	7.90	6.50	14.40	50.733	1000.00	50732.50
19	38.00	39.00	7.65	4.35	7.85	6.90	14.75	49.155	1000.00	49155.00
20	39.00	40.00	6.20	5.80	6.20	5.30	11.50	51.330	1000.00	51330.00
21	40.00	41.00	7.20	4.80	6.70	5.00	11.70	44.160	1000.00	44160.00
22	41.00	42.00	7.15	4.85	6.70	4.70	11.40	43.893	1000.00	43892.50
23	42.00	43.00	7.00	5.00	6.50	4.50	11.00	43.750	1000.00	43750.00
24	43.00	44.00	7.00	5.00	10.70	7.40	18.10	72.000	1000.00	72000.00
25	44.00	45.00	7.05	4.95	9.80	6.90	16.70	65.588	1000.00	65587.50
26	45.00	46.00	7.00	5.00	8.40	5.80	14.20	56.500	1000.00	56500.00
27	46.00	47.00	7.50	4.50	8.60	7.10	15.70	54.675	1000.00	54675.00
28	47.00	48.00	7.50	4.50	9.40	7.80	17.20	59.850	1000.00	59850.00
29	48.00	49.00	6.20	5.80	8.60	4.50	13.10	62.930	1000.00	62930.00

Sl.No	Chainage (in Km)		L 1 (in Mtrs)	L2 (in Mtrs)	Height (H 1) (in Mtrs)	Height (H 2) (in Mtrs)	Height (H) (H1+H2) (in Mtr)	Area (H+H1)/2xL 2	Length (in Mtr)	Volume (in Cum)
	From	To								
30	49.00	50.00	7.00	5.00	8.90	6.20	15.10	60.000	1000.00	60000.00
31	50.00	51.00	6.20	5.80	10.60	5.60	16.20	77.720	1000.00	77720.00
32	51.00	52.00	6.50	5.50	8.20	4.70	12.90	58.025	1000.00	58025.00
33	52.00	53.00	6.00	6.00	10.20	5.10	15.30	76.500	1000.00	76500.00
34	53.00	54.00	7.00	5.00	9.50	6.50	16.00	63.750	1000.00	63750.00
35	54.00	55.00	6.30	5.70	7.20	4.80	12.00	54.720	1000.00	54720.00
36	55.00	56.00	6.10	5.90	5.20	6.70	11.90	50.445	1000.00	50445.00
37	56.00	57.00	6.00	6.00	6.80	5.30	12.10	56.700	1000.00	56700.00
38	57.00	58.00	6.30	5.70	6.20	5.30	11.50	50.445	1000.00	50445.00
39	58.00	59.00	6.60	5.40	5.70	5.40	11.10	45.360	1000.00	45360.00
40	59.00	59.30	7.00	5.00	6.90	4.80	11.70	46.500	300.00	13950.00
	Total =								39300.00	2121232.50

SOIL CLASSIFICATION.**Ch.20.0 to 59.3 km**

Ordinary Soil	=	60%	=	1272739.5
Ordinary Rock	=	30%	=	636369.8
Hard Rock	=	10%	=	212123.3
				2121232.5

DETAILS OF MEASUREMENT

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

CHAINAGE:- 20.00 TO 59.30 KM

SITE CLEAREANCE

- 1 Clearing and grubbing road land. (Clearing and grabbing road land i/c uprooting rank vegetation grass)

II) by manual means

B) in area of light jungle

$$\begin{aligned} 1 \times 39300.00 \times 10 &= 393000.00 \text{ Sqm} \\ &= 39.3 \text{ Hact.} \end{aligned}$$

ANNEXURE - III

GENERAL ABSTRACT OF COST

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 59.30 TO 110.45 KM

(Financial figures are Rs. in lakh)

Item No.	Sub-heads and items of work	Quantity or No.	Rate	Per	Amount	Remarks
A.	<u>Earth Work</u>					
I.	Widening of formation	51.150 km	92.17	km	Rs. 4,714.61	Appendix - A 2
B.	<u>Pavement</u>					
	<u>a) Carriageway</u>					
I.	Preparation of Sub-grade	51.150 Km	2.48	km	Rs. 126.85	Appendix - B
II.	Granular Sub-Base	51.150 Km	31.82	km	Rs. 1,627.59	---do---
III.	Wet Mix Macadam	51.150 Km	26.30	km	Rs. 1,345.25	---do---
IV.	Dense Mixed Bituminous Macadam	51.150 Km	44.34	km	Rs. 2,267.99	---do---
V.	Bituminous Macadam & Seal Coat	51.150 km	28.92	km	Rs. 1,479.26	---do---
	Total of carriageway=				Rs. 6,846.94	
	<u>b) Shoulder</u>					
I.	Construction of paved shoulder	51.150 Km	38.61	km	Rs. 1,974.90	Appendix - B1
	Total of Pavement=				Rs. 8,821.84	
C.	<u>Cross Drainage Structures</u>					
I.	RCC Slab Culvert 1.50m span	165 No.	10.78	Each	Rs. 1,779.26	Appendix - C1
II.	RCC Slab Culvert 2.00m span	75 No.	11.09	Each	Rs. 831.99	Appendix - C2
III.	RCC Slab Culvert 3.00m span	5 No.	13.38	Each	Rs. 66.92	Appendix- C3
IV.	RCC Slab Culvert 4.00m span	0 No.	16.90	Each	Rs. -	Appendix- C4
V.	RCC Slab Culvert 5.00m span	0 No.	18.22	Each	Rs. -	Appendix- C5
VI.	RCC Slab Culvert 6.00m span	1 No.	19.32	Each	Rs. 19.32	Appendix- C6
	Total of CD Structures=				Rs. 2,697.49	
D.	<u>Road Side Drain</u>					
I.	CC Drain	50.600 km	18.42	km	Rs. 932.05	Appendix - D
E.	<u>Protection Work</u>					
I.	Retaining wall 4.0 m height	3069.00 m	0.21	m	Rs. 644.49	Appendix - E
II.	Breast wall 3.0 m height	2046.00 m	0.15	m	Rs. 306.90	Appendix - F
	Total of Protection work=				Rs. 951.39	
F.	<u>Bridges</u>					
		108.51 m	6.50	Each	Rs. 705.32	Appendix - G
	Total				Rs. 18,822.70	

ABSTRACT OF COST

State :- A.P
Branch :- B & R

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 59.30 TO 110.45 KM

SH:- WIDENING OF FORMATION

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
SITE CLEARANCE						
1	Clearing and Grubbing Road Land. (Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking (ii) By Manual means (A) In area of light jungle	51.15	19594.00	Hectare	1002233.00	APSR'2007, Item No.2.3, Page - 21
EARTH WORK						
2	Excavation in Hill Area in Soil by Mechanical Means (Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres)	1899564.30	121.00	Cum	229847280.00	APSR'2007, Item No.3.32(i), Page - 28
3	Excavation in Hilly Area in Ordinary Rock by Mechanical Means not Requiring Blasting. (Excavation in hilly area in ordinary rock not requiring ballasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all lift and lead upto 1000 metres)	949782.15	176.00	Cum	167161658.00	APSR'2007, Item No.3.33(i), Page - 28
4	Excavation in Hilly Areas in Hard Rock Requiring Blasting (Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 metres.)	316594.05	232.00	Cum	73449820.00	APSR'2007, Item No.3.34, Page - 28

COST PER KM =

471460991.00

9217224.00

Say Rs:

92.17 lakh

DETAILS OF MEASUREMENT / ABSTRACT OF QUANTITIES

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 59.30 TO 110.45 KM

Sl.No	Chainage (in Km)		L 1 (in Mtrs)	L2 (in Mtrs)	Height (H 1) (in Mtrs)	Height (H 2) (in Mtrs)	Height (H) (H1+H2) (in Mtr)	Area (H+H1)/2xL 2	Length (in Mtr)	Volume (in Cum)
	From	To								
1	2	3		4	6	7	8	9	10	11
1	59.30	60.00	7.05	4.95	9.75	3.90	13.65	57.915	700.00	40540.50
2	60.00	61.00	7.00	5.00	8.36	4.90	13.26	54.050	1000.00	54050.00
3	61.00	62.00	7.50	4.50	8.60	3.90	12.50	47.475	1000.00	47475.00
4	62.00	63.00	7.50	4.50	9.40	3.10	12.50	49.275	1000.00	49275.00
5	63.00	64.00	6.20	5.80	8.60	4.00	12.60	61.480	1000.00	61480.00
6	64.00	65.00	7.00	5.00	8.90	4.20	13.10	55.000	1000.00	55000.00
7	65.00	66.00	6.20	5.80	10.60	3.40	14.00	71.340	1000.00	71340.00
8	66.00	67.00	6.50	5.50	8.15	3.40	11.55	54.175	1000.00	54175.00
9	67.00	68.00	6.00	6.00	10.20	3.70	13.90	72.300	1000.00	72300.00
10	68.00	69.00	7.00	5.00	9.45	4.00	13.45	57.250	1000.00	57250.00
11	69.00	70.00	6.30	5.70	7.12	3.40	10.52	50.274	1000.00	50274.00
12	70.00	71.00	6.10	5.90	5.22	4.40	9.62	43.778	1000.00	43778.00
13	71.00	72.00	6.00	6.00	6.76	4.70	11.46	54.660	1000.00	54660.00
14	72.00	73.00	6.30	5.70	6.12	10.75	16.87	65.522	1000.00	65521.50
15	73.00	74.00	6.60	5.40	5.65	5.60	11.25	45.630	1000.00	45630.00
16	74.00	75.00	7.00	5.00	6.87	5.00	11.87	46.850	1000.00	46850.00
17	75.00	76.00	6.70	5.30	6.30	5.60	11.90	48.230	1000.00	48230.00
18	76.00	77.00	7.20	4.80	6.52	5.50	12.02	44.496	1000.00	44496.00
19	77.00	78.00	6.30	5.70	7.10	4.30	11.40	52.725	1000.00	52725.00
20	78.00	79.00	6.20	5.80	5.70	3.30	9.00	42.630	1000.00	42630.00
21	79.00	80.00	6.50	5.50	6.75	6.70	13.45	55.550	1000.00	55550.00
22	80.00	81.00	6.20	5.80	7.77	4.40	12.17	57.826	1000.00	57826.00
23	81.00	82.00	6.00	6.00	6.79	4.60	11.39	54.540	1000.00	54540.00
24	82.00	83.00	6.00	6.00	6.70	2.80	9.50	48.600	1000.00	48600.00
25	83.00	84.00	6.20	5.80	6.92	4.40	11.32	52.896	1000.00	52896.00
26	84.00	85.00	6.20	5.80	7.50	5.10	12.60	58.290	1000.00	58290.00
27	85.00	86.00	6.00	6.00	6.85	6.60	13.45	60.900	1000.00	60900.00
28	86.00	87.00	7.05	4.95	1.95	6.10	8.05	24.750	1000.00	24750.00

Sl.No	Chainage (in Km)		L 1 (in Mtrs)	L2 (in Mtrs)	Height (H 1) (in Mtrs)	Height (H 2) (in Mtrs)	Height (H) (H1+H2) (in Mtr)	Area (H+H1)/2xL 2	Length (in Mtr)	Volume (in Cum)
	From	To								
29	87.00	88.00	4.20	7.80	6.40	7.80	14.20	80.340	1000.00	80340.00
30	88.00	89.00	6.80	5.20	6.50	10.50	17.00	61.100	1000.00	61100.00
31	89.00	90.00	6.90	5.10	8.30	7.30	15.60	60.945	1000.00	60945.00
32	90.00	91.00	6.50	5.50	8.40	4.70	13.10	59.125	1000.00	59125.00
33	91.00	92.00	7.10	4.90	7.77	4.50	12.27	49.098	1000.00	49098.00
34	92.00	93.00	6.30	5.70	9.89	4.00	13.89	67.773	1000.00	67773.00
35	93.00	94.00	5.50	6.50	10.10	4.20	14.30	79.300	1000.00	79300.00
36	94.00	95.00	6.20	5.80	6.20	5.00	11.20	50.460	1000.00	50460.00
37	95.00	96.00	6.00	6.00	13.40	3.00	16.40	89.400	1000.00	89400.00
38	96.00	97.00	6.10	5.90	8.55	3.80	12.35	61.655	1000.00	61655.00
39	97.00	98.00	6.10	5.90	8.90	3.60	12.50	63.130	1000.00	63130.00
40	98.00	99.00	6.00	6.00	5.50	3.70	9.20	44.100	1000.00	44100.00
41	99.00	100.00	6.00	6.00	8.70	4.30	13.00	65.100	1000.00	65100.00
42	100.00	101.00	6.00	6.00	10.25	3.40	13.65	71.700	1000.00	71700.00
43	101.00	102.00	6.00	6.00	13.15	2.60	15.75	86.700	1000.00	86700.00
44	102.00	103.00	6.00	6.00	12.20	3.40	15.60	83.400	1000.00	83400.00
45	103.00	104.00	6.00	6.00	15.55	3.90	19.45	105.000	1000.00	105000.00
46	104.00	105.00	5.80	6.20	22.40	3.00	25.40	148.180	1000.00	148180.00
47	105.00	106.00	5.85	6.15	15.40	4.50	19.90	108.548	1000.00	108547.50
48	106.00	107.00	5.90	6.10	9.80	3.10	12.90	69.235	1000.00	69235.00
49	107.00	108.00	5.80	6.20	9.65	4.00	13.65	72.230	1000.00	72230.00
50	108.00	109.00	5.90	6.10	8.20	3.00	11.20	59.170	1000.00	59170.00
51	109.00	110.00	6.00	6.00	8.37	3.00	11.37	59.22	1000.00	59220.00
52	110.00	110.45	6.00	6.00	8.37	3.00	11.37	59.22	450.00	26649.00
Total =									50700.00	3165940.50

SOIL CLASSIFICATION.**Ch.59.3 to 110.45 km**

Ordinary Soil	=	60%	=	1899564.3
Ordinary Rock	=	30%	=	949782.2
Hard Rock	=	10%	=	316594.1
				3165940.5

DETAILS OF MEASUREMENT

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

CHAINAGE:- 59.30 TO 110.45 KM

SITE CLEAREANCE

- 1 Clearing and grubbing road land. (Clearing and grabbing road land i/c uprooting rank vegetation grass)

II) by manual means
B) in area of light jungle

$$\begin{array}{rcl} 1 \times 51150.00 \times 10 & = & 511500.00 \text{ Sqm} \\ & = & 51.15 \text{ Hact.} \end{array}$$

ANNEXURE - IV

GENERAL ABSTRACT OF COST

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 20.00 TO 43.00 KM on Realignment Portion.
SH:- FORMATION CUTTING

(Financial figures are Rs. in lakh)

Item No.	Sub-heads and items of work	Quantity or No.	Rate	Per	Amount	Remarks
A.	<u>Earth Work</u>					
I.	Widening of formation	23.000 km	66.08	km	Rs. 1,519.76	Appendix - A3
B.	<u>Pavement</u>					
	<u>a) Carriageway</u>					
I.	Preparation of Sub-grade	23.000 Km	2.48	km	Rs. 57.04	Appendix - B
II.	Granular Sub-Base	23.000 Km	31.82	km	Rs. 731.86	---do---
III.	Wet Mix Macadam	23.000 Km	26.30	km	Rs. 604.90	---do---
IV.	Dense Mixed Bituminous Macadam	23.000 Km	44.34	km	Rs. 1,019.82	---do---
V.	Bituminous Macadam & Seal Coat	23.000 km	28.92	km	Rs. 665.16	---do---
	Total of carriageway=				Rs. 3,078.78	
	<u>b) Shoulder</u>					
I.	Construction of paved shoulder	23.000 Km	38.61	km	Rs. 888.03	Appendix - B1
	Total of Pavement=				Rs. 3,966.81	
C.	<u>Cross Drainage Structures</u>					
I.	RCC Slab Culvert 1.50m span	52 No.	10.78	Each	Rs. 560.74	Appendix - C1
II.	RCC Slab Culvert 2.00m span	38 No.	11.09	Each	Rs. 421.54	Appendix - C2
III.	RCC Slab Culvert 3.00m span	9 No.	13.38	Each	Rs. 120.46	Appendix- C3
IV.	RCC Slab Culvert 4.00m span	8 No.	16.90	Each	Rs. 135.16	Appendix- C4
V.	RCC Slab Culvert 5.00m span	3 No.	18.22	Each	Rs. 54.65	Appendix- C5
VI.	RCC Slab Culvert 6.00m span	4 No.	19.32	Each	Rs. 77.29	Appendix- C6
	Total of CD Structures=				Rs. 1,369.83	
D.	<u>Road Side Drain</u>					
I.	CC Drain	22.700 km	18.42	km	Rs. 418.13	Appendix - D
E.	<u>Protection Work</u>					
I.	Retaining wall 4.0 m height	1380.00 m	0.21	m	Rs. 289.80	Appendix - E
II.	Breast wall 3.0 m height	920.00 m	0.15	m	Rs. 138.00	Appendix - F
	Total of Protection work=				Rs. 427.80	
F.	<u>Bridges</u>					
		83.00 m	6.50	Each	Rs. 539.50	Appendix - G
	Total				Rs. 8,241.84	

ABSTRACT OF COST

State :- A.P

Branch :- B & R

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) CHAINAGE:- 20.00 TO 43.00 KM on Realignment Portion.

SH:- FORMATION CUTTING

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
SITE CLEARANCE						
1	Clearing and Grubbing Road Land. (Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking (ii) By Manual means (A) In area of light jungle	34.50	19594.00	Hectare	675993.00	APSR'2007, Item No.2.3, Page - 21
EARTH WORK						
2	Excavation in Hill Area in Soil by Mechanical Means (Excavation in soil in hilly area by mechanical means including cutting and trimming of side slopes and disposing of excavated earth with all lifts and lead upto 1000 metres)	610903.35	121.00	Cum	73919305.00	APSR'2007, Item No.3.32(i), Page - 28
3	Excavation in Hilly Area in Ordinary Rock by Mechanical Means not Requiring Blasting. (Excavation in hilly area in ordinary rock not requiring ballasting by mechanical means including cutting and trimming of slopes and disposal of cut material with all li	305451.68	176.00	Cum	53759495.00	APSR'2007, Item No.3.33(i), Page - 28
4	Excavation in Hilly Areas in Hard Rock Requiring Blasting (Excavation in hilly areas in hard rock requiring blasting, by mechanical means including trimming of slopes and disposal of cut material with all lifts and lead upto 1000 metres.)	101817.23	232.00	Cum	23621596.00	APSR'2007, Item No.3.34, Page - 28
COST PER KM =					151976389.00	
					6607669.00	
					Say	66.08 lakh

DETAILS OF MEASUREMENT / ABSTRACT OF QUANTITIES

Name of work:- C/o. Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

RE- ALIGNMENT FROM CH.20.0 KM TO 59.3 KM (REALIGNED LENGTH 23.0 KM)

Sl.No	Chainage (in Km)	Area (in sqm)	Average Area (in sqm)	Length (in Mtr)	Less for culvert/bridge span (in mtr)	Net length (in mtr)	Volume (in cum)
1	2		4	6		7	8
1	20.000	24.00	-	-	-	-	
2	20.300	39.00	31.50	300	2.00	298.00	9387.0
3	20.600	40.80	39.90	300	2.00	298.00	11890.2
4	20.900	42.00	41.40	300	5.00	295.00	12213.0
5	21.200	43.80	42.90	300	6.00	294.00	12612.6
6	21.500	45.00	44.40	300	3.00	297.00	13186.8
7	21.800	48.00	46.50	300	2.00	298.00	13857.0
8	22.100	51.00	49.50	300	6.00	294.00	14553.0
9	22.400	51.60	51.30	300	7.00	293.00	15030.9
10	22.700	54.00	52.80	300	2.00	298.00	15734.4
11	23.000	54.60	54.30	300	2.00	298.00	16181.4
12	23.300	55.80	55.20	300	2.00	298.00	16449.6
13	23.600	54.60	55.20	300	5.00	295.00	16284.0
14	23.900	54.00	54.30	300	2.00	298.00	16181.4
15	24.200	42.00	48.00	300	3.00	297.00	14256.0
16	24.500	36.00	39.00	300	7.00	293.00	11427.0
17	24.800	34.80	35.40	300	5.00	295.00	10443.0
18	25.100	33.00	33.90	300	4.00	296.00	10034.4
19	25.400	30.60	31.80	300	4.00	296.00	9412.8
20	25.700	30.00	30.30	300	3.00	297.00	8999.1
21	26.000	30.00	30.00	300	6.00	294.00	8820.0
22	26.300	36.00	33.00	300	2.00	298.00	9834.0
23	26.600	25.80	30.90	300	4.00	296.00	9146.4

Sl.No	Chainage (in Km)	Area (in sqm)	Average Area (in sqm)	Length (in Mtr)	Less for culvert/bridge span (in mtr)	Net length (in mtr)	Volume (in cum)
1	2		4	6		7	8
24	26.900	36.00	30.90	300	4.00	296.00	9146.4
25	27.200	36.00	36.00	300	0.00	300.00	10800.0
26	27.500	51.00	43.50	300	9.50	290.50	12636.8
27	27.800	55.80	53.40	300	18.00	282.00	15058.8
28	28.100	52.80	54.30	300	-	300.00	16290.0
29	28.400	46.80	49.80	300	11.00	289.00	14392.2
30	28.700	47.40	47.10	300	1.50	298.50	14059.4
31	29.000	46.80	47.10	300	4.50	295.50	13918.1
32	29.300	49.80	48.30	300	4.50	295.50	14272.7
33	29.600	76.80	63.30	300	1.50	298.50	18895.1
34	29.900	61.20	69.00	300	2.00	298.00	20562.0
35	30.200	58.80	60.00	300	4.50	295.50	17730.0
36	30.500	55.80	57.30	300	1.50	298.50	17104.1
37	30.800	55.20	55.50	300	1.50	298.50	16566.8
38	31.100	52.80	54.00	300	1.50	298.50	16119.0
39	31.400	46.80	49.80	300	-	300.00	14940.0
40	31.700	43.80	45.30	300	1.50	298.50	13522.1
41	32.000	43.80	43.80	300	-	300.00	13140.0
42	32.300	39.00	41.40	300	9.50	290.50	12026.7
43	32.600	26.40	32.70	300	3.00	297.00	9711.9
44	32.900	25.80	26.10	300	1.50	298.50	7790.9
45	33.200	25.80	25.80	300	3.00	297.00	7662.6
46	33.500	25.80	25.80	300	3.50	296.50	7649.7
47	33.800	25.80	25.80	300	4.50	295.50	7623.9
48	34.100	25.80	25.80	300	-	300.00	7740.0
49	34.400	33.00	29.40	300	1.50	298.50	8775.9
50	34.700	46.80	39.90	300	1.50	298.50	11910.2
51	35.000	57.00	51.90	300	3.00	297.00	15414.3
52	35.300	55.20	56.10	300	1.50	298.50	16745.9
53	35.600	48.00	51.60	300	1.50	298.50	15402.6
54	35.900	46.80	47.40	300	1.50	298.50	14148.9
55	36.200	42.60	44.70	300	-	300.00	13410.0

Sl.No	Chainage (in Km)	Area (in sqm)	Average Area (in sqm)	Length (in Mtr)	Less for culvert/bridge span (in mtr)	Net length (in mtr)	Volume (in cum)
1	2		4	6		7	8
56	36.500	40.80	41.70	300	1.50	298.50	12447.5
57	36.800	39.00	39.90	300	-	300.00	11970.0
58	37.100	34.80	36.90	300	1.50	298.50	11014.7
59	37.400	41.40	38.10	300	55.00	245.00	9334.5
60	37.700	46.20	43.80	300	-	300.00	13140.0
61	38.000	52.80	49.50	300	-	300.00	14850.0
62	38.300	64.20	58.50	300	-	300.00	17550.0
63	38.600	55.20	59.70	300	-	300.00	17910.0
64	38.900	32.40	43.80	300	-	300.00	13140.0
65	39.200	30.60	31.50	300	1.50	298.50	9402.8
66	39.500	28.80	29.70	300	1.50	298.50	8865.5
67	39.800	36.60	32.70	300	-	300.00	9810.0
68	40.100	47.40	42.00	300	-	300.00	12600.0
69	40.400	52.80	50.10	300	-	300.00	15030.0
70	40.700	55.20	54.00	300	2.00	298.00	16092.0
71	41.000	58.20	56.70	300	3.00	297.00	16839.9
72	41.300	60.00	59.10	300	1.50	298.50	17641.4
73	41.600	58.20	59.10	300	-	300.00	17730.0
74	41.900	51.60	54.90	300	6.00	294.00	16140.6
75	42.200	49.20	50.40	300	-	300.00	15120.0
76	42.500	47.40	48.30	300	1.50	298.50	14417.6
77	42.800	52.80	50.10	300	-	300.00	15030.0
78	43.000	59.40	56.10	200	4.00	196.00	10995.6
							1018172.3

SOIL CLASSIFICATION.**Ch.20.0 to 43.00 km**

Ordinary Soil	60%	=	610903.4
Ordinary Rock	30%	=	305451.7
Hard Rock	10%	=	101817.2
			1018172.3

DETAILS OF MEASUREMENT

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

RE- ALIGNMENT FROM CH.20.0 KM TO 59.3 KM (REALIGNED LENGTH 23.0 KM)

SITE CLEAREANCE

- 1 Clearing and grubbing road land. (Clearing and grabbing road land i/c uprooting rank vegetation grass)

II) by manual meand

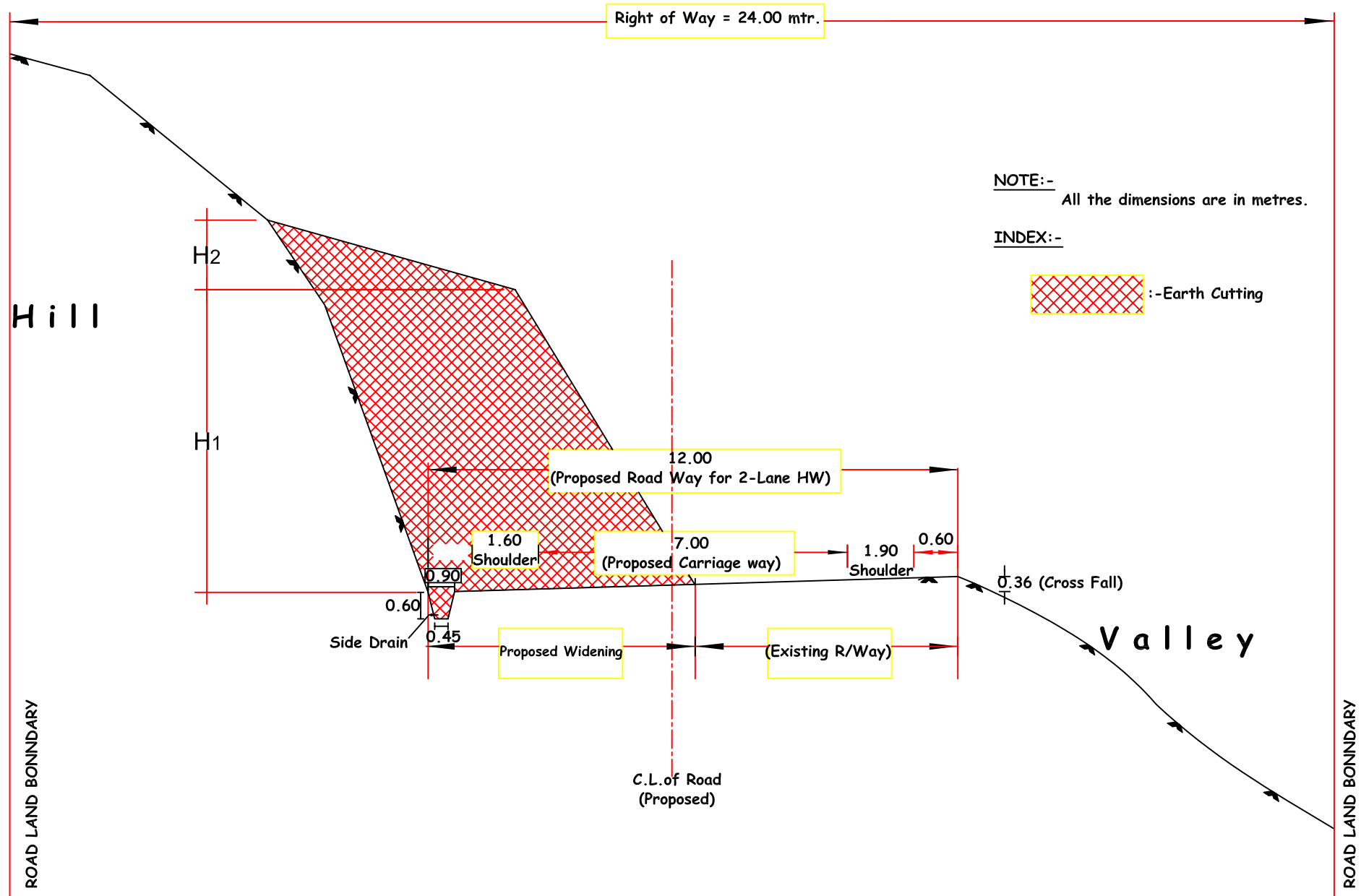
B) in area of light jungle

$$\begin{aligned} 1 \times 23000.00 \times 15 &= 345000.00 \text{ Sqm} \\ &= 34.50 \text{ Hact.} \end{aligned}$$

TYPICAL X- SECTION OF SIDE HILL CUT

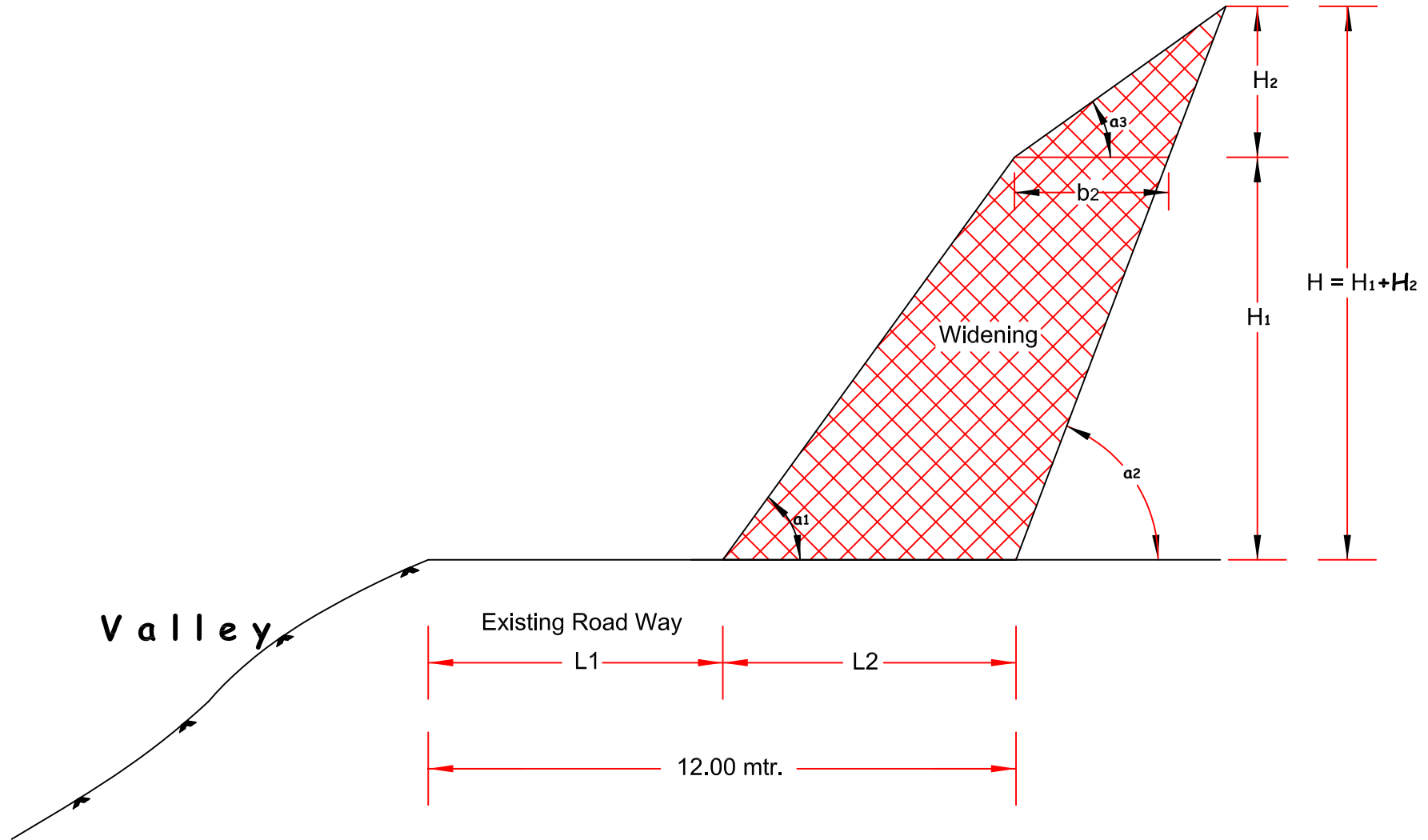
Ref. IRC:SP:48-1998

SCALE:- 1:100



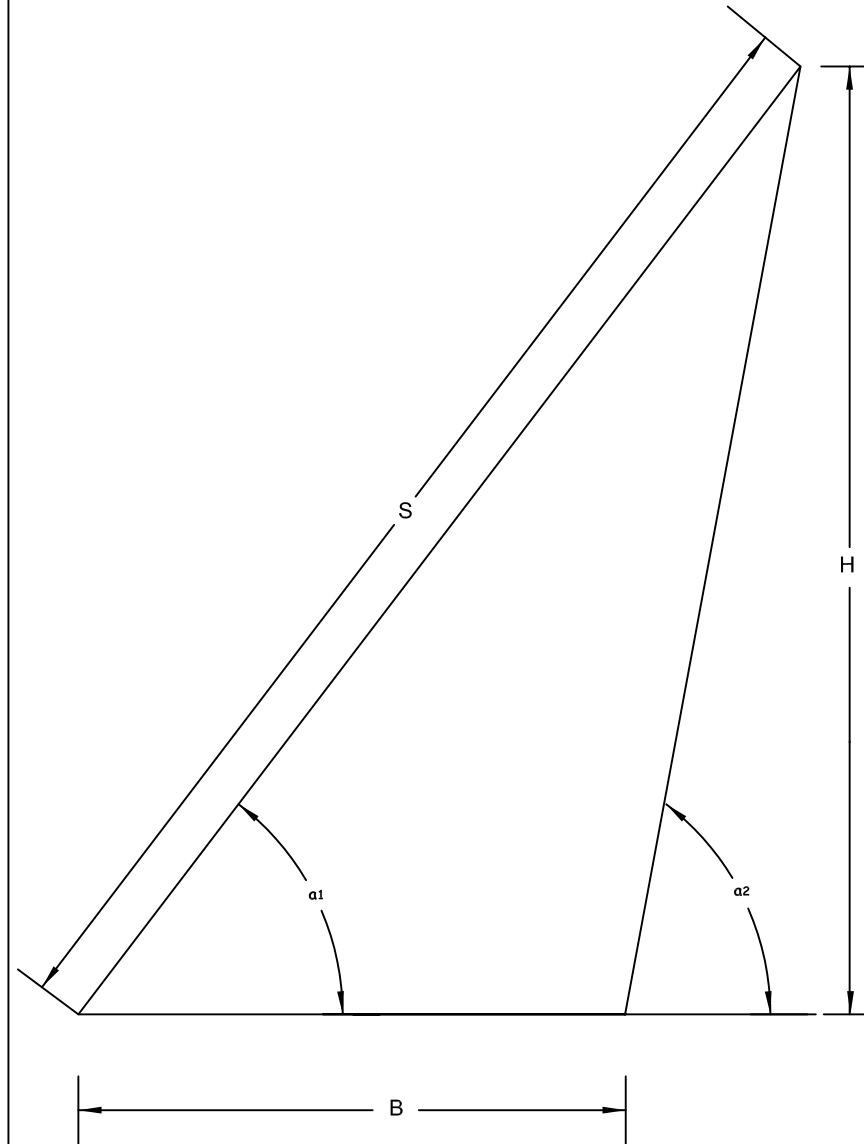
TYPICAL CROSS-SECTION FOR CALCULATION
OF EARTHWORK (WIDENING)

Scale:- 1:100



TYPICAL X-SECTION FOR CALCULATION OF EARTHWORK
ON THE PROPOSED NEW ALIGNMENT

Scale:- 1:100



ABSTRACT OF COST

State :- A.P

Branch :- B & R

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
(A) CARRIAGE WAY PORTION.						
<u>Preparation of sub grade</u>						
1	Preparation of sub grade(Preparation of sub grade by excavating earth to an average depth of 22.50 cm, dressing to camber and consolidating with road roller, making good the undulations etc. and disposal of surplus earth, lead upto 50 m.)	8030.00	28.00	Sqm	224840.00	APSR'2007/4.18A
2	Consolidation of sub-grade with road roller of 8 to 12 tonne capacity including making good the undulations etc. with earth or quarry spoils etc. and rerolling the sub grade.	8030.00	2.90	Sqm	23287.00	APSR'2007/4.18B
COST PER KM =						Rs. 2.48 lakh
<u>GRANULAR SUB-BASE</u>						
3	Granular/Gravel sub-base with coarse Graded Materials (Table :- 400-2) (Constrction of granular sub-base by providing coarse graded materials spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC and compacting with vibrator roller to achieve the desired density complete as per clause 401) (i) for grading - I material	2007.50	1585.00	cum	3181888.00	Analysed rate
COST PER KM =						Rs. 31.82 lakh
<u>WET MIX MACADAM</u>						
4	Weter Mix Macadam (Providing , laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the materials with water at OMC in mechanical mix plant carriage of mixed materials by tipper to site , laying in uniform layers with paver in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density).	1540.00	1708.00	cum	2630320.00	Analysed rate
COST PER KM =						Rs. 26.30 lakh

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
	<u>DENSE BITUMINOUS MACADAM</u>					
5	Prime Coat(Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means.)	7700.00	31.00	Sqm	238700.00	Analysed rate
6	Dense Graded Bituminous Macadam (Providing and laying dense bituminous macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @4.0 to 4.5% by weight of total mix of mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment , rolling with smooth wheeled, vibratory and tandem roller to achieve the desired compaction as per MoRTH specification clause No.507 complete in all respect).					
	for Grading 1 (60mm nominal size)	462.00	9081.00	Cum	4195422.00	Analysed rate
	COST PER KM =					Rs. 44.34 lakh
	<u>BITUMINOUS MACADAM & SEAL COAT</u>					
7	Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.20Kg per sqm. On the prepared bituminous/granular surface cleaned with mechanical broom.	7700.00	11.00	Sqm	84700.00	Analysed rate
8	Bituminous Macadam (Providing and laying bituminous macadam with 100-120 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with bituminous binder, transported to site, laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction)					
	(i) for grading I (40mm nominal size)	308.00	7288.00	Cum	2244704.00	Analysed rate
9	Seal (Coat Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A and B seal coats)	7700.00	73.00	Sqm	562100.00	Analysed rate
	Case-I : Type A					
	COST PER KM =					Rs. 28.92 lakh
	TOTAL COST PER KM =					133.86

ABSTRACT OF COST

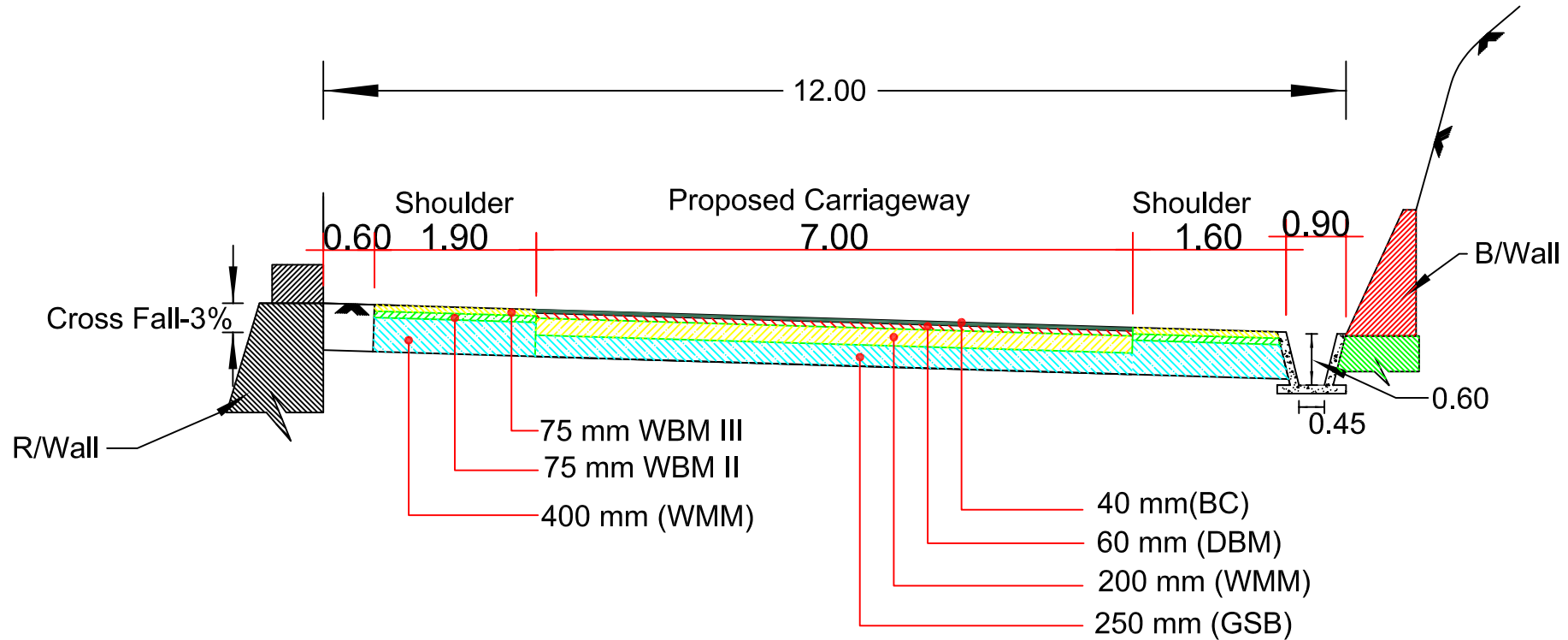
State :- A.P

Branch :- B & R

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
(B) SHOULDER PORTION.						
1	Earth work in excavation in foundation and trenches in soils containing 50% or more of shingle or small size boulders upto 30 cm size, lift upto 1.50 m and stacking the excavated soil not more than 3 m clear from the edge of the excavation and returning the stacked soil in 15 cm layers when required, into plinth, sides of foundation etc consolidating each deposited layer by ramming and watering and then disposing of all surplus excavated soil as directed within a lead	2695.00	93.80	Cum	252791.00	APSR'2007/4(Bldg)
2	Granular/Gravel sub-base with coarse Graded Materials (Table :- 400-2) (Constrction of granular sub-base by providing coarse graded materials spreading in uniform layers with motor grader on prepared surface, mixing by mix in place method with rotavator at OMC and compacting with vibrator roller to achieve the desired density complete as per clause 401) (i) for grading - I material	1540.00	1585.00	Cum	2440900.00	Analysed rate
3	Water Bound Macadam (Providing , laying, spreading and compacting stone aggregate of special sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with vibrator roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding materials to fill up the interestices of course aggregate watring and compacting to the required density). By Manual means Using screening Type-A (13.2mm Agg) Grading - I (Using screening Crushable type such as Moorum of Gravel)	288.75	1953.00	Cum	563929.00	Analysed rate
4	Water Bound Macadam (Providing , laying, spreading and compacting stone aggregate of special sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with vibrator roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding materials to fill up the interestices of course aggregate watring and compacting to the required density). By Manual means Using screening Type-B (11.2mm Agg) Grading - II (Using screening Crushable type such as Moorum of Gravel)	288.75	2090.00	Cum	603488.00	Analysed rate
TOTAL COST PER KM =					3861108.00	
					Say Rs. 38.61	lakh

CROSS SECTION OF PAVEMENT



Ref. IRC:SP:48-1998

SCALE:- 1:100

NOTE:-

All the dimensions are in metres.

DETAILS OF MEASUREMENT

SH:- PAVEMENT

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

A) CARRIAGE WAY

Details of quantity for 1.0 km

- 1 Preparation of sub-grade.....

	1 x	1000.00	x	7.30	=	7300.00 Sqm
Add	10% for curves				=	730.00 Sqm
Total:-						8030.00 Sqm

- 2 Consolidation of sub-grade with Roller

	1 x	1000	x	7.30	=	7300.00 Sqm
Add	10% for curves				=	730.00 Sqm
Total:-						8030.00 Sqm

- 3 Providing and laying gravel sub-base coarse.

	1 x	1000	x	7.30	x	0.25	=	1825.00 Cum
Add	10% for curves						=	182.50 Cum
Total:-								2007.5 Cum

- 4 Providing and laying WMM (Wet Mix Macadam)

	1 x	1000	x	7.00	x	0.200	=	1400.00 Cum
Add	10% for curves						=	140.00 Cum
Total:-								1540.0 Cum

- 5 Providing and laying DBM (Dense Bituminous Macadam)

	1 x	1000	x	7.00	x	0.06	=	420.00 Cum
Add	10% for curves						=	42.00 Cum
Total:-								462.00 Cum

- 6 Providing and laying prime coat with Bitumen emulsion

	1 x	1000	x	7.00	=	7000.00 Sqm
Add	10% for curves				=	700.00 Sqm
Total:-						7700.00 Sqm

- 7 Providing and applying tack coat with Bitumen emulsion over DBM layer

	1 x	1000	x	7.00	=	7000.00 Sqm
Add	10% for curves				=	700.00 Sqm
Total:-						7700.00 Sqm

- 8 Providing and laying Bituminous coat over DBM layer

	1 x	1000	x	7.00	x	0.04	=	280.00 Cum
Add	10% for curves						=	28.00 Cum
Total:-								308.00 Cum

- 9 Providing and laying Seal coat .

	1 x	1000	x	7.00	=	7000.00 Sqm
Add	10% for curves				=	700.00 Sqm
Total:-						7700.00 Sqm

DETAILS OF MEASUREMENT**B) SHOULDER****1 Earth work in foundation & trench**

VALLEY SIDE							
1	x	1000	x	0.70	x	1.90	= 1330.00 Cum
HILL SIDE							
1	x	1000	x	0.70	x	1.60	= 1120.00 Cum
							<u>2450.00</u>
Add	10% for curves					=	245.00 Cum
Total:-							<u>2695.00 Cum</u>

2 Providing and laying granular / gravel sub-base

VALLEY SIDE						
1 x	1000	x	1.90	x	0.40 =	760.00 Cum
HILL SIDE						
1 x	1000	x	1.60	x	0.40 =	640.00 Cum
						<u>1400.00 Cum</u>
Add	10% for curves				=	140.00 Cum
Total:-						<u>1540.00 Cum</u>

3 Wet mixed maccadam.....(Type-A 13.20mm aggr..)

VALLEY SIDE							
WBM Grd.I							
	1 x	1000	x	1.90	x	0.075 =	142.50 Cum
HILL SIDE							
WBM Grd.I							
	1 x	1000	x	1.60	x	0.075 =	120.00 Cum
							<u>262.50 Cum</u>
Add	10% for curves					=	26.25 Cum
Total:-							<u>288.75 Cum</u>

Type-B, 11.20mm aggregate Grd-II

VALLEY SIDE							
WBM Grd.II							
1 x	1000	x	1.90	x	0.075	=	142.50 Cum
HILL SIDE							
WBM Grd.II							
1 x	1000	x	1.60	x	0.075	=	120.00 Cum
							<u>262.50 Cum</u>
Add	10% for curves					=	26.25 Cum
Total:-							<u>288.75 Cum</u>

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
4.1	401	Granular Sub-Base with Close Graded Material (Table:- 400-1)					
	A	Plant Mix Method					
		Construction of granular sub-base by providing close graded Material, mixing in a mechanical mix plant at OMC, carriage of mixed Material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per clause 401					
		Unit = cum					
		Taking output = 225 cum (450 tonne)					
		a) Labour					
		Mate	day	0.400	140.00	56.00	L-12
		Mazdoor skilled	day	2.000	180.00	360.00	L-15
		Mazdoor	day	8.000	100.00	800.00	L-13
		b) Machinery					
		Wet mix plant @ 75 tonne capacity per hour	hour	6.000	1500.00	9000.00	P&M-093
		Electric generator 125 KVA	hour	6.000	650.00	3900.00	P&M-018
		Water tanker 6 KL capacity 5 km lead with one trip per hour	hour	4.500	404.00	1818.00	P&M-060
		Front end loader 1 cum bucket capacity	hour	6.000	1035.00	6210.00	P&M-017
		Tipper 10 tonne	tonne.km	450 x L	20.20	0.00	Lead =0 km & P&M-058
		Add 10 per cent of cost of carriage to cover loading and unloading				0.00	
		Motor Grader 110 HP	hour	6.000	2163.00	12978.00	P&M-032
		Vibratory roller 8-10 t	hour	6.000	544.00	3264.00	P&M-059
		c) Material					
		Close graded Granular sub-base Material as per table 400-1					
		For Grading-I Material					
		53 mm to 9.5 mm @ 50 per cent	cum	144.000	600.00	86400.00	M-013
		9.5 mm to 2.36 mm @ 20 per cent (graded)	cum	57.000	480.00	27360.00	M-017
		2.36 mm below @ 30 per cent	cum	86.400	340.00	29376.00	M-020
		Cost of water	KL	27.000	50.00	1350.00	M-189
4.1A	(i)	Rate per cum for grading-I Material					
	d)	Overhead charges @ 10 % on (a+b+c)				18287.20	
	e)	Contractor's profit @ 10 % on (a+b+c+d)				20115.92	
		Cost for 225 cum = a+b+c+d+e				221275.12	
		Carriage cost of materials from quarry to work site					
		53 mm to 9.5 mm @ 50 per cent	cum	144.000	471.00	67824.00	
		9.5 mm to 2.36 mm @ 20 per cent (graded)	cum	57.000	471.00	26847.00	
		2.36 mm below @ 30 per cent	cum	86.400	471.00	40694.40	
						356640.52	
		Rate per cum = (a+b+c+d+e)/225				1585.07	
					say	1585.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
4.12	406	Wet Mix Macadam					
		Providing, laying, spreading and compacting graded stone aggregate to wet mix macadam specification including premixing the Material with water at OMC in mechanical mix plant carriage of mixed Material by tipper to site, laying in uniform layers with paver in sub- base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density.					
		Unit = cum					
		Taking output = 225 cum (495 tonnes)					
		a) Labour					
		Mate	day	0.480	140.00	67.20	L-12
		Mazdoor skilled	day	2.000	180.00	360.00	L-15
		Mazdoor	day	10.000	100.00	1000.00	L-13
		b) Machinery					
		Wet mix plant of 75 tonne hourly capacity	hour	9.000	1200.00	10800.00	P&M-094
		Electric generator 125 KVA	hour	6.000	650.00	3900.00	P&M-018
		Front end loader 1 cum capacity	hour	6.000	1035.00	6210.00	P&M-017
		Paver finisher	hour	6.000	880.00	5280.00	P&M-035
		Three wheel 80-100 kN Statis Roller	hour	6x0.65	544.00	2121.60	P&M-059
		or					
		Smooth 3 wheeled steel roller @ 8-10 tonnes.	hour	12.000			
		Water tanker 6 KL capacity	hour	3.000	404.00	1212.00	P&M-060
		Tipper	tonne.km	495 x L	20.20	0.00	Lead =0 km & P&M-058
		Add 10 per cent of cost of carriage to cover cost of loading and unloading				0.00	
		c) Material (Table 400-11)					
		45 mm to 22.4 mm@ 30 per cent	cum	89.100	650.00	57915.00	M-034
		22.4 mm to 2.36 mm @ 40 per cent	cum	118.800	675.00	80190.00	M-031
		2.36 mm to 75 micron@ 30 per cent	cum	89.100	360.00	32076.00	M-022
		Cost of water	KL	18.000	50.00	900.00	M-189
		d) Overhead charges @ 10 % on (a+b+c)				20203.18	
		e) Contractor's profit @ 10 % on (a+b+c+d)				22223.50	
		Cost for 225 cum = a+b+c+d+e				244458.48	
		Carriage cost of materials from quarry to work site					
		45 mm to 22.4 mm@ 30 per cent	cum	89.100	471.00	41966.10	M-034
		22.4 mm to 2.36 mm @ 40 per cent	cum	118.800	471.00	55954.80	M-031
		2.36 mm to 75 micron@ 30 per cent	cum	89.100	471.00	41966.10	M-022
						384345.48	
		Rate per cum = (a+b+c+d+e)/225				1708.20	
					say	1708.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
5.1	502	Prime Coat					
		Providing and applying primer coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means.					
		Unit = sqm					
		Taking output = 3500 sqm					
		a) Labour					
		Mate	day	0.080	140.00	11.20	L-12
		Mazdoor	day	2.000	100.00	200.00	L-13
		b) Machinery					
		Mechanical broom @ 1250 sqm per hour	hour	2.800	322.00	901.60	P&M-031
		Air compressor 250 cfm	hour	2.800	426.00	1192.80	P&M-001
		Bitumen pressure distributor @ 1750 sqm per hour	hour	2.000	970.00	1940.00	P&M-004
		Water tanker 6 KL capacity @ 1 trip per hour	hour	1.000	404.00	404.00	P&M-060
		c) Material					
		Bitumen emulsion @ 0.6 kg per sqm	tonne	2.100	37500.00	78750.00	IOC, GHY
		Cost of water	KL	6.000	50.00	300.00	M-189
		d) Overhead charges @ 10 % on (a+b+c)				8369.96	
		e) Contractor's profit @ 10 % on (a+b+c+d)				9206.96	
		Cost for 3500 sqm = a+b+c+d+e				101276.52	
		Carriage cost of materials from quarry to work site					
		Bitumen emulsion @ 0.6 kg per sqm	tonne	2.100	3860.00	8106.00	M-077
						109382.52	
		Rate per sqm = (a+b+c+d+e)/3500				31.25	
					say	31.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
5.6	507	Dense Graded Bituminous Macadam					
		Providing and laying dense graded bituminous macadam with 100-120 TPH batch type HMP producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.0 to 4.5 per cent by weight of total mix and filler, transporting the hot mix to work site, laying with a hydrostatic paver finisher with sensor control to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction as per MoRTH specification clause No. 507 complete in all respects.					
		Unit = cum					
		Taking output = 195 cum (450 tonnes)					
		a) Labour					
		Mate	day	0.840	140.00	117.60	L-12
		Mazdoor working with HMP, mechanical broom, paver, roller, asphalt cutter and assistance for setting out lines, levels and layout of construction	day	16.000	100.00	1600.00	L-13
		Skilled mazdoor for checking line & levels	day	5.000	180.00	900.00	L-15
		b) Machinery					
		Batch mix HMP @ 75 tonne per hour	hour	6.000	15634.00	93804.00	P&M-022
		Paver finisher hydrostatic with sensor control @ 75 cum per hour	hour	6.000	2415.00	14490.00	P&M-034
		Generator 250 KVA	hour	6.000	750.00	4500.00	P&M-081
		Front end loader 1 cum bucket capacity	hour	6.000	1035.00	6210.00	P&M-017
		Tipper 10 tonne capacity	tonne.km	450 x L	20.20	0.00	Lead =0 km & P&M-058
		Add 10 per cent of cost of carriage to cover cost of loading and unloading				0.00	
		Smooth wheeled roller 8-10 tonnes for initial break down rolling.	hour	6.00x0.65*	416.00	1622.40	P&M-044
		Three wheel 80-100 kN Statis Roller	hour	6.00x0.65*	544.00	2121.60	P&M-059
		Finish rolling with 6-8 tonnes smooth wheeled tandem roller.	hour	6.00x0.65*	1033.00	4028.70	P&M-045
		c) Materials					
		Bitumen @ 4.25 per cent of weight of mix	tonne	19.130	37500.00	717375.00	IOC, GHY
		Aggregate					
		Total weight of mix = 450 tonnes					
		Weight of bitumen = 19.13 tonnes					
		Weight of aggregate = 450 -19.13 = 430.87 tonnes					
		Taking density of aggregate = 1.5 ton/cum					
		Volume of aggregate = 287.25 cum					
		Grading - I40 mm (Nominal Size)					
		37.5 - 25 mm 22 per cent	cum	63.190	650.00	41073.50	M-049
		25 - 10 mm 13 per cent	cum	37.340	1150.00	42941.00	M-046
		10 -4.75 mm 19 per cent	cum	54.580	1490.00	81324.20	M-040
		4.75 mm and below 44 per cent	cum	126.390	1540.00	194640.60	M-030
		Filler @ 2 per cent of weight of aggregates.	tonne	8.620	9600.00	82752.00	M-188
		For Grading I (40 mm nominal size)					
		d) Overhead charges @ 10 % on (a+b+c)				128950.06	
		e) Contractor's profit @ 10 % on (a+b+c+d)				141845.07	
		Cost for 205 cum = a+b+c+d+e				1560295.73	

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
		Carriage cost of materials from quarry to work site					
		Bitumen @ 4.25 per cent of weight of mix	tonne	19.130	3860.00	73841.80	
		37.5 - 25 mm 22 per cent	cum	63.190	471.00	29762.49	
		25 - 10 mm 13 per cent	cum	37.340	471.00	17587.14	
		10 - 4.75 mm 19 per cent	cum	54.580	471.00	25707.18	
		4.75 mm and below 44 per cent	cum	126.390	471.00	59529.69	
		Filler @ 2 per cent of weight of aggregates.	tonne	8.620	471.00	4060.02	
						1770784.05	
		Rate per cum = (a+b+c+d+e)/195 (For Grading I)				9080.94	
					say	<u>9081.00</u>	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
5.2	503	Tack Coat					
		Providing and applying tack coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous/granular surface cleaned with mechanical broom.					
		Unit = sqm					
		Taking output = 3500 sqm					
		a) Labour					
		Mate	day	0.080	140.00	11.20	L-12
		Mazdoor	day	2.000	100.00	200.00	L-13
		b) Machinery					
		Mechanical broom @ 1250 sqm per hour	hour	2.800	322.00	901.60	P&M-031
		Air compressor 250 cfm	hour	2.800	426.00	1192.80	P&M-001
		Emulsion pressure distributor @ 1750 sqm per hour	hour	2.000	970.00	1940.00	P&M-004
		c) Material					
		Bitumen emulsion @ 0.2 kg per sqm	tonne	0.700	37500.00	26250.00	IOC, GHY
		d) Overhead charges @ 10 % on (a+b+c)				3049.56	
		e) Contractor's profit @ 10 % on (a+b+c+d)				3354.52	
		Cost for 3500 sqm = a+b+c+d+e				36899.68	
		Carriage cost of materials from quarry to work site					
		Bitumen emulsion @ 0.6 kg per sqm	tonne	0.700	3860.00	2702.00	M-077
						39601.68	
		Rate per sqm = (a+b+c+d+e)/3500				11.31	
					say	11.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
5.3	504	Bituminous Macadam					
		Providing and laying bituminous macadam with 100-120 TPH hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading premixed with bituminous binder, transported to site, laid over a previously prepared surface with paver finisher to the required grade, level and alignment and rolled as per clauses 501.6 and 501.7 to achieve the desired compaction					
		Unit = cum					
		Taking output = 205 cum (450 tonnes)					
		a) Labour					
		Mate	day	0.840	140.00	117.60	L-12
		Mazdoor working with HMP, mechanical broom, paver, roller, asphalt cutter and assistance for setting out lines, levels and layout of construction	day	16.000	100.00	1600.00	L-13
		Skilled mazdoor for checking line & levels	day	5.000	180.00	900.00	L-15
		b) Machinery					
		Batch mix HMP 100-120 TPH @ 75 tonne per hour actual output	hour	6.000	21140.00	126840.00	P&M-021
		Mechanical broom hydraulic @ 1250 sqm per hour	hour	2.200	322.00	708.40	P&M-031
		Air compressor 250 cfm	hour	2.200	426.00	937.20	P&M-001
		Paver finisher hydrostatic with sensor control @ 75 cum per hour	hour	6.000	2415.00	14490.00	P&M-034
		Generator 250 KVA	hour	6.000	750.00	4500.00	P&M-081
		Front end loader 1 cum bucket capacity	hour	6.000	1035.00	6210.00	P&M-017
		Tipper 10 tonne capacity	tonne.km	450 x L	20.20	0.00	Lead =0 km & P&M-058
		Add 10 per cent of cost of carriage to cover cost of loading and unloading				0.00	
		Smooth wheeled roller 8-10 tonnes for initial break down rolling.	hour	6.00x0.65*	416.00	1622.40	P&M-044
		Three wheel 80-100 kN Statis Roller	hour	6.00x0.65*	544.00	2121.60	P&M-059
		Finish rolling with 6-8 tonnes smooth wheeled tandem roller.	hour	6.00x0.65*	1033.00	4028.70	P&M-045
		c) Material					
		i) Bitumen@ 3.3 per cent of mix	tonne	14.850	37500.00	556875.00	IOC, GHY
		weight of mix = 205 x 2.2 = 450 tonne					
		ii) Aggregate					
		Total weight of mix = 450 tonnes					
		Weight of bitumen = 14.85 tonnes					
		Weight of aggregate = 450 -14.85 = 435.15 tonnes					
		Taking density of aggregate = 1.5 ton/cum					
		Volume of aggregate = 290.1 cum					
		*Grading I (40 mm nominal size)					
		37.5 - 25 mm 15 per cent	cum	43.510	650.00	28281.50	M-049
		25 - 10 mm 45 per cent	cum	130.550	1150.00	150132.50	M-046
		10 - 5 mm 25 per cent	cum	72.530	1490.00	108069.70	M-040
		5 mm and below 15 per cent	cum	43.510	1540.00	67005.40	M-030

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
		for Grading I (40 mm nominal size)					
		d) Overhead charges @ 10 % on (a+b+c)				107444.00	
		e) Contractor's profit @ 10 % on (a+b+c+d)				118188.40	
		Cost for 205 cum = a+b+c+d+e				1300072.40	
		Carriage cost of materials from quarry to work site					
		i) Bitumen@ 3.3 per cent of mix	tonne	14.850	3860.00	57321.00	
		37.5 - 25 mm 15 per cent	cum	43.510	471.00	20493.21	
		25 - 10 mm 45 per cent	cum	130.550	471.00	61489.05	
		10 - 5 mm 25 per cent	cum	72.530	471.00	34161.63	
		5 mm and below 15 per cent	cum	43.510	471.00	20493.21	
						1494030.50	
		Rate per cum = (a+b+c+d+e)/205 (For Grading I)				7287.95	
					say	<u>7288.00</u>	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
5.12	513	Seal Coat					
		Providing and laying seal coat sealing the voids in a bituminous surface laid to the specified levels, grade and cross fall using Type A and B seal coats					
		Unit = sqm					
		Taking output = 10250 sqm (92.25 cum)					
		(i) Case - I : Type A					
		a) Labour					
		Mate	day	0.240	140.00	33.60	L-12
		Mazdoor	day	6.000	100.00	600.00	L-13
		b) Machinery					
		Hydraulic self propelled chip spreader	hour	6.000	2380.00	14280.00	P&M-025
		Tipper 5.5 cum capacity	hour	6.000	504.00	3024.00	P&M-048
		Front end loader 1 cum bucket capacity	hour	6.000	1035.00	6210.00	P&M-017
		Bitumen pressure distributor @ 1750 sqm per hour	hour	6.000	970.00	5820.00	P&M-004
		Smooth wheeled roller 8 -10 tonne weight	hour	6.000	416.00	2496.00	P&M-044
		c) Material					
		Bitumen@ 9.80 kg per 10 sqm	tonne	10.050	37500.00	376875.00	IOC, GHY
		Crushed stone chipping of 6.7 mm size defined as 100 per cent passing 11.2 mm sieve and retained on 2.36 mm sieve applied @ 0.09 cum per 10 sqm	cum	92.250	1540.00	142065.00	M-050
		d) Overhead charges @ 10 % on (a+b+c)				55140.36	
		e) Contractor's profit @ 10 % on (a+b+c+d)				60654.40	
		Cost for 10250 sqm = a+b+c+d+e				667198.36	
		Carriage cost of materials from quarry to work site					
		Bitumen@ 9.80 kg per 10 sqm	tonne	10.050	3860.00	38793.00	
		Crushed stone chipping of 6.7 mm size defined as 100 per cent passing 11.2 mm sieve and retained on 2.36 mm sieve applied @ 0.09 cum per 10 sqm	cum	92.250	471.00	43449.75	
						749441.11	
		Rate per sqm = (a+b+c+d+e)/10250				73.12	
					say	73.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
4.9	404	Water Bound Macadam					
		Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with 3 wheeled steel/ vibratory roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/ binding Materials to fill up the interstices of coarse aggregate, watering and compacting to the required density.					
	A	By Manual Means					
		Unit = cum					
		Taking output = 360 cum					
		a) Labour					
		Mate	day	10.080	140.00	1411.20	L-12
		Mazdoor skilled	day	2.000	180.00	360.00	L-15
		Mazdoor	day	250.000	100.00	25000.00	L-13
		b) Machinery					
		Three wheel 80-100 kN Statis Roller	hour	6.000	544.00	3264.00	P&M-059
		or					
		Smooth 3 wheeled steel roller @ 30cum/hour	hour	12.000			
		Water tanker 6 KL capacity	hour	24.000	404.00	9696.00	P&M-060
		c) Material (Refer table 400 - 7, 8 & 9)					
4.9A	(i)	Grading-I					
		Aggregate					
		Grading-I 90 mm to 45 mm@ 1.21cum per 10 sqm for compacted thickness of 100 mm	cum	435.600	520.00	226512.00	M-039
		Stone Screening					
		Type A 13.2 mm for grading-I @ 0.27 cum per 10 sqm	cum	97.200	870.00	84564.00	M-052
		Binding material					
		Binding Material @ 0.08cum per 10 sqm for grading I material	cum	28.800	150.00	4320.00	M-007
		Cost of water	KL	144.000	50.00	7200.00	M-189
4.9A (i)	(b)	Using Scrining Type-A (13.2mm agg.)					
		d) Overhead charges @ 10 % on (a+b+c)				36232.72	
		e) Contractor's profit @ 10 % on (a+b+c+d)				39855.99	
		Cost for 360 cum = a+b+c+d+e				438415.91	
		Carriage cost of materials from quarry to work site					
		Grading-I 90 mm to 45 mm@ 1.21cum per 10 sqm for compacted thickness of 100 mm	cum	435.600	471.00	205167.60	AR attached
		Type A 13.2 mm for grading-I @ 0.27 cum per 10 sqm	cum	97.200	471.00	45781.20	AR attached
		Binding Material @ 0.08cum per 10 sqm for grading I material	cum	28.800	471.00	13564.80	AR attached
						702929.51	
		Rate per cum = (a+b+c+d+e)/360				1953.00	
					say	1953.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
4.9	404	Water Bound Macadam					
		Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with 3 wheeled steel/ vibratory roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/ binding Materials to fill up the interstices of coarse aggregate, watering and compacting to the required density.					
	A	By Manual Means					
		Unit = cum					
		Taking output = 360 cum					
		a) Labour					
		Mate	day	10.080	140.00	1411.20	L-12
		Mazdoor skilled	day	2.000	180.00	360.00	L-15
		Mazdoor	day	250.000	100.00	25000.00	L-13
		b) Machinery					
		Three wheel 80-100 kN Statis Roller	hour	6.000	544.00	3264.00	P&M-059
		or					
		Smooth 3 wheeled steel roller @ 30cum/hour	hour	12.000			
		Water tanker 6 KL capacity	hour	24.000	404.00	9696.00	P&M-060
		c) Material (Refer table 400 - 7, 8 & 9)					
4.9A	(ii)	Grading-II Aggregate					
		Grading-II 63 mm to 45 mm /Grading-III 53 mm to 22.4 mm@ 0.91 cum per 10 sqm for compacted thickness of 75 mm	cum	435.600	540.00	235224.00	M-038
		Stone Screening					
		Type B11.2 mm for grading-III @ 0.18 cum per 10 sqm	cum	86.400	1400.00	120960.00	M-051
		Binding material					
		Binding Material @ 0.06cum per 10 sqm for grading II material	cum	28.800	150.00	4320.00	M-007
		Cost of water	KL	144.000	50.00	7200.00	M-189
4.9A (ii)	(c)	Using Scrining Type-B (11.2mm agg.)					
		d) Overhead charges @ 10 % on (a+b+c)				40743.52	
		e) Contractor's profit @ 10 % on (a+b+c+d)				44817.87	
		Cost for 360 cum = a+b+c+d+e				492996.59	
		Carriage cost of materials from quarry to work site					
		Grading-II 63 mm to 45 mm /Grading-III 53 mm to 22.4 mm@ 0.91 cum per 10 sqm for compacted thickness of 75 mm	cum	435.600	471.00	205167.60	AR attached
		Type B11.2 mm for grading-III @ 0.18 cum per 10 sqm	cum	86.400	471.00	40694.40	AR attached
		Binding Material @ 0.08cum per 10 sqm for grading I material	cum	28.800	471.00	13564.80	AR attached
						752423.39	
		Rate per cum = (a+b+c+d+e)/360				2090.00	
					say	2090.00	

DETAILS OF RCC SLAB CULVERT

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

Sl. No.	Span (in mtrs)	Quantity (in Nos)
1	2	3

A- (SH:- CH:- 0.00 to 20.00 km)

a)	1.50	39
b)	2.00	61
c)	3.00	7
d)	4.00	-
e)	5.00	1
f)	6.00	2
		110
		Nos

B- (SH:- CH:- 20.00 to 59.30 km)

a)	1.50	117
b)	2.00	119
c)	3.00	20
d)	4.00	3
e)	5.00	-
f)	6.00	1
		260
		Nos

C- (SH:- CH:- 59.30 to 110.45 km)

a)	1.50	165
b)	2.00	75
c)	3.00	5
d)	4.00	1
e)	5.00	-
f)	6.00	1
		247
		Nos

D- RE- ALIGNED PORTION (SH Ch:- 20.00 TO 43.00 KM)

1

a)	1.50	52
b)	2.00	38
c)	3.00	9
d)	4.00	8
e)	5.00	3
f)	6.00	4
		114
		Nos

ABSTRACT OF COST

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH: Slab Culvert 1.50 Mtr Span, Abutment Ht - 2.50Mtr)

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
	<u>Detail of 1 Nos. culvert as per IRC-SP-13</u>					
1	Excavation for Structures (Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides a					
I	Ordinary soil					
A	Manual Means					
(i)	upto 3 m depth	202.50	Cum.	49.00	9,923.00	APSR'2007, It.12.1 (A) (i)
2.	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	31.86	Cum.	4534.00	144,453.00	Analysed of rates based on APSR '07
3.	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications					
	Coursed rubble masonry (first sort)	169.82	Cum.	3998.00	678,925.00	-- do--
4	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications	64	mtr	118.00	7,552.00	-- do--

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications PCC Grade M20 Height upto 5m	16.248	Cum.	6331.00	102,866.00	Analysed of rates based on APSR '07
6	a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications	0.418	MT	71679.00	29,926.00	-- do--
7	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification RCC Grade M20 Height upto 5m	8.21	Cum.	7590.00	62,314.00	-- do--
8	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification Granular material	32.90	Cum.	1287.00	42,347.00	-- do--
					1078306.00	

Say Rs.

10.78 lakh

$$\text{Therefore, cost per Mtrs} = \frac{1078306.00}{1.50} = \text{Rs. } 718871.00$$

DETAILS OF MEASUREMENT**Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)****(SH: Slab Culvert 1.50 Mtr Span, Abutment Ht - 2.50 Mtr)****Ref :Plate 5 of IRC : SP : 13-2004****Items.1 :- Excavation for Structures (Earth work in excavation of foundation of structures.....)**

I	Ordinary soil						
A	Manual Means						
(i)	upto 3 m depth						
		2 x	12 x	3.40 x	2.00	=	163.20 Cum
Wing Wall-							
i) High end		2 x	2.50 x	2.28 x	2.00	=	22.80 Cum
ii) Low end		2 x	2.50 x	1.65 x	2.00	=	16.50 Cum
						Total:-	202.50 Cum

Item. 2 :- PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation**a) Foundations and plinth**

Abutment -	1 x	12.00 x	5.20 x	0.20	=	12.48 Cum
	1 x	12.00 x	4.80 x	0.20	=	11.52 Cum
Wing Wall-						
	2 x	2.50 x	2.28 x	0.40	=	4.56 Cum
	2 x	2.50 x	1.65 x	0.40	=	3.30 Cum
					Total:-	31.86 Cum

Item. 3:- Stone masonry work in cement mortar 1:6 for substructure complete as per**Coursed rubble masonry (first sort)**

Abutment -	2 x	12.00 x	2.60 x	0.40	=	24.96 Cum
	2 x	12 x (	2.60 +	2.20)x		
	0.5 x	0.40			=	23.04 Cum
Wing Wall-						
i) High end -	2 x	2.50 x	1.88 x	0.40	=	3.76 Cum
	2 x	2.50 x (	1.88 +	1.48) x		
	0.5 x	0.4			=	3.36 Cum

ii) Low end -

$$2 \times 2.50 \times 1.25 \times 0.4 = 2.50 \text{ Cum}$$

$$\begin{aligned} & 2 \times 2.50 \times (1.25 + 0.85) \times 0.5 \times 0.4 = 2.10 \text{ Cum} \\ & \text{Coursed rubble masonry (Second sort)} \end{aligned}$$

Abutment -

$$2 \times 12.00 \times (2.00 + 1.05) \times 0.5 \times 2.50 = 91.50 \text{ Cum}$$

Wing Wall-

i) High end-

$$2 \times 2.50 \times (1.48 + 0.50) \times 0.5 \times 3.075 = 15.221 \text{ Cum}$$

ii) Low end-

$$2 \times 2.50 \times (0.85 + 0.50) \times 0.5 \times 1 = 3.38 \text{ Cum}$$

Total:- 169.816 Cum

Item. 4:- Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment.....

$$\text{a) Abutment-} \quad 2 \times 12 \times 2 = 48 \text{ Nos}$$

$$\text{b) Wing wall-} \quad 4 \times 2 \times 2 = 16 \text{ Nos}$$

Total:- 64 Nos

Item. 5:- Plain/Reinforced cement concrete in sub-structure complete as per drawing.....

PCC Grade M 15

a) Abutment Cap & D/Wall

$$2 \times 12 \times 1.00 \times 0.50 = 12.00 \text{ Cum}$$

$$2 \times 12 \times 0.60 \times 0.295 = 4.248 \text{ Cum}$$

Total:- 16.25 Cum

Item. 6:- a) Supplying, fitting and placing HYSD bar reinforcement in super-structure.....

a) MS deformed bars :- As per Plate No.9 of IRC SP: 13-2004

$$\text{Qty} = (0.835 \text{ MT} / 3) \times 1.50 \text{ mtr}$$

$$0.4175 \text{ MT}$$

Total:- 0.4175 MT

Item. 7:- Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per.....

RCC Grade M20

Height upto 5m

Deck slab - Ref: IRC SP : 13- 2004 Plate No.9

$$\text{Qty} = (16.42 \text{ MT} / 3) \times 1.50 \text{ mtr}$$

$$8.21 \text{ Cum}$$

Total:- 8.21 Cum

Item. 8:- Back filling behind abutment, wing wall and return wall complete as per drawing

Granular material

a) Abutment :-

$$2 \times 1 \times 12 \times 0.95 \times 2 = 25.08 \text{ Cum}$$

b) Wing wall:-

$$2 \times 1 \times 4 \times 0.73 \times 2 = 6.424 \text{ Cum}$$

$$2 \times 1 \times 4 \times 0.5 \times 1 = 1.40 \text{ Cum}$$

Total:- 32.904 Cum

ABSTRACT OF COST

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH: Slab Culvert 2.0 Mtr Span, Abutment Ht - 2.50 Mtr)

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
	<u>Detail of 1 Nos. culvert as per IRC-SP-13</u>					
1	Excavation for Structures (Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides a					
I	Ordinary soil					
A	Manual Means					
(i)	upto 3 m depth	202.50	Cum.	49.00	9,923.00	APSR'2007, It.12.1 (A) (i)
2.	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	31.86	Cum.	4534.00	144,453.00	Analysed of rates based on APSR `07
3.	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications					
	Coursed rubble masonry (first sort)	169.82	Cum.	3998.00	678,925.00	-- do--

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
4	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications	64	mtr	118.00	7,552.00	Analysed of rates based on APSR '07
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications PCC Grade M20 Height upto 5m	16.25	Cum.	6331.00	102,866.00	-- do--
6	a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications	0.560	MT	71679.00	40,140.00	-- do--
7	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification RCC Grade M20 Height upto 5m	10.95	Cum.	7590.00	83,111.00	-- do--
8	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification Granular material	32.90	Cum.	1287.00	42,347.00	-- do--

1109317.00

Say Rs.

11.09 lakh

$$\text{Therefore, cost per Mtrs} = \frac{1109317.00}{1.50} = \text{Rs. } 739545.00$$

DETAILS OF MEASUREMENT**Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)**

(SH: Slab Culvert 2.0 Mtr Span, Abutment Ht - 2.50 Mtr)

Ref :Plate 5 of IRC : SP : 13-2004

Items.1 :- Excavation for Structures (Earth work in excavation of foundation of structures.....)

I	Ordinary soil						
A	Manual Means						
(i)	upto 3 m depth						
		2 x	12 x	3.40 x	2.00	=	163.20 Cum
Wing Wall-							
i) High end		2 x	2.50 x	2.28 x	2.00	=	22.80 Cum
ii) Low end		2 x	2.50 x	1.65 x	2.00	=	16.50 Cum
						Total:-	202.50 Cum

Item. 2 :- PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation

a) Foundations and plinth

Abutment -		12.00 x	5.20 x	0.20	=	12.48 Cum
		12.00 x	4.80 x	0.20	=	11.52 Cum
Wing Wall-						
		2 x	2.50 x	2.28 x	0.40	= 4.56 Cum
		2 x	2.50 x	1.65 x	0.40	= 3.30 Cum
					Total:-	31.86 Cum

Item. 3:- Stone masonry work in cement mortar 1:6 for substructure complete as per

Coursed rubble masonry (first sort)

Abutment -	2 x	12.00 x	2.60 x	0.40	=	24.96 Cum
	2 x	12 x (	2.60 +	2.20) x		
	0.5 x	0.40			=	23.04 Cum
Wing Wall-						
i) High end -	2 x	2.50 x	1.88 x	0.40	=	3.76 Cum
	2 x	2.50 x (	1.88 +	1.48) x		
	0.5 x	0.4			=	3.36 Cum
ii) Low end -						
	2 x	2.50 x	1.25 x	0.4	=	2.50 Cum
	2 x	2.50 x (	1.25 +	0.85) x		
	0.5 x	0.4			=	2.10 Cum

DETAILS OF MEASUREMENT

Coursed rubble masonry (Second sort)

Abutment -	2 x	12.00 x(	2.00 +	1.05)x	=	91.50 Cum
	0.5 x	2.50				

Wing Wall-

i) High end-	2 x	2.50 x(	1.48 +	0.50)x	=	15.22 Cum
	0.5 x	3.075				

ii) Low end-

	2 x	2.50 x(	0.85 +	0.50)x	=	3.38 Cum
	0.5 x	1				

Total:- 169.82 Cum

Item. 4:- Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment.....

a) Abutment-	2 x	12 x	2	=	48 Nos
b) Wing wall-	4 x	2 x	2	=	16 Nos

Total:- 64 Nos

Item. 5:- Plain/Reinforced cement concrete in sub-structure complete as per drawing.....

PCC Grade M 15

a) Abutment Cap & D/Wall

	2 x	12 x	1.00 x	0.50	=	12.00 Cum
	2 x	12 x	0.60 x	0.295	=	4.248 Cum

Total:- 16.25 Cum

Item. 6:- a) Supplying, fitting and placing HYSD bar reinforcement in super-structure.....

a) MS deformed bars :- As per Plate No.9 of IRC SP: 13-2004

Qty = (0.835 MT / 3) x 2.0 mtr

0.56 MT

Total:- 0.56 MT

Item. 7:- Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per.....

RCC Grade M20

Height upto 5m

Deck slab - Ref: IRC SP : 13- 2004 Plate No.9

Qty = (16.42 cum / 3) x 2.0 cum

10.95 Cum

Total:- 10.95 Cum

Item. 8:- Back filling behind abutment, wing wall and return wall complete as per drawing

Granular material

a) Abutment :-

	2 x	1 x	12 x	0.95 x	2 =	25.08 Cum
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b) Wing wall:-

	2 x	1 x	4 x	0.73 x	2 =	6.424 Cum
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	2 x	1 x	4 x	0.5 x	1 =	1.40 Cum
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Total:- 32.904 Cum

ABSTRACT OF COST

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH: Slab Culvert 3.00 Mtr Span, Abutment Ht - 3.00Mtr)

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
	<u>Detail of 1 Nos. culvert as per IRC-SP-13</u>					
1	Excavation for Structures (Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides a					
I	Ordinary soil					
A	Manual Means					
(i)	upto 3 m depth	231.96	Cum.	49.00	11,366.00	APSR'2007, It.12.1 (A) (i)
2.	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	44.47	Cum.	4534.00	201,636.00	Analysed of rates based on APSR '07
3.	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications					
	Coursed rubble masonry (first sort)	197.14	Cum.	3998.00	788,146.00	-- do--
4	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications	64	Nos.	118.00	7,552.00	-- do--

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications PCC Grade M20 Height upto 5m	16.250	Cum.	6331.00	102,879.00	Analysed of rates based on APSR '07
6	a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications	0.835	MT	71679.00	59,852.00	-- do--
7	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification RCC Grade M20 Height upto 5m	16.42	Cum.	7590.00	124,628.00	-- do--
8	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification Granular material	32.90	Cum.	1287.00	42,347.00	-- do--

1338406.00

Say Rs.

13.38 lakh

Therefore, cost per Mtrs = $\frac{1338406.00}{3}$ = Rs. **446135.00**

DETAILS OF MEASUREMENT**Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)**

(SH: Slab Culvert 3.00 Mtr Span, Abutment Ht - 3.00 Mtr)

Ref :Plate 5 of IRC : SP : 13-2004

Items.1 :- Excavation for Structures (Earth work in excavation of foundation of structures.....)

I	Ordinary soil						
A	Manual Means						
(i)	upto 3 m depth						
		2 x	12 x	3.80 x	2.00	=	182.4 Cum
Wing Wall-							
i) High end		2 x	3.00 x	2.48 x	2.00	=	29.76 Cum
ii) Low end		2 x	3.00 x	1.65 x	2.00	=	19.80 Cum
						Total:-	231.96 Cum

Item. 2 :- PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation

a) Foundations and plinth

Abutment -	2 x	12.00 x	3.80 x	0.20	=	18.24 Cum
	2 x	12.00 x	3.40 x	0.20	=	16.32 Cum
Wing Wall-						
	2 x	3.00 x	2.48 x	0.40	=	5.952 Cum
	2 x	3.00 x	1.65 x	0.40	=	3.96 Cum
					Total:-	44.472 Cum

Item. 3:- Stone masonry work in cement mortar 1:6 for substructure complete as per

Coursed rubble masonry (first sort)

Abutment -	2 x	12.00 x	3.00 x	0.40	=	28.80 Cum
	2 x	12 x (	3.00 +	2.60) x		
	0.5 x	0.40			=	26.88 Cum
Wing Wall-						
i) High end -	2 x	3.00 x	2.08 x	0.40	=	4.992 Cum
	2 x	3.00 x (	2.08 +	1.68) x		
	0.5 x	0.4			=	4.512 Cum
ii) Low end -						
	2 x	3.00 x	1.25 x	0.4	=	3.00 Cum
	2 x	3.00 x (	1.25 +	0.85) x		
	0.5 x	0.4			=	2.52 Cum

DETAILS OF MEASUREMENT

Coursed rubble masonry (Second sort)

Abutment -	2 x	12.00 x(	2.20 +	1.10)x	=	99.00 Cum
	0.5 x	2.50				

Wing Wall-

i) High end-	2 x	3.00 x(	1.68 +	0.50)x	=	23.381 Cum
	0.5 x	3.575				

ii) Low end-

	2 x	3.00 x(	0.85 +	0.50)x	=	4.05 Cum
	0.5 x	1				

Total:- 197.1345 Cum

Item. 4:- Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment.....

a) Abutment-	2 x	12 x	2	=	48 Nos
b) Wing wall-	4 x	2 x	2	=	16 Nos

Total:- 64 Nos

Item. 5:- Plain/Reinforced cement concrete in sub-structure complete as per drawing.....

PCC Grade M 15

a) Abutment Cap & D/Wall

	2 x	12 x	1.00 x	0.50	=	12.00 Cum
	2 x	12 x	0.60 x	0.295	=	4.248 Cum

Total:- 16.25 Cum

Item. 6:- a) Supplying, fitting and placing HYSD bar reinforcement in super-structure.....

a) MS deformed bars :- As per Plate No.9 of IRC SP: 13-2004

Qty	=	0.835 MT
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Total:- 0.835 MT

Item. 7:- Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per.....

RCC Grade M20

Height upto 5m

Deck slab - Ref: IRC SP : 13- 2004 Plate No.9

Qty	=	16.42 Cum
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Total:- 16.42 Cum

Item. 8:- Back filling behind abutment, wing wall and return wall complete as per drawing

Granular material

a) Abutment :-

2 x	1 x	12 x	0.95 x	2 =	25.08 Cum
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b) Wing wall:-

2 x	1 x	4 x	0.73 x	2 =	6.424 Cum
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2 x	1 x	4 x	0.5 x	1 =	1.40 Cum
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Total:- 32.904 Cum

ABSTRACT OF COST

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH: Slab Culvert 4.00 Mtr Span, Abutment Ht - 3.00Mtr)

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
	<u>Detail of 1 Nos. culvert as per IRC-SP-13</u>					
1	Excavation for Structures (Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides a					
I	Ordinary soil					
A	Manual Means					
(i)	upto 3 m depth	272.64	Cum.	49.00	13,359.00	APSR'2007, It.12.1 (A) (i)
2.	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	52.61	Cum.	4534.00	238,525.00	Analysed of rates based on APSR '07
3.	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications					
	Coursed rubble masonry (first sort)	251.53	Cum.	3998.00	1,005,621.00	-- do--
4	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications	64	mtr	118.00	7,552.00	-- do--

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications PCC Grade M20 Height upto 5m	17.040	Cum.	6331.00	107,880.00	Analysed of rates based on APSR `07
6	a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications	1.296	MT	71679.00	92,896.00	-- do--
7	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification RCC Grade M20 Height upto 5m	23.90	Cum.	7590.00	181,371.00	-- do--
8	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification Granular material	32.90	Cum.	1287.00	42,347.00	-- do--
					1689551.00	
					Say Rs.	16.90 lakh

DETAILS OF MEASUREMENT**Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)**

(SH: Slab Culvert 4.00 Mtr Span, Abutment Ht - 3.00 Mtr)

Ref :Plate 5 of IRC : SP : 13-2004

Items.1 :- Excavation for Structures (Earth work in excavation of foundation of structures.....)

I	Ordinary soil						
A	Manual Means						
(i)	upto 3 m depth						
		2 x	12.00 x	4.30 x	2.00	=	206.40 Cum
Wing Wall-							
i) High end		2 x	2.49 x	4 x	2.00	=	39.84 Cum
ii) Low end		2 x	1.65 x	4 x	2.00	=	26.40 Cum
Total:-							272.64 Cum

Item. 2 :- PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation

a) Foundations and plinth

Abutment -		2 x	12 x	4.3 x	0.2	=	20.64 Cum
		2 x	12 x	3.9 x	0.2	=	18.72 Cum
Wing Wall-							
		2 x	4 x	2.49 x	0.40	=	7.968 Cum
		2 x	4 x	1.65 x	0.40	=	5.28 Cum
Total:-							52.608 Cum

Item. 3:- Stone masonry work in cement mortar 1:6 for substructure complete as per

Coursed rubble masonry (first sort)

Abutment -		2 x	12.00 x	3.50 x	0.40	=	33.60 Cum
		2 x	12.00 x (	3.50 +	3.10) x		
		0.5 x	0.40			=	31.68 Cum
Wing Wall-							
i) High end -		2 x	4 x	2.09 x	0.40	=	6.688 Cum
		2 x	4 x (	2.09 +	1.69) x		
		0.5 x	0.4			=	6.048 Cum
ii) Low end -							
		2 x	4 x	1.25 x	0.4	=	4.00 Cum
		2 x	4 x (	1.25 +	0.85) x		
		0.5 x	0.4			=	3.36 Cum

DETAILS OF MEASUREMENT

Coursed rubble masonry (Second sort)

Abutment -	2 x	12 x	(2.7 +	1.6)x	
	0.5 x	2.5			= 129.00 Cum

Wing Wall-

i) High end-	2 x	4 x	(1.69 +	0.5)x	
	0.5 x	3.625			= 31.755 Cum

ii) Low end-

	2 x	4 x	(0.85 +	0.5)x	
	0.5 x	1			= 5.4 Cum

Total :- 251.531 Cum

Item. 4:- Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment.....

a) Abutment-	2 x	12 x	2	=	48 Nos
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b) Wing wall-	4 x	2 x	2	=	16 Nos
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Total :- 64 Nos

Item. 5:- Plain/Reinforced cement concrete in sub-structure complete as per drawing.....

PCC Grade M 15

a) Abutment Cap & D/Wall

	2 x	12 x	1 x	0.50	=	12.00 Cum
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	2 x	12 x	0.6 x	0.35	=	5.04 Cum
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Total :- 17.04 Cum

Item. 6:- a) Supplying, fitting and placing HYSD bar reinforcement in super-structure.....

a) MS deformed bars :- As per Plate No.9 of IRC SP: 13-2004

Qty	=	1.296 MT
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Total :- 1.296 MT

Item. 7:- Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per.....

RCC Grade M20

Height upto 5m

Deck slab - Ref: IRC SP : 13- 2004 Plate No.9

Qty	=	23.896 Cum
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Total :- 23.896 Cum

Item. 8:- Back filling behind abutment, wing wall and return wall complete as per drawing

Granular material

a) Abutment :-

2 x	1 x	12 x	0.95 x	2 =	25.08 Cum
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b) Wing wall:-

2 x	1 x	4 x	0.73 x	2 =	6.424 Cum
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2 x	1 x	4 x	0.5 x	1 =	1.40 Cum
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Total :- 32.904 Cum

ABSTRACT OF COST

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH: Slab Culvert 5.00 Mtr Span, Abutment Ht - 3.00Mtr)

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
	<u>Detail of 1 Nos. culvert as per IRC-SP-13</u>					
1	Excavation for Structures (Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides a					
I	Ordinary soil					
A	Manual Means					
(i)	upto 3 m depth	268.00	Cum.	49.00	13,132.00	APSR'2007, It.12.1 (A) (i)
2.	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	51.74	Cum.	4534.00	234,607.00	Analysed of rates based on APSR `07
3.	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications Coursed rubble masonry (first sort)	255.41	Cum.	3998.00	1,021,115.00	-- do--
4	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications	64	mtr	118.00	7,552.00	-- do--

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications PCC Grade M20 Height upto 5m	17.040	Cum.	6331.00	107,880.00	Analysed of rates based on APSR `07
6	a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications	2.061	MT	71679.00	147,730.00	-- do--
7	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification RCC Grade M20 Height upto 5m	32.57	Cum.	7590.00	247,206.00	-- do--
8	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification Granular material	32.90	Cum.	1287.00	42,347.00	-- do--

1821569.00

Say Rs.

18.22 lakh

DETAILS OF MEASUREMENT**Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)**

(SH: Slab Culvert 5.00 Mtr Span, Abutment Ht - 3.00 Mtr)

Ref :Plate 5 of IRC : SP : 13-2004

Items.1 :- Excavation for Structures (Earth work in excavation of foundation of structures.....)

I	Ordinary soil						
A	Manual Means						
(i)	upto 3 m depth						
		2 x	12.00 x	4.20 x	2.00	=	201.60 Cum
Wing Wall-							
i) High end		2 x	4 x	2.5 x	2.00	=	40.00 Cum
ii) Low end		2 x	4 x	1.65 x	2.00	=	26.40 Cum
Total:-							268.00 Cum

Item. 2 :- PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation

a) Foundations and plinth

Abutment -	2 x	12 x	4.2 x	0.2	=	20.16 Cum
	2 x	12 x	3.8 x	0.2	=	18.24 Cum
Wing Wall-						
	2 x	4 x	2.52 x	0.40	=	8.064 Cum
	2 x	4 x	1.65 x	0.40	=	5.28 Cum
Total:-						51.744 Cum

Item. 3:- Stone masonry work in cement mortar 1:6 for substructure complete as per

Coursed rubble masonry (first sort)

Abutment -	2 x	12.00 x	3.80 x	0.40	=	36.48 Cum
	2 x	12.00 x (	3.80 +	3.40) x		
	0.5 x	0.40			=	34.56 Cum
Wing Wall-						
i) High end -	2 x	4 x	2.12 x	0.40	=	6.784 Cum
	2 x	4 x (	2.12 +	1.72) x		
	0.5 x	0.4			=	6.144 Cum
ii) Low end -						
	2 x	4 x	1.25 x	0.4	=	4.00 Cum
	2 x	4 x (	1.25 +	0.85) x		
	0.5 x	0.4			=	3.36 Cum

DETAILS OF MEASUREMENT

Coursed rubble masonry (Second sort)

Abutment -	2 x	12 x	2.6 +	1.6)x	
	0.5 x	2.5			= 126.00 Cum

Wing Wall-

i) High end-	2 x	4 x	1.72 +	0.5)x	
	0.5 x	3.68			= 32.6784 Cum

ii) Low end-

	2 x	4 x	0.85 +	0.5)x	
	0.5 x	1			= 5.4 Cum

Total :- 255.4064 Cum

Item. 4:- Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment.....

a) Abutment-	2 x	12 x	2	=	48 Nos
b) Wing wall-	4 x	2 x	2	=	16 Nos

Total :- 64 Nos

Item. 5:- Plain/Reinforced cement concrete in sub-structure complete as per drawing.....

PCC Grade M 15

a) Abutment Cap & D/Wall

	2 x	12 x	1 x	0.50	= 12.00 Cum
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	2 x	12 x	0.6 x	0.35	= 5.04 Cum
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Total :- 17.04 Cum

Item. 6:- a) Supplying, fitting and placing HYSD bar reinforcement in super-structure.....

a) MS deformed bars :- As per Plate No.9 of IRC SP: 13-2004

Qty

	=	2.061 MT
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Total :- 2.061 MT

Item. 7:- Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per.....

RCC Grade M20

Height upto 5m

Deck slab - Ref: IRC SP : 13- 2004 Plate No.9

Qty

	=	32.57 Cum
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Total :- 32.57 Cum

Item. 8:- Back filling behind abutment, wing wall and return wall complete as per drawing

Granular material

a) Abutment :-

2 x	1 x	12 x	0.95 x	2 =	25.08 Cum
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b) Wing wall:-

2 x	1 x	4 x	0.73 x	2 =	6.424 Cum
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2 x	1 x	4 x	0.5 x	1 =	1.40 Cum
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Total :- 32.904 Cum

ABSTRACT OF COST

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH: Slab Culvert 6.00 Mtr Span, Abutment Ht - 3.00Mtr)

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
	<u>Detail of 1 Nos. culvert as per IRC-SP-13</u>					
1	Excavation for Structures (Earth work in excavation of foundation of structures as per drawing and technical specification, including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides a					
I	Ordinary soil					
A	Manual Means					
(i)	upto 3 m depth	268.48	Cum.	49.00	13,156.00	APSR'2007, It.12.1 (A) (i)
2.	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	51.78	Cum.	4534.00	234,752.00	Analysed of rates based on APSR '07
3.	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications					
	Coursed rubble masonry (first sort)	248.34	Cum.	3998.00	992,859.00	-- do--
4	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications	64	Mtr	118.00	7,552.00	-- do--

Sl. No.	Description of Item	Quantity	Unit	Rate (in Rs.)	Amount (in Rs.)	Remarks
1	2	3	4	5	6	7
5	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications PCC Grade M20 Height upto 5m	18.480	Cum.	6331.00	116,997.00	Analysed of rates based on APSR '07
6	a) Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications	2.825	MT	71679.00	202,493.00	-- do--
7	Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification RCC Grade M20 Height upto 5m	42.43	Cum.	7590.00	322,044.00	-- do--
8	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical specification Granular material	32.90	Cum.	1287.00	42,347.00	-- do--

1932200.00

Say Rs.

19.32 lakh

DETAILS OF MEASUREMENT**Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)**

(SH: Slab Culvert 6.00 Mtr Span, Abutment Ht - 3.00 Mtr)

Ref :Plate 5 of IRC : SP : 13-2004

Items.1 :- Excavation for Structures (Earth work in excavation of foundation of structures.....)

I	Ordinary soil						
A	Manual Means						
(i)	upto 3 m depth						
		2 x	12 x	4.20 x	2.00	=	201.6 Cum
Wing Wall-							
i) High end		2 x	4.00 x	2.53 x	2.00	=	40.48 Cum
ii) Low end		2 x	4.00 x	1.65 x	2.00	=	26.4 Cum
						Total:-	268.48 Cum

Item. 2 :- PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation

a) Foundations and plinth

Abutment -		2 x	12.00 x	4.20 x	0.20	=	20.16 Cum
		2 x	12.00 x	3.80 x	0.20	=	18.24 Cum
Wing Wall-							
		2 x	4.00 x	2.53 x	0.40	=	8.096 Cum
		2 x	4.00 x	1.65 x	0.40	=	5.28 Cum
						Total:-	51.776 Cum

Item. 3:- Stone masonry work in cement mortar 1:6 for substructure complete as per

Coursed rubble masonry (first sort)

Abutment -		2 x	12.00 x	3.40 x	0.40	=	32.64 Cum
		2 x	12 x (	3.40 +	3.00)x		
		0.5 x	0.40			=	30.72 Cum
Wing Wall-							
i) High end -		2 x	4.00 x	2.13 x	0.40	=	6.816 Cum
		2 x	4.00 x (	2.13 +	1.73) x		
		0.5 x	0.4			=	6.176 Cum
ii) Low end -							
		2 x	4.00 x	1.25 x	0.4	=	4.00 Cum
		2 x	4.00 x (	1.25 +	0.85) x		
		0.5 x	0.4			=	3.36 Cum
Coursed rubble masonry (Second sort)							
Abutment -		2 x	12.00 x (	2.6 +	1.60)x		
		0.5 x	2.50			=	126 Cum

DETAILS OF MEASUREMENT

Wing Wall-						
i) High end-	2 x	4.00 x(	1.73 +	0.5)x	=	33.227 Cum
	0.5 x	3.725				
ii) Low end-	2 x	4.00 x(	0.85 +	0.5)x	=	5.40 Cum
	0.5 x	1				
Total:-						248.339 Cum

Item. 4:- Providing weep holes in Brick masonry/Plain/Reinforced concrete abutment.....

a) Abutment-	2 x	12 x	2	=	48 Nos
b) Wing wall-	4 x	2 x	2	=	16 Nos
Total:-					64 Nos

Item. 5:- Plain/Reinforced cement concrete in sub-structure complete as per drawing.....

PCC Grade M 15

a) Abutment Cap & D/Wall

2 x	12 x	1 x	0.50	=	12.00 Cum
2 x	12 x	0.6 x	0.45	=	6.48 Cum
Total:-					18.48 Cum

Item. 6:- a) Supplying, fitting and placing HYSD bar reinforcement in super-structure.....

a) MS deformed bars :- As per Plate No.9 of IRC SP: 13-2004

Qty	=	2.825 MT
Total:-		2.825 MT

Item. 7:- Furnishing and Placing Reinforced/Prestressed cement concrete in super-structure as per.....

RCC Grade M20

Height upto 5m

Deck slab - Ref: IRC SP : 13- 2004 Plate No.9

Qty	=	42.43 Cum
Total:-		42.43 Cum

Item. 8:- Back filling behind abutment, wing wall and return wall complete as per drawing

Granular material

a) Abutment :-

2 x	1 x	12 x	0.95 x	2 =	25.08 Cum
-----	-----	------	--------	-----	-----------

b) Wing wall:-

2 x	1 x	4 x	0.73 x	2 =	6.424 Cum
-----	-----	-----	--------	-----	-----------

2 x	1 x	4 x	0.5 x	1 =	1.40 Cum
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Total:- 32.904 Cum

ABSTRACT OF COST

State :- A.P

Branch :- B & R

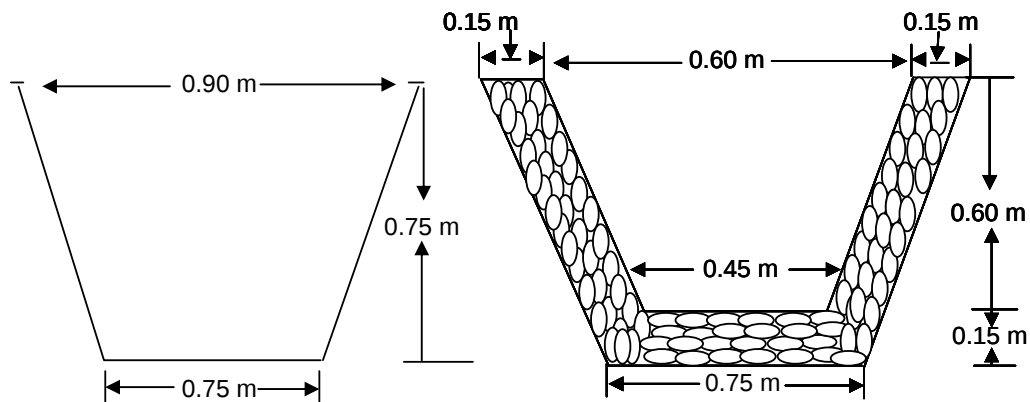
Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km) SH:- CC DRAIN

Sl.No	Description of item	Quantity	Rate	Unit	Amount	Remarks
C.C. DRAIN						
1 a)	Excavation in Soil by Manual Means. (Excavation for roadway in soil using manual means including loading in truck for carrying of cut earth to embankment site with all lifts and lead upto 1000 metres.)	433.13	89.00	Cu.m.	38549.00	APSR'2007(bldg), item.No-3.1,P-25
b)	Excavation in ordinary rock by manual means (Excavation in ordinary rock using manual means including loading in a truck and carrying of excavated material to embankment site with in all lifts and leads upto 1000 metres)	185.63	115.00	Cu.m.	21347.00	APSR'2007(bldg), item.No-3.2,P-25
2	PCC 1:3:6 in Foundation (Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.)	340.50	4534.00	Cum	1543827.00	A/R attached
3	Centering and shuttering i/c strutting, propping etc and removal of form					
a)	Foundation, footings, bases of columns etc. and mass concrete.	3040.00	78.30	Sqm	238032.00	APSR'2007bldg), item.No-12, P-86
TOTAL COST PER KM =					1841755.00	
					Say Rs. 18.42	lakh

TYPICAL CROSS SECTION OF C.C. DRAIN PROPOSED.

(SH:- C.C. Drain).

For 1.00 Km length



1	Earth Work.....								
		0.5	x	(	0.75	+	0.9	)	x
					0.75		x	1000.00	=
									618.75 Cum
	a) Excavation in Soil.....								
		70%	of		618.75				=
									433.125 Cum
	b) Excavation in ordinary rock.....								
		30%	of		618.75		=		=
									185.625 Cum
2	PCC 1:3:6.....								
		1	x	1000	x	0.75	x	0.15	=
									112.50 Cum
		2	x	1000	x	0.760	x	0.15	=
									228.00 Cum
								Total :-	340.50 Cum
3	Centring & shuttering.....								
		4	x	1000	x	0.76			=
									3040.00 Sqm

Appendix- "E"

ABSTRACT OF COST

State :- A.P

Branch :- B & R

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH:- Retaining wall - 4.00mt height and 10.00 mtr length)

Sl.No	Sub-head & Item of work	Quantity	Unit	Rate	Amount	Remarks
1	2	3	4	5	6	7
1	Excavation for structures) Earth work in excavation of foundation of structures as per drawing and technical specification i/c setting out, construction aof shoring and bracing, removal of stamps and other deleterious matter, dressing of sites and bottom, and back filling with approved materials i) Ordinary soil A) Manual means i) upto 3 mtr depth	27.78	Cum	49.00	Rs. 1,361.00	APSR'2007 R&B, Item 12.1A(i),P-60
2	PCC 1:3:6 in foundation (Plain cement concrete 1:3:6 nominal mixed in foundation with crushed stone aggregate 40mm nominal size mechanically mixed, placed in foundation and compacted by vibration i/c curing for 14 days	3.03	Cum	4534.00	Rs. 13,738.00	AR attached
3	Stone masonry work in cement mortar 1:3 in foundation complete as per drawing and technical specification. b) Random Rubble Masonary	41.31	Cum	3972.00	Rs. 164,083.00	AR attached
4	Dry Rubble masonry	15.09	Cum	906.00	Rs. 13,672.00	APSR'2007 R&B, Item 15.9,P-85
5	Back filling behind abutment, W/wall and R/Wall complete as per drawing and technical specification., A) Granural material	15.00	Cum	721.00	Rs. 10,815.00	APSR'2007 R&B, Item 13.9,P-76
6	Providing weep holes in brick masonry /plain/ reinforced concrete abutment, W/wall/ R/wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1 V : 20H towards drawing face complete as per drawing and technical specification.	16.00	Mtr	115.00	Rs. 1,840.00	Analysed of Rates
Cost for 10.00 mtr =					Rs. 205,509.00	
Cost per meter =					Rs. 20,550.90	
Say Rs					0.21	lakh

DETAILS OF MEASUREMENT

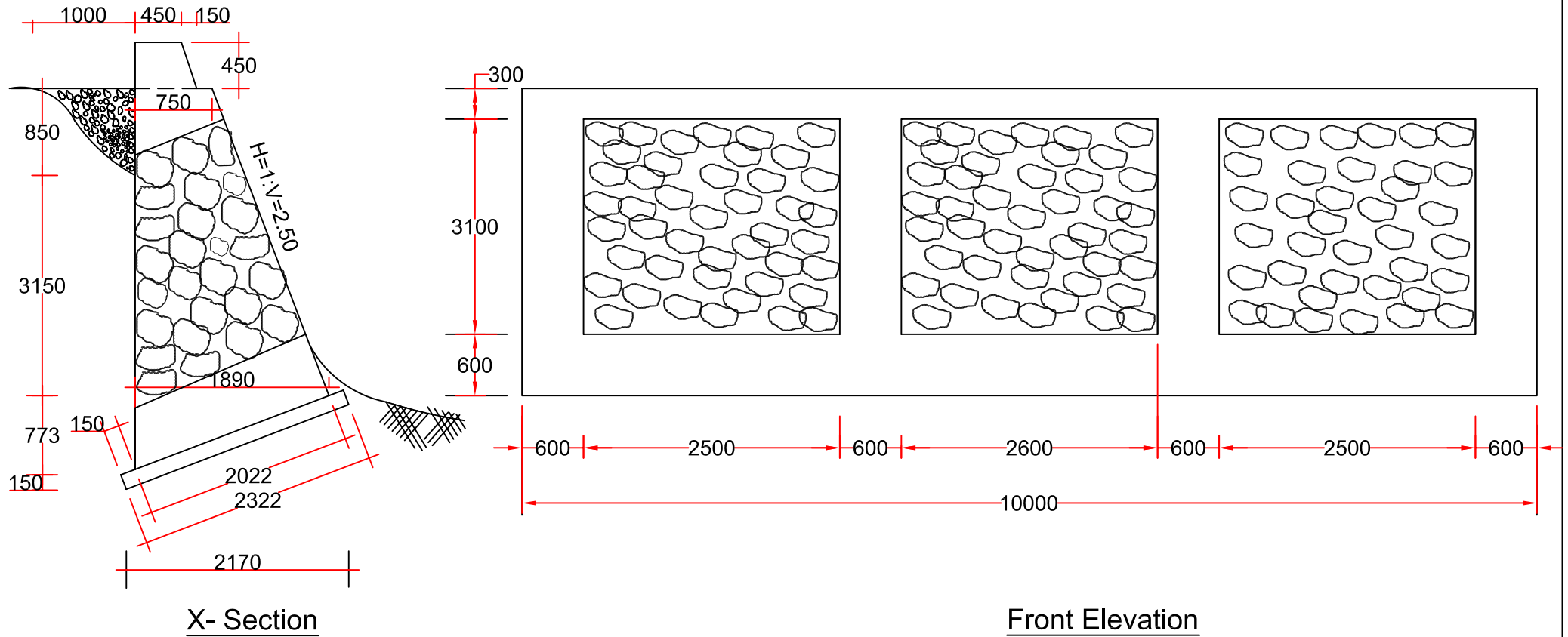
Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH:- Retaining wall - 4.00mt height and 10.00 mtr length)

Item 1	Earth work in excavation.....						
		10 x	0.5 x	2.02 x	2.75	=	27.775 Cum
Item 2	PCC 1:3:6 (1 cement : 3 sand : 6 stone aggregate).....						
		10 x	2.02 x	0.15		=	3.03 Cum
Item 3	RR Masonary in cement mortar 1:3						
	Horizontal Bond						
		10 x (	1.81 +	1.70) x	0.5 x	0.6 =	10.53 Cum
		10 x (	0.8 +	0.75) x	0.5 x	0.6 =	4.65 Cum
	Vertical Bond	5 x (	1.70 +	0.80) x	0.5 x	3.8 =	23.75 Cum
							38.93 Cum
	Parapet	11 x	0.6 x	0.6 x	0.6	=	2.38 Cum
							41.31 Cum
Item 4	Dry RR Masonary.....						
		10 x (	1.81 +	0.75) x	0.5 x (	4.44	
		+ 4) x		0.5		=	54.02 Cum
	Deduct for RR Masonary in cement mortar 1:3(Horizontal & vertical bond)					=	(-) 38.93 Cum
							15.09 Cum
Item 5	Back filling behind the wall with granular material..						
		10 x	0.5 x	4 x	0.75	=	15.00 Cum
Item 6	Providing weep hole 75 mm dia with AC pipe						
		2 x	8			=	16.00 Cum

CROSS - SECTION OF RETAINING WALL.

(4.00 Mtrs. Height and 10.000 Mtrs. length)

All Dimensions are in mm.
Scale :- 1:100



Appendix- "F"

ABSTRACT OF COST

State :- A.P

Branch :- B & R

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH:- Breast wall - 3.00mt height and 10.00 mtr length)

Sl.No	Sub-head & Item of work	Quantity	Unit	Rate	Amount	Remarks
1	2	3	4	5	6	7
1	Excavation for structures) Earth work in excavation of foundation of structures as per drawing and technical specification i/c setting out, construction aof shoring and bracing, removal of stamps and other deleterious matter, dressing of sites and bottom i) Ordinary soil A) Manual means i) upto 3 mtr depth	21.88	Cum	49.00	Rs. 1,072.00	APSR'2007 R&B, Item 12.1A(i),P-60
2	PCC 1:3:6 in foundation (Plain cement concrete 1:3:6 nominal mixed in foundation with crushed stone aggregate 40mm nominal size mechanically mixed, placed in foundation and compacted by vibration i/c curing for 14 days	2.63	Cum	4534.00	Rs. 11,924.00	AR attached
3	Stone masonry work in cement mortar 1:3 in foundation complete as per drawing and technical specification. b) Random Rubble Masonary	30.55	Cum	3972.00	Rs. 121,345.00	AR attached
4	Dry Rubble masonry	5.76	Cum	906.00	Rs. 5,219.00	APSR'2007 R&B, Item 15.9,P-85
5	Back filling behind abutment, W/wall and R/Wall complete as per drawing and technical specification., A) Granural material	11.25	Cum	721.00	Rs. 8,111.00	APSR'2007 R&B, Item 13.9,P-76
6	Providing weep holes in brick masonry /plain/ reinforced concrete abutment, W/wall/ R/wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1 V : 20H towards drawing face complete as per drawing and technical spe	16.00	Mtr	115.00	Rs. 1,840.00	Analysed of Rates

Cost for 10.00 mtr = Rs. 149,511.00

Cost per meter = Rs. 14,951.10

Say Rs 0.15 lakh

DETAILS OF MEASUREMENT

Name of work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)
(SH:- Breast wall - 3.00 mt height and 10.00 mtr length)

Item 1 Earth work in excavation.....

$$10 \times 0.50 \times 1.75 \times 2.50 = 21.88 \text{ Cum}$$

Item 2 PCC 1:3:6 (1 cement : 3 sand : 6 stone aggregate).....

$$10 \times 1.75 \times 0.15 = 2.63 \text{ Cum}$$

Item 3 RR Masonary in cement mortar 1:3

Horizontal Bond

$$10 \times (1.55 + 1.45) \times 0.5 \times 0.6 = 9.00 \text{ Cum}$$

$$10 \times (0.90 + 0.80) \times 0.5 \times 0.6 = 5.10 \text{ Cum}$$

Vertical Bond

$$5 \times (1.45 + 0.90) \times 0.5 \times 2.8 = 16.45 \text{ Cum}$$

30.55 Cum

Item 4 Dry RR Masonary.....

$$10 \times (1.55 + 0.80) \times 0.5 \times (3.38$$

$$+ 2.80) \times 0.50 = 36.31 \text{ Cum}$$

Deduct for RR Masonary in cement mortar 1:3(Horizontal & vertical bond) =
(-)

30.55 Cum

5.76 Cum

Item 5 Back filling behind the wall with granular material..

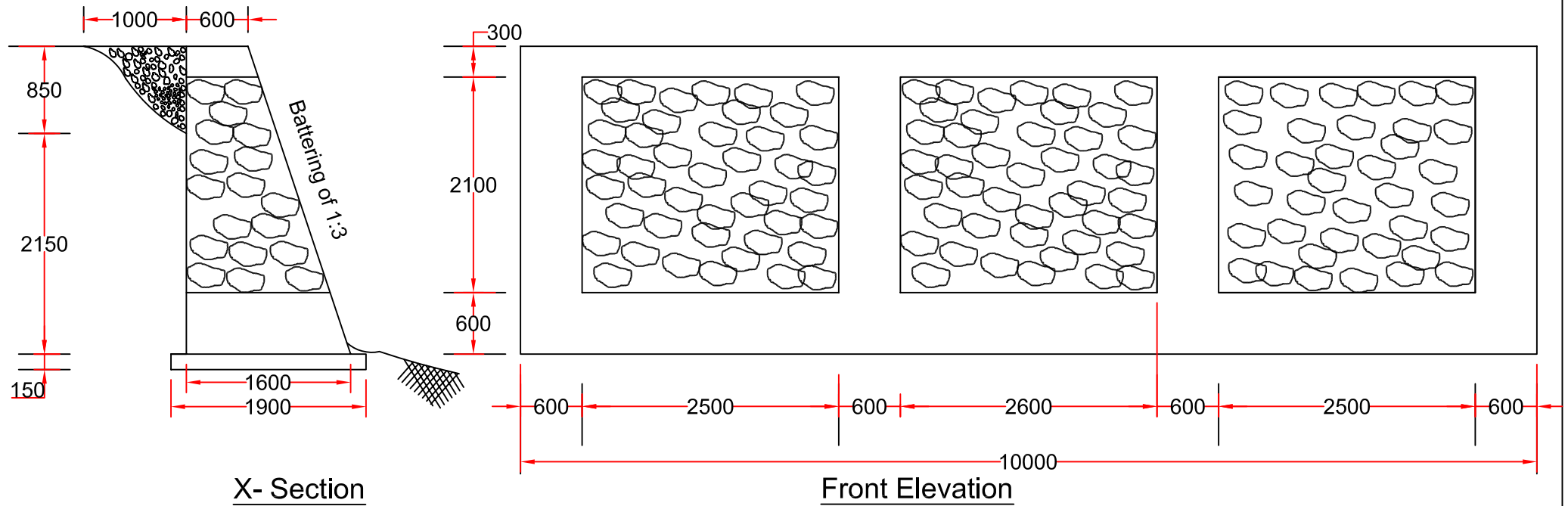
$$10 \times 0.5 \times 3.00 \times 0.75 = 11.25 \text{ Cum}$$

Item 6 Providing weep hole 75 mm dia with AC pipe

$$2 \times 8 = 16.00 \text{ Cum}$$

CROSS - SECTION OF BREAST WALL.
(3.00 Mtrs. Height and 10.00 Mtrs. Length)

All Dimensions are in mm.
Scale :- 1:100



ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
12.4	2100	PCC 1:3:6 in Foundation					
		Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.					
		Unit = cum					
		Taking output = 15 cum					
		a) Labour					
		Mate	day	0.64	140.00	89.60	L-12
		Mason	day	1.00	180.00	180.00	L-11
		Mazdoor	day	15.00	100.00	1500.00	L-13
		b) Material					
		40 mm Aggregate	cum	13.50	540.00	7290.00	M-055
		coarse Sand	cum	6.75	445.00	3003.75	M-005
		cement	tonne	3.45	7200.00	24840.00	MR
		Cost of water	KL	18.00	50.00	900.00	M-189
		c) Machinery					
		Concrete mixer (cap. 0.40/0.28 cum)	hour	6.00	200.00	1200.00	P&M-009
		Generator 33 KVA	hour	6.00	336.00	2016.00	P&M-079
		Water tanker 6 KL capacity	hour	2.00	404.00	808.00	P&M-060
		d) Overhead charges @ 20 % on (a+b+c)				8365.47	
		e) Contractor's profit @ 10 % on (a+b+c+d)				5019.28	
		Cost for 15 cum = a+b+c+d+e				55212.10	
		Carriage cost of materials from quarry to work site					
		40 mm Aggregate	cum	13.50	471.00	6358.50	AR attached
		coarse Sand	cum	6.75	471.00	3179.25	AR attached
		cement	tonne	3.45	944.00	3256.80	AR attached
						68006.65	
		Rate per cum = (a+b+c+d+e)/15				4533.78	
					say	4534.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
13.4	1400 & 2200	Stone masonry work in cement mortar 1:3 for substructure complete as per drawing and Technical Specifications					
13.4		B Coursed rubble masonry (first sort)					
		Unit = cum					
		Taking output = 1 cum					
		a) Material					
		Stone	cum	1.10	425.00	467.50	M-148
		Through and bond stone	each	7.00	10.00	70.00	M-182
		(7no.x0.24mx0.24mx0.39m = 0.16 cu.m)					
		Cement mortar 1:3 (Rate as in Item 12.6)	cum	0.30	5121.83	1536.55	Sub-AR
		b) Labour					
		Mate	day	0.12	140.00	16.80	L-12
		Mason	day	1.50	180.00	270.00	L-11
		Mazdoor	day	1.50	100.00	150.00	L-13
		Add for scaffolding @ 5 per cent of cost of material and labour				125.54	
		c) Overhead charges @ 20 % on (a+b)				527.28	
		d) Contractor's profit @ 10 % on (a+b+c)				316.37	
						3480.04	
		Carriage cost of materials from quarry to work site					
		Stone	cum	1.10	471.00	518.10	AR attached
		Rate per cum (a+b+c+d)				3998.14	
					say	3998.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
13.8	2706 & 2200	Providing weep holes in Brick masonry/Plain/ Reinforced concrete abutment, wing wall/ return wall with 100 mm dia AC pipe, extending through the full width of the structure with slope of 1V :20H towards drawing face. Complete as per drawing and Technical Specifications					
		Unit = Nos.					
		Taking output = 30 Nos.					
		a) Material					
		AC pipe 100 mm dia. (including wastage @ 5 per cent)	metre	31.50	25.00	787.50	M-056
		Average length of weep hole is taken as one metre for the purpose of estimating.					
		MS clamp	each.	30.00	50.00	1500.00	M-123
		collar for AC pipe (average) taking 10% of above pipe rate	each.	10.00	2.50	25.00	M-056/10
		Cement mortar 1:3 (Rate as in Item 12.6)	cum	0.05	5121.83	256.09	Sub-AR
		b) Labour					
		Mate	day	0.03	140.00	4.20	L-12
		Mason	day	0.50	180.00	90.00	L-11
		Mazdoor	day	0.25	100.00	25.00	L-13
		c) Overhead charges @ 20 % on (a+b)				537.56	
		d) Contractor's profit @ 10 % on (a+b+c)				322.53	
		Cost for 30 m = a+b+c+d				3547.88	
		Rate per m (a+b+c+d)/30				118.26	
					say	<u>118.00</u>	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
13.5	1500, 1700 & 2200	Plain/Reinforced cement concrete in sub-structure complete as per drawing and Technical Specifications					
		Unit = cum					
		Taking output = 1 cum					
13.5		B PCC Grade M20					
		(p) Height upto 5m					
		Unit : cum					
		Taking output = 15 cum					
		a) Material					
		Cement	tonne	5.16	7200.00	37152.00	MR
		Coarse sand	cum	6.75	445.00	3003.75	M-005
		40 mm Aggregate	cum	5.40	540.00	2916.00	M-055
		20 mm Aggregate	cum	5.40	560.00	3024.00	M-053
		10 mm Aggregate	cum	2.70	1400.00	3780.00	M-051
		b) Labour					
		Mate	day	0.86	140.00	120.40	L-12
		Mason	day	1.50	180.00	270.00	L-11
		Mazdoor	day	20.00	100.00	2000.00	L-13
		c) Machinery					
		Concrete mixer (cap. 0.40/0.28 cum)	hour	6.00	200.00	1200.00	P&M-009
		Generator 33 KVA	hour	6.00	336.00	2016.00	P&M-079
		Per Cum Basic Cost of Labour, Material & Machinery (a+b+c)		3699.00			
		d) Formwork @ 10per cent on cost of concrete i.e. cost of material, labour and machinery				5548.22	
		e) Overhead charges @ 20 % on (a+b+c+d)				12206.07	
		f) Contractor's profit @ 10 % on (a+b+c+d+e)				7323.64	
		Cost for 15 cum = a+b+c+d+e+f				80560.08	
		Carriage cost of materials from Seppa store /quarry to work site					
		Cement	tonne	5.16	944.00	4871.04	AR attached
		Coarse sand	cum	6.75	471.00	3179.25	AR attached
		40 mm Aggregate	cum	5.40	471.00	2543.40	AR attached
		20 mm Aggregate	cum	5.40	471.00	2543.40	AR attached
		10 mm Aggregate	cum	2.70	471.00	1271.70	AR attached
						94968.87	
		Rate per cum = (a+b+c+d+e+f)/15				6331.26	
					say	6331.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.		Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
14.1	1500 & 1600 1700		Furnishing and Placing Reinforced/ Prestressed cement concrete in super-structure as per drawing and Technical Specification					
14.1A Case I		A Case I	RCC Grade M20					
			Using Concrete Mixer					
			Unit = 1 cum					
			Taking output = 15 cum					
			a) Material					
			Cement	tonne	5.12	7200.00	36864.00	MR
			Coarse sand	cum	6.75	445.00	3003.75	M-005
			20 mm Aggregate	cum	8.10	560.00	4536.00	M-053
			10 mm Aggregate	cum	5.40	1400.00	7560.00	M-051
			b) Labour					
			Mate	day	0.86	140.00	120.40	L-12
			Mason	day	1.50	180.00	270.00	L-11
			Mazdoor	day	20.00	100.00	2000.00	L-13
			c) Machinery					
			Concrete mixer (cap. 0.40/0.28 cum)	hour	6.00	200.00	1200.00	P&M-009
			Generator 33 KVA	hour	6.00	336.00	2016.00	P&M-079
			Basic Cost of Labour, Material & Machinery (a+b+c) for 15 cum		57571.00			
			For formwork and staging add the following:					
			(i) For solid slab super-structure, 20-30 per cent of (a+b+c)					
			(p) Height upto 5m					
			Basic Cost of Labour, Material & Machinery (a+b+c) for 15 cum				57571.00	
			d) Formwork and staging 20 per cent of (a+b+c)				11514.20	
			e) Overhead charges @ 20 % on (a+b+c+d)				13817.04	
			f) Contractor's profit @ 10 % on (a+b+c+d+e)				8290.22	
			Cost for 15 cum = a+b+c+d+e+f				91192.46	
			Carriage cost of materials from Seppa store /quarry to work site					
			Cement	tonne	5.12	944.00	4833.28	AR attached
			40 mm Aggregate	cum	6.75	471.00	3179.25	AR attached
			20 mm Aggregate	cum	8.10	471.00	3815.10	AR attached
			10 mm Aggregate	cum	5.40	471.00	2543.40	AR attached
							113853.72	
			Rate per cum = (a+b+c+d+e+f)/15				7590.25	
						say	7590.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
14.2	1600	Supplying, fitting and placing HYSD bar reinforcement in super-structure complete as per drawing and technical specifications					
		Unit = 1 MT					
		Taking output = 1 MT					
		a) Material					
		HYSD bars including 5 per cent for laps and wastage	tonne	1.05	47000.00	49350.00	MR at Guwahati
		Binding wire	Kg	8.00	60.00	480.00	MR
		b) Labour for cutting, bending, tying and placing in position					
		Mate	day	0.44	140.00	61.60	L-12
		Blacksmith	day	3.00	180.00	540.00	L-02
		Mazdoor	day	8.00	100.00	800.00	L-13
		Basic Cost of Labour & Material (a+b)		51232.00			
		c) Overhead charges @ 20 % on (a+b)				10246.32	
		d) Contractor's profit @ 10 % on (a+b+c)				6147.79	
						67625.71	
		Carriage cost of materials from Guwahati to work site					
		HYSD bars including 5 per cent for laps and wastage	tonne	1.05	3860.00	4053.00	AR attached
		Rate per MT = a+b+c+d				71678.71	
					say	71679.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
13.9	710.1.4 of IRC:78 & 2200	Back filling behind abutment, wing wall and return wall complete as per drawing and Technical Specification					
		Unit = cum					
		Taking output = 10 cum					
	A	Granular material					
	a)	Labour					
		Mate	day	0.28	140.00	39.20	L-12
		Mazdoor	day	7.00	100.00	700.00	L-13
	b)	Material					
		Granular material	cum	12.00	340.00	4080.00	M-009
	c)	Machinery					
		Plate compactor/power rammer	hour	2.50	250.00	625.00	P&M-086
		Water Tanker	hour	0.05	404.00	20.20	P&M-060
	d)	Overhead charges @ 20 % on (a+b+c)				1092.88	
	e)	Contractor's profit @ 10 % on (a+b+c+d)				655.73	
		Cost for 10 cum of granular backfill = a+b+c+d+e				7213.01	
		Carriage cost of materials from quarry to work site					
		Granular material	cum	12.00	471.00	5652.00	AR attached
						12865.01	
		Rate per cum = (a+b+c+d+e)/10				1286.50	
					say	1287.00	

ANALYSIS OF RATE

Sr No	Ref. to MoRTH Spec.	Description	Unit	Quantity	Rate Rs	Cost Rs	Remarks/ Input ref.
12.4	2100	PCC 1:3:6 in Foundation					
		Plain cement concrete 1:3:6 nominal mix in foundation with crushed stone aggregate 40 mm nominal size mechanically mixed, placed in foundation and compacted by vibration including curing for 14 days.					
		Unit = cum					
		Taking output = 15 cum					
		a) Labour					
		Mate	day	0.64	140.00	89.60	L-12
		Mason	day	1.00	180.00	180.00	L-11
		Mazdoor	day	15.00	100.00	1500.00	L-13
		b) Material					
		40 mm Aggregate	cum	13.50	540.00	7290.00	M-055
		coarse Sand	cum	6.75	445.00	3003.75	M-005
		cement	tonne	3.45	7200.00	24840.00	MR
		Cost of water	KL	18.00	50.00	900.00	M-189
		c) Machinery					
		Concrete mixer (cap. 0.40/0.28 cum)	hour	6.00	200.00	1200.00	P&M-009
		Generator 33 KVA	hour	6.00	336.00	2016.00	P&M-079
		Water tanker 6 KL capacity	hour	2.00	404.00	808.00	P&M-060
		d) Overhead charges @ 20 % on (a+b+c)				8365.47	
		e) Contractor's profit @ 10 % on (a+b+c+d)				5019.28	
		Cost for 15 cum = a+b+c+d+e				55212.10	
		Carriage cost of materials from Seppa store /quarry to work site					
		40 mm Aggregate	cum	13.50	471.00	6358.50	AR attached
		coarse Sand	cum	6.75	471.00	3179.25	AR attached
		cement	tonne	3.45	944.00	3256.80	AR attached
						68006.65	
		Rate per cum = (a+b+c+d+e)/15				4533.78	
					say	4534.00	

ANALYSIS OF RATE

Item Stone masonry in cement mortar 1:3 (1 cement : 3 sand).....
 (Based on APAR 2007, Item-12.7/1405.3(B))

Detail of cost for 5.00 cum**Labour :**

Mate =	0.62 Nos	@	140.00 /each	=Rs.	86.80
Mason =	6 Nos	@	180.00 /each	=Rs.	1080.00
Mazdoor =	9 Nos	@	100.00 /each	=Rs.	900.00

Material :

Stone =	5.50 Cum	@	425.00 /Cum	=Rs.	2337.50
Carriage of stone =	5.50 Cum	@	428.00 /Cum	=Rs.	2354.00
			(Sub A/Rate)		
Bond stone =	35 Nos	@	10.00 /each	=Rs.	350.00
			(Rate at Seppa)		
Cement mortar 1:3	1.55 Cum	@	5121.83 Cum	=Rs.	7938.84
			(Sub A/Rate)	Rs	15047.14

Add 20% over head =Rs. 3009.428

Rs 18056.57

Add 10% contractor profit =Rs. 1805.657

Cost for 5.00 cum = Rs 19862.23

Cost per cum = Rs 3972.00

SUB ANALYSIS OF RATE

Item Cement mortar 1:3 (1 cement :3 sand)
 (Based on APAR 2007, Item-12.6 A)

Detail of cost for 1.00 cum

Labour :

Mate =	0.04 Nos	@	140.00 /each	=Rs.	5.60
Mazdoor =	0.90 Nos	@	100.00 /each	=Rs.	90.00

Material :

Cement =	0.51 MT	@	7200.00 /MT	=Rs.	3672.00
			(Rate at Seppa)		
Sand =	1.05 Cum	@	445.00 /Cum	=Rs.	467.25
			(Sub A/Rate)		
Carriage of sand =	1.05 Cum	@	428.00 /Cum	=Rs.	449.40
			(Sub A/Rate)		
Carriage of cement =	0.51 MT	@	858.00 /MT	=Rs.	437.58
			(Sub A/Rate)	Rs	5121.83

Analysis of Rate

Item:- Carriage of materials such as cement steel, Bitumen & CGI sheet by mechanical transport i/c loading, unloading & stacking etc. complete as per direction of engineer-incharge.

DETAILS OF CARRIAGE COST PER MT

1 From Guwahati to Bhalukpong (for Plain road)

Lead = 238.00 Km
 Avg. Speed = 31.00 Km/Hr.
 Capacity of Truck = 10.00 MT

No. of trip =
$$\frac{\frac{2 \times 238.00}{31.00} + 1}{\frac{8}{507}} = 0.49 \text{ Trips}$$

Km recovered = 2 x 0.49 x 238.00 + 6 = 239.24 Km
 Disel consumption = $\frac{239.24}{5.00} = 47.85 \text{ Ltr. @ } 32.47 \text{ Ltr.} = \text{Rs. } 1553.69$

Mobil consumption = $\frac{239.24}{140.00} = 1.71 \text{ Ltr. @ } 130.00 \text{ Ltr.} = \text{Rs. } 222.30$

Labour for loading unloading & stacking = 5 Nos. @ 100.00 per day = Rs. 500.00

Hire charge of truck per day = Rs. 3000.00

5275.99

5275.99

5275.99

Cost per trip = $\frac{5275.99}{0.49} = \text{Rs. } 10767.33$

Cost per trip = $\frac{10767.33}{10.00} = \text{Rs. } 1076.73$

Add Contractor's profit @ 10% = Rs. 107.67

1184.40

Say Rs. 1184.00 / MT

Rate per Km = Rs. 4.97 / MT

Analysis of Rate

Item:- Carriage of materials such as cement steel, Bitumen & CGI sheet by mechanical transport i/c loading, unloading & stacking etc. complete as per direction of engineer-incharge.

DETAILS OF CARRIAGE COST PER MT

1 From Bhalukpong to Seppa (for hill road)

Lead = 150.00 Km
 Avg. Speed = 18.00 Km/Hr.
 Capacity of Truck = 7.00 MT

No. of trip =
$$\frac{\frac{2 \times 150.00}{18.00} + 1}{1} = \frac{144}{318} = 0.45 \text{ Trips}$$

Km recovered = 2 x 0.45 x 150.00 + 6 = 141.00 Km
 Disel consumption =
$$\frac{141.00}{3.50} = 40.29 \text{ Ltr. @ } 32.47 \text{ Ltr.} = \text{Rs. } 1308.22$$

Mobil consumption =
$$\frac{141.00}{120.00} = 1.175 \text{ Ltr. @ } 130.00 \text{ Ltr.} = \text{Rs. } 152.75$$

Labour for loading unloading & stacking = 5 Nos. @ 100.00 per day = Rs. 500.00
 Hire charge of truck per day = Rs. 3000.00
 4960.97
 4960.97

Cost per trip =
$$\frac{4960.97}{0.45} = \text{Rs. } 11024.38$$

Cost per trip =
$$\frac{11024.38}{7.00} = \text{Rs. } 1574.91$$

Add Contractor's profit @ 10% = Rs. 157.49

1732.40
Say Rs. 1732.00 / MT

Rate per Km = Rs. 11.55 / MT

Analysis of Rate

Item:- Carriage of materials such as cement steel, Bitumen & CGI sheet by mechanical transport i/c loading, unloading & stacking etc. complete as per direction of engineer-incharge.

DETAILS OF CARRIAGE COST PER CUM

1 From Seppa to work site (for hill road)

Lead = 55.00 Km
 Avg. Speed = 18.00 Km/Hr.
 Capacity of Truck = 5.00 MT

No. of trip =
$$\frac{\frac{2 \times 55.00}{18.00} + 1}{1} = \frac{144}{128} = 1.13 \text{ Trips}$$

Km recovered = 2 x 1.13 x 55.00 + 6 = 130.30 Km
 Disel consumption = $\frac{130.30}{3.50} = 37.23 \text{ Ltr. @ } 32.47 \text{ Ltr.} = \text{Rs. } 1208.86$

Mobil consumption = $\frac{130.30}{120.00} = 1.086 \text{ Ltr. @ } 130.00 \text{ Ltr.} = \text{Rs. } 141.18$

Labour for loading unloading & stacking

= 5 Nos. @ 100.00 per day = Rs. 500.00
 Hire charge of truck per day = Rs. 3000.00
 4850.04
 4850.04
 4850.04

Cost per trip = $\frac{4850.04}{1.13} = \text{Rs. } 4292.07$

Cost per trip = $\frac{4292.07}{5.00} = \text{Rs. } 858.41$

Add Contractor's profit @ 10% = Rs. 85.84

Say Rs. 944.25
Say Rs. 944.00 / MT

Carriage cost from Guwahati to work site = **Rate per Km = Rs. 17.16 / MT**
Rs. 3860.00 / MT

Analysis of Rate

Item:- Carriage of materials such as stone aggregate, sand etc. by mechanical transport i/c loading, unloading & stacking etc. complete as per direction of engineer-incharge.

DETAILS OF CARRIAGE COST PER MT

1 From Seppa to work site (for hill road)

Lead = 15.00 Km
 Avg. Speed = 18.00 Km/Hr.
 Capacity of Truck = 3.50 cum

No. of trip = $\frac{2 \times 15.00}{18.00} + 1 = \frac{144}{48} = 3.00$ Trips

Km recovered = $2 \times 3.00 \times 15.00 + 6 = 96.00$ Km

Disel consumption = $\frac{96.00}{3.50} = 27.43$ Ltr. @ 32.47 Ltr. = Rs. 890.65

Mobil consumption = $\frac{96.00}{120.00} = 0.800$ Ltr. @ 130.00 Ltr. = Rs. 104.00

Labour for loading unloading & stacking

= 5 Nos. @ 100.00 per day = Rs. 500.00

Hire charge of truck per day = Rs. 3000.00

4494.65

4494.65

4494.65

Cost per trip = $\frac{4494.65}{3.00} = Rs. 1498.22$

Cost per trip = $\frac{1498.22}{3.50} = Rs. 428.06$

Add Contractor's profit @ 10% = Rs. 42.81

470.87

Say Rs. 471.00 /cum
 Rate per Km = Rs. 31.40 /cum

DETAILS OF BRIDGES

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (110.45 Km)

Sl.No	Chainage (in Km)	Name of Nallah	Span (in Mtr)	Remarks
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A- (SH:- CH:- 0.00 to 20.00 km)**N I L****B- (SH:- CH:- 20.00 to 59.30 km)**

1	26.15	Patta	19.70	
2	32.56	Papu	42.67	
			62.37	

C- (SH:- CH:- 59.30 to 110.45 km)

1	65.39	Sama	21.40	
2	69.468	Passa	22.65	
3	71.23	Nguranko	15.21	
4	72.46	Ngoleko	27.70	
5	73.95	Rilloh	21.55	
			108.51	

D- (SH Ch:- 20.00 TO 43.00 KM) PROPOSED RE-ALIGNMENT PORTION

1	27.448	Papang	8.00	
2	27.77	Pare	12.00	
3	32.15	Ningcho	8.00	
4	37.20	Papu	55.00	
			83.00	

DETAILS OF PROPOSED BRIDGES AS PER NEW ALIGNMENT

Name of Work:- C/o Trans - Arunachal Highway from Seppa to Khodaso (94.15 Km)

Sl.No	Chainage (in Km)	Name of Nallah	Span (in Mtr)	Remarks
1	27.448	Papang	8.00	} New Proposals
2	27.77	Pare	12.00	
3	32.15	Ningcho	8.00	
4	37.2	Papu	55.00	
5	49.09	Sama	21.40	} Existing sites
6	53.538	Passa	22.65	
7	54.93	Nguranko	15.21	
8	56.16	Ngoleko	27.70	
9	57.65	Rilloh	21.55	
			191.51	

DETAILS OF MEASUREMENTS**SH: AFFORESTATION AND NET PRESENT VALUE (NPV)****1 Area of deforestation:****a) As per original road length**

$$\begin{aligned}
 110450 \times 10 &= 1104500 \text{ Sqm.} \\
 &= 110.45 \text{ Hectares} \\
 \text{Area required for afforestation} &= 110.45 \times 2 \\
 &= 220.90 \text{ Hectares}
 \end{aligned}$$

b) As per proposed new alignment

$$\begin{aligned}
 \text{i) } 71150 \times 10 &= 711500.00 \text{ Sqm.} \\
 \text{ii) } 23000 \times 15 &= 345000.00 \text{ Sqm.} \\
 &\hline
 &1056500.00 \text{ Sqm.} \\
 &= 105.65 \text{ Hectares}
 \end{aligned}$$

$$\begin{aligned}
 \text{Area required for afforestation} &= 105.65 \times 2 \\
 &= 211.30 \text{ Hectares}
 \end{aligned}$$

2 Net present value (NPV)

$$\text{a) Area involved for original alignment} = 110.45 \text{ Hectares}$$

$$\text{b) Area involved as per proposed new alignment} = 105.65 \text{ Hectares}$$