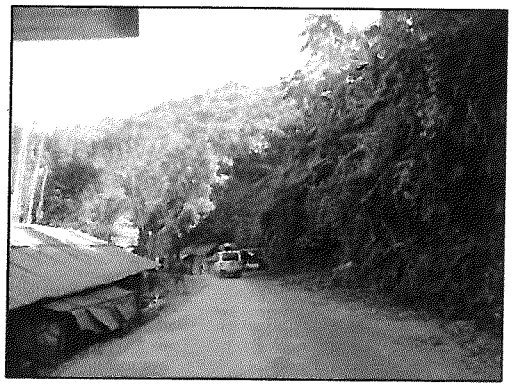
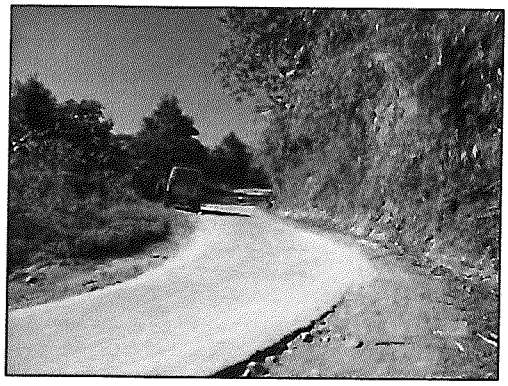
Doc. No. 1438/TRB/DFSR/REP-01

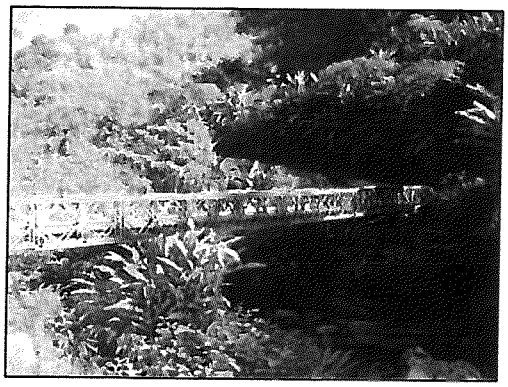
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. (NHIDCL)

Ministry of Road, Transport & Highways

Government of India

3rd Flr, PTI Building, 4 Parliament Street, New Delhi 11001,



Consultancy Services for preparation of Feasibility Study and Detailed Project Report for Two laning of Joram - Koloriang Road (NH-713) from Km. 20.00 to Km. 70.00 & Km. 138.00 to Km. 158.00 (Total Length 70 Km) in the State of Arunachal Pradesh on EPC mode

DETAILED PROJECT REPORT

Volume VII -Cost Estimate

(Package I: km 20+000 - km 32+050)

Revision : R0, September 2016

VOYANTS SOLUTIONS PVT LTD.

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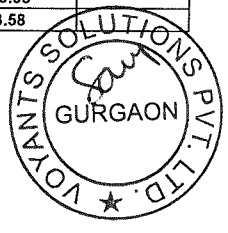
ABSTRACT OF COST : PACKAGE I (KM 20+000 TO KM 32+050)

Sl. No	Description	Percentage Weightage vis a vis overall project	Amount (in RS)	percentage Weightage vis a vis Overall Project Cost	References
	Design Length in Km	**12.050**			
	A- Widening and strengthening of existing road				
Road works including culverts, minor bridges, underpasses, overpasses, approaches to ROB/RUB/ Major Bridges/ Structures	(1) Earthwork up to top of the sub-grade icluding excavation in soil,soft rock and hard rock including Cleaning and Grubbing with required site clearance etc.	65.39%	161995996	13.10%	Bill 1a,1b,1d,1e
	(2) Granular work (sub- base, shoulders)		45503744	3.68%	Bill 1a,1b,1d,1e
	(3) Bituminous work				
	a)DBM		50498325	4.08%	Bill 1a,1b,1d,1e
	b)BC with Tack coat and prime coat		31250459	2.53%	Bill 1a,1b,1d,1e
	c) Site Clearence		0	0.00%	Bill 1a,1b,1d,1e
	B - New 2-Lane alignment				
	(1) Earthwork up to top of the sub-grade icluding excavation in soil,soft rock and hard rock including Cleaning and Grubbing with required site clearance etc.		263673627	21.32%	Bill 1c
	(2) Granular work (sub- base, shoulders)		63310979	5.12%	Bill 1c
	(3) Bituminous work				
	a)DBM		71285424	5.77%	Bill 1c
	b)BC with Tack coat and prime coat		44006536	3.56%	Bill 1c
	c)Site Clearence		0	0.00%	Bill 1c
	C- New culverts, minor bridges, underpasses, overpasses on existing road, realignments, bypasses:				
	(1)Box / Slab culvert		76977320	6.23%	Bill 4
	D-Other Engineering Works				
Other Works	Road Appurtenances	34.61%	1027926	0.08%	Bill 9
	Road side drain & toe wall		50753318	4.10%	Bill 10
	Traffic Sign		700821	0.06%	Bill 9
	Pavement Marking		4714076	0.38%	Bill 9
	Crash barrier/W metal crash barrier		15971706	1.29%	Bill 10
	Rip-Rap protection work		2963200	0.24%	Bill 10
	Boundary stone, km Stone,5th km stone and hectometer stone		112690	0.01%	Bill 10
	Traffic blinker LED delineator,stud,reflective payment marker, tree reflector		2859968	0.23%	Bill 10
	Bus bays and Bus Shelter		1089468	0.09%	Bill 6
	Minor Junction		18779663	1.52%	Bill 5
	Vativer Plantation(Hydro seeding and Mulching)		0	0.00%	Bill 10
	Overhead signboard		313047	0.03%	Bill 10
	Plantation		40669800	3.29%	Bill 10
	Road side drain		19827600	1.60%	Bill 10
	Repair for protection work				
	Maintanance of existing road		0	0.00%	Bill 11
	Passing Places		1018039	0.08%	Bill 8
	(vi)Repairs to bridges/structures				
	(vii)Protection Works				
	Breast Wall		228245804	18.46%	Bill 10
	Retaining Wall		21889507	1.77%	Bill 10
	Breast Wall Sausage Type		0	0.00%	Bill 10
	Parapet		17056060	1.38%	Bill 10
A	**Civil Cost**		**1236495103**	**123.65**	
	Cost/KM at Civil Cost		102613702	10.26	
B	Contingency Charges @ 2.8% of Civil Cost (A)	2.80%	34621863	3.46	
C	**SUB TOTAL (A+B)**		**1271116966**	**127.11**	
D	Supervision @ 3% on C	3.00%	38133509	3.81	
E	Agency Charges @ 3% on C	3.00%	38133509	3.81	
F	Quality Control @ 0.25 % on C	0.25%	3177792	0.32	
G	Road Safety Cell Audit Charges @ 0.25% on C	0.25%	3177792	0.32	
H	**Sub-Total (C+D+E+F+G)**		**1353739569**	**135.37**	
I	Maintenance for 4 years @ 5% on C	5.00%	63555848	6.36	
J	Escalation @ 5% per annum for 3 years on C	5.00%	190667545	19.07	
K	***Grand Total (H+I+J)***		***1607962962***	***160.80***	
	Cost of Land Acquisition etc.		6455000	**0.65**	
	Solatium Charges @ 30% on land value		1936500		
	Establishment Charges @ 8% on land value		516400		
	Contingency Charges @ 2% on land value		129100		
	Total Cost of Land Acquisition etc.		9037000		
	Total Cost of R&R		7500000		
	Shifting of Utility Service		6061000	**0.61**	
	Environment Cost		6061000	**0.61**	
	Total Cost		**1636621962**	**163.66**	
	Cost/KM at Total Cost		**135819250**	**13.58**	



BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
Bill No. 1a :	**TCS I Typical Cross Section of 2 Lane C/W(Mountainous Terrain with Retaining Wall)**			**570.000**						
1.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1	570.000	17.500			9975.000	5.25	52409.65
1.02	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2									
a)	For Subgrade	Cum	1	570.000	13.000	0.500		3705.000		
b)	For Earthen Shoulder	Cum	1	570.000	0.500	0.370		105.450		
	Total of Subgrade							3810.450	242.00	922128.90
1.03	Construction of lined trapezoidal surface drains (Ref. dwg. VSPL/1438/JK/DFSR/MISC-O5) in soil to specified lines, grades, levels and dimensions to the requirement of clause 301 and 309. Excavated material to be used in embankment within a lead of 50 metres (average lead 25 metres)	Rm	1	570.000			1.870	1065.900	2542.00	2709517.80
1.04	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1	570.000	12.000	0.200		1368.000	1479.00	2023272.00
1.05	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.	Cum	1	570.000	10.500	0.250		1496.250	1905.00	2850356.25
1.06	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1	570.000	10.500			5985.000	33.00	197505.00
1.07	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.	Sqm	2	570.000	10.000			11400.000	12.00	136800.00

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
1.08	Providing and laying **bituminous concrete** 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 @ 5.4 to 5.6 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.	Cum	1	570.000	10.000	0.040		228.000	13402.00	3055656.00
1.09	Providing and laying **dense graded bituminous macadam** with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5. per cent 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 rollers to achieve the desired compaction as per MORTH specification clause No. 509 complete in all respects	Cum	1	570.000	10.000	0.080		456.000	12009.00	5476104.00
	Total of TCS I									**17423749.60**
Bill No. 1 b :	**TCS II Typical Cross Section of 2 Lane C/W(Mountainous Terrain without Retaining and Parapet Wall)**			**4060.000**						
1.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1	4060.000	20.000			81200.000	5.25	426632.92
1.02	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2									
a)	For Subgrade	Cum	1	4060.000	14.640	0.500		29719.200		
b)	For Earthen Shoulder	Cum	1	4060.000	1.990	0.370		2989.378		
	Total of Subgrade							32708.578	242.00	7915475.88

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
1.03	Construction of lined trapezoidal surface drains (Ref. dwg. VSPL/1438/JK/DFSR/MISC-O5) in soil to specified lines, grades, levels and dimensions to the requirement of clause 301 and 309. Excavated material to be used in embankment within a lead of 50 metres (average lead 25 metres)	Rm	1	4060.000			1.870	4060.000	2542.00	10320520.00
1.04	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1	4060.000	12.900	0.200		10474.800	1479.00	15492229.20
1.05	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.	Cum	1	4060.000	10.500	0.250		10657.500	1905.00	20302537.50
1.06	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1	4060.000	10.500			42630.000	33.00	1406790.00
1.07	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.	Sqm	2	4060.000	10.000			81200.000	12.00	974400.00
1.08	Providing and laying **bituminous concrete** 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 @ 5.4 to 5.6 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.	Cum	1	4060.000	10.000	0.040		1624.000	13402.00	21764848.00
1.09	Providing and laying **dense graded bituminous macadam** with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5. per cent 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 rollers to achieve the desired compaction as per MORTH specification clause No. 509 complete in all respects	Cum	1	4060.000	10.000	0.080		3248.000	12009.00	39005232.00
	Total of TCS II									**117608665.50**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
Bill No. 1c:	TCS III (Typical Cross Section of Realignment By Hill Cutting)			7420.000						
1.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1	7420.000	20.500			152110.000	5.25	799201.15
1.02	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2									
a)	For Subgrade	Cum	1	0.000	14.500	0.500		0.000		
b)	For Earthen Shoulder	Cum	2	7420.000	0.500	0.370		2745.400		
	Total of Subgrade							2745.400	242.00	664386.80
c)	Loosening, leveling and **Compacting original ground supporting embankment / Subgrade** to facilitate placement of first layer of embankment / Subgrade, scarified to a depth of 150 mm, mixed with water at OMC and then compacted by rolling so as to achieve minimum dry density as given in Table 300-2 for embankment / Subgrade construction.	cum	1	7420.000	14.500	0.150		16138.500	63.00	1016725.50
1.03	Construction of lined trapezoidal surface drains (Ref. dwg. VSPL/1438/JK/DFSR/MISC-O5) in soil to specified lines, grades, levels and dimensions to the requirement of clause 301 and 309. Excavated material to be used in embankment within a lead of 50 metres (average lead 25 metres)	Rm	2	7420.000			1.870	14840.000	2542.00	37723280.00
1.04	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1	7420.000	11.940	0.200		17718.960	1479.00	26206341.84
1.05	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.	Cum	1	7420.000	10.500	0.250		19477.500	1905.00	37104637.50
1.06	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1	7420.000	10.000			74200.000	33.00	2448600.00

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
1.07	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.	Sqm	2	7420.000	10.000			148400.000	12.00	1780800.00
1.08	Providing and laying **bituminous concrete** 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 @ 5.4 to 5.6 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.	Cum	1	7420.000	10.000	0.040		2968.000	13402.00	39777136.00
1.09	Providing and laying **dense graded bituminous macadam** with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5. per cent 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 rollers to achieve the desired compaction as per MORTH specification clause No. 509 complete in all respects	Cum	1	7420.000	10.000	0.080		5936.000	12009.00	71285424.00
	Total of TCS III									**218806532.79**
Bill No. 1d :	**TCS IV (Typical Cross Section at Built up Strech)**			**0.000**						
1.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1	0.000	14.000			0.000	5.25	0.00
1.02	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2									
a)	For Subgrade	Cum	1	0.000	10.000	0.500		0.000		
b)	For Earthen Shoulder	Cum	2	0.000	0.000	0.000		0.000		
	Total of Subgrade							0.000	242.00	0.00

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
1.03	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1	0.000	10.000	0.200		0.000	1479.00	0.00
1.04	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.	Cum	1	0.000	10.000	0.250		0.000	1905.00	0.00
1.05	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1	0.000	10.000			0.000	33.00	0.00
1.06	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.	Sqm	2	0.000	10.000			0.000	12.00	0.00

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
1.07	Providing and laying **bituminous concrete** 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 @ 5.4 to 5.6 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.	Cum	1	0.000	10.000	0.040		0.000	13402.00	0.00
1.08	Providing and layin **dense graded bituminous concrete** with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5. per cent 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 rollers to achieve the desired compaction as per MORTH specification clause No. 509 complete in all respects	Cum	1	0.000	10.000	0.080		0.000	12009.00	0.00
1.09	Providing RCC Covered Drain	Rm	2	0.000				0.000	10097.00	0.00
	Total of TCS IV									**0.00**
Bill No. 1e:	**Extra Widening**									
1.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1				6263.000	6263.000	5.25	32906.43
1.02	Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead upto 1000m									
(i)	Ordiniary Soil	Cum	1				6263.000	5323.550	78.00	415236.90
(ii)	Ordiniary Rock	Cum						626.300	302.00	189142.60
(iii)	Hard Rock without Blasting	Cum						187.890	460.00	86429.40
(iv)	Hard Rock with Control Blasting	Cum						125.260	383.00	47974.58

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
1.03	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2									
a)	For Subgrade	Cum	1			0.500	6263.000	3131.500	242.00	757823.00
	Total of Subgrade									
1.04	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1			0.200	6263.000	1252.600	1479.00	1852595.40
1.05	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	Cum	1			0.250	6263.000	1565.750	1905.00	2982753.75
1.06	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1			0.000	6263.000	6263.000	33.00	206679.00
1.07	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.	Sqm	2			0.000	6263.000	12526.000	12.00	150312.00
1.08	Providing and laying **bituminous concrete** 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 @ 5.4 to 5.6 per cent by weight of total mix and filler, transporting the hot mix to	Cum	1			0.040	6263.000	250.520	13402.00	3357469.04
1.09	Providing and laying **dense graded bituminous macadam** with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 4.5 to 5. per cent of mix and filler, transporting the hot	Cum	1			0.080	6263.000	501.040	12009.00	6016989.36
	Total of Extra Widening									**16096311.46**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
Bill No. 2 :	Major Bridge (1 Nos) & Minor Bridge (06 Nos)									
2.01	**Major Bridges**									
i	Major Bridge at Km -									
2.02	**Minor Bridges**									
i	Minor Bridge at Km - 36+500									
ii	Minor Bridge at Km - 56+400									
iii	Minor Bridge at Km - 56+600									
iii	Minor Bridge at Km - 62+900									
iii	Minor Bridge at Km - 69+975									
	TOTAL OF BILL NO. - 02									0.00
Bill No.3 :	Repair and Rehabilitation of Existing Bridges									
3.01	@ 5% of New Construction Cost									0.00
	TOTAL OF BILL NO. - 03									0.00
Bill No. 4 :	Culverts									
4.01	Excavation for Structure									
	Pipe Culvert									0.00
	Box Culvert									76977320.00
	TOTAL OF BILL NO. - 04									76977320.00

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
Bill No. 5 :	Junctions (26 Minor)									
5.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1				7800.000		5.25	**40982.00**
5.02	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2	Cum	1			0.870	7800.000		242.00	**1642212.00**
5.03	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1			0.150	7800.000		1479.00	**1730430.00**
5.04	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.	Cum	1			0.250	7800.000		1905.00	**3714750.00**
5.05	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1				7800.000		33.00	**257400.00**
5.06	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.	Sqm	2				7800.000		12.00	**187200.00**
5.07	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.	Cum	1			0.075	7800.000		12009.00	**7025265.00**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
5.08	Providing and laying **bituminous concrete** with 100-120 TPH batch type hot mix plant producing an average output of 75 tonnes per hour using crushed aggregates of specified grading, premixed with bituminous binder @ 5.4 to 5.6 per cent 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 rollers to achieve the desired compaction as per MORTH specification clause No. 509 complete in all respects	Cum	1			0.040	7800.000		13402.00	**4181424.00**
	TOTAL OF BILL NO. - 5									**18779663.00**
Bill No. 6 :	**Bus Bays (0 Nos), BUS SHELTERS(03 Nos.)**									
6.01	Bus Shelters	Nos.	3					3.000	110000.00	**330000.00**
6.02	Chequered Tiles	Sqm	3	76.000	1.500			342.000	1146.00	**391932.00**
6.03	Construction of cement concrete kerb with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M-10 grade foundation 150 mm thick, foundation having 50 mm projection beyond kerb stone, kerb stone laid with kerb laying machine	Rm	6	76.000				456.000	806.00	**367536.00**
	TOTAL OF BILL NO. - 7									1089468.00
Bill No. 7 :	**Truck Lay bye (1 No.)**	**Sqm**	**0.000**							
7.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	0				0.000	0.000	5.25	**0.00**
7.02	Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead upto 1000m to match link road profile	Cum	0			0.750	0.000	0.000	78.00	**0.00**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
7.03	Construction of embankment with approved materials deposited at site **from roadway cutting and excavation** from drain and foundation of other structures graded and compacted to meet requirement of table 300-2.	Cum	0			0.600	0.000	0.000	116.00	**0.00**
7.04	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2	Cum	0			0.400	0.000	0.000	242.00	**0.00**
7.05	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	0			0.200	0.000	0.000	1479.00	**0.00**
7.06	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.	Cum	0			0.250	0.000	0.000	1905.00	**0.00**
7.07	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	0				0.000	0.000	33.00	**0.00**
7.08	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.	Sqm	0				0.000	0.000	12.00	**0.00**
7.09	**Dry Lean Cement Concrete Sub- base** (Construction of dry lean cement concrete Sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 1	Cum	0			0.150	0.000	0.000	0.00	**0.00**
7.10	**Cement Concrete Pavement** (Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement @ 400 kg per cum, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exc	Cum	0			0.340	0.000	0.000	0.00	**0.00**
7.11	Construction of cement concrete kerb with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M-10 grade foundation 150 mm thick, foundation having 50 mm projection beyond kerb stone, kerb stone laid with kerb laying machine	Rm	1	0.000				0.000	802.00	**0.00**
7.12	Misc Items Like Tiles,Crash barriers, Road Markings etc	LS	0					0.000	350000.00	**0.00**
	TOTAL OF BILL NO. - 8									**0.00**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
Bill No. 8 :	**Passing Places (1No.....@every 3km)**	**Sqm**	**2**	**235.000**						
8.01	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, up to a lead of 1000 metres including removal and disposal of top organic soil not exceeding 150 mm in thickness.	Sqm	1				470.000	470.000	5.25	**2469.00**
8.02	Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead upto 1000m to match link road profile	Cum	1			0.750	470.000	353.000	78.00	**27534.00**
8.03	Construction of embankment with approved materials deposited at site **from roadway cutting and excavation** from drain and foundation of other structures graded and compacted to meet requirement of table 300-2.	Cum	1			0.600	470.000	282.000	116.00	**32712.00**
8.04	Construction of sub-grade and earthen shoulders with approved material obtained from borrow pits with all lifts & leads, transporting to site, spreading, grading to required slope and compacted to meet requirement of table No. 300-2	Cum	1			0.400	470.000	188.000	242.00	**45496.00**
8.05	Construction of granular sub-base by providing coarse graded material, spreading in uniform layers with motor grader on prepared surface, mixing by **mix in place method** with rotavator at OMC, and compacting with vibratory roller to achieve the desired density, complete as per clause 401.	Cum	1			0.200	470.000	94.000	1479.00	**139026.00**
8.06	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.	Cum	1			0.250	470.000	118.000	1905.00	**224790.00**
8.07	Providing and applying Prime coat with bitumen emulsion on prepared surface of granular Base including clearing of road surface and spraying Prime at the rate of 0.60 kg/sqm using mechanical means.	Sqm	1				470.000	470.000	33.00	**15510.00**
8.08	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.	Sqm	2				470.000	940.000	12.00	**11280.00**
8.09	**Dry Lean Cement Concrete Sub- base** (Construction of dry lean cement concrete Sub- base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 1	Cum	1			0.150	470.000	71.000	0.00	**0.00**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
8.10	**Cement Concrete Pavement** (Construction of un-reinforced, dowel jointed, plain cement concrete pavement over a prepared sub base with 43 grade cement @ 400 kg per cum, coarse and fine aggregate conforming to IS 383, maximum size of coarse aggregate not exc	Cum	1			0.340	470.000	160.000	0.00	**0.00**
8.11	Construction of cement concrete kerb with top and bottom width 115 and 165 mm respectively, 250 mm high in M 20 grade PCC on M-10 grade foundation 150 mm thick, foundation having 50 mm projection beyond kerb stone, kerb stone laid with kerb laying machine	Rm	2	105.341				211.000	802.00	**169222.00**
8.12	Misc Items Like Tiles,Crash barriers, Road Markings etc	LS	1					1.000	350000.00	**350000.00**
	TOTAL OF BILL NO. - 8									**1018039.00**
Bill No - 9	**Traffic Signages, Road Marking and other appurtenances**			**12050.000**						
9.01	Road Marking: - Lane, Centre Line, Pedestrian crossing									
	Centre line on straight portion	Sqm	0.66	9640.000	0.150	-		954.360		
	Centre line on curve portion	Sqm	1	2410.000	0.150	-		361.500		
	Edge Line at Paved Shoulder	Sqm	4	12050.000	0.100	-		4820.000		
	Add 15% for Misc. including Pedestrian X-ings etc							920.379		
	Total							**7057.000**	668.00	**4714076.00**
9.02	Directional Arrows, letter marking etc.	Nos.						45.000	810.00	**36450.00**
9.03	Advance Direction signs size 1800X1200 mm	Nos.						5.000	8528.00	**42640.00**
9.04	Village name boards size 600X800 mm	Nos.						46.000	2652.00	**121992.00**
9.05	Place Identification signs size 1200X900 mm	Nos.						3.000	3630.00	**10890.00**
9.06	90 cm Triangle	Nos.						7.000	2627.00	**18389.00**
9.07	90 cm Octagon	Nos.						9.000	2689.00	**24201.00**
9.08	Hazard plate 300X900 mm	Nos.						34.000	2612.00	**88808.00**
9.09	800 x 600 mm Size	Nos.						14.000	2652.00	**37128.00**
9.10	60 Cm circular	Nos.						75.000	2614.00	**196050.00**
9.11	Enamel Paint over MBCB	Sqm						1445.040	86.00	**124273.00**
	TOTAL OF BILL NO. - 10									**5414897.00**
Bill No. 10 :	**Other Miscellaneous Works**									
10.01	Catch Pit (2 x 2 mtrs)	Nos.	0					0.000	0.00	**0.00**
10.02	Catch Pit above 2 x 2 mtrs.	Nos.	0					0.000	0.00	**0.00**
10.03	Providing & Maintaining HTMS	Rkm	0					0.000	1200000.00	**0.00**
10.04	Slow Speed Weigh-in- Motion System including Civil work for foundation	No	0					0.000	2800000.00	**0.00**
10.05	Environmental Management Plan including mitigation / enhancement measures, monitoring, prevention of ribbon development, etc.	Km	0					0.000	380000.00	**0.00**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
10.06	Supply installation, testing and commissioning of GSM technology based emergency call boxes (SOS Phones) a) Way side equipment(ECB Boxes) with complete in all respect	No	0					0.000	48000.00	**0.00**
10.07	Supply installation, testing and commissioning of GSM technology based emergency call boxes (SOS Phones) a) Control Room Equipment with complete in all respect	Complete Set	0					0.000	380000.00	**0.00**
10.08	Way Side Amenities	No	0					0.000	3300000.00	**0.00**
10.09	Traffic Aid Post	LS	0					0.000	5000000.00	0
10.10	Transition Slab at Toll Plazas	Nos	0					0.000	256870.94	**0.00**
10.11	Parapet	Rm	1	4060.000				4060.000	4201.00	**17056060.00**
10.12	Breast Wall	Rm	1							**0.00**
	a)1.5m height			1950.000					13714.90	**26744055.00**
	b) 2.0m height			4270.000					16951.00	**72380770.00**
	c) 3.0m height			3530.000					34364.30	**121305979.00**
	d) Sausage Type Breast wall			500.000				500.000	15630.00	**7815000.00**
10.13	W Type metal Crash Barrier	LM								
	Along High Embankment		0					0.000		
	On Curves <360m		1	4014.000				4014.000		
	At Superelevtated Stretch		0					0.000		
	Total							4014.000	3979.00	**15971706.00**
10.14	River Training Works		0							**0.00**
10.15	Trapezoidal catch water drain (cut ht. >3m)	Rm	1	7800.000				7800.000	2542.00	**19827600.00**
10.16	Rumble Strips (Provision of 3 nos rumble strips covered with bituminous conctrete, 15-20 mm high at center, 250 mm wide placed at 1 m center to center at approved locations to control speed, marked with white strips of road marking paint.)	No	60						9780.00	**586800.00**
10.17	Provision of riprap protection at valley side	Rm		4630.000					640.00	**2963200.00**
10.18	Hydro seeding and mulching at hill side slope for errosion control	sqm		97500.000					400.00	**39000000.00**
10.19	Road stud at center line and edges	No		3893.000					716.00	**2787388.00**
10.20	Km stone	No		10.000					2888.00	**28880.00**
10.21	5th km stone	No		2.000					4705.00	**9410.00**
10.22	Boundary Stone	No		120.000					620.00	**74400.00**
10.23	Afforestation of trees	No		1650.000					1012.00	**1669800.00**
10.24	Cantilever Gantry	MT	2	1.500					89442.00	**268326.00**
10.25	Overhead Gantry	MT	1	3.500					89442.00	**313047.00**
10.26	Delineator at reataining wall	No	190						382.00	**72580.00**
10.27	Convex Mirror at sharp curved	No	60						2880.00	**172800.00**
	TOTAL OF BILL NO. - 11									**329047801.00**
Bill No. 11 :	**Maintenance**									
11.01	Maintenance of Existing Road	Rm	1	0.000				0.000	5824.64	**0.00**

BILL OF QUANTITIES

Item	Description	Unit	No	Length (m)	Breadth (m)	Height (m)	Area (sqm)	Quantity (cum)	Rate	Amount
Agriculture Area :	Rs. 11 /Sq.m (Jhum Land)		278787.9							
Built up Area :	Rs. 86 / Sq.m		39393.94							
Fish Land (Standing) :	Rs. 300/ sq.m									
Total Area of acquisistion (sqm)	318181.8182									
Cost of acquisistion	6455000									

FFSR: km 20 to km 70
Earthwork

Item	Description	Unit	Qty	Rate	Amount
	Dismantling of flexible pavements and disposal of dismantled materials up to a lead of 1000 metres, stacking serviceable and unserviceable materials separately)				
	By Mechanical Means				
	Bituminous course	Cum	4116	328.00	1350048.00
	Granular courses	Cum	8232	267.00	2197944.00
					3547992.00

Item	Earth work	Unit	Qty	Rate	Amount
1	*Excavation for roadwork in soil with hydraulic excavator of 0.9 cum bucket capacity including cutting and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead*				
(i)	*Ordinary Soil*	*Cum*	*165856.56*	*78.00*	*12936811.35*
(ii)	*Soft rock*	*Cum*	*884568.30*	*302.00*	*267139625.88*
(ii)	*Hard rock(Blasting)*	*Cum*	*55285.52*	*383.00*	*21174353.62*
2	*Removal of unserviceable soil including excavation, loading and disposal upto 1000 metres lead but excluding replacement by suitable soil which shall be paid separately as per clause 305.*	*Cum*	*980826.85*	*91.00*	*89255243.53*
3	*Construction of embankment with approved material obtained from borrow pits* with all lifts and leads, transporting to site, spreading, grading to required slope and compacting to meet requirement of table 300-2.	*Cum*	*31220.88*	*201.00*	*6275396.88*
4	*Construction of embankment with approved materials deposited at site f*rom roadway cutting and excavation from drain and foundation of other structures graded and compacted to meet requirement of table 300-2.	*Cum*	*124883.52*	*116.00*	*14486488.32*
	Total Earthwork Cost				***411267919.58***

From	To	Length- m	nature of rock		%
138000	145000	7000	Hard Rock	9000	45
146000	153000	7000	Soft Rock	8000	40
154000	156000	2000	Hard Rock		
157000	158000	1000	Soft Rock		
	Total	20000	ordinary soil		3000

Total fill volume	1,56,104
Total cut volume	11,05,710

SCHEDULE OF TYPICAL CROSS SECTIONS OF NH-713

S.NO.	EXISTING CHAINAGE		DESIGN CHAINAGE		LENGTH	Ded.	CD	Final	TYPE	Remarks / Location
	FROM	TO	FROM	TO	(m)	(m)	(m)		TCS	
5			20000	20010	10				1	Realignment with Retaining wall
6			20010	20200	190				2	Reconstruction and widening
7			20200	20600	400				3	Realignment
8			20600	20610	10				1	Realignment with Retaining wall
9			20610	20690	80				3	Realignment
10			20690	20700	10				1	Realignment with Retaining wall
11			20700	21000	300				3	Realignment
12			21000	21130	130				2	Reconstruction and widening
13			21130	21140	10				1	Realignment with Retaining wall
14			21140	21240	100				2	Reconstruction and widening
15			21240	21270	30				1	Realignment with Retaining wall
16			21270	21840	570				3	Realignment
17			21840	21850	10				1	Realignment with Retaining wall
18			21850	21940	90				3	Realignment
19			21940	21990	50				1	Realignment with Retaining wall
20			21990	22000	10				3	Realignment
21			22000	22200	200				2	Reconstruction and widening
22			22200	22220	20				3	Realignment
23			22220	22230	10				1	Realignment with Retaining wall
24			22230	22300	70				3	Realignment
25			22300	22310	10				1	Realignment with Retaining wall
26			22310	22700	390				3	Realignment
27			22700	22850	150				2	Reconstruction and widening
28			22850	23000	150				3	Realignment
29			23000	23500	500				2	Reconstruction and widening
30			23500	24000	500				3	Realignment
31			24000	24500	500				2	Reconstruction and widening
32			24500	24700	200				3	Realignment
33			24700	24710	10				1	Realignment with Retaining wall
34			24710	25010	300				3	Realignment
35			25010	25090	80				1	Realignment with Retaining wall
36			25090	25500	410				3	Realignment
37			25500	25800	300				2	Reconstruction and widening
38			25800	27400	1600				3	Realignment
39			27400	27520	120				2	Reconstruction and widening
40			27520	27590	70				1	Reconstruction and widening with Retaining wall
41			27590	27600	10				2	Reconstruction and widening
42			27600	27630	30				3	Realignment
43			27630	27650	20				1	Realignment with Retaining wall
44			27650	28310	660				3	Realignment
45			28310	28350	40				1	Realignment with Retaining wall
46			28350	28400	50				3	Realignment
47			28400	28680	280				2	Reconstruction and widening

S.NO.	EXISTING CHAINAGE		DESIGN CHAINAGE		LENGTH	Ded.	CD	Final	TYPE	Remarks / Location
	FROM	TO	FROM	TO	(m)	(m)	(m)		TCS	
48			28680	28720	40				1	Realignment with Retaining wall
49			28720	28920	200				3	Realignment
50			28920	28970	50				1	Realignment with Retaining wall
51			28970	29260	290				2	Reconstruction and widening
52			29260	29280	20				1	Reconstruction and widening with Retaining wall
53			29280	29340	60				2	Reconstruction and widening
54			29340	29400	60				1	Reconstruction and widening with Retaining wall
55			29400	29600	200				2	Reconstruction and widening
56			29600	29790	190				3	Realignment
57			29790	29820	30				1	Realignment with Retaining wall
58			29820	30200	380				3	Realignment
59			30200	30400	200				2	Reconstruction and widening
60			30400	30600	200				3	Realignment
61			30600	30800	200				2	Reconstruction and widening
62			30800	31300	500				3	Realignment
63			31300	31480	180				2	Reconstruction and widening
64			31480	31600	120				3	Realignment
65			31600	32050	450				2	Reconstruction and widening

Total 12050

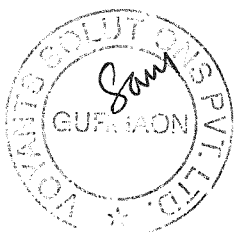
1	570
2	4060
3	7420
4	0

TCS I Typical Cross Section of 2 Lane C/W(Mountainous Terrain with Retaining Wall)

TCS II Typical Cross Section of 2 Lane C/W(Mountainous Terrain without Retaining and Parapet Wall)

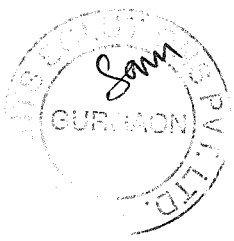
TCS III (Typical Cross Section of Realignment By Hill Cutting)

TCS IV (Typical Cross Section at Built up Strech)



Package-I: km 20.000-32.050

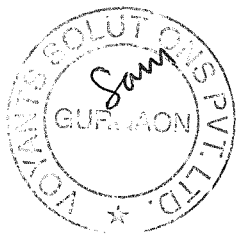
Chainage		Breast Wall Height(m)		Chainage		Retaining Wall Height(m)		Length of Breast Wall(m)		Length of Retaining wall(m)	
From	To	Left	Right	From	To	Left	Right				
20000	20010		0	20000	20010	4		0	0	10	0
20010	20020		1.5	20600	20610	3		0	10	10	0
20020	20230			20690	20700	4		0	0	10	0
20030	20240		2	21130	21140	2		0	210	10	0
20250	20270		3	21240	21270	3		0	20	30	0
20330	20430	3	3	21840	21850	4		100	100	10	0
20430	20440	1.5	1.5	21940	21970	4		10	10	30	0
20490	20500		3	21970	21990	3		0	10	20	0
20500	20570	3	3	22220	22230	3		70	70	10	0
20600	20610			22300	22310	4		0	0	10	0
20620	20670		3	24700	24710	2		0	50	10	0
20690	20700			25010	25090	4		0	0	80	0
20710	20740		2	27630	27650	4		0	30	20	0
20740	20770	2	3	27520	27590	2		30	30	70	0
20770	20820		2	28310	28340	4		0	50	30	0
20820	20870		3	28340	28360	4		0	50	20	0
20870	20950		3	28680	28720	2		0	80	40	0
20990	21040		2	28920	28970	2		0	50	50	0
21040	21120		1.5	29260	29280	3		0	80	20	0
21160	21270		2	29340	29400	2		0	110	60	0
21270	21330		3	29790	29820	3		0	60	30	0
21330	21430		2					0	100	0	0
21430	21540		3					0	110	0	0
21540	21610		2					0	70	0	0
21610	21630		3					0	20	0	0
21630	21670		3					0	40	0	0
21670	21700		2					0	30	0	0
21720	21760		3					0	40	0	0
21760	21790		3					0	30	0	0
21790	21860		3					0	70	0	0
21860	21900		3					0	40	0	0
21990	22040		2					0	50	0	0
22080	22100		3					0	20	0	0
22100	22120		3					0	20	0	0
22130	22220		2					0	90	0	0
22340	22380		2					0	40	0	0
22380	22390		2					0	10	0	0
22470	22520		1.5					0	50	0	0
22520	22610		3					0	90	0	0
22620	22880		3					0	260	0	0
22880	22950	3	3					70	70	0	0
22950	23250	2	3					300	300	0	0
23250	23810	3	3					560	560	0	0
23810	23870	3	3					60	60	0	0
23990	24000		1.5					0	10	0	0
24600	24670		2					0	70	0	0
24700	24720		1.5					0	20	0	0
24720	24760		2					0	40	0	0
24760	24780		2					0	20	0	0
24810	24880		2					0	70	0	0
24900	25000		2					0	100	0	0
25010	25020		1.5					0	10	0	0
25120	25130		1.5					0	10	0	0
25130	25160	1.5						30	0	0	0
25190	25220	1.5	2					30	30	0	0



25220	25290		2					0	70	0	0
25290	25380		2					0	90	0	0
25380	25430		2					0	50	0	0
25460	25480	1.5						20	0	0	0
25860	25870		1.5					0	10	0	0
25870	25960	2	3					90	90	0	0
25960	26000	1.5	2					40	40	0	0
26070	26160		2					0	90	0	0
26160	26240		2					0	80	0	0
26240	26340		1.5					0	100	0	0
26390	26450		1.5					0	60	0	0
								0	0	0	0
26450	26480	1.5	1.5					30	30	0	0
26480	26560		1.5					0	80	0	0
26680	26710		2					0	30	0	0
26830	26880		1.5					0	50	0	0
26920	27000		2					0	80	0	0
27040	27050		1.5					0	10	0	0
27050	27090		1.5					0	40	0	0
27100	27160		2					0	60	0	0
27160	27190		3					0	30	0	0
27200	27280		3					0	80	0	0
27280	27320	2	2					40	40	0	0
27330	27400		2					0	70	0	0
27400	27630		1.5					0	230	0	0
27660	27680		2					0	20	0	0
27680	27760	2	3					80	80	0	0
27840	27900	3	3					60	60	0	0
27950	27970	1.5	3					20	20	0	0
27980	27990		2					0	10	0	0
28040	28190		2					0	150	0	0
28200	28230		3					0	30	0	0
28230	28290	2	3					60	60	0	0
28370	28410		2					0	40	0	0
28470	28480		2					0	10	0	0
28490	28560		2					0	70	0	0
28630	28770		2					0	140	0	0
28920	29060		1.5					0	140	0	0
29090	29170		1.5					0	80	0	0
29170	29360		2					0	190	0	0
29360	29390		3					0	30	0	0
29410	29660		3					0	250	0	0
29660	29710		2					0	50	0	0
29710	29770	1.5	2					60	60	0	0
29770	29970		2					0	200	0	0
30060	30110	1.5	2					50	50	0	0
30520	30650		1.5					0	130	0	0
30660	30710		1.5					0	50	0	0
30850	30970	2	2					120	120	0	0
30980	31090		1.5					0	110	0	0
31100	31110		1.5					0	10	0	0
31110	31120		2					0	10	0	0
31240	31380		3					0	140	0	0
31190	31520		1.5					0	330	0	0
31520	31690		2					0	170	0	0
31690	31730		3					0	40	0	0
31730	31970		2					0	240	0	0
31970	32120		2					0	150	0	0

Breast Wall of PCC M15(m)			Breast Wall of Sausage Wall	
Breast Wall 1.5m	1.5	1950		
Beast Wall 2m	2	4270		
Breast wall 3m	3	3530	500	

Retaining Wall(m)		
Breast Wall 1.5m	2	240
Beast Wall 2m	3	120
Breast wall 3m	4	210

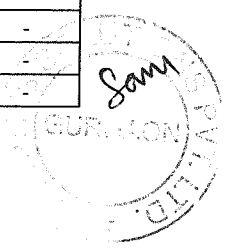


Major Junctions					
S.No.	**Junction Type**	**Nos**	**Per Junction Area (Sqm)**	**Total Area**	**Remarks**
Total					
Minor Junctions					
S.No.	**Junction Type**	**Nos**	**Per Junction Area (Sqm)**	**Total Area**	**Remarks**
1	Y/T Junctions	26	300	7800	
Total				***7800***	
	Total (1+2)			**7800**	
				7800	

FFSR: KM 20 TO KM 32.05

Extra Widening

Extra-Widening								
SL. No	Design Chainage(m)		Length(m)	IRC-SP:73-2105 Radius of Curve		IRC-SP:48-1998 Radius of Curve		
	From	To		75-100	101-300	41-60	75-100	101-300
1	20+037.178	20+039.551	0+002.373	-	-	60	-	-
2	20+153.705	20+345.832	0+192.127	85	-	-	85	-
3	20+387.690	20+410.476	0+022.786	-	-	60	-	-
4	20+489.719	20+496.692	0+006.973	-	250	-	-	250
5	20+580.281	20+603.590	0+023.309	-	300	-	-	300
6	20+674.181	20+699.387	0+025.206	-	-	50	-	-
7	20+749.700	20+777.486	0+027.786	-	-	45	-	-
8	20+862.006	20+873.883	0+011.877	-	-	60	-	-
9	20+951.339	21+005.538	0+054.199	-	-	60	-	-
10	21+058.354	21+069.160	0+010.806	90	-	-	90	-
11	21+127.102	21+137.124	0+010.022	-	-	60	-	-
12	21+237.646	21+297.938	0+060.292	-	-	60	-	-
13	21+329.603	21+362.927	0+033.324	80	-	-	80	-
14	21+407.353	21+411.748	0+004.395	-	-	60	-	-
15	21+477.824	21+484.813	0+006.989	80	-	-	80	-
16	21+567.689	21+568.270	0+000.581	80	-	-	80	-
17	21+707.601	21+721.387	0+013.786	-	-	40	-	-
18	21+784.831	21+792.985	0+008.154	-	-	40	-	-
19	21+839.263	21+940.007	0+100.744	-	-	60	-	-
20	21+975.562	22+029.790	0+054.228	-	200	-	-	200
21	22+081.441	22+167.257	0+085.816	-	-	50	-	-
22	22+220.623	22+346.658	0+126.035	-	-	60	-	-
23	22+415.321	22+529.770	0+114.449	-	-	56	-	-
24	22+601.252	22+664.284	0+063.032	-	-	50	-	-
25	22+782.299	22+813.795	0+031.496	-	-	60	-	-
26	22+847.609	23+004.167	0+156.558	80	-	-	80	-
27	23+062.815	23+066.225	0+003.410	-	200	-	-	200
28	23+128.022	23+136.587	0+008.565	-	-	60	-	-
29	23+193.117	23+204.112	0+010.995	-	150	-	-	150
30	23+369.816	23+435.932	0+066.116	-	-	60	-	-
31	23+612.688	23+626.652	0+013.964	-	-	60	-	-
32	23+868.983	23+897.139	0+028.156	-	-	60	-	-
33	23+938.236	23+964.908	0+026.672	-	-	60	-	-
34	24+038.816	24+161.250	0+122.434	75	-	-	75	-
35	24+359.951	24+370.865	0+010.914	70	-	-	70	-
36	24+555.022	24+586.084	0+031.062	-	-	60	-	-
37	25+081.050	25+104.357	0+023.307	-	-	40	-	-
38	25+418.730	25+532.977	0+114.247	-	-	60	-	-
39	25+671.986	25+674.072	0+002.086	80	-	-	80	-
40	25+708.090	25+731.980	0+023.890	-	-	60	-	-
41	25+769.977	25+785.543	0+015.566	-	150	-	-	150
42	25+838.783	25+868.565	0+029.782	-	-	45	-	-
43	25+969.350	26+002.287	0+032.937	-	-	40	-	-
44	26+168.356	26+226.720	0+058.364	-	-	60	-	-
45	26+323.066	26+452.944	0+129.878	70	-	-	70	-
46	26+517.834	26+598.464	0+080.630	-	-	60	-	-
47	26+652.669	26+667.366	0+014.697	-	-	40	-	-
48	26+807.270	26+823.408	0+016.138	-	120	-	-	120
49	26+864.487	26+873.390	0+008.903	-	-	45	-	-
50	26+929.084	26+958.418	0+029.334	-	-	60	-	-
51	27+008.227	27+085.206	0+076.979	80	-	-	80	-
52	27+225.676	27+321.497	0+095.821	-	-	60	-	-
53	27+398.276	27+474.209	0+075.933	-	-	60	-	-
54	27+543.830	27+609.959	0+066.129	80	-	-	80	-
55	27+738.410	27+779.837	0+041.427	-	-	60	-	-
56	27+872.194	27+962.301	0+090.107	-	-	60	-	-
57	28+028.627	28+101.333	0+072.706	-	-	40	-	-



FFSR: KM 20 TO KM 32.05

Extra Widening

SL. No	Design Chainage(m)		Length(m)	IRC-SP:73-2105		IRC-SP:48-1998		
				Radius of Curve		Radius of Curve		
	From	To		75-100	101-300	41-60	75-100	101-300
58	28+168.776	28+243.494	0+074.718	-	150	-	-	150
59	28+301.330	28+441.364	0+140.034	-	120	-	-	120
60	28+574.879	28+632.942	0+058.063	-	120	-	-	120
61	28+916.087	29+015.159	0+099.072	-	-	60	-	-
62	29+203.305	29+246.137	0+042.832	-	150	-	-	150
63	29+338.059	29+353.274	0+015.215	-	-	60	-	-
64	29+391.178	29+412.805	0+021.627	-	-	60	-	-
65	29+497.165	29+560.291	0+063.126	-	-	60	-	-
66	29+595.135	29+636.953	0+041.818	-	-	60	-	-
67	29+683.569	29+742.079	0+058.510	-	-	40	-	-
68	29+811.740	29+826.511	0+014.771	-	-	60	-	-
69	29+920.284	29+933.738	0+013.454	-	-	60	-	-
70	30+089.767	30+165.539	0+075.772	-	-	60	-	-
71	30+226.267	30+249.166	0+022.899	-	-	60	-	-
72	30+424.078	30+501.819	0+077.741	-	-	40	-	-
73	30+627.179	30+636.334	0+009.155	-	-	60	-	-
74	30+714.272	30+885.959	0+171.687	-	-	55	-	-
75	30+997.379	31+053.375	0+055.996	-	-	60	-	-
76	31+090.993	31+122.228	0+031.235	-	-	60	-	-
77	31+338.900	31+378.578	0+039.678	80	-	-	80	-
78	31+449.817	31+478.655	0+028.838	-	-	60	-	-
79	31+542.058	31+583.658	0+041.600	-	-	60	-	-
80	31+630.258	31+655.280	0+025.022	-	-	60	-	-
81	31+711.209	31+800.862	0+089.653	-	-	60	-	-
82	31+960.919	31+994.335	0+033.416	-	-	60	-	-

Retaining Wall					
	Height	Conc. area($m^{2)}$	Avg. Conc. area(m^2)	Earthwork area(m2)	Avg. Earthwork area(m^2)
1	1m height	2.096		1.4	
2	2m height	3.189	2.6425	1.7	1.55
3	3m height	4.984	4.0865	2.2	1.95
4	4m height	6.9365	5.96025	2.55	2.375
		Length	Avg Area	Rate	Amount
1	2m Height	240	765.36	7705.00	5897098.8
2	3m Height	120	598.08	7705.00	4608206.4
3	4m Height	210	1456.665	7705.00	11223603.83
					21728909.03
Earthwork for Retaining wall			Avg Area	Rate	Amount
1	2m Height	240	1.7	133.00	54264
2	3m Height	120	2.2	133.00	35112
3	4m Height	210	2.55	133.00	71221.5
					160597.5
				Total	***21889506.53***
				Say	***21889507***

(i) Sausage Wall for 1.0m height			No	L(m)	B(m)	H(m)	Qty(cum)	Rate	Ammount
1	Eartwork in excavation	Cum		1	0.5	1.2	0.60	133.00	79.8
2	Sausage Wall(0.6 * 1 *1)	Cum	2	1	1	0.60	1.20	4275.00	5130
									5209.8
								Say	***5210***

(ii) Sausage Wall for 2.0m height			No	L(m)	B(m)	H(m)	Qty(cum)	Rate	Ammount
1	Eartwork in excavation	Cum		1	0.5	2	1.00	133.00	133
2	Sausage Wall(0.6 * 1 *1)	Cum	3	1	1	0.60	1.80	4275.00	7695
									7828
								Say	***7830***

(iii) Sausage Wall for 3.5m height			No	L(m)	B(m)	H(m)	Qty(cum)	Rate	Ammount
1	Eartwork in excavation	Cum		1	0.5	3.5	1.75	133.00	232.75
2	Sausage Wall(0.6 * 1 *1)	Cum	6	1	1	0.60	3.60	4275.00	15390
									15622.75
								Say	***15630***

(iv) Sausage Wall for 5.0m height			No	L(m)	B(m)	H(m)	Qty(cum)	Rate	Ammount
1	Eartwork in excavation	Cum		1	0.5	5	2.50	133.00	332.5
2	Sausage Wall(0.6 * 1 *1)	Cum	8	1	1	0.60	4.80	4275.00	20520
									20852.5
								Say	***20860***

Sl. No.	Item Descrption	Unit	Nos	Length	Width	Height	Qty	Rate	Amount	Rate/m	Remarks
1. Drain with RCC per m											
a	Earthwork in Excavation									481	
	Ordiniary Soil	Cum	1	1	1.5	0.6	0.9			862	50% of Total
	Soft Rock	Cum	1	1	1.5	0.6	0.9			2781	50% of Total
							1.8	267.00	481	1589	
b	PCC M15 on bottom base	Cum	1	1	1.5	0.075	0.1125	7705.00	867		
c	RCC M20 in Vertical wall M15	Cum	2	1	0.15	1.05	0.315	8873.00	2795	1324	
	PCC in Base M15	Cum	1	1	1.2	0.15	0.18	8873.00	1597	2720	
							0				
d	Drain Cover RCC M20	Cum	1	1	1.5	0.1	0.15	8873.00	1331		
e	HYSD for Wall & Drain Cover	MT					0.0387	78203.00	3026	**10097**	

(i) Parapet Wall per m											
a	Eartwork in excavation	Cum	1	1	0.75	0.7	0.53	267.00	140.18		Gap of 300 mm after every 900mm
b	PCC M15	Cum	1	1	0.75	0.1	0.08	7705.00	577.88		as per SoR HP page 136
c	Rubble Masonry in Par	Cum	1	1	0.6	1.2	0.72	4516.00	3251.52		as per SoR HP page 136
d	Coping 5.0 cm thick	Cum	1	1	0.6	0.05	0.03	7705.00	231.15	**4201.00**	

Trapezoidal Lined Drain		Quantity					
		Area	Thickness	Vol.		Rate	Amount
1	PCC M20	1.870	0.150	0.281			
	Total	**1.870**	0.150	**0.281**		8441.00	2368
2	Excavation	0.65		0.65		267.00	174
						Total	**2542.00**

		L	B	H	Area	Rate	Amount
Road Maintainance							
Filling of Potholes with BC		1000	10	0.04	8000	536.08	4288640
Filling of Potholes with Open Graded Prem		1000	10	0.04	8000	192.00	1536000
					Total for 1km		5824640
						For 1m	**5825**

Breast Wall

Concrete Area		Length	Area	Rate	Amount
1	1.5m Height	1950	1.78	7705.00	13714.9
2	2m Height	4270	2.2	7705.00	16951
3	3m Height	4030	4.46	7705.00	34364.3

Summary of Quantity of each Box Culvert (20 Km to 32.050Km)

INR

S.No.	Description	Unit	0 1x1x2	60 1x2X2	2 1x2.5x2.0	1 1x3x3	0 1x6x4	Total Qty.	Rate	Cost
1	**Earth work in excavation**	cum	*0.00*	*6496.90*	*243.92*	*158.60*	*0.00*	6899.41	*70.00*	*4,82,958.95*
2	**PCC M-15 for leveling course**	cum	*0.00*	*507.15*	*119.89*	*78.94*	*0.00*	705.99	*7705.00*	*54,39,618.51*
3	**PCC M-15**	cum	*0.00*	*278.40*	*9.28*	*4.64*	*0.00*	292.32	*7705.00*	*22,52,325.60*
4	**PCC M-15 for curtain wall**	cum	*0.00*	*153.00*	*6.12*	*3.88*	*0.00*	163.00	*7705.00*	*12,55,884.18*
5	***For Box Barrel***									*0.00*
5.a.	RCC M-25 grade conc. For foundation	cum	*0.00*	*540.00*	*21.60*	*16.87*	*0.00*	578.47	*9509.00*	*55,00,690.25*
5.b.	RCC M-25 grade conc. For sub-structure	cum	*0.00*	*752.40*	*25.08*	*29.34*	*0.00*	806.82	*10224.00*	*82,48,927.68*
5.c	RCC M-25 grade conc. For super-structure (box)	cum	*0.00*	*450.00*	*18.00*	*16.87*	*0.00*	484.87	*10733.00*	*52,04,131.18*
6	***For Return Wall***									*0.00*
6.a	M15 PLUM CONCRETE .For foundation	cum	*0.00*	*1567.80*	*52.26*	*35.70*	*0.00*	1655.76	*7705.00*	*1,27,57,612.31*
6.b	M15 PLUM CONCRETE .For Sub-structure	cum	*0.00*	*1345.50*	*44.85*	*30.64*	*0.00*	1420.99	*8150.00*	*1,15,81,035.90*
7	**Reinforcement**	Mt	*0.00*	*130.68*	*4.85*	*4.73*	*0.00*	140.26	*79759.00*	*1,11,87,180.79*
8	**Weep Hole**	No.	*0.00*	*3120.00*	*104.00*	*77.00*	*0.00*	3301.00	*153.00*	*5,05,053.00*
9	**Filter media**	cum	*0.00*	*1851.12*	*61.70*	*46.11*	*0.00*	1958.93	*2365.00*	*46,32,876.07*
10	**450mm thk floor apron**	cum	*0.00*	*202.50*	*8.10*	*5.13*	*0.00*	215.73	*5810.00*	*12,53,391.30*
11	**750 mm thk Stone Apron floor(flexible)**	cum	*0.00*	*337.50*	*13.50*	*8.55*	*0.00*	359.55	*1302.00*	*4,68,134.10*
12	**RCC Railing M30**	Rm	*0.00*	*600.00*	*24.00*	*15.20*	*0.00*	639.20	*2379.00*	*15,20,656.80*
13	**Guard Stone**	No.	*0.00*	*480.00*	*20.00*	*14.00*	*0.00*	514.00	*2317.00*	*11,90,938.00*
14	**Mark Post**	No.	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	0.00		*0.00*
15	**Back Filling**	cum	*0.00*	*1662.77*	*55.43*	*27.71*	*0.00*	1745.91	*1070.00*	*18,68,120.72*
16	**Stone Pitching on slop**	cum	*0.00*	*611.67*	*20.39*	*10.19*	*0.00*	642.25	*1252.00*	*8,04,097.92*
17	**Filter media under stone pitching**	cum	*0.00*	*305.83*	*10.19*	*5.10*	*0.00*	321.13	*2565.00*	*8,23,686.56*
									TOTAL	**7,69,77,320.00**