PROJECT DESCRIPTION

3.1 Existing Scenario

The name of the road as per offer and agreement is Peren – Dimapur road section of NH-129A starting from Dzuko bridge (Manipur & Nagaland state border) near Peren town and ends near Jalukie town under Peren district of Nagaland. The project road lies in Peren district of Nagaland. The length of the road is 15.436 km (as per Topography Survey). The Project Road starts from Dzuko Bridge and passes through Peren town.

Details are summarized in below table 3.1.

Table 3.1: Package Details

Package No	Existing Chainage (Km)		Existing Length (KM)	Design Chainage (Km)		Design Length (KM)
	From	To		From	To	
PKG-IA	109+767	125+203	15.436	109+494	126+775	17.281
	Total existing length		15.436	**Total design length**		17.281

3.2 Settlement

The Project Road passes through village / localities namely Peren town. Details in Table 3.2 are given below.

Table 3.2: List of Habitation

Sl. No.	Existing Chainage (Km)		Name of Habitation
	From	To	
Package - IA			
1	119.200	121.700	Peren Town

3.3 Land Use Pattern

The project is located in the moderately high rainfall area with majority portions are found to have matured trees and vegetation growth observed along side road. However, for clarification of forest stretch letter has been issued to Peren, DFO through NHIDCL. As per Peren DFO, the alignment passes through forest land at Jalukie Range and Peren Range with roadside plantation. Beside this the project road passes through 6 nos. settlement areas. The details are already mentioned in article 3.2. Road Inventory details are given in data sheet of Appendix to main report.

3.4 Right of Way (ROW)

The existing ROW varies from 5.0 m to 12.0 m throughout the project road. However, the existing ROW does not cater to the codal provision of 24m ROW of Hill Road in open areas and 20m in built-up area and hence land is required to be acquired to adhere to the codal provision.

Details of Existing ROW have been given below in Table 3.3:

Table 3.3: List of EROW

Existing Chainage		EROW(m)
From (m)	To (m)	
Package-IA		
109.767	109.967	9.500
109.967	110.167	10.100
110.167	110.290	8.500
110.290	110.490	11.240
110.490	110.690	8.550
110.690	110.890	11.060
110.890	111.090	13.530
111.090	111.290	8.660
111.290	111.490	11.540
111.490	111.690	11.460
111.690	111.890	10.780
111.890	112.090	10.980
112.090	112.290	10.360
112.290	112.490	10.050
112.490	112.690	9.200
112.690	112.890	12.820
112.890	113.090	11.570
113.090	113.290	11.770
113.290	113.490	8.170
113.490	113.690	8.710
113.690	113.890	9.090
113.890	114.090	8.780
114.090	114.290	7.950
114.290	114.490	8.890
114.490	114.690	7.830
114.690	114.890	8.160
114.890	115.090	9.810
115.090	115.290	9.000
115.290	115.490	9.720
115.490	115.690	10.020
115.690	115.890	10.970
115.890	116.090	7.860
116.090	116.290	8.720
116.290	116.490	10.180
116.490	116.690	8.250
116.690	116.890	10.470
116.890	117.090	11.770
117.090	117.290	12.370
117.290	117.490	9.440
117.490	117.690	8.990
117.690	117.890	9.800
117.890	118.090	9.570

Existing Chainage		EROW(m)
From (m)	To (m)	
118.090	118.290	8.840
118.290	118.490	9.260
118.490	118.690	8.420
118.690	118.890	10.620
118.890	119.090	11.860
119.090	119.290	10.390
119.290	119.490	7.300
119.490	119.690	5.560
119.690	119.890	5.290
119.890	120.090	11.130
120.090	120.290	6.260
120.290	120.490	5.390
120.490	120.690	6.680
120.690	120.890	6.810
120.890	121.090	6.100
121.090	121.290	7.380
121.290	121.490	6.900
121.490	121.690	8.320
121.690	121.890	7.740
121.890	122.090	6.710
122.090	122.290	8.010
122.290	122.490	9.290
122.490	122.690	8.100
122.690	122.890	8.320
122.890	123.090	7.740
123.090	123.290	9.830
123.290	123.490	8.440
123.490	123.690	9.900
123.690	123.890	8.080
123.890	124.090	8.530
124.090	124.290	8.920
124.290	124.490	7.420
124.490	124.690	9.590
124.690	124.890	6.640
124.890	125.090	7.450
125.090	125.290	5.670

3.5 Existing Alignment

The horizontal alignment of the existing road has some locations with sub-standard and sharp curve including zigzag curve and hair-pin bends. Also, there is no proper transition length for most of the horizontal curves including the zigzag ones require to be providing for super elevation. These deficiencies have been corrected in fixing the horizontal alignment for the entire project road to conform to MoRT&H standards. The vertical alignment of the existing road is also deficient along a few

locations of the alignment with proper gradient. The details horizontal curves are given below in Table 3.4**.**

Table 3.4: List of Horizontal Curves

Types of Curves	Existing Chainage	
	From (km)	To (km)
Sharp Curves/ Blind Curves	Package-IA	
	118+190	125+690
Hair-Pin Bends	Package-IA	
	109+767	117+940
	123+690	127+440

3.6 Existing Pavement

The existing road is mostly Intermediate/two Lane with earthen shoulder. The carriageway width of the existing road varies from 3.5 – 7.0 meter. Width of earthen shoulder varies from 1.0 – 3.5 meter. Hence, total formation width varies from 6.5 – 11.2 meter.

Table 3.5: List of Chainage wise Carriage way width

Existing Chainage (km)		Average Carriageway Width (m)
From	To	
Package-IA		
109.767	120.917	3.5 - 5.0
120.917	125.203	3.0 - 5.0

The existing pavement condition along the road varies from good to fair (around 16% of project road) to poor (around 84% of project road). It has been observed that the portion of the stretch, which is in poor condition is partially damaged with cracks, potholes, raveling, rutting, considerable amount of patching and some stretches have been observed as fully exposed. The summary of deflection of existing pavement which is in good to fair condition is presented below:

Table 3.6: Summary of Deflection

EXISTING CHAINAGE (KM)		DEFLECTION (MM/KM) LHS	DEFLECTION (MM/KM) RHS	AVERAGE DEFLECTION (MM/KM)
FROM	TO			
125.000	126.000	1.003	0.923	0.963
126.000	127.000	0.783	0.863	0.823
134.800	135.000	0.644	0.449	0.546
135.000	136.000	0.520	0.505	0.513
136.000	137.000	0.717	0.586	0.651
137.000	138.000	0.763	0.504	0.634
138.000	139.000	0.914	0.749	0.832
139.000	140.000	1.016	0.676	0.846
140.000	141.000	1.033	1.619	1.326
141.000	141.700	0.950	0.934	0.942

Fair Condition of Pavement

Poor Condition of Pavement

3.7 Existing Junction:

There are 3 nos. major Junction and 11 nos. minor junction in the project stretches.

Table 3.7: Major Junction List

Sl. No.	Existing Chainage (Km)	Name of Junction	Type of Junction	Leads To
Package-IA				
1	119.000	Kiepeuzang junction	3-Legged	Tenning
2	119.560	Peren town junction	3-Legged	Peren Town
3	124.250	Pelekie junction	3-Legged	Kohima

Minor Junctions:

- Package – IA: 11 Nos.

Kiepeuzang Junction at Ch. 119+000 km

Peren Town Junction at Ch. 119+560 km

Pelekie Junction at Ch-124+250 km

3.8 Existing Bridges and Culverts

Bridges:

There is no bridge is present in the project stretch.
The details are given below:

Table 3.8: Minor Bridge List

Sl. No.	Existing Chainage (km)	Name of River /Stream	Types of Bridge	Span Arrangement (No x Span)	Clear Roadway Between kerb to Kerb	Total Outer to Outer Width of Bridge(m)
Package-IA						
Nil						

Culverts:

Total 35 nos. Culverts are there on the project road including 28 nos. of HP Culverts and 7 nos. of RCC Slab Culverts.
Details are given below:

Table 3.9: Culvert List

Sl. No.	Existing Chainage (km)	Type of Structures (Pipe/ Slab/ Box/ Arch)	Span Arrangement (No. x Length) (m)	Width of Culvert (m)
Package-IA				
1	110.140	Slab Culvert	1 x 3.5	11.3
2	111.547	Slab Culvert	1 x 3.2	11.3
3	112.183	HP Culvert	2 x 1.2 dia	10
4	112.727	HP Culvert	2 x 1.0 dia	10
5	113.180	HP Culvert	2 x 1.0 dia	10
6	113.687	HP Culvert	2 x 1.0 dia	10
7	113.729	Slab Culvert	1 x 1.5	11
8	113.885	HP Culvert	-	11
9	113.974	Slab Culvert	1 x 1.0	11
10	114.662	HP Culvert	2 x 1.2 dia	11

Sl. No.	Existing Chainage (km)	Type of Structures (Pipe/ Slab/ Box/ Arch)	Span Arrangement (No. x Length) (m)	Width of Culvert (m)
11	114.817	HP Culvert	2 x 1.2 dia	11
12	115.130	HP Culvert	2 x 1.2 dia	11
13	115.310	HP Culvert	2 x 1.2 dia	11
14	115.671	Slab Culvert	1 x 3.5	11
15	115.911	Slab Culvert	1 x 3.5	11
16	116.098	HP Culvert	2 x 1.0 dia	11
17	116.200	Slab Culvert	1X3.5	11
18	116.336	HP Culvert	2 x 0.9 dia	11
19	116.552	HP Culvert	2 x 0.9 dia	11
20	116.935	HP Culvert	2 x 1.0 dia	11
21	117.027	HP Culvert	2 x 1.0 dia	11
22	117.065	HP Culvert	2 x 1.0 dia	10
23	118.207	HP Culvert	2 x 1.0 dia	10
24	117.322	HP Culvert	2 x 1.0 dia	10
25	117.471	HP Culvert	2 x 1.0 dia	10
26	117.768	HP Culvert	1 x 0.6 dia	10
27	117.869	HP Culvert	2 x 1.0 dia	10
28	118.341	HP Culvert	2 x 1.0 dia	10
29	118.603	HP Culvert	1 x 1.0 dia	10
30	118.705	HP Culvert	1 x 1.0 dia	10
31	119.339	HP Culvert	1 x 0.9 dia	7.5
32	119.668	HP Culvert	2 x 1.0 dia	7.5
33	120.070	HP Culvert	1 x 1.0 dia	7.5
34	120.615	HP Culvert	1 x 0.9 dia	7.5
35	121.375	HP Culvert	1 x 1.0 dia	12.5

3.9 Forest Stretch

The project is located in the moderately high rainfall area with majority portions are found to have matured trees and vegetation growth observed along side road. However, for clarification of forest stretch letter has been issued to Peren, DFO through NHIDCL. As per Peren DFO, the alignment passes through forest land at Jalukie Range and Peren Range with roadside plantation.

3.10 Roadway Drainage

Side drains (Lined & Unlined) are present in the few stretches in the built up area & unlined drain is also present in few stretches in the hill side. So most of the portion of the project road stretch is being affected by rain water and seepage water from hilly portion due to poor condition of existing side drains. Details of existing length of the drain are given below:

Package-I

Length of Lined Drain = 897 m

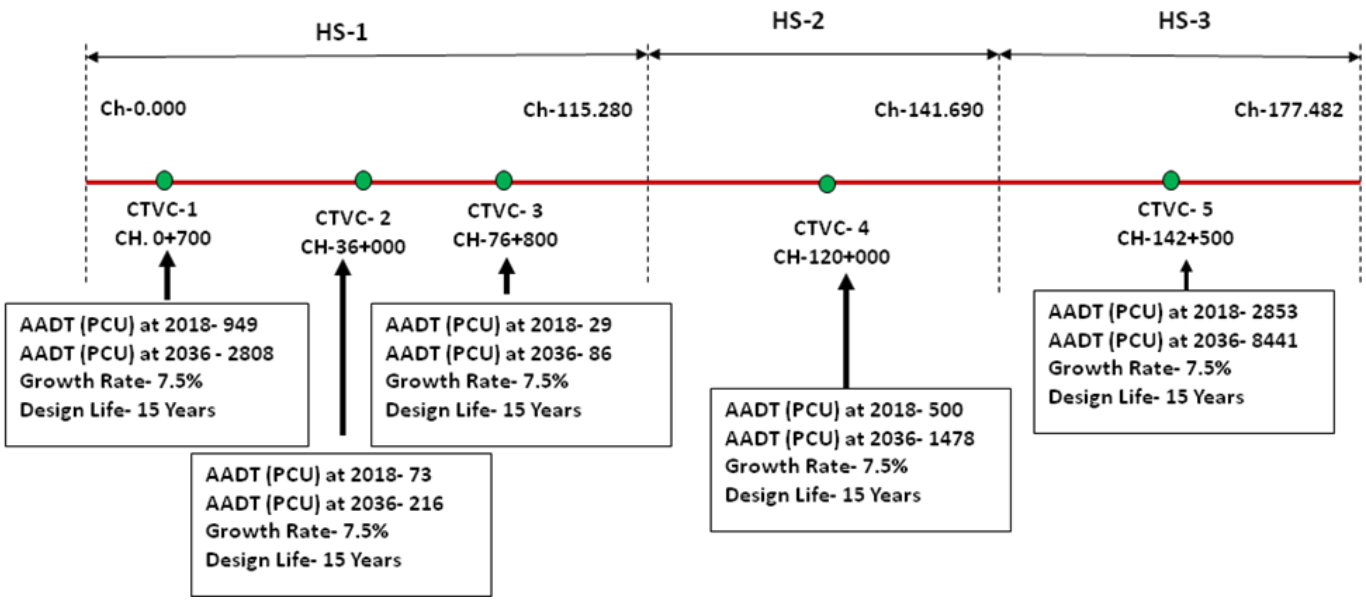
Length of Earthen Drain = 3144 m (on hill side)

3.11 Traffic

The Traffic on the road is mixed in character. It consists of mainly fast moving vehicles. Locations of traffic survey have been given below:

Sl.	Type of Survey	Nos. Proposed	Locations (At existing ch.)
1	Classified Traffic Volume Count	5	• **CTVC-1:** At Ch- 0+700 km near Maram village • **CTVC-2:** At Ch-36+000 km near Willong village • **CTVC-3:** At Ch-76+800 km near Ziumi Village • **CTVC-4:** At Ch-120+000 km near peren town • **CTVC-5:** At Ch- 142+500 km near Jalukie town
2	Origin-Destination and Commodity Movement Characteristics	2	• **OD-1:** On NH-39 near maram Village • **OD-2:** At Ch-120 km near peren town
3	Axle Loading Characteristics	2	• **AXLE-1:** On NH-39 near maram Village • **AXLE-2:** At Ch-120 km near peren town
4	Intersection Volume Count	7	• **TMC-1:** At Ch-0+000 (Maram) • **TMC-2:** At Ch-115+280 (Kiepeuzang Junction) • **TMC-3:** At Ch-115+833 (Peren Town Junction) • **TMC-4:** At Ch-121+500(Pelekie junction) • **TMC-5:** At Ch-137+513(Sugar Mill Junction, Jalukie B) • **TMC-6:** At Ch-141+690 (High School Junction, jalukie Town) • **TMC-7:** At Ch-177+482 (7th Mile Junction)
5	Speed-Delay Characteristics	Project Road Section	Project Road Section.
6	Pedestrian/ animal cross traffic count	3	• **0+700 km** Near Maram Village • **117+000 km** Near Peren Town • **142+000 km** Near Jalukie Town

Summary of Average Annual Daily Traffic has given below:



The detailed traffic analysis report has been presented in **Chapter – 7** of main report.

3.12 Development Proposal

3.12.1 Geometrics Design

Horizontal Alignment

Horizontal curves including the sharp/blind curves as well as zigzag ones has been improved to achieve required design speed and super elevation reversal for riding safety and comfort in conformation to MoRT&H standards.

Details of Horizontal Alignment Report are given below:

Table 3.10: Details of Horizontal Alignment

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
Package - IA															
						Start	109493.81	109504.85	11.049						
						Transition	109504.85	109529.85		25					
1	576824.472	2823859.075	81	8	28.56" Righ	Arc	109529.85	109618.15		88.295	80	Right	7	40	0.9
						Transition	109618.15	109643.15		25					
						Straight	109643.15	109819.25	176.099						
						Transition	109819.25	109834.25		15					
2	576829.847	2824150.849	152	56	58.04" Lef	Arc	109834.25	109872.64		38.389	20	Left	7	20	1.5
						Transition	109872.64	109887.64		15					
						Straight	109887.64	109941.32	53.678						
						Transition	109941.32	109961.32		20					
3	576756.879	2824056.47	15	46	23.09" Lef	Arc	109961.32	109968.85		7.529	100	Left	7	40	0.9
						Transition	109968.85	109988.85		20					
						Straight	109988.85	110004.08	15.23						
						Transition	110004.08	110024.08		20					
4	576732.9	2823993.017	54	17	09.38" Righ	Arc	110024.08	110041.97		17.899	40	Right	6.9	25	1.5
						Transition	110041.97	110061.97		20					
						Straight	110061.97	110077.86	15.887						
						Transition	110077.86	110092.86		15					
5	576673.01	2823963.13	84	16	47.43"	Arc	110092.86	110107.28		14.419	20	Left	7	20	1.5

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
					Lef										
						Transition	110107.28	110122.28		15					
						Straight	110122.28	110150.31	28.032						
						Transition	110150.31	110165.31		15					
6	576688.738	2823888.399	43	27	17.19" Lef	Arc	110165.31	110188.23		22.921	50	Left	5.6	25	1.2
						Transition	110188.23	110203.23		15					
						Straight	110203.23	110210.27	7.041						
						Transition	110210.27	110225.27		15					
7	576737.599	2823850.341	47	5	42.85" Righ	Arc	110225.27	110251.37		26.098	50	Right	5.6	25	1.2
						Transition	110251.37	110266.37		15					
						Straight	110266.37	110304.05	37.677						
8	576755.707	2823761.99	9	15	40.63" Righ	Arc	110304.05	110352.54		48.492	300	Right	Normal Camber	40	0.6
						Straight	110352.54	110418.32	65.775						
						Transition	110418.32	110433.32		15					
9	576743.766	2823627.945	157	41	25.71" Righ	Arc	110433.32	110473.36		40.044	20	Right	7	20	1.5
						Transition	110473.36	110488.36		15					
						Straight	110488.36	110506.96	18.602						
						Transition	110506.96	110521.96		15					
10	576700.06	2823702.399	35	58	26.55" Righ	Arc	110521.96	110538.36		16.393	50	Right	5.6	25	1.2
						Transition	110538.36	110553.36		15					
						Straight	110553.36	110585.82	32.462						
						Transition	110585.82	110600.82		15					
11	576714.824	2823784.493	38	26	55.13" Lef	Arc	110600.82	110626.08		25.263	60	Left	6.7	30	1.2
						Transition	110626.08	110641.08		15					
						Straight	110641.08	110695.17	54.09						
12	576665.221	2823894.324	14	42	09.44" Lef	Arc	110695.17	110772.15		76.983	300	Left	Normal Camber	40	0.6
						Straight	110772.15	110855.72	83.57						
						Transition	110855.72	110870.72		15					
13	576550.397	2824011.671	153	6	59.14" Lef	Arc	110870.72	110909.17		38.448	20	Left	7	20	1.5

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	110909.17	110924.17		15					
						Straight	110924.17	110960.53	36.362						
						Transition	110960.53	110975.53		15					
14	576560.615	2823917.384	16	55	50.94" Lef	Arc	110975.53	110978.26		2.73	60	Left	6.7	30	1.2
						Transition	110978.26	110993.26		15					
						Straight	110993.26	111001.61	8.343						
						Transition	111001.61	111016.61		15					
15	576583.972	2823871.29	37	0	27.53" Righ	Arc	111016.61	111040.36		23.754	60	Right	6.7	30	1.2
						Transition	111040.36	111055.36		15					
						Straight	111055.36	111092.72	37.363						
						Transition	111092.72	111117.72		25					
16	576577.97	2823778.249	38	0	17.13" Lef	Arc	111117.72	111125.89		8.165	50	Left	7	35	1.2
						Transition	111125.89	111150.89		25					
						Straight	111150.89	111164.16	13.271						
						Transition	111164.16	111189.16		25					
17	576612.62	2823703.392	63	12	29.35" Righ	Arc	111189.16	111219.32		30.16	50	Right	7	35	1.2
						Transition	111219.32	111244.32		25					
						Straight	111244.32	111264.18	19.857						
						Transition	111264.18	111279.18		15					
18	576559.686	2823625.706	135	16	55.89" Righ	Arc	111279.18	111311.4		32.222	20	Right	7	20	1.5
						Transition	111311.4	111326.4		15					
						Straight	111326.4	111365.98	39.586						
						Transition	111365.98	111380.98		15					
19	576529.529	2823720.523	13	38	45.32" Righ	Arc	111380.98	111401.71		20.725	150	Right	4.7	40	0.6
						Transition	111401.71	111416.71		15					
						Straight	111416.71	111476.49	59.777						
						Transition	111476.49	111491.49		15					
20	576529.398	2823848.963	27	6	35.68" Lef	Arc	111491.49	111547.46		55.974	150	Left	4.7	40	0.6
						Transition	111547.46	111562.46		15					
						Straight	111562.46	111642.12	79.662						

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	111642.12	111657.12		15					
21	576466.495	2823982.963	13	25	27.54" Righ	Arc	111657.12	111677.27		20.145	150	Right	4.7	40	0.6
						Transition	111677.27	111692.27		15					
						Straight	111692.27	111733.36	41.094						
						Transition	111733.36	111748.36		15					
22	576423.521	2824094.832	170	19	09.14" Lef	Arc	111748.36	111792.81		44.453	20	Left	7	20	1.5
						Transition	111792.81	111807.81		15					
						Straight	111807.81	111831.27	23.461						
						Transition	111831.27	111856.27		25					
23	576414.32	2823993.07	29	41	17.06" Lef	Arc	111856.27	111857.18		0.908	50	Left	7	35	1.2
						Transition	111857.18	111882.18		25					
						Straight	111882.18	111918.54	36.361						
						Transition	111918.54	111938.54		20					
24	576462.33	2823910.308	27	25	54.43" Righ	Arc	111938.54	111966.42		27.877	100	Right	7	40	0.9
						Transition	111966.42	111986.42		20					
						Straight	111986.42	112048.54	62.118						
						Transition	112048.54	112068.54		20					
25	576474.301	2823793.847	12	38	43.88" Righ	Arc	112068.54	112070.61		2.071	100	Right	7	40	0.9
						Transition	112070.61	112090.61		20					
						Straight	112090.61	112126.2	35.593						
						Transition	112126.2	112141.2		15					
26	576445.563	2823689.763	167	40	41.41" Righ	Arc	112141.2	112184.73		43.531	20	Right	7	20	1.5
						Transition	112184.73	112199.73		15					
						Straight	112199.73	112232.56	32.828						
						Transition	112232.56	112252.56		20					
27	576421.88	2823793.652	17	49	05.00" Righ	Arc	112252.56	112257.44		4.879	80	Right	6.8	35	0.9
						Transition	112257.44	112277.44		20					
						Straight	112277.44	112283.62	6.182						
						Transition	112283.62	112303.62		20					
28	576431.875	2823852.048	29	33	09.11"	Arc	112303.62	112324.88		21.263	80	Left	6.8	35	0.9

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
					Lef										
						Transition	112324.88	112344.88		20					
						Straight	112344.88	112353.6	8.717						
						Transition	112353.6	112373.6		20					
29	576413.308	2823915.712	24	28	26.37" Lef	Arc	112373.6	112387.77		14.172	80	Left	6.8	35	0.9
						Transition	112387.77	112407.77		20					
						Straight	112407.77	112473.12	65.347						
30	576344.296	2823997.382	5	33	06.07" Righ	Arc	112473.12	112502.19		29.069	300	Right	Normal Camber	40	0.6
						Straight	112502.19	112628.14	125.953						
						Transition	112628.14	112643.14		15					
31	576250.613	2824135.588	71	50	42.87" Righ	Arc	112643.14	112665.76		22.618	30	Right	5.9	20	1.5
						Transition	112665.76	112680.76		15					
						Straight	112680.76	112722.01	41.254						
						Transition	112722.01	112737.01		15					
32	576301.896	2824222.233	91	5	23.12" Lef	Arc	112737.01	112769.71		32.694	30	Left	5.9	20	1.5
						Transition	112769.71	112784.71		15					
						Straight	112784.71	112812.51	27.798						
						Transition	112812.51	112832.51		20					
33	576237.167	2824276.519	19	56	17.85" Righ	Arc	112832.51	112840.35		7.839	80	Right	6.8	35	0.9
						Transition	112840.35	112860.35		20					
						Straight	112860.35	112929.79	69.441						
						Transition	112929.79	112949.79		20					
34	576169.521	2824369.454	16	42	38.39" Lef	Arc	112949.79	112953.12		3.332	80	Left	6.8	35	0.9
						Transition	112953.12	112973.12		20					
						Straight	112973.12	112999.81	26.693						
						Transition	112999.81	113014.81		15					
35	576092.921	2824416.138	151	36	52.65" Lef	Arc	113014.81	113052.73		37.923	20	Left	7	20	1.5
						Transition	113052.73	113067.73		15					
						Straight	113067.73	113274.79	207.055						
						Transition	113274.79	113289.79		15					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
36	576184.542	2824136.398	160	27	11.75" Righ	Arc	113289.79	113330.8		41.009	20	Right	7	20	1.5
						Transition	113330.8	113345.8		15					
						Straight	113345.8	113383.64	37.845						
						Transition	113383.64	113403.64		20					
37	576102.015	2824208.95	37	4	06.88" Righ	Arc	113403.64	113415.99		12.348	50	Right	7	30	1.2
						Transition	113415.99	113435.99		20					
						Straight	113435.99	113465.63	29.633						
						Transition	113465.63	113485.63		20					
38	576090.568	2824284.076	23	42	04.18" Lef	Arc	113485.63	113486.31		0.683	50	Left	7	30	1.2
						Transition	113486.31	113506.31		20					
						Straight	113506.31	113571.68	65.376						
						Transition	113571.68	113586.68		15					
39	576021.656	2824387.022	145	14	20.54" Lef	Arc	113586.68	113622.38		35.698	20	Left	7	20	1.5
						Transition	113622.38	113637.38		15					
						Straight	113637.38	113655.74	18.358						
						Transition	113655.74	113670.74		15					
40	575999.301	2824301.03	54	6	31.04" Righ	Arc	113670.74	113702.96		32.219	50	Right	5.6	25	1.2
						Transition	113702.96	113717.96		15					
						Straight	113717.96	113803.31	85.348						
						Transition	113803.31	113818.31		15					
41	575872.915	2824209.878	146	20	59.78" Lef	Arc	113818.31	113854.39		36.086	20	Left	7	20	1.5
						Transition	113854.39	113869.39		15					
						Straight	113869.39	113894.77	25.372						
						Transition	113894.77	113914.77		20					
42	575969.26	2824190.905	33	42	10.96" Righ	Arc	113914.77	113941.82		27.058	80	Right	6.8	35	0.9
						Transition	113941.82	113961.82		20					
						Straight	113961.82	114025.18	63.361						
						Transition	114025.18	114045.18		20					
43	576067.095	2824119.008	20	53	39.17" Righ	Arc	114045.18	114054.36		9.174	80	Right	6.8	35	0.9

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	114054.36	114074.36		20					
						Straight	114074.36	114213.11	138.755						
						Transition	114213.11	114233.11		20					
44	576170.508	2823949.491	57	41	50.56" Righ	Arc	114233.11	114263.46		30.35	50	Right	7	30	1.2
						Transition	114263.46	114283.46		20					
						Straight	114283.46	114367.6	84.134						
						Transition	114367.6	114382.6		15					
45	576092.484	2823805.953	157	29	34.19" Righ	Arc	114382.6	114422.57		39.975	20	Right	7	20	1.5
						Transition	114422.57	114437.57		15					
						Straight	114437.57	114461.47	23.899						
						Transition	114461.47	114481.47		20					
46	576085.466	2823901.127	19	35	49.52" Righ	Arc	114481.47	114495.67		14.203	100	Right	7	40	0.9
						Transition	114495.67	114515.67		20					
						Straight	114515.67	114535.38	19.708						
						Transition	114535.38	114550.38		15					
47	576106.2	2823966.82	84	33	45.22" Lef	Arc	114550.38	114564.9		14.518	20	Left	7	20	1.5
						Transition	114564.9	114579.9		15					
						Straight	114579.9	114645.46	65.558						
						Transition	114645.46	114665.46		20					
48	576011.903	2824024.307	29	42	38.07" Righ	Arc	114665.46	114671.39		5.927	50	Right	7	30	1.2
						Transition	114671.39	114691.39		20					
						Straight	114691.39	114719.96	28.574						
						Transition	114719.96	114739.96		20					
49	575960.616	2824093.693	56	23	26.15" Lef	Arc	114739.96	114769.17		29.21	50	Left	7	30	1.2
						Transition	114769.17	114789.17		20					
						Straight	114789.17	114803.7	14.531						
						Transition	114803.7	114823.7		20					
50	575889.414	2824097.837	27	59	17.10" Lef	Arc	114823.7	114828.13		4.424	50	Left	7	30	1.2
						Transition	114828.13	114848.13		20					
						Straight	114848.13	114894.31	46.189						

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	114894.31	114909.31		15					
51	575789.322	2824031.445	168	32	08.22" Lef	Arc	114909.31	114953.14		43.83	20	Left	7	20	1.5
						Transition	114953.14	114968.14		15					
						Straight	114968.14	115049.73	81.589						
						Transition	115049.73	115064.73		15					
52	575980.474	2824048.011	174	35	40.33" Righ	Arc	115064.73	115110.68		45.945	20	Right	7	20	1.5
						Transition	115110.68	115125.68		15					
						Straight	115125.68	115167.05	41.37						
						Transition	115167.05	115182.05		15					
53	575867.477	2823986.815	12	43	34.47" Righ	Arc	115182.05	115211.47		29.423	200	Right	3.6	40	0.6
						Transition	115211.47	115226.47		15					
						Straight	115226.47	115342.09	115.618						
						Transition	115342.09	115357.09		15					
54	575708.271	2823963.213	15	30	50.13" Lef	Arc	115357.09	115358.34		1.246	60	Left	6.7	30	1.2
						Transition	115358.34	115373.34		15					
						Straight	115373.34	115383.38	10.048						
						Transition	115383.38	115398.38		15					
55	575648.71	2823940.46	34	38	19.89" Righ	Arc	115398.38	115443.84		45.456	100	Right	5.4	35	0.9
						Transition	115443.84	115458.84		15					
						Straight	115458.84	115477.27	18.434						
						Transition	115477.27	115497.27		20					
56	575569.574	2823951.922	30	57	50.16" Lef	Arc	115497.27	115504.3		7.021	50	Left	7	30	1.2
						Transition	115504.3	115524.3		20					
						Straight	115524.3	115567.78	43.484						
						Transition	115567.78	115582.78		15					
57	575487.573	2823928.095	64	47	38.16" Righ	Arc	115582.78	115590.4		7.617	20	Right	7	20	1.5
						Transition	115590.4	115605.4		15					
						Straight	115605.4	115621.25	15.852						
						Transition	115621.25	115636.25		15					
58	575442.982	2823963.638	57	40	08.23"	Arc	115636.25	115651.44		15.195	30	Left	5.9	20	1.5

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
					Lef										
						Transition	115651.44	115666.44		15					
						Straight	115666.44	115719.55	53.102						
						Transition	115719.55	115739.55		20					
59	575346.083	2823947.091	29	16	20.36" Righ	Arc	115739.55	115745.09		5.545	50	Right	7	30	1.2
						Transition	115745.09	115765.09		20					
						Straight	115765.09	115811.94	46.848						
						Transition	115811.94	115836.94		25					
60	575252.85	2823980.056	82	28	02.99" Righ	Arc	115836.94	115847.92		10.983	25	Right	7	25	1.5
						Transition	115847.92	115872.92		25					
						Straight	115872.92	115889.92	16.999						
						Transition	115889.92	115904.92		15					
61	575255.196	2824050.171	36	22	36.59" Lef	Arc	115904.92	115921.67		16.745	50	Left	5.6	25	1.2
						Transition	115921.67	115936.67		15					
						Straight	115936.67	115945.61	8.948						
						Transition	115945.61	115960.61		15					
62	575231.575	2824106.533	48	7	55.87" Righ	Arc	115960.61	115987.62		27.003	50	Right	5.6	25	1.2
						Transition	115987.62	116002.62		15					
						Straight	116002.62	116052.87	50.251						
						Transition	116052.87	116067.87		15					
63	575260.252	2824225.253	154	42	50.78" Lef	Arc	116067.87	116106.87		39.005	20	Left	7	20	1.5
						Transition	116106.87	116121.87		15					
						Straight	116121.87	116138.79	16.917						
						Transition	116138.79	116153.79		15					
64	575192.061	2824173.052	53	22	28.40" Lef	Arc	116153.79	116176.05		22.262	40	Left	4.4	20	1.5
						Transition	116176.05	116191.05		15					
						Straight	116191.05	116247.04	55.985						
						Transition	116247.04	116262.04		15					
65	575201.523	2824063.472	23	9	55.54" Righ	Arc	116262.04	116287.47		25.431	100	Right	5.4	35	0.9
						Transition	116287.47	116302.47		15					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Straight	116302.47	116323.75	21.281						
						Transition	116323.75	116338.75		15					
66	575158.48	2823969.566	171	8	44.66" Righ	Arc	116338.75	116383.49		44.741	20	Right	7	20	1.5
						Transition	116383.49	116398.49		15					
						Straight	116398.49	116462.24	63.749						
						Transition	116462.24	116477.24		15					
67	575156.984	2824110.329	34	52	46.85" Lef	Arc	116477.24	116492.68		15.438	50	Left	5.6	25	1.2
						Transition	116492.68	116507.68		15					
						Straight	116507.68	116532.72	25.037						
						Transition	116532.72	116547.72		15					
68	575126.139	2824178.423	44	22	58.90" Righ	Arc	116547.72	116571.45		23.731	50	Right	5.6	25	1.2
						Transition	116571.45	116586.45		15					
						Straight	116586.45	116592.29	5.841						
						Transition	116592.29	116612.29		20					
69	575133.961	2824249.773	122	22	40.95" Lef	Arc	116612.29	116645.69		33.397	25	Left	7	20	1.5
						Transition	116645.69	116665.69		20					
						Straight	116665.69	116698.83	33.148						
						Transition	116698.83	116713.83		15					
70	575039.063	2824233.079	9	56	53.99" Lef	Arc	116713.83	116733.56		19.726	200	Left	3.6	40	0.6
						Transition	116733.56	116748.56		15					
						Straight	116748.56	116792.67	44.105						
						Transition	116792.67	116807.67		15					
71	574881.128	2824161.489	52	29	30.12" Righ	Arc	116807.67	116975.9		168.231	200	Right	3.6	40	0.6
						Transition	116975.9	116990.9		15					
						Straight	116990.9	117028.13	37.229						
						Transition	117028.13	117043.13		15					
72	574729.469	2824233.299	10	40	28.74" Lef	Arc	117043.13	117065.39		22.262	200	Left	3.6	40	0.6
						Transition	117065.39	117080.39		15					
						Straight	117080.39	117172.14	91.752						
						Transition	117172.14	117187.14		15					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
73	574591.312	2824278.35	74	59	00.59" Righ	Arc	117187.14	117211.4		24.261	30	Right	5.9	20	1.5
						Transition	117211.4	117226.4		15					
						Straight	117226.4	117291.67	65.265						
						Transition	117291.67	117306.67		15					
74	574576.734	2824413.487	154	41	11.76" Lef	Arc	117306.67	117345.66		38.996	20	Left	7	20	1.5
						Transition	117345.66	117360.66		15					
						Straight	117360.66	117387.87	27.212						
						Transition	117387.87	117402.87		15					
75	574523.777	2824338.892	30	54	00.29" Righ	Arc	117402.87	117414.84		11.965	50	Right	5.6	25	1.2
						Transition	117414.84	117429.84		15					
						Straight	117429.84	117514.83	84.994						
						Transition	117514.83	117529.83		15					
76	574397.89	2824269.005	144	59	57.05" Righ	Arc	117529.83	117565.45		35.614	20	Right	7	20	1.5
						Transition	117565.45	117580.45		15					
						Straight	117580.45	117608.22	27.77						
						Transition	117608.22	117623.22		15					
77	574418.536	2824358.034	65	44	19.26" Lef	Arc	117623.22	117642.64		19.421	30	Left	5.9	20	1.5
						Transition	117642.64	117657.64		15					
						Straight	117657.64	117663.94	6.301						
						Transition	117663.94	117678.94		15					
78	574379.665	2824398.786	68	12	09.70" Lef	Arc	117678.94	117699.65		20.711	30	Left	5.9	20	1.5
						Transition	117699.65	117714.65		15					
						Straight	117714.65	117758.6	43.947						
						Transition	117758.6	117773.6		15					
79	574278.169	2824373.032	136	20	20.64" Righ	Arc	117773.6	117806.19		32.591	20	Right	7	20	1.5
						Transition	117806.19	117821.19		15					
						Straight	117821.19	117891.82	70.634						
						Transition	117891.82	117916.82		25					
80	574322.405	2824505.47	62	6	54.95" Lef	Arc	117916.82	117935.19		18.365	40	Left	7	30	1.5

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	117935.19	117960.19		25					
						Straight	117960.19	117983.83	23.638						
						Transition	117983.83	118008.83		25					
81	574277.23	2824578.124	35	46	20.97" Righ	Arc	118008.83	118015.04		6.217	50	Right	7	35	1.2
						Transition	118015.04	118040.04		25					
						Straight	118040.04	118071.92	31.876						
						Transition	118071.92	118086.92		15					
82	574256.018	2824686.011	165	29	17.53" Lef	Arc	118086.92	118129.68		42.766	20	Left	7	20	1.5
						Transition	118129.68	118144.68		15					
						Straight	118144.68	118215.91	71.226						
						Transition	118215.91	118240.91		25					
83	574209.795	2824541.123	27	31	27.03" Lef	Arc	118240.91	118254.34		13.431	80	Left	7	40	0.9
						Transition	118254.34	118279.34		25					
						Straight	118279.34	118325.32	45.974						
						Transition	118325.32	118350.32		25					
84	574231.518	2824434.019	44	24	36.74" Righ	Arc	118350.32	118364.07		13.755	50	Right	7	35	1.2
						Transition	118364.07	118389.07		25					
						Straight	118389.07	118487.06	97.993						
						Transition	118487.06	118502.06		15					
85	574163.03	2824293.343	107	41	01.03" Lef	Arc	118502.06	118524.65		22.589	20	Left	7	20	1.5
						Transition	118524.65	118539.65		15					
						Straight	118539.65	118556.08	16.432						
						Transition	118556.08	118571.08		15					
86	574235.945	2824274.573	55	39	12.40" Lef	Arc	118571.08	118604.65		33.567	50	Left	5.6	25	1.2
						Transition	118604.65	118619.65		15					
						Straight	118619.65	118642.02	22.367						
						Transition	118642.02	118657.02		15					
87	574321.104	2824331.387	161	47	02.40" Righ	Arc	118657.02	118698.49		41.473	20	Right	7	20	1.5
						Transition	118698.49	118713.49		15					
						Straight	118713.49	118834.91	121.42						

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	118834.91	118859.91		25					
88	574241.055	2824146.203	30	3	34.12" Lef	Arc	118859.91	118876.88		16.971	80	Left	7	40	0.9
						Transition	118876.88	118901.88		25					
						Straight	118901.88	118938.52	36.635						
						Transition	118938.52	118973.52		35					
89	574258.369	2824019.449	114	47	33.47" Lef	Arc	118973.52	119018.66		45.14	40	Left	7	35	1.5
						Transition	119018.66	119053.66		35					
						Straight	119053.66	119076.15	22.498						
						Transition	119076.15	119096.15		20					
90	574358.77	2824053.599	17	33	26.38" Lef	Arc	119096.15	119106.8		10.643	100	Left	7	40	0.9
						Transition	119106.8	119126.8		20					
						Straight	119126.8	119135.07	8.276						
						Transition	119135.07	119150.07		15					
91	574405.95	2824093.981	47	37	50.02" Righ	Arc	119150.07	119176.64		26.566	50	Right	5.6	25	1.2
						Transition	119176.64	119191.64		15					
						Straight	119191.64	119259.03	67.393						
						Transition	119259.03	119274.03		15					
92	574534.346	2824085.692	56	57	53.83" Righ	Arc	119274.03	119308.74		34.711	50	Right	5.6	25	1.2
						Transition	119308.74	119323.74		15					
						Straight	119323.74	119353.77	30.028						
						Transition	119353.77	119368.77		15					
93	574578.789	2824017.198	25	40	09.42" Lef	Arc	119368.77	119376.17		7.401	50	Left	5.6	25	1.2
						Transition	119376.17	119391.17		15					
						Straight	119391.17	119473.03	81.856						
						Transition	119473.03	119493.03		20					
94	574692.807	2823929.313	73	53	41.27" Righ	Arc	119493.03	119537.51		44.485	50	Right	7	30	1.2
						Transition	119537.51	119557.51		20					
						Straight	119557.51	119568.16	10.651						
						Transition	119568.16	119583.16		15					
95	574668.204	2823851.354	76	29	56.46"	Arc	119583.16	119608.22		25.055	30	Right	5.9	20	1.5

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
					Righ										
						Transition	119608.22	119623.22		15					
						Straight	119623.22	119717.94	94.727						
						Transition	119717.94	119737.94		20					
96	574494.557	2823866.119	46	52	03.22" Righ	Arc	119737.94	119799.74		61.799	100	Right	7	40	0.9
						Transition	119799.74	119819.74		20					
						Straight	119819.74	119880.75	61.007						
						Transition	119880.75	119895.75		15					
97	574368.533	2824005.111	117	39	25.08" Lef	Arc	119895.75	119983.43		87.675	50	Left	5.6	25	1.2
						Transition	119983.43	119998.43		15					
						Straight	119998.43	120015.55	17.121						
						Transition	120015.55	120030.55		15					
98	574315.862	2823905.02	53	50	06.24" Lef	Arc	120030.55	120043.74		13.188	30	Left	5.9	20	1.5
						Transition	120043.74	120058.74		15					
						Straight	120058.74	120064.98	6.242						
						Transition	120064.98	120079.98		15					
99	574338.257	2823847.479	93	45	02.29" Righ	Arc	120079.98	120114.06		34.088	30	Right	5.9	20	1.5
						Transition	120114.06	120129.06		15					
						Straight	120129.06	120135.33	6.261						
						Transition	120135.33	120160.33		25					
100	574276.17	2823813.345	26	43	20.86" Righ	Arc	120160.33	120172.64		12.312	80	Right	7	40	0.9
						Transition	120172.64	120197.64		25					
						Straight	120197.64	120245.71	48.071						
						Transition	120245.71	120275.71		30					
101	574167.849	2823817.772	57	22	08.15" Righ	Arc	120275.71	120275.75		0.038	30	Right	7	30	1.5
						Transition	120275.75	120305.75		30					
						Straight	120305.75	120355.08	49.336						
						Transition	120355.08	120380.08		25					
102	574106.429	2823901.243	48	12	47.16" Lef	Arc	120380.08	120380.33		0.244	30	Left	7	25	1.5
						Transition	120380.33	120405.33		25					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Straight	120405.33	120415.72	10.393						
						Transition	120415.72	120430.72		15					
103	574051.291	2823919.52	87	31	04.54" Righ	Arc	120430.72	120446.27		15.55	20	Right	7	20	1.5
						Transition	120446.27	120461.27		15					
						Straight	120461.27	120471.66	10.394						
						Transition	120471.66	120486.66		15					
104	574050.21	2823970.535	60	14	11.91" Lef	Arc	120486.66	120492.69		6.027	20	Left	7	20	1.5
						Transition	120492.69	120507.69		15					
						Straight	120507.69	120593.55	85.861						
						Transition	120593.55	120613.55		20					
105	573942.574	2824062.775	63	31	37.87" Righ	Arc	120613.55	120648.99		35.438	50	Right	7	30	1.2
						Transition	120648.99	120668.99		20					
						Straight	120668.99	120674.01	5.02						
						Transition	120674.01	120689.01		15					
106	573946.596	2824134.287	76	51	15.34" Lef	Arc	120689.01	120714.25		25.241	30	Left	5.9	20	1.5
						Transition	120714.25	120729.25		15					
						Straight	120729.25	120867.67	138.42						
						Transition	120867.67	120892.67		25					
107	573767.654	2824222.938	39	59	38.73" Righ	Arc	120892.67	120909.55		16.882	60	Right	7	35	1.2
						Transition	120909.55	120934.55		25					
						Straight	120934.55	120955.56	21.005						
						Transition	120955.56	120980.56		25					
108	573727.943	2824311.997	70	14	44.16" Righ	Arc	120980.56	121016.86		36.301	50	Right	7	35	1.2
						Transition	121016.86	121041.86		25					
						Straight	121041.86	121087.97	46.113						
						Transition	121087.97	121102.97		15					
109	573798.597	2824402.37	98	53	45.86" Lef	Arc	121102.97	121122.49		19.521	20	Left	7	20	1.5
						Transition	121122.49	121137.49		15					
						Straight	121137.49	121150.71	13.22						
						Transition	121150.71	121175.71		25					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
110	573752.487	2824446.865	51	30	04.30" Righ	Arc	121175.71	121177.68		1.966	30	Right	7	25	1.5
						Transition	121177.68	121202.68		25					
						Straight	121202.68	121211.79	9.112						
						Transition	121211.79	121226.79		15					
111	573744.249	2824500.812	28	12	23.14" Lef	Arc	121226.79	121236.41		9.615	50	Left	5.6	25	1.2
						Transition	121236.41	121251.41		15					
						Straight	121251.41	121367.55	116.141						
						Transition	121367.55	121382.55		15					
112	573665.358	2824635.833	24	53	05.09" Righ	Arc	121382.55	121393.61		11.059	60	Right	6.7	30	1.2
						Transition	121393.61	121408.61		15					
						Straight	121408.61	121436.14	27.538						
						Transition	121436.14	121451.14		15					
113	573657.668	2824702.695	22	36	20.33" Righ	Arc	121451.14	121459.82		8.673	60	Right	6.7	30	1.2
						Transition	121459.82	121474.82		15					
						Straight	121474.82	121507.91	33.099						
						Transition	121507.91	121522.91		15					
114	573682.764	2824774.436	93	9	49.15" Righ	Arc	121522.91	121540.44		17.52	20	Right	7	20	1.5
						Transition	121540.44	121555.44		15					
						Straight	121555.44	121575.14	19.705						
						Transition	121575.14	121600.14		25					
115	573751.7	2824760.384	55	45	05.71" Lef	Arc	121600.14	121604.33		4.191	30	Left	7	25	1.5
						Transition	121604.33	121629.33		25					
						Straight	121629.33	121671.86	42.529						
						Transition	121671.86	121696.86		25					
116	573829.19	2824815.121	30	59	26.23" Lef	Arc	121696.86	121698.9		2.044	50	Left	7	35	1.2
						Transition	121698.9	121723.9		25					
						Straight	121723.9	121730.4	6.497						
						Transition	121730.4	121755.4		25					
117	573851.48	2824868.429	30	4	34.82" Lef	Arc	121755.4	121756.65		1.247	50	Left	7	35	1.2

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	121756.65	121781.65		25					
						Straight	121781.65	121791.55	9.901						
						Transition	121791.55	121806.55		15					
118	573849.664	2824921.336	58	36	13.33" Righ	Arc	121806.55	121812.01		5.457	20	Right	7	20	1.5
						Transition	121812.01	121827.01		15					
						Straight	121827.01	121899.76	72.753						
						Transition	121899.76	121914.76		15					
119	573933.164	2824988.731	57	46	02.05" Righ	Arc	121914.76	121919.92		5.165	20	Right	7	20	1.5
						Transition	121919.92	121934.92		15					
						Straight	121934.92	121954	19.074						
						Transition	121954	121969		15					
120	573985.771	2824975.27	29	56	16.55" Lef	Arc	121969	121974.9		5.901	40	Left	4.4	20	1.5
						Transition	121974.9	121989.9		15					
						Straight	121989.9	122027.52	37.627						
						Transition	122027.52	122042.52		15					
121	574057.712	2824988.791	19	36	08.41" Lef	Arc	122042.52	122048.05		5.528	60	Left	6.7	30	1.2
						Transition	122048.05	122063.05		15					
						Straight	122063.05	122114.53	51.474						
						Transition	122114.53	122129.53		15					
122	574141.094	2825047.272	129	39	05.23" Lef	Arc	122129.53	122159.78		30.257	20	Left	7	20	1.5
						Transition	122159.78	122174.78		15					
						Straight	122174.78	122200.53	25.749						
						Transition	122200.53	122215.53		15					
123	574072.996	2825081.993	19	35	29.09" Righ	Arc	122215.53	122221.05		5.516	60	Right	6.7	30	1.2
						Transition	122221.05	122236.05		15					
						Straight	122236.05	122269.31	33.263						
						Transition	122269.31	122289.31		20					
124	574015.478	2825129.099	15	21	34.55" Righ	Arc	122289.31	122296.12		6.808	100	Right	7	40	0.9
						Transition	122296.12	122316.12		20					
						Straight	122316.12	122336.71	20.597						

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	122336.71	122356.71		20					
125	573971.303	2825186.953	21	34	09.07" Lef	Arc	122356.71	122374.36		17.645	100	Left	7	40	0.9
						Transition	122374.36	122394.36		20					
						Straight	122394.36	122418.38	24.024						
						Transition	122418.38	122438.38		20					
126	573900.635	2825237.293	27	22	08.81" Righ	Arc	122438.38	122466.15		27.768	100	Right	7	40	0.9
						Transition	122466.15	122486.15		20					
						Straight	122486.15	122525.78	39.627						
						Transition	122525.78	122550.78		25					
127	573851.969	2825323.469	30	5	45.24" Righ	Arc	122550.78	122552.04		1.264	50	Right	7	35	1.2
						Transition	122552.04	122577.04		25					
						Straight	122577.04	122647.01	69.967						
						Transition	122647.01	122662.01		15					
128	573854.279	2825442.277	61	13	43.07" Righ	Arc	122662.01	122679.07		17.059	30	Right	5.9	20	1.5
						Transition	122679.07	122694.07		15					
						Straight	122694.07	122697.01	2.937						
						Transition	122697.01	122712.01		15					
129	573896.174	2825473.01	67	20	00.35" Lef	Arc	122712.01	122732.26		20.256	30	Left	5.9	20	1.5
						Transition	122732.26	122747.26		15					
						Straight	122747.26	122754.5	7.234						
						Transition	122754.5	122769.5		15					
130	573893.593	2825521.935	35	19	02.86" Lef	Arc	122769.5	122772.99		3.492	30	Left	5.9	20	1.5
						Transition	122772.99	122787.99		15					
						Straight	122787.99	122832.39	44.399						
						Transition	122832.39	122857.39		25					
131	573835.997	2825585.614	48	53	18.93" Lef	Arc	122857.39	122857.98		0.598	30	Left	7	25	1.5
						Transition	122857.98	122882.98		25					
						Straight	122882.98	122907.58	24.591						
						Transition	122907.58	122932.58		25					
132	573755.187	2825593.242	44	4	34.08"	Arc	122932.58	122946.04		13.464	50	Right	7	35	1.2

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
					Righ										
						Transition	122946.04	122971.04		25					
						Straight	122971.04	123001.11	30.067						
						Transition	123001.11	123016.11		15					
133	573694.845	2825651.259	56	56	25.83" Righ	Arc	123016.11	123030.92		14.814	30	Right	5.9	20	1.5
						Transition	123030.92	123045.92		15					
						Straight	123045.92	123049.89	3.97						
						Transition	123049.89	123064.89		15					
134	573696.816	2825698.804	78	50	15.80" Lef	Arc	123064.89	123077.41		12.52	20	Left	7	20	1.5
						Transition	123077.41	123092.41		15					
						Straight	123092.41	123099.57	7.157						
						Transition	123099.57	123124.57		25					
135	573644.873	2825727.216	26	30	15.48" Righ	Arc	123124.57	123136.57		12.007	80	Right	7	40	0.9
						Transition	123136.57	123161.57		25					
						Straight	123161.57	123188.78	27.204						
						Transition	123188.78	123208.78		20					
136	573587.47	2825787.825	17	36	22.01" Lef	Arc	123208.78	123219.51		10.728	100	Left	7	40	0.9
						Transition	123219.51	123239.51		20					
						Straight	123239.51	123296.26	56.75						
						Transition	123296.26	123311.26		15					
137	573499.861	2825849.259	99	3	11.13" Righ	Arc	123311.26	123330.83		19.576	20	Right	7	20	1.5
						Transition	123330.83	123345.83		15					
						Straight	123345.83	123394.91	49.079						
						Transition	123394.91	123409.91		15					
138	573554.795	2825931.547	98	3	22.80" Lef	Arc	123409.91	123429.14		19.228	20	Left	7	20	1.5
						Transition	123429.14	123444.14		15					
						Straight	123444.14	123466.77	22.629						
						Transition	123466.77	123481.77		15					
139	573493.744	2825983.592	90	24	50.37" Righ	Arc	123481.77	123514.11		32.341	30	Right	5.9	20	1.5
						Transition	123514.11	123529.11		15					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Straight	123529.11	123558.01	28.896						
						Transition	123558.01	123583.01		25					
140	573534.769	2826061.951	27	49	05.99" Lef	Arc	123583.01	123587.14		4.131	60	Left	7	35	1.2
						Transition	123587.14	123612.14		25					
						Straight	123612.14	123665.82	53.688						
						Transition	123665.82	123680.82		15					
141	573542.565	2826164.721	57	46	35.58" Lef	Arc	123680.82	123696.08		15.252	30	Left	5.9	20	1.5
						Transition	123696.08	123711.08		15					
						Straight	123711.08	123713.95	2.879						
						Transition	123713.95	123728.95		15					
142	573491.81	2826213.695	79	13	01.86" Righ	Arc	123728.95	123783.08		54.13	50	Right	5.6	25	1.2
						Transition	123783.08	123798.08		15					
						Straight	123798.08	123855.25	57.161						
						Transition	123855.25	123870.25		15					
143	573538.483	2826324.376	40	59	07.39" Lef	Arc	123870.25	123876.71		6.46	30	Left	5.9	20	1.5
						Transition	123876.71	123891.71		15					
						Straight	123891.71	123923.01	31.303						
						Transition	123923.01	123938.01		15					
144	573525.387	2826394.045	53	42	24.46" Righ	Arc	123938.01	123951.13		13.121	30	Right	5.9	20	1.5
						Transition	123951.13	123966.13		15					
						Straight	123966.13	123995.72	29.592						
						Transition	123995.72	124015.72		20					
145	573570.525	2826460.668	55	45	02.59" Lef	Arc	124015.72	124034.64		18.921	40	Left	6.9	25	1.5
						Transition	124034.64	124054.64		20					
						Straight	124054.64	124075.99	21.348						
						Transition	124075.99	124095.99		20					
146	573546.584	2826538.809	61	6	54.67" Lef	Arc	124095.99	124118.66		22.666	40	Left	6.9	25	1.5
						Transition	124118.66	124138.66		20					
						Straight	124138.66	124231.41	92.752						
						Transition	124231.41	124251.41		20					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
147	573379.163	2826589.32	105	5	54.78" Righ	Arc	124251.41	124304.78		53.373	40	Right	6.9	25	1.5
						Transition	124304.78	124324.78		20					
						Straight	124324.78	124347.32	22.538						
						Transition	124347.32	124362.32		15					
148	573410.305	2826681.895	93	40	38.22" Lef	Arc	124362.32	124380.02		17.7	20	Left	7	20	1.5
						Transition	124380.02	124395.02		15					
						Straight	124395.02	124420.74	25.724						
						Transition	124420.74	124435.74		15					
149	573347.018	2826721.61	98	23	32.77" Righ	Arc	124435.74	124455.09		19.345	20	Right	7	20	1.5
						Transition	124455.09	124470.09		15					
						Straight	124470.09	124564.22	94.128						
150	573412.94	2826837.819	5	38	42.01" Righ	Arc	124564.22	124593.77		29.557	300	Right	Normal Camber	40	0.6
						Straight	124593.77	124687.79	94.014						
						Transition	124687.79	124707.79		20					
151	573504.285	2826949.002	57	10	34.40" Righ	Arc	124707.79	124737.68		29.896	50	Right	7	30	1.2
						Transition	124737.68	124757.68		20					
						Straight	124757.68	124795.93	38.246						
						Transition	124795.93	124815.93		20					
152	573627.533	2826950.324	85	1	45.76" Lef	Arc	124815.93	124870.13		54.202	50	Left	7	30	1.2
						Transition	124870.13	124890.13		20					
						Straight	124890.13	124906.09	15.96						
						Transition	124906.09	124921.09		15					
153	573653.3	2827036.17	61	54	56.22" Righ	Arc	124921.09	124938.51		17.419	30	Right	5.9	20	1.5
						Transition	124938.51	124953.51		15					
						Straight	124953.51	125013	59.485						
						Transition	125013	125033		20					
154	573765.788	2827079.51	31	14	27.00" Lef	Arc	125033	125067.52		34.526	100	Left	7	40	0.9
						Transition	125067.52	125087.52		20					
						Straight	125087.52	125174.53	87.004						

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Transition	125174.53	125189.53		15					
155	573867.623	2827186.975	93	13	09.75" Righ	Arc	125189.53	125207.07		17.54	20	Right	7	20	1.5
						Transition	125207.07	125222.07		15					
						Straight	125222.07	125258.03	35.959						
						Transition	125258.03	125278.03		20					
156	573936.032	2827132.853	40	12	44.29" Lef	Arc	125278.03	125293.12		15.092	50	Left	7	30	1.2
						Transition	125293.12	125313.12		20					
						Straight	125313.12	125366.3	53.187						
						Transition	125366.3	125386.3		20					
157	574042.064	2827122.285	18	17	29.84" Righ	Arc	125386.3	125398.23		11.925	100	Right	7	40	0.9
						Transition	125398.23	125418.23		20					
						Straight	125418.23	125434.05	15.82						
						Transition	125434.05	125449.05		15					
158	574109.028	2827101.839	77	14	50.83" Lef	Arc	125449.05	125474.5		25.447	30	Left	5.9	20	1.5
						Transition	125474.5	125489.5		15					
						Straight	125489.5	125569.67	80.171						
						Transition	125569.67	125589.67		20					
159	574204.045	2827218.894	88	17	21.26" Righ	Arc	125589.67	125631.3		41.638	40	Right	6.9	25	1.5
						Transition	125631.3	125651.3		20					
						Straight	125651.3	125680.2	28.896						
						Transition	125680.2	125700.2		20					
160	574296.737	2827173.37	62	16	09.17" Lef	Arc	125700.2	125723.67		23.472	40	Left	6.9	25	1.5
						Transition	125723.67	125743.67		20					
						Straight	125743.67	125771.85	28.178						
						Transition	125771.85	125791.85		20					
161	574377.935	2827216.016	25	8	04.28" Lef	Arc	125791.85	125815.72		23.868	100	Left	7	40	0.9
						Transition	125815.72	125835.72		20					
						Straight	125835.72	125847.04	11.326						
						Transition	125847.04	125862.04		15					
162	574417.723	2827288.12	146	54	21.72"	Arc	125862.04	125898.32		36.28	20	Left	7	20	1.5

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
					Lef										
						Transition	125898.32	125913.32		15					
						Straight	125913.32	125968.85	55.529						
						Transition	125968.85	125983.85		15					
163	574301.206	2827260.392	97	54	07.56" Righ	Arc	125983.85	126003.03		19.174	20	Right	7	20	1.5
						Transition	126003.03	126018.03		15					
						Straight	126018.03	126070.6	52.57						
						Transition	126070.6	126085.6		15					
164	574272.711	2827356.217	8	46	13.50" Righ	Arc	126085.6	126101.21		15.615	200	Right	3.6	40	0.6
						Transition	126101.21	126116.21		15					
						Straight	126116.21	126148.72	32.507						
						Transition	126148.72	126168.72		20					
165	574264.725	2827433.936	14	42	37.37" Lef	Arc	126168.72	126174.39		5.674	100	Left	7	40	0.9
						Transition	126174.39	126194.39		20					
						Straight	126194.39	126245.12	50.723						
						Transition	126245.12	126260.12		15					
166	574232.911	2827520.127	42	7	22.40" Lef	Arc	126260.12	126267.17		7.055	30	Left	5.9	20	1.5
						Transition	126267.17	126282.17		15					
						Straight	126282.17	126286.94	4.768						
						Transition	126286.94	126301.94		15					
167	574191.89	2827540.943	59	18	57.89" Lef	Arc	126301.94	126318		16.058	30	Left	5.9	20	1.5
						Transition	126318	126333		15					
						Straight	126333	126338.76	5.765						
						Transition	126338.76	126353.76		15					
168	574141.36	2827517.404	44	6	19.30" Righ	Arc	126353.76	126377.25		23.489	50	Right	5.6	25	1.2
						Transition	126377.25	126392.25		15					
						Straight	126392.25	126441.76	49.507						
						Transition	126441.76	126456.76		15					
169	574036.806	2827544.9	88	52	05.34" Righ	Arc	126456.76	126488.29		31.531	30	Right	5.9	20	1.5
						Transition	126488.29	126503.29		15					

HIP/CURVE NO.	HIP		DEFLECTION ANGLE			ELEMENT	START	END	LENGTH (m)	CHORD LENGTH (m)	RADIUS (m)	HAND OF ARC	SUPERELEVATION (%)	DESIGN SPEED	EXTRA WIDENING
	EASTING	NORTHING	DEG	MIN	SEC		CHAINAGE (m)	CHAINAGE (m)							
						Straight	126503.29	126504.62	1.325						
						Transition	126504.62	126519.62		15					
170	574039.721	2827603.732	67	9	56.65" Lef	Arc	126519.62	126539.78		20.168	30	Left	5.9	20	1.5
						Transition	126539.78	126554.78		15					
						Straight	126554.78	126584.3	29.512						
						Transition	126584.3	126599.3		15					
171	573979.977	2827654.101	60	37	36.14" Righ	Arc	126599.3	126616.04		16.744	30	Right	5.9	20	1.5
						Transition	126616.04	126631.04		15					
						Straight	126631.04	126684.95	53.913						
						Transition	126684.95	126704.95		20					
172	573987.35	2827755.144	16	14	42.09" Righ	Arc	126704.95	126713.31		8.353	100	Right	7	40	0.9
						Transition	126713.31	126733.31		20					
						Straight	126733.31	126775	42						

3.13 Proposed Cross Section Details

Cross-section of the improved facility should be adequate to cater to the traffic expected over the design period and offer safe and convenient traffic operation at speeds consistent with the terrain conditions and functional classification of this road. The cross sectional elements (carriageway/shoulder width etc) shall be as per guideline specified in geometric design standard mentioned in chapter 6. Following typical cross sections have been envisaged for the subject project as given below:

Table 3.11: Proposed Cross Sectional Details

TCS TYPE	DESCRIPTION	Length(m)
TCS-1	New Construction of two lane carriageway in rural area with one side retaining wall on Valley side And RR Masonry Trapezoidal Open Drain On Hill Side	1950
TCS-2	New Construction of two lane carriageway in rural area with Both Side RR Masonry Trapezoidal Open Drain On Hill Section	1231
TCS-3	New Construction of two lane carriageway in rural area With Breast Wall On Hill Side And RR Masonry Trapezoidal Open Drain On Valley Side	1175
TCS-4	New Construction of two lane carriageway in rural area With Breast Wall On Hill Side And Earthen Shoulder On Valley Side	250
TCS-5	Reconstruction Of Two Lane Carriageway In Rural Area With RR Masonry Trapezoidal Open Drain On Hill Side And Earthen Shoulder On Valley Side	1700
TCS-6	Reconstruction Of Two Lane Carriageway In Rural Area With Both Side RR Masonry Trapezoidal Open Drain On Hill Section	1400
TCS-7	Reconstruction Of Two Lane Carriageway At Reconstruction Stretch In Rural Area With Retaining Wall On Valley Side And RR Masonry Trapezoidal Open Drain On Hill Side	1950
TCS-8	Reconstruction Of Two Lane Carriageway In Rural Area With Breast Wall On Hill Side And Earthen Shoulder On Valley Side	100
TCS-9	Reconstruction Of Two Lane Carriageway In Rural Area With Breast Wall On Hill Side And RR Masonry Trapezoidal Open Drain On Valley Side	1375
TCS-10	Reconstruction Of Two Lane Carriageway in Rural Area With Retaining Wall On Valley Side And Breast Wall On Hill Side	50
TCS-11	Reconstruction Of Two Lane Carriageway In Rural Area	100
TCS-12	Reconstruction Of Two Lane Carriageway In Built Up Area With Both Side Footpath Cum RCC Rectangular Drain	2300
TCS-16	Reconstruction Of Two Lane Carriageway Stretch In Rural Area With bothside Breast Wall On Hill Side	1600
TCS-17	Reconstruction Of Two Lane Carriageway In Rural Area With Retaining Wall On valley Side And Earthen Shoulder On other side	150
TCS-19	New construction Of Two Lane Carriageway At Reconstruction Stretch In Rural Area With Retaining Wall On Valley Side And Breast Wall On Hill Side	200

TCS TYPE	DESCRIPTION	Length(m)
TCS-20	New construction Of Two Lane Carriageway In Rural Area With RR Masonry Trapezoidal Open Drain On Hill Side And Earthen Shoulder On Valley Side	400
TCS-21	New construction Of Two Lane Carriageway In Rural Area With Retaining Wall On valley Side And Earthen Shoulder On other side	500
TCS-22	New construction Of Two Lane Carriageway Stretch In Rural Area With bothside Breast Wall On Hill Side	250
TCS-23	New construction Of Two Lane Carriageway In Rural Area With Bothside Retaining Wall On valley Side	350
TCS-24	New construction Of Two Lane Carriageway At Realignment Stretch with One side Composite RE Wall In Rural Area	250
Total Length (m) =		**17281**

Chainage wise typical cross section details are mentioned below:

Chainage (km)		Length	TCS
From	To		
PKG - IA			
109494	109775	281	TCS-2
109775	109875	100	TCS-21
109875	109925	50	TCS-3
109925	109975	50	TCS-19
109975	110075	100	TCS-20
110075	110125	50	TCS-1
110125	110225	100	TCS-4
110225	110575	350	TCS-2
110575	110875	300	TCS-1
110875	111025	150	TCS-2
111025	111175	150	TCS-1
111175	111275	100	TCS-20
111275	111375	100	TCS-2
111375	111775	400	TCS-1
111775	111875	100	TCS-2
111875	112025	150	TCS-19
112025	112175	150	TCS-1
112175	112375	200	TCS-3
112375	112475	100	TCS-4
112475	112625	150	TCS-1
112625	112675	50	TCS-2
112675	113025	350	TCS-1
113025	113075	50	TCS-3
113075	113175	100	TCS-22
113175	113275	100	TCS-3
113275	113325	50	TCS-20
113325	113575	250	TCS-3
113575	113625	50	TCS-20
113625	113775	150	TCS-22
113775	113825	50	TCS-2
113825	113975	150	TCS-3
113975	114025	50	TCS-2
114025	114075	50	TCS-1
114075	114225	150	TCS-23
114225	114275	50	TCS-1

Chainage (km)		Length	TCS
From	To		
114275	114375	100	TCS-23
114375	114425	50	TCS-2
114425	114525	100	TCS-1
114525	114625	100	TCS-23
114625	114925	300	TCS-21
114925	114975	50	TCS-4
114975	115025	50	TCS-3
115025	115125	100	TCS-1
115125	115175	50	TCS-2
115175	115350	175	TCS-3
115350	115975	625	TCS-9
115975	116225	250	TCS-16
116225	116275	50	TCS-9
116275	117625	1350	TCS-16
117625	118025	400	TCS-9
118025	118075	50	TCS-10
118075	118225	150	TCS-3
118225	118275	50	TCS-5
118275	118325	50	TCS-6
118325	118475	150	TCS-5
118475	118525	50	TCS-1
118525	118775	250	TCS-24
118775	118875	100	TCS-20
118875	118975	100	TCS-6
118975	119125	150	TCS-7
119125	119225	100	TCS-8
119225	119275	50	TCS-7
119275	119575	300	TCS-5
119575	119975	400	TCS-6
119975	120125	150	TCS-9
120125	120225	100	TCS-6
120225	120325	100	TCS-5
120325	120375	50	TCS-7
120375	120425	50	TCS-6
120425	120625	200	TCS-12
120625	120725	100	TCS-6
120725	120775	50	TCS-1

Chainage (km)		Length	TCS
From	To		
120775	120875	100	TCS-21
120875	120925	50	TCS-11
120925	120975	50	TCS-5
120975	121125	150	TCS-6
121125	123225	2100	TCS-12
123225	123475	250	TCS-7
123475	123725	250	TCS-5
123725	123975	250	TCS-7
123975	124025	50	TCS-5
124025	124225	200	TCS-7
124225	124375	150	TCS-6
124375	124425	50	TCS-7
124425	124475	50	TCS-17
124475	124675	200	TCS-7
124675	124725	50	TCS-5
124725	124775	50	TCS-7
124775	125225	450	TCS-5
125225	125275	50	TCS-7
125275	125325	50	TCS-5
125325	125475	150	TCS-7
125475	125525	50	TCS-5
125525	125725	200	TCS-7
125725	125775	50	TCS-11
125775	125875	100	TCS-17
125875	125925	50	TCS-5
125925	126025	100	TCS-9
126025	126325	300	TCS-6
126325	126375	50	TCS-7
126375	126425	50	TCS-9
126425	126475	50	TCS-7
126475	126525	50	TCS-5
126525	126725	200	TCS-7
126725	126775	50	TCS-5
Total Length		**17281 m**	

3.14 Pavement Details

2-lane road will be developed in place of existing intermediate/two lane road. Considering Design traffic of 20 msa and Design CBR of 10% following pavement thickness has been adopted over existing and New/Widening portion.

TABLE 3.12: PAVEMENT THICKNESS

Design CBR (%)	Design Traffic (MSA)	GSB (mm)	WMM (mm)	DBM (mm)	BC (mm)	Total Thickness (mm)	Sub-grade in New /Widening portion (CBR-10%)
10%	20	200	250	70	40	560	500

Pavement Thickness as per IRC:37-2018

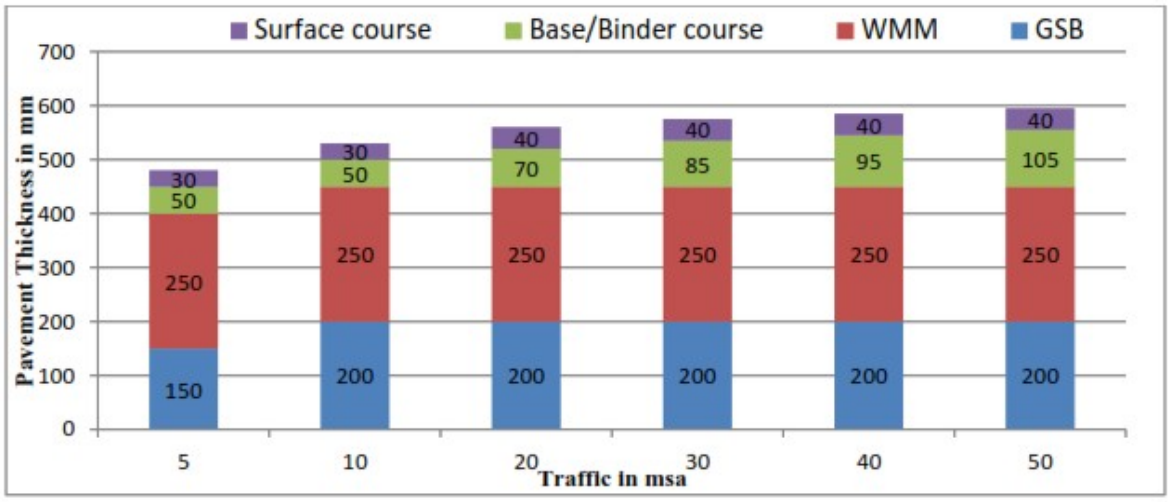


Figure 12.6 Catalogue for pavement with bituminous surface course with granular base and sub-base - Effective CBR 10% (Plate-6)

3.15 MUCK DISPOSAL

The muck from hill cutting and construction activities will be safely disposed at suitable locations. Principle adopted for selecting muck dumping areas was to avoid sensitive areas like dense vegetation, natural water courses and areas prone to landslides. During the selection of the dumping sites preference was given on the following aspects.

- The muck does not fall/ flow into stream/river.
- Dumping sites should be at least 30 m (horizontal) away from the High Flood Level of the River/ stream.
- The sites are free from active landslides or creeps.
- The sites should not fall within pristine forest nor are these habitats of threatened species of flora and fauna.
- The sites are located close to its source in order to avoid long distance haulage.

Muck Disposal Estimate (Peren-Dimapur Road Stretch)												
PKG No.	Chainage(KM)		Quantity of Muck/Debris generated in Cum	Quantity of Muck with 30% swell factor in Cum	Total Quantity of Muck/Debris including swell factor in Cum	Estimated Quantity of Muck/Debris proposed to be utilized for Filling in cum	Estimated quantity of muck/debris proposed to be dumped in cum.	Remarks	Estimated quantity of muck/debris proposed to be dumped in cum.	Avg. Dumping Height in M.	Avg. Dumping Area (Sqm.)	Avg. Dumping Area (Ha.)
	From	To										
PKG-IA	109.494	126.775	2,423,117.00	726,935.10	3,150,052.10	434,793.00	2,715,259.10		2,715,259.10	12	223,938.89	22.39

3.16 Bridges and Culverts

3.16.1 Bridges

There is no bridge has been proposed along this project stretch.

Table 3.13: Bridge Proposal

Sl. No.	Survey Chainage (km)	Design Chainage (km)	Existing Details			Proposal Details		
			Type of Structures	Span Arrangement (No. x Span) m	CRW Width / O/O Width (m)	Type of Structures (Bridge)	Span Arrangement (No. x Span) m	Proposed Width (m)
Package-IA								
Nil								

3.16.2 Culverts

Package: IA

Reconstruction with Box culverts=32 nos.

New Box culverts =7 nos.

Table 3.14a-DETAILS OF RECONSTRUCTION OF EXISTING CULVERTS

Sl. No.	Survey Chainage (Km)	Design Chainage (km)	Existing Details		Proposal	
			Type of Structure	Span Arrangement (M)	Type of Structure	Span Arrangement [Span (M) X Height (M)] (No. of Cell)
Package-IA						
1	110.14	110.09	Slab Culvert	1 x 3.5	BOX CULVERT	3.0 X 3.0
2	111.547	112.64	Slab Culvert	1 x 3.2	BOX CULVERT	3.0 X 3.0
3	112.727	114.095	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 2.0
4	113.18	114.67	HP Culvert	2 x 1.0 dia	BOX CULVERT (ENCASED IN RE WALL)	3.0 X 4.0
5	116.552	118.504	HP Culvert	2 x 0.9 dia	BOX CULVERT	2.0 X 3.0
6	116.935	118.85	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 2.0
7	117.027	118.941	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 2.0
8	117.065	118.985	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 2.0
9	118.207	119.092	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 3.0
10	117.322	119.225	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 2.0
11	117.471	119.365	HP Culvert	2 x 1.0 dia	BOX CULVERT	2.0 X 2.0
12	118.603	120.475	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
13	118.705	120.575	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 3.0
14	119.339	121.202	HP Culvert	1 x 0.9 dia	BOX CULVERT	2.0 X 2.0
15	120.615	122.31	HP Culvert	1 x 0.9 dia	BOX CULVERT	2.0 X 2.0
16	121.375	123.015	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
17	130.661	123.07	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0

Sl. No.	Survey Chainage (Km)	Design Chainage (km)	Existing Details		Proposal	
			Type of Structure	Span Arrangement (M)	Type of Structure	Span Arrangement [Span (M) X Height (M)] (No. of Cell)
18	121.475	123.115	HP Culvert	1 x 1.2 dia	BOX CULVERT	2.0 X 2.0
19	121.52	123.162	HP Culvert	1 x 1.2 dia	BOX CULVERT	2.0 X 2.0
20	121.691	123.315	HP Culvert	1 x 1.2 dia	BOX CULVERT	2.0 X 2.0
21	121.885	123.504	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
22	122.155	123.768	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 3.0
23	122.338	123.952	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
24	131.586	123.99	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
25	122.675	124.33	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
26	122.807	124.438	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 3.0
27	123.255	124.88	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
28	123.388	125.015	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
29	123.574	125.19	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
30	123.702	125.325	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
31	124.892	126.482	HP Culvert	1 x 1.0 dia	BOX CULVERT	2.0 X 2.0
32	125.027	126.612	HP Culvert	1 x 0.6 dia	BOX CULVERT	2.0 X 3.0

TABLE- 3.14b: DETAILS OF ADDITIONAL NEW CULVERT

Sl. No.	Survey Chainage (Km)	Design Chainage (km)	Existing Details		Proposal	
			Type of Structure	Span Arrangement (M)	Type of Structure	Span Arrangement [Span (M) X Height (M)] (No. of Cell)
Package-IA						
1	-	110.857	-	-	BOX CULVERT	2.0 X 2.0
2	-	111.038	-	-	BOX CULVERT	2.0 X 3.0
3	-	111.39	-	-	BOX CULVERT	2.0 X 3.0
4	-	111.74	-	-	BOX CULVERT	2.0 X 2.0
5	-	115.064	-	-	BOX CULVERT	2.0 X 3.0
6	-	124.61	-	-	BOX CULVERT	2.0 X 2.0
7	-	125.855	-	-	BOX CULVERT	2.0 X 3.0

3.16.3 ROB

There is no ROB has been proposed in this stretch.

Table 3.15: ROB Proposal

Sl. No.	Survey Chainage (km)	Design Chainage (km)	Existing Details		Proposal Details	
			Type of Structures	Span Arrangement (No. x Span) m	Type of Structures (Bridge)	Span Arrangement (No. x Span) m
Package-IA						
Nil						

3.17 Junction Improvement

The existing project road has a number of junctions mainly with village roads. Junctions have been classified into "Major" and "Minor" junctions according to functional importance and future prospects. There are 3 nos. major junctions and 11 nos. minor junctions in the project road. The details of proposals of major junctions are given below:

Table 3.16: Junction Proposal

Sl. No.	Existing Chainage (Km)	Name of Junction	Type of Junction	Leads To	Proposal	
					Design Chainage (Km)	Type
Package-IA						
1	119.000	Kiepeuzang junction	3-Legged	Tenning	120.900	At Grade 3-Legged
2	119.560	Peren town junction	3-Legged	Peren Town	121.400	At Grade 3-Legged
3	124.250	Pelekie junction	3-Legged	Kohima	125.870	At Grade 3-Legged

Minor Junctions:

- Package – IA: 11 Nos.

3.18 Realignment/Bypass

There is one major and one minor realignment have been done along the proposed project stretch for geometric improvement of existing road.

Table 3.17: Realignment Proposal

Sl. No.	Ext. Ch. (km)		Length	Design Ch. (km)		Length (km)	Remarks
	From	To		From	To		
a) Major Realignment							
1	109.767	114.14	4.373	109.494	116.116	6.622	Length increased due to Vertical Grade Correction
b) Minor Realignment							
1	115.125	115.235	0.11	117.116	117.216	0.100	
Total Realignment (km) = (Major +Minor)						**6.722**	

3.19 Service Roads

There is no Service Road proposed along the project stretch.

3.20 Toll Plaza

There is no toll plaza has been proposed in Package-IA.

3.21 Footpath and Drains

Footpath cum cover drain has been proposed in built up area for safe maneuverability of pedestrians. PCC V-shaped open drain has been proposed on hill side for proper drainage purpose. Details are given below:

Table 3.18: List of Footpath cum covered drain

Chainage (km)		Side	Length (m)	Structure Length (m)	Net Length (m)	TCS Type
From	To					
Package-IA						
120425	120625	Both	400	2.6	397	TCS-12
121125	123225	Both	4200	13	4187	TCS-12
Total Length of Footpath Cum RCC Cover Drain				4584 m		

Table 3.19: List of RR Masonry Trapezoidal Drain (Open)

Chainage		Side	Length(m)	Structure Length (m)	Net Length (m)	TCS Type
From(m)	To(m)					
Package-IA						
109494	109775	both side	562		562	TCS-2
109875	109925	one side	50		50	TCS-3
109975	110075	one side	100		100	TCS-20
110075	110125	one side	50		50	TCS-1
110225	110575	both side	700		700	TCS-2
110575	110875	one side	300	2.6	297.4	TCS-1
110875	111025	both side	300		300	TCS-2
111025	111175	one side	150		150	TCS-1
111175	111275	one side	100		100	TCS-20
111275	111375	both side	200		200	TCS-2
111375	111775	one side	400	5.3	394.7	TCS-1
111775	111875	both side	200		200	TCS-2
112025	112175	one side	150		150	TCS-1
112175	112375	one side	200		200	TCS-3
112475	112625	one side	150		150	TCS-1
112625	112675	both side	100	3.84	96.16	TCS-2
112675	113025	one side	350		350	TCS-1
113025	113075	one side	50		50	TCS-3
113175	113275	one side	100		100	TCS-3
113275	113325	one side	50		50	TCS-20
113325	113575	one side	250		250	TCS-3
113575	113625	one side	50		50	TCS-20
113775	113825	both side	100		100	TCS-2
113825	113975	one side	150		150	TCS-3
113975	114025	both side	100		100	TCS-2
114025	114075	one side	50		50	TCS-1
114225	114275	one side	50		50	TCS-1
114375	114425	both side	100		100	TCS-2
114425	114525	one side	100		100	TCS-1
114975	115025	one side	50		50	TCS-3

Chainage		Side	Length(m)	Structure Length (m)	Net Length (m)	TCS Type
From(m)	To(m)					
115025	115125	one side	100		100	TCS-1
115125	115175	both side	100		100	TCS-2
115175	115350	one side	175		175	TCS-3
115350	115975	one side	625		625	TCS-9
116225	116275	one side	50		50	TCS-9
117625	118025	one side	400		400	TCS-9
118075	118225	one side	150		150	TCS-3
118225	118275	one side	50		50	TCS-5
118275	118325	both side	100		100	TCS-6
118325	118475	one side	150		150	TCS-5
118475	118525	one side	50		50	TCS-1
118775	118875	one side	100	2.6	97.4	TCS-20
118875	118975	both side	200	2.6	197.4	TCS-6
118975	119125	one side	150		150	TCS-7
119225	119275	one side	50		50	TCS-7
119275	119575	one side	300		300	TCS-5
119575	119975	both side	800		800	TCS-6
119975	120125	one side	150		150	TCS-9
120125	120225	both side	200		200	TCS-6
120225	120325	one side	100		100	TCS-5
120325	120375	one side	50		50	TCS-7
120375	120425	both side	100		100	TCS-6
120625	120725	both side	200		200	TCS-6
120725	120775	one side	50		50	TCS-1
120925	120975	one side	50		50	TCS-5
120975	121125	both side	300		300	TCS-6
123225	123475	one side	250		250	TCS-7
123475	123725	one side	250		250	TCS-5
123725	123975	one side	250		250	TCS-7
123975	124025	one side	50	2.6	47.4	TCS-5
124025	124225	one side	200		200	TCS-7
124225	124375	both side	300	2.6	297.4	TCS-6
124375	124425	one side	50		50	TCS-7
124475	124675	one side	200	2.6	197.4	TCS-7
124675	124725	one side	50		50	TCS-5
124725	124775	one side	50		50	TCS-7
124775	125225	one side	450	5.2	444.8	TCS-5
125225	125275	one side	50		50	TCS-7
125275	125325	one side	50		50	TCS-5
125325	125475	one side	150		150	TCS-7
125475	125525	one side	50		50	TCS-5
125525	125725	one side	200		200	TCS-7
125875	125925	one side	50		50	TCS-5
125925	126025	one side	100		100	TCS-9
126025	126325	both side	600		600	TCS-6
126325	126375	one side	50		50	TCS-7

Chainage		Side	Length(m)	Structure Length (m)	Net Length (m)	TCS Type
From(m)	To(m)					
126375	126425	one side	50		50	TCS-9
126425	126475	one side	50		50	TCS-7
126475	126525	one side	50	2.6	47.4	TCS-5
126525	126725	one side	200		200	TCS-7
126725	126775	one side	50		50	TCS-5
				Total length =	**13779.46 m**	

3.22 Road Markings/Signage/Road Furniture

Retro-reflective signage as per IRC standard mounted on post or overhead gantry, required for safety and traffic control will be provided at suitable locations. Thermoplastic road markings, road studs, delineators, crash barriers etc. will be provided at required locations to ensure adequate safety of the road users.

3.23 Bus Bay and Passenger Shelter

2 no. of Bus Bays with Passenger Shelter are provided at 1 habitation areas along the project road. Details of proposed Bus Bay with Passenger Shelter locations are given below in Table 3.19

Table 3.20: List of Bus Bay with Passenger Shelter

Sl. No.	Design Chainage (km)	Side	Name of Place
Package - IA			
1	114.15	Both side	Peren Town

3.24 Truck Lay Bye

No truck Lay by is proposed on the project stretch.

3.25 Protection Work

No Gabion structure and W-Beam Crash Barrier were observed during the survey work. However, for proper protection of proposed road, breast wall, retaining wall with parapet has been proposed on hill and valley side respectively from road safety point of view. So, proper Breast Wall, Retaining Wall & Composite RE Wall have been proposed for road safety issues. The details of proposed Protection works are given below:

Table 3.21: Breast Wall

Chainage		Side	Length (m)	TCS Type
From (m)	To (m)			
Package - IA				
109875	109925	one side	50	TCS-3
109925	109975	one side	50	TCS-19
110125	110225	one side	100	TCS-4
111875	112025	one side	150	TCS-19
112175	112375	one side	200	TCS-3

Chainage		Side	Length (m)	TCS Type
From (m)	To (m)			
112375	112475	one side	100	TCS-4
113025	113075	one side	50	TCS-3
113075	113175	both side	200	TCS-22
113175	113275	one side	100	TCS-3
113325	113575	one side	250	TCS-3
113625	113775	both side	300	TCS-22
113825	113975	one side	150	TCS-3
114925	114975	one side	50	TCS-4
114975	115025	one side	50	TCS-3
115175	115350	one side	175	TCS-3
115350	115975	one side	625	TCS-9
115975	116225	both side	500	TCS-16
116225	116275	one side	50	TCS-9
116275	117625	both side	2700	TCS-16
117625	118025	one side	400	TCS-9
118025	118075	one side	50	TCS-10
118075	118225	one side	150	TCS-3
119125	119225	one side	100	TCS-8
119975	120125	one side	150	TCS-9
125925	126025	one side	100	TCS-9
126375	126425	one side	50	TCS-9
Total length =		**6850 m**		

Table 3.22: Retaining Wall

Chainage		CD Length(m)	Side	Average Height(m)	Length(m)	TCS Type
From(m)	To(m)					
Package-IA						
109775	109875		one side	4	100	TCS-21
109925	109975		one side	4	50	TCS-19
110075	110125		one side	3	50	TCS-1
110575	110875	2.6	one side	3	300	TCS-1
111025	111175		one side	3	150	TCS-1
111375	111775	5.3	one side	4	400	TCS-1
111875	112025		one side	3	150	TCS-19
112025	112175		one side	3	150	TCS-1
112475	112625		one side	3	150	TCS-1
112675	113025		one side	3	350	TCS-1
114025	114075		one side	2	50	TCS-1
114075	114225	2.6	both side	4	300	TCS-23
114225	114275		one side	4	50	TCS-1
114275	114375		both side	4	200	TCS-23
114425	114525		one side	3	100	TCS-1

Chainage		CD Length(m)	Side	Average Height(m)	Length(m)	TCS Type
From(m)	To(m)					
114525	114625		both side	3	200	TCS-23
114625	114925		one side	3	300	TCS-21
115025	115125		one side	3	100	TCS-1
118025	118075		one side	2	50	TCS-10
118475	118525		one side	3	50	TCS-1
118975	119125		one side	3	150	TCS-7
119225	119275		one side	3	50	TCS-7
120325	120375		one side	2	50	TCS-7
120725	120775		one side	2	50	TCS-1
120775	120875		one side	4	100	TCS-21
123225	123475		one side	1.5	250	TCS-7
123725	123975		one side	2	250	TCS-7
124025	124225		one side	2	200	TCS-7
124375	124425		one side	2	50	TCS-7
124425	124475	2.6	one side	3	50	TCS-17
124475	124675		one side	3	200	TCS-7
124725	124775		one side	3	50	TCS-7
125225	125275		one side	2	50	TCS-7
125325	125475		one side	2	150	TCS-7
125525	125725		one side	2	200	TCS-7
125775	125875		one side	4	100	TCS-17
126325	126375		one side	2	50	TCS-7
126425	126475		one side	2	50	TCS-7
126525	126725		one side	3	200	TCS-7
Length of 1.5m Retaining Wall=250m Length of 2.0m Retaining Wall=1200m Length of 3.0m Retaining Wall=2750m Length of 4.0m Retaining Wall=1300m **Total Length of Retaining Wall=5500m**						

Table 3.23: Composite RE Wall

Chainage		Length(m)	TCS Type
From (m)	To (m)		
Package - IA			
118525	118775	250	TCS-24
Length of Composite RE Wall = 250 m			

- **Parapet Wall**

  Parapet Wall is provided along with the retaining wall portion for a length of 5500 m in Package– IA.

- **Hydro seeding or vegetation**
  Hydro seeding or roadside vegetation will be provided through hill cutting portion for better stability and prevention of soil erosion. A total of **50800 Sqm** Hydro seeding has been proposed in package – IA.