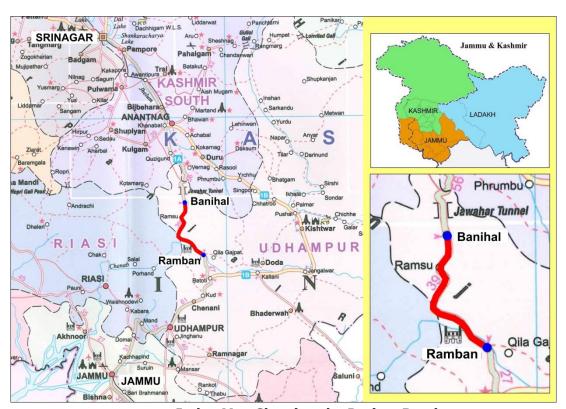
1.0 PROJECT BACKGROUND

The National Highway Authority of India (NHAI) under the Ministry of Road Transport & Highways (MoRT&H), Government of India has been entrusted the assignment of study of the existing DPR/ contract provisions for 4 laning of Ramban Banihal Section of NH-1A from Km 151 to Km 187 under implementation and prepare revised DPR for critical locations to make project road all weather traffic worthy and safe in the Union Territory of Jammu & Kashmir on EPC mode. With a view to this, it has been proposed to conduct a "Consultancy Services for studying the existing DPR/contract provisions for 4 laning of Ramban Banihal section (Km 151 to Km 187) under implementation and prepare revised DPR for critical locations to provide realignments/alternate solutions to the extent required in the form of tunnels/viaducts etc., to make such locations all weather traffic worthy and safe for operations".

The Project Road is shown in the Index Map below.



Index Map Showing the Project Road

In pursuance of the above, Intercontinental Consultants and Technocrats Pvt. Ltd. (ICT) in JV with ALTINOK Consulting Engineering Inc. have been appointed as Consultant by NHAI. The consultancy agreement for the services was signed on 17th September 2020 and the NHAI has asked the Consultants to commence the consultancy services immediately vide its letter no. NHAI/11019/22/ 2020RB/DPR dated 21st September 2020. Accordingly, Consultant vide letter no. ICT/NHAI/RAMBAN-BANIHAL/851/4357 dated 22nd September 2020 agreed to commence services from 22nd September 2020 in accordance with the Conditions of the Contract.

After discussion with Authority Consultant had submitted the Draft Feasibility report in two parts as detailed below:

S. No.	Description of Section	Date of Submission	Remarks
1	Existing Ch. 148+047 (NB)/Ch. 150+056 to Ch. 153+122 (NB)/Ch. 154+850 (SB) and from Ch. 171+860 (NB)/ Ch. 173+350 to Ch. 180+282 (NB)/Ch. 181+750 (SB) (Total length 13.194 Km)	On 29 th December 2020, vide letter No. ICT/RAMBAN- BANIHAL/851/6025	FOR COS under ongoing Project
2	Existing Ch. 153+122 (NB)/Ch. 154+850 (SB) to Ch. 163+545 (NB)/Ch. 165+300 (SB) and from existing Ch. 163+545 (NB)/ Ch. 165+300 (SB) to Ch. 171+860 (NB)/ Ch. 173+350 (SB)	On 17 th February, 2021, vide letter No. ICT/RAMBAN- BANIHAL/851/6025	For award of New tenders

Further to submission of Draft Feasibility, the Consultant has divided the Project road in two sections and three packages and are submitting the combined **Final Feasibility Report** after compliance of comments of Client & Peer Reviewer. This combined **Final Feasibility Report** pertains to two sections and three packages i.e. from Existing Ch. 148+047 (NB)/Ch. 150 + 056 (SB) to Existing Ch. 180+300 (NB) Ch. 181+700 (SB). The details of two COS sections and three packages for contract award are given below:

Section	Design Chainage and Existing Chainage	Design Length
COS Section-I	From Existing Ch.148+047 (NB)/Ch.150+056(SB) to Design. Ch.154+210(NB) /Ch.155+940(SB) [Corresponding existing Ch.154+210 (NB)/Ch. 155+940 (SB)].	Total length- NB=6.143 Km, SB=5.726m. The improvements proposed NB- 1.085Km & SB-0.902Km. In balance length Slope protection measures proposed wherever required.
PKG-I	From Design Ch.154+210 (NB)/Ch. 155+940 (SB) to Design Ch. 158+675 (NB)/Ch. 160+282 (SB) [Corresponding Existing/Design Ch. 154+210 (NB) / Ch. 155+940 (SB) and Existing Ch. 159+945 (NB)/Ch. 161+725 (SB)].	Total Length- NB=4.465Km, SB=4.342 Km
PKG-II	From Design Ch. 158+675 (NB)/Ch. 160+282 (SB) to Design Ch. 164+660 (NB)/Ch. 163+368 (SB) [Corresponding existing Ch. 159+945 (NB)/existing Ch. 161+725 (SB) and existing Ch. 164+635 (NB)/existing Ch. 165+292 (SB) excluding Design Ch. 161+544 (NB) to Ch. 164+100 (NB) [Corresponding existing Ch. 163+240 (NB) to existing Ch. 164+097 (NB)].	Total Length- NB= 3.429Km, SB=3.086Km
PKG-III	From Design Ch. 165+092 (NB)/Ch. 166+895 (SB) to Design Ch. 171+855 (NB)/Ch. 173+638 (SB), [Corresponding existing Ch.165+092 (NB)/existing Ch. 166+895 (SB) to existing Ch.171+987 (NB)/existing Ch.173+478 (SB), excluding section from (a) Design Ch.166+610 (NB)/Ch. 168+425 (SB) to Design Ch. 167+150 (NB)/Ch. 168+935 (SB), [Corresponding existing Ch. 166+698 (NB)/existing Ch.168+270 (SB) to existing Ch. 167+247 (NB)/existing Ch. 168+780 (SB), (b) Section from Design Ch. 167+960 (NB)/Ch. 169+745 (SB) to Design Ch. 168+168 (NB)/Ch. 169+951 (SB), [Corresponding existing Ch. 168+067 (NB)/existing Ch. 169+605 (SB) to existing Ch. 168+278 (NB)/existing Ch. 169+811 (SB).	Total Length-NB=6.015Km, SB=6.027Km
COS Section-II	From Design Ch. 171+855 (NB)/Ch.173+638 (SB) to Existing Ch. 180+300 (NB)/Ch. 181+700 (SB), [Corresponding existing Ch. 171+987 (NB)/existing Ch. 173+478 (SB) to Existing Ch. 180+300 (NB)/ Ch. 181+700 (SB).	Total length- NB=8.318 Km, SB=8.217m. The improvements proposed NB- 0.370Km & SB-0.865Km. In balance length Slope protection measures proposed wherever required.

2.0 PROJECT DESCRIPTION

The project road under this contract for preparation of Detailed Project Report starts from existing Km 151.000 at end of Ramban bypass and ends at existing Km 187.000 on the outskirts at the start of Banihal town. The project road is part of the North-South corridor connecting Srinagar in Jammu & Kashmir to Kanyakumari in Tamil Nadu, State. The existing road is of 2-lane configuration with earthen shoulders on both side and having flexible pavement.

Four Lanning of Ramban-Banihal section of NH-44 from existing Km 151.000 to existing Km 187.000 is in progress under NHDP Phase-II through an Engineering, Procurement and Construction (EPC) Contract.

The Start & End points are shown below:



Start Point of the Project Road after Ramban Town at existing Km 151.000.



End Point of the Project Road before start of Banihal town at existing Km 187.000.

3.0 ENGINEERING SURVEYS AND INVESTIGATIONS

The consultants have carried out engineering surveys and investigations that include Alignment Studies, Topographical Surveys, Road Inventory and Pavement Condition Surveys, Inventory and Condition Surveys for Bridges, Culverts and other Structures, Traffic Survey, Pavement Composition Investigations, Preliminary Material Investigations for Construction Materials. Summary is presented as under:

Terrain Classification: The Project Road for its total length traverses through Hilly terrain.

Land Use Pattern: Forest land & Govt. land are the predominant land use along the project road. However residential and commercial activities have been observed at 6-7 places along the Project Road.

Right-of-Way (ROW): The Right of Way (ROW) Pillars are not marked on the ground however it has been informed that the required ROW has been acquired for 4laning of the project road in the on-going EPC contract which varies between 30 to 60 m in general.

Major Built up Sections: Seri, Makarkot, Ramsu and Chamalwas are the major settlements along both sides of the Project Highway.

Geometry: Majority of the project section is curvilinear with many substandard horizontal

curves. The existing gradients are ranging from 5%-8% with some small sections of flatter gradients. Improvements have been considered to the maximum extent possible in the prevailing EPC contract proposal under implementation to meet the standards and specifications as per codal provisions for hill roads.





Structures: The culvert condition and inventory surveys were carried out to find the number, type, size and condition of the culvert. The summary of existing culverts is given in table below.

Summary of Existing Culvert

SI. No.	Туре	No of Culverts (no's)
1	Box	38
2	HP	2
3	Slab	99
4 Arch		1
To	otal Culverts	140

Bridge Inventory was carried out to find the number, type, size, functioning, structural stability and soundness of the structures.

Subsoil & Geotechnical Investigations for Slope Stability: There are natural slides along the Project Road. The following field Investigations has been carried out:

- **a) Seismic Refraction Tomography (SRT) -** The SRT tests were conducted at the Landslide locations. It provides velocity of compressional P-waves in subsurface materials.
- **b) Geological Mapping Survey -** The Geological mapping survey was conducted at all the existing Landslides. In the geological mapping, the number of joints, dipping of joints, spacing of joints and joint separation measured at site
- **c) Geotechnical Investigations -** The geotechnical investigation was conducted at land slide areas, following tests were conducted:
 - Borehole drilling at land slide areas
 - Conducting Field Test
 - Sampling
 - Laboratory test:

4.0 TRAFFIC ANALYSIS

The primary traffic surveys including Classified Traffic Volume count at 2 locations, Origin - Destination survey at one location, Intersection turning movement count at 3 locations Axle load survey at one location and Pedestrian count survey at 2 locations were conducted. Since

there are no major dispersal nodes along the 36 km stretch, the project road has been considered as one homogenous section for further analysis.

4.1 Axle Load Survey

The axle load survey was carried out using the electronic static axle load pad on the project road and after analysis of the data collected from site, the VDF factors worked out are presented in table below:

Vohielo Tyro	Vehicle Damage Factor (VDF)			
Vehicle Type	Up	Down		
LCV	0.03	0.02		
2-axle Truck	3.90	2.54		
3-axle Truck	5.85	4.68		
MAV	6.96	4.94		

Note: UP = Ramban to Banihal, DN = Banihal to Ramban.

4.2 Existing Traffic

The AADT (Without COVID-19 Correction) is presented below:

Annual Average Daily Traffic (AADT)

Vehicle Category	Nallah o	5+000 at Khooni n NH-44	Rashtriya Rifle o	n NH-44
	Veh.	PCUs	Veh.	PCUs
Car / Taxi	3216	3216	3052	3052
Mini Bus	163	244	143	215
Bus	35	104	34	102
LGV 4-Wheeler	581	872	667	1000
2-axle Truck	2488	7465	2721	8162
3-axle Truck	1130	3391	1061	3183
4-6 axle Truck	659	659 2966		3005
Total Tollable Traffic	8272	18258	8348	18730
Toll Exempt Vehicles	43	109	42	115
LGV 3-Wheeler	4	6	19	28
3-Wheeler (Passenger)	4	4	3	3
2-Wheeler	77	38	92	46
Tractor	3	4	5	7
Tractor With Trailer	6	26	4	17
Bicycle	0	0	0	0
Cycle Rickshaw	0	0	0	0
Hand Cart	0	0	0	0
Animal Drawn Cart	0	0	0	0
Total Non- Tollable Traffic	137	188	165	216
Total Traffic	8409	18445	8513	18946

The Consultant has also studied the effect of COVID-19 on the traffic and accordingly COVID-19 correction has been applied and the comparison of AADT data with & without COVID-19 is presented below:

C No	AADT at Km 165+000		AADT at Km 172+500		Domayka	
S. No.	Veh.	PCU	Veh.	PCU	Remarks	
1	8409	18445	8513	18946	Before COVID-19 Correction	
2	9245	20279	9360	20829	After COVID-19 Correction	

The Construction of Jammu-Baramulla Railway link is in progress and expected to complete by year 2022. The Consultant has also assessed the diversion of traffic from the project road to

Jammu-Baramulla Rail link. Diversion of 20% for all modes has been assumed based on results arrived from the analysis. This have been added in three stages i.e. 30% in Year 2022, 30% in Year 2023 and 40% in Year 2024.

4.3 Projected Traffic

The projected traffic for the project road is presented below:

C No	Vone	Projecte	d Traffic
S. No.	Year	Vehicle	PCU
1	2020-2021	9360	20829
2	2025-2026	9682	21359
3	2030-2031	13090	28613
4	2035-2036	16750	36285
5	2040-2041	20658	44404
6	2045-2046	24629	52590
7	2050-2051	29370	62298
8	2054-2055	33820	71351

As can be seen from above, the project road has already crossed 20,000 PCU/day traffic corresponding to level of service B as per IRC:SP:84-2019 and will reach 30,000 PCU/day within 5 to 6 years of opening the improved road to traffic. However, since the existing EPC contract is for 4 laning so the same has been followed in current proposals after due consultations with the Authority.

5.0 Improvement Proposals

5.1 Carriageway

For improving the horizontal geometry of the existing road and to provide a better horizontal geometry to the new 2lane carriageway, 2 project chainage systems has been provided. One chainage runs all along the Northbound (NB) carriageway (i.e. improvement of existing carriageway) and other chainage runs all along the southbound (SB) carriageway (new two lane road, generally on hill side of existing road. The respective lengths for improvement proposal of North Bound and South Bound carriageways are given in the below table.

Detail of Proposed Improvements along North Bound Carriageway

Cri	Critical Location			Improvement Proposal				
Location	Start	End	Component	Start	End	Length	PKG	
			Road	150+904	151+043	139	IV	
Α	150+90 4	151+384	Viaduct	151+043	151+343	300	IV	
			Road	151+343	151+384	41	IV	
В	153+200	153+565	Road	153+200	153+565	365	IV	
			Tunnel	154+415	158+650	4235	I	
С	154+415	161+350	Road	158+650	158+678	28	II	
			Tunnel	158+750	161+350	2600	II	
D	164+140	164+570	Tunnel	164+140	16 4 +570	430	II	
Е	165,005	166 + 610	Viaduct	165+095	165+913	818	III	
	165+095	166+610	Road	165+913	166+610	697	III	
			Road	167+150	167+310	160	III	
F	167+150	167+960	Viaduct	167+310	167+760	450	III	
			Road	167+760	167+960	200	III	

Critical Location			Improvement Proposal				
Location	Start	End	Component	Start	End	Length	PKG
			Road	168+168	168+278	110	III
			Viaduct	168+278	170+528	2250	III
G	168+168	171+855	Road	170+528	170+609	81	III
			Viaduct	170+609	171+758	1149	III
			Road	171+758	171+855	97	III
			Road	173+630	173+700	70	IV
Н	173+630	173+955	Viaduct	173+700	173+920	220	IV
			Road	173+920	174+000	80	IV

Detail of Proposed Improvements along South Bound Carriageway

Critical Location				Impro	ovement Pro	posal	
Location	Start	End	Feature	Start	End	Length	PKG
В	154.050	155 : 405	Viaduct	154+850	155+100	250	IV
Б	154+850	155+495	Tunnel	155+100	155+495	395	IV
			Tunnel	156+035	160+260	4225	I
С	156+035	163+368	Road	160+260	160+360	100	II
C			Tunnel	160+360	163+368	3008	II
	*Marog Inter	change	Tunnel	0+060	0+195	135	II
Е	166+935	168+300	Viaduct	166+935	167+ 44 5	510	III
	100+933	100+300	Road	168+053	168+300	2 4 7	III
F	169+115	169+555	Viaduct	169+115	169+555	440	III
			Viaduct	170+120	170+ 4 20	300	III
			Road	170+420	171+285	865	III
			Viaduct	171+285	171+ 44 5	160	III
			Road	171+445	171+621	176	III
			Viaduct	171+621	171+795	174	III
G	170+120	173+638	Road	171+795	171+884	89	III
G	170+120	1/3+036	Viaduct	171+884	172+048	164	III
			Road	172+048	172+805	757	III
			Viaduct	172+805	172+877	72	III
			Road	172+877	173+260	383	III
			Viaduct	173+260	173+353	93	III
			Road	173+353	173+638	285	III
			Road	175+100	175+267	167	IV
Н	175+100	175+605	Viaduct	175+267	175+405	138	IV
			Road	175+405	175+605	200	IV
I	176+330	176+670	Tunnel	176+330	176+670	340	IV

Other than the above improvements, the slope protection measures are also proposed in two COS sections and three packages.

5.2 Service Road

Service road having carriageway width of 5.5m is proposed at Marog interchange from km 154+266 to 154+373, totalling a length of 107 m.

5.3 At-Grade Intersection / Grade Separated Intersection

9 no's of Minor At grade junctions and 2 no Grade Separator interchanges are proposed at the below following locations.

SN	Design Chainage (Ch.)	Side (Left/Right)	Type of Junction	Category of Road	Remarks
1	Marog Interchange at Ch. 154+320 (NB)	-	U-Turn	For NH & Tunnel Approach	For Access to Marog Village traffic
2	Marog Interchange at Ch. 154+390 (NB)	Left	Y	For NH & Tunnel Approach	For Access to Battery Chasma
3	0+000	Left (NB)	Т	Existing NH-44	At Digdol interchange Junction of Ramp with NH- 44
4	Digdol at Ch. 158+700 (NB) & at Ch. 160+300 (SB)	All Movements	Grade Separated Rotary	On Main Carriageway	Exit Ramps xonnecting with the existing road.
5	166+908(SB)	Left	Т	Village Road	For Makarkot
6	0+110	Right	Т	Village Road	For Makarkot
7	0+110 to 312.375 (Ramp)	Left	Y	Village Road	For traffic Connectivity of Makarkot to Banihal traffic (0+110 to 0+205 at grade & balance is Grade separated)
8	167+500 (SB)	Left	Υ	Village Road	For Makarkot
9	171+168 (SB)	Left	Т	Village Road	For IRCON
10	171+855 (SB)	Left	Т	Village Road	For Nachlana
11	170+578 (NB) & 172+365 (SB)	Left /Right	+	Village Road	To Rashtriya Rifles

5.4 Bus Bays

Total 3 No's of Bus Bays with shelter has been proposed along the project stretch. The details are given below:

Design Chainage	Side
165+990	North Bound LHS
166+350	North Bound LHS
172+240	South Bound RHS

5.5 Road Signs, Pavement Marking and Lighting

Pavement markings will be done for traffic lane line, center line, edge lines and hatching etc. The marking will be with hot applied thermoplastics materials confirming to IRC:35. The pavement markings will be reinforced with reflective pavement markers which shall be provided as per IRC: SP:84. Highway lightings have been proposed for Tunnels and Bus Bays.

5.6 Boundary stone, Km stone and Hectometer Stone

Road boundary stones have been proposed all along the project highway to discourage future encroachment into the right of way as per IRC:SP: 84. Km stone and hectometer stones have been proposed all along the project road as per IRC Codal Provisions.

5.7 Culverts

Based on the site requirements, 45 culverts are proposed out of which 5 are under/partially constructed, the summary is presented as below

S. No.	Span Arrangement	Reconstruction	New Construction	Partially Construction
1	1x2x2	2	6	3
2	1x2x3	3	13	-
3	1x3x3	2	10	2
4	1x3x2	-	1	-
5	1x1x3	-	1	-
6	1x4x3	-	2	-
	Total	7	33	5

5.8 Structures / VUP / LVUP

The summary of the proposed structures are presented in table below:

S. No.	Type of structure	Section I	Package I	Package II	Package III	Section II
1	Major Bridges/ Viaducts	2	-	-	12	2
2	Minor Bridges/ Viaducts	1	-	1	10	-
3	LVUP	-	-	2		-
4	VUP	-	-	-	1	-
5	Interchange with Ramp	-	-	-	1	-

The total width of viaduct & bridges has been considered as 10.5m (outer to outer) comprises 8.5 m wide carriageway including paved shoulder 0.5m wide crash barrier and shyness on both side.

5.9 Structure for Hill Side Protection

Three Canopy type structures also proposed, one before AT-2 tunnel and one each at entry & exist of proposed at AT4 tunnel for Protection from Shooting Stones

5.10 Tunnels

Horizontal and vertical geometry of the proposed tunnels have been designed considering IRC: SP: 91-2019 & IRC: SP:84-2019 and maximum longitudinal gradient for long tunnels and short tunnels has been considered as 4% & 6% respectively. The proposed tunnels are with 2 lane carriageway of 8.5m including paved shoulder except Digdol ramp tunnel having 7.0m wide carriageway (without Paved Shoulder). The clearance height for the traffic for all tunnels is 5.5m.

Summary of Tunnels proposed are presented in table below

S. No.	Tunnel Designation	Carriageway	Length of Tunnel (m)	Carriageway* width (m)	Remarks
1	AT1 (Marog)	South Bound	395	1x11.95	New 2-lane Single tube Uni- directional Tunnel
2	AT2	North Bound	4235		New 2-lane Twin tube Uni-
2	(Marog)	South Bound	4225	2x11.95	directional Tunnel

S. No.	Tunnel Designation	Carriageway	Length of Tunnel (m)	Carriageway* width (m)	Remarks
	AT3	North Bound	2600		New 2-lane Twin tube Uni-
3	(Digdol-Khuni Nallah - Panthal)	South Bound	3008	2x11.95	directional Tunnel
4	AT4 (Panthal)	North Bound	430	1x11.95	New 2-lane Single tube Uni- directional Tunnel
5	AT5 (Chamalwas)	South Bound	340	1x11.9	New 2-lane Single tube Uni- directional Tunnel
6	AT6 Digdol Ramp	Digdol Interchange Ramp	135	1x10.4	New 2-lane , Bi- directional Single tube Tunnel

^{*} including Footpath & Walkway

5.11 Slope Protection Works

A Rock fall barrier from km 169+120 to km 169+450 (south bound) totalling a length of 330 m has been proposed. Further, protection measures at 19 Landslide zones along the critical stretches are as under:

Cutting Upto 3m No Protection
Cutting Upto 3m to 5m Revetment Wall

Cutting >5m Following protection measures are proposed

Rock/Soil Reinforcement using Rock Bolts/soil anchors

The 32 mm diameter of bolts/anchors fully grouted/end anchored rock bolts/anchors of FE 500 grade of steel are proposed for slopes.

DT Mesh & Coir MAT

The DT mesh of 2.7/3.7 mm thickness and coir mat with vegetation are also proposed for vegetation in soils/overburden.

76 mm dia Drainage holes with perforated pipes

The 76 mm diameter drainage holes with perforated pipes & geotextile at the mouth of the pipe is proposed for seepage/drainage of water.

Apart from the above, slope protection for median and valley are proposed:

- Widening on valley side: Height Up to 4m- Gabion Wall; Height > 4m Stone Masonry Retaining Wall
- Median at Differential carriageway Locations: Stone Masonry Walls
- Ramps/Approaches to Grade Separators: RCC Retaining Wall

5.12 Other Facilities

The following amenities are being constructed under ongoing EPC contract within the existing right of the way of the project road. Approximate dimensions are provided in Layout plan.

SN	Item	Chainage	Side
1	Control Room	154+400	NB
2	Ventilation Room	154+415	NB
3	Public Toilet	157+830	NB
4	Control Room	158+650	NB

SN	Item	Chainage	Side
5	Ventilation Room	158+650	NB
6	Ventilation Room	158+750	NB
7	Control Room	158+750	NB
8	Ventilation Room	161+350	NB

SN	Item	Chainage	Side
9	Control Room	161+400	NB
10	Control Room	161+400	NB
11	Ventilation Room	164+140	NB
12	Ventilation Room	164+570	NB
13	Bus Stand	166+350	NB
14	Bus Stand	166+990	NB

SN	Item	Chainage	Side
15	Bus Stand	172+240	NB
16	Ventilation Room	155+100	SB
17	Ventilation Room	155+495	SB
18	Ventilation Room	156+035	SB
19	Ventilation Room	176+330	SB
20	Ventilation Room	176+670	SB

NB: North Bound, SB-South Bound

5.13 Cost Estimates

The Civil Cost of project road is INR 3030.07 Crores (exclusive of GST & labour cess) and the Total Project Cost is INR 4534.09 crores. The de-scoping of works of existing EPC Contract corresponding to the improvement proposal arrived as INR 717.74 Crores.

6.0 ECONOMIC ANALYSIS

The annual cost and benefit streams are used to derive the net cash flow for the project. The EIRR (Economic Internal Rate of Return) and NPV(Net Present Value for three scenarios at 10% discount rate are determined using the discounted cash flow technique for all the Sections and are given in table below.

Result of Economic Evaluation

S. No.	Description	Base case (EIRR) %	Sen-1 (EIRR) Base Costs and Base Benefits minus15%.	Sen-2 (EIRR) Base Costs plus 15 % and Base Benefits	Sen-3 (EIRR) Base Costs plus 15% and Base Benefits minus15%.
1	Ramban Banihal section (Km 151 to Km 187)	12.3	8.8	10.7	7.4

The Economic Analysis has been done for the Flexible Pavement using HDM-4 for Ramban Banihal section (Km 151 to Km 187). Results of economic analysis tabulated above indicate that the project is economically viable in base case and base costs plus 15% case (Sen-2) as EIRR is more than 10%. Also it is observed that the project is not economically viable in base benefits minus 15% case (Sen-1) and base costs plus 15% & base benefits minus 15% case (Sen-3) as EIRR is less than 10%.

Based on the analysis above, it is concluded that the investment on the said project is economically viable and is a worthwhile and justified investment.

परियोजना निर्देशक Project Director शक्ते व सादीय संज्ञानं अधिकल, परि. उन इकई सकत National Highway Authority of India, P.W. Ramber

Divisional Forest Officer Ramban Forest Division