

राष्ट्रीय राजमार्ग एवं अवसंरचना विकास निगम लिमिटेड  
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

# EXECUTIVE SUMMARY

OCTOBER 2019

CONSULTANCY SERVICES FOR PREPERATION OF DETAILED PROJECT REPORT AND PROVIDING PRE-CONSTRUCTION ACTIVITIES IN RESPECT OF THE FOLLOWING STRETCH ON NH-244 (OLD NH-1B) IN THE STATE OF JAMMU AND KASHMIR.

- (1) SUDHMAHADEV- DRANGA TUNNEL OF APPROX. LENGTH 4.5 KM AND ITS APPROACH ROAD ON CHENANI - SUDHMAHADEV- GOHA ROAD PORTION.
- (2) VAILOO TUNNEL OF APPROX. LENGTH 10.0 KM UNDER SINTHAN PASS AND ITS APPROACH ROAD ON GOHA-KHELLANI-KHANABAL ROAD PORTION.
- (3) ROAD PORTION FROM 82.675 TO 82.925 AT KM 83 ON BATOTE-KISHTWAR ROAD SECTION OF NH-244.
- (4) EXTENDED ROAD SECTION FROM GOHA TO KHELLANI OF 30 KM LENGTH



## KM - 83<sup>RD</sup> TUNNEL

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*Consultancy Services for Preparation of Detailed Project Report and providing Pre-Construction activities in respect of the following stretches on NH-244 (old NH-1B) in the State of Jammu & Kashmir. (i) Sudhmahadev – Dranga Tunnel of approx. length 4.5 Km and its approach roads on Chenani – Sudhmahadev – Goha road portion. (ii) Vailoo Tunnel of approx. length 10.00 Km under Sinthan Pass and its approach roads on Goha – Khellani – Khanabal road portion.*

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## 1 EXECUTIVE SUMMARY

The National Highway (NH-1B) is entirely within the state of Jammu and Kashmir. NH 1B linked Batote with Khanabal and is 274 km long. It has been renamed as National Highway 244 (NH 244). The Site is in Jammu province on NH 244. From Batote it is about 83km towards Kishtwar and about 33 km from Doda town towards Kishtwar. Kishtwar is about 110 km from Batote. The Government of India (GOI) is planning to ease traffic volume on Jammu-Srinagar Highway and would want to connect Srinagar and border areas in J&K with alternate routes with all-weather roads. NH 244 has been selected by the GOI for this purpose.

The NHIDCL has already awarded the Consultancy Services for Preparation of Detailed Project Report and providing Pre-Construction activities in respect of the following stretches on NH-244 (old NH-1B) in the State of Jammu & Kashmir. (i) Sudhmahadev – Dranga Tunnel of approx. length 4.5 Km and its approach roads on Chenani – Sudhmahadev – Goha road portion. (ii) Vailoo Tunnel of approx. length 10.00 Km under Sinthan Pass and its approach roads on Goha – Khellani – Khanabal road portion TPF Getinsa-Eurostudios S.L in Association with Rodic Consultants Private Limited.

The road stretch of NH 244 between Thatri-Kishtwar near Darabshala village about +83 km from Batote is a land slide prone area. A major landslide was occurred in this area, in the first week of April 2017 killing three people. In another accident in 2nd week of September 2018, several people, including a policeman, were killed and others injured after huge boulders and debris suddenly came down from the hill burying a mini-bus and a car plying on the Doda-Kishtwar road. These accidents have put government under pressure to take up this stretch of NH 244 on high priority for strengthening/realigning so that occurrence of such incident is minimized or avoided.

A variation order for consultancy work was given to TPF Getinsa-Eurostudios S.L in Association with Rodic Consultants Private Limited for preparing Detailed Project Report alternate alignment of NH 244 for bypassing this land slide prone area at CH -83 Tunnel. For this, a 495 m Bi-Directional single tube road tunnel with the approach roads 664m and Major Bridge of 110m is proposed.

## 1.1 Proposal for New construction

To meet future traffic requirement, new alignment is proposed to achieve high speed of travel with comfort and safety.

**Table 1: Proposed Cross Section**

Design Chainage		Design Length (m)	TCS Type	TCS No
From	To			
0+000	0+065	65	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Both Side Cut	TCS-1
0+065	0+128	63	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Both Side Cut	TCS-1
0+128	0+623	495	TUNNEL	TUNNEL
0+623	0+733	110	BRIDGE	BRIDGE
0+733	0+745	12	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	TCS-3
0+745	0+780	35	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Both Side Cut	TCS-1
0+780	0+845	65	Typical Cross-Section For Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height of Less Than 10M.)	TCS-2
0+845	0+880	35	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	TCS-3
0+880	0+935	55	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	TCS-3
0+935	0+975	40	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	TCS-3
0+975	1+015	40	Typical Cross-Section For Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall &	TCS-2

Design Chainage		Design Length (m)	TCS Type	TCS No
From	To			
			Right Side Cut (Height of Less Than 10M.)	
1+015	1+080	65	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	TCS-3
1+080	1+155	75	Typical Cross-Section For Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height of Less Than 10M.)	TCS-2
1+155	1+215	60	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Both Side Cut	TCS-1
1+215	1+240	25	Typical Cross-Section For Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height of Less Than 10M.)	TCS-2
1+240	1+269	29	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	TCS-3
<b>Total Road Length</b>		<b>1269</b>		

## 1.2 Typical Cross-sections

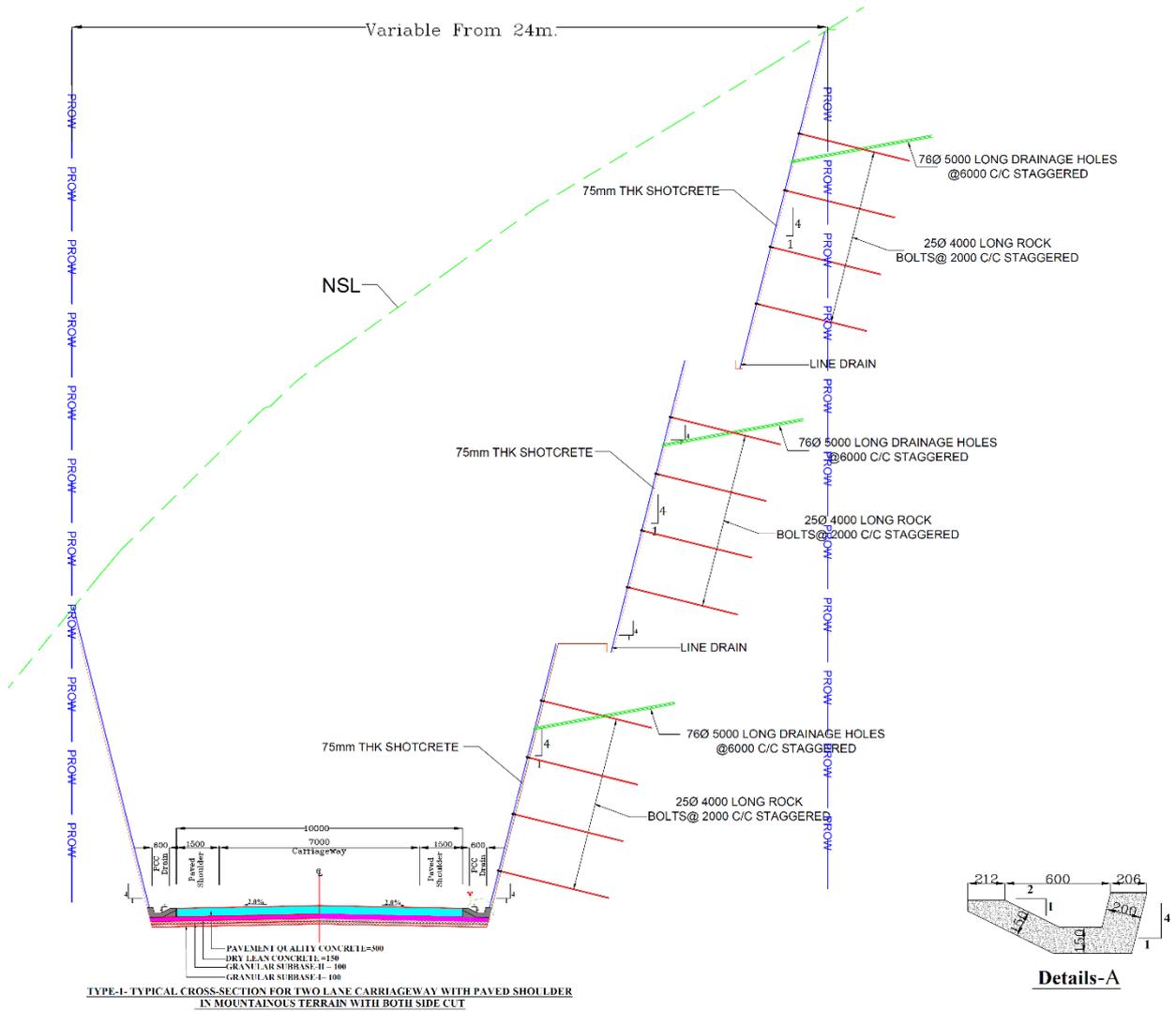
Proposed cross-sections are shown in table given below.

**Table 2: Summary of TCS**

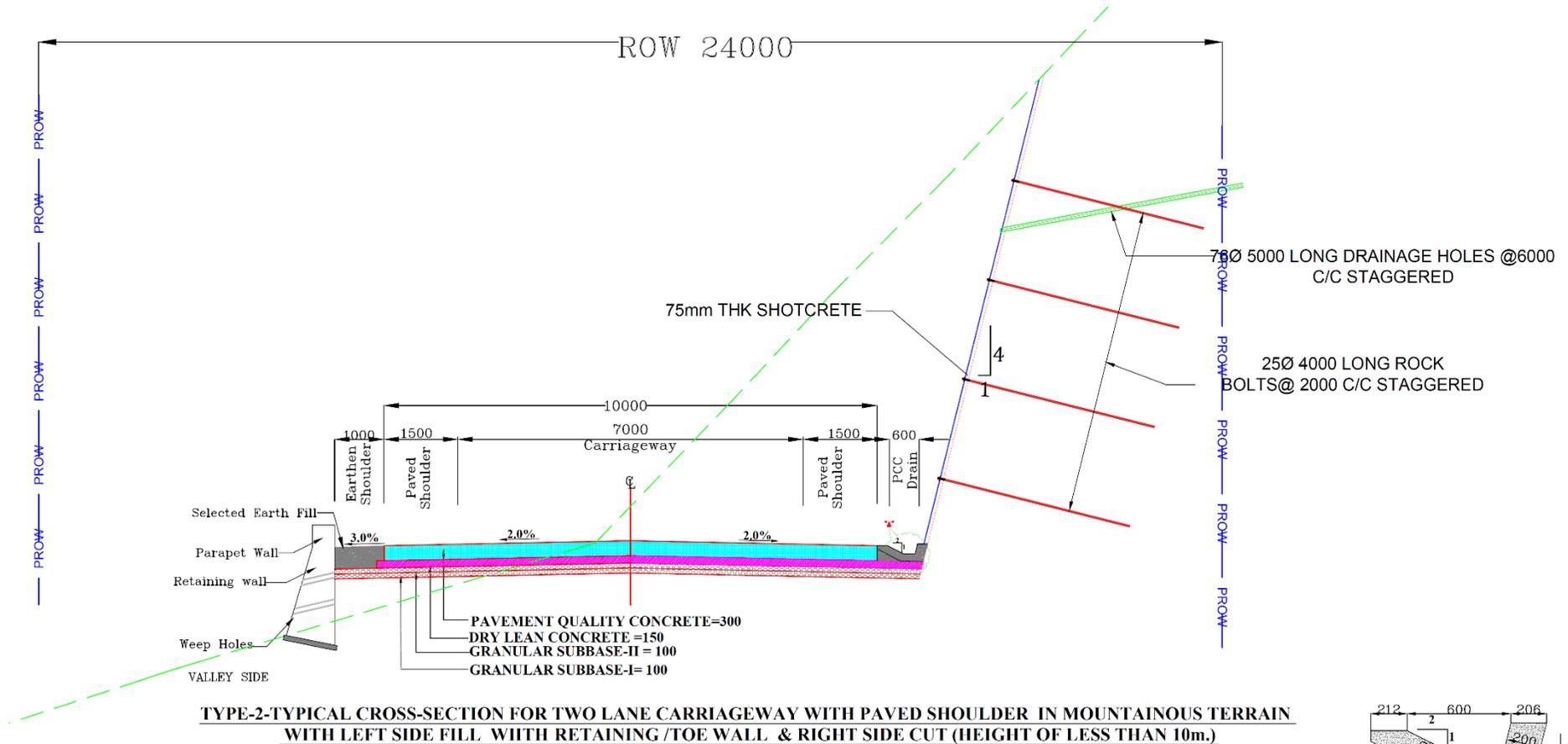
Sr.No.	Detail	TCS	Length		Net Length	
			(m)	Kms	(m)	Kms
1	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Both Side Cut	1	223.00	0.223	223	0.223
2	Typical Cross-Section For Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of Less Than 10M.)	2	205.00	0.205	205	0.205
3	Two Lane Carriageway With Paved Shoulder In Mountainous Terrain With Left Side Fill With Retaining /Toe Wall & Right Side Cut (Height Of More Than 10M.)	3	235.67	0.236	236	0.236

Consultancy Services for Preparation of Detailed Project Report and providing Pre-Construction activities in respect of the following stretches on NH-244 (old NH-1B) in the State of Jammu & Kashmir. (i) Sudhmahadev – Dranga Tunnel of approx. length 4.5 Km and its approach roads on Chenani – Sudhmahadev – Goha road portion. (ii) Vailoo Tunnel of approx. length 10.00 Km under Sinthan Pass and its approach roads on Goha – Khellani – Khanabal road portion.

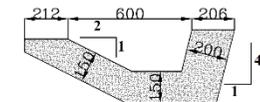
Sr.No.	Detail	TCS	Length		Net Length	
			(m)	Kms	(m)	Kms
4	Bridge		110.00	0.110	110	0.110
5	Tunnel		495.00	0.495	495	0.495
<b>TOTAL DESIGN LENGTH</b>			<b>1268.67</b>	<b>1.269</b>	<b>1269</b>	<b>1.269</b>



NOTE:  
1. All dimension in millimeters except otherwise specified



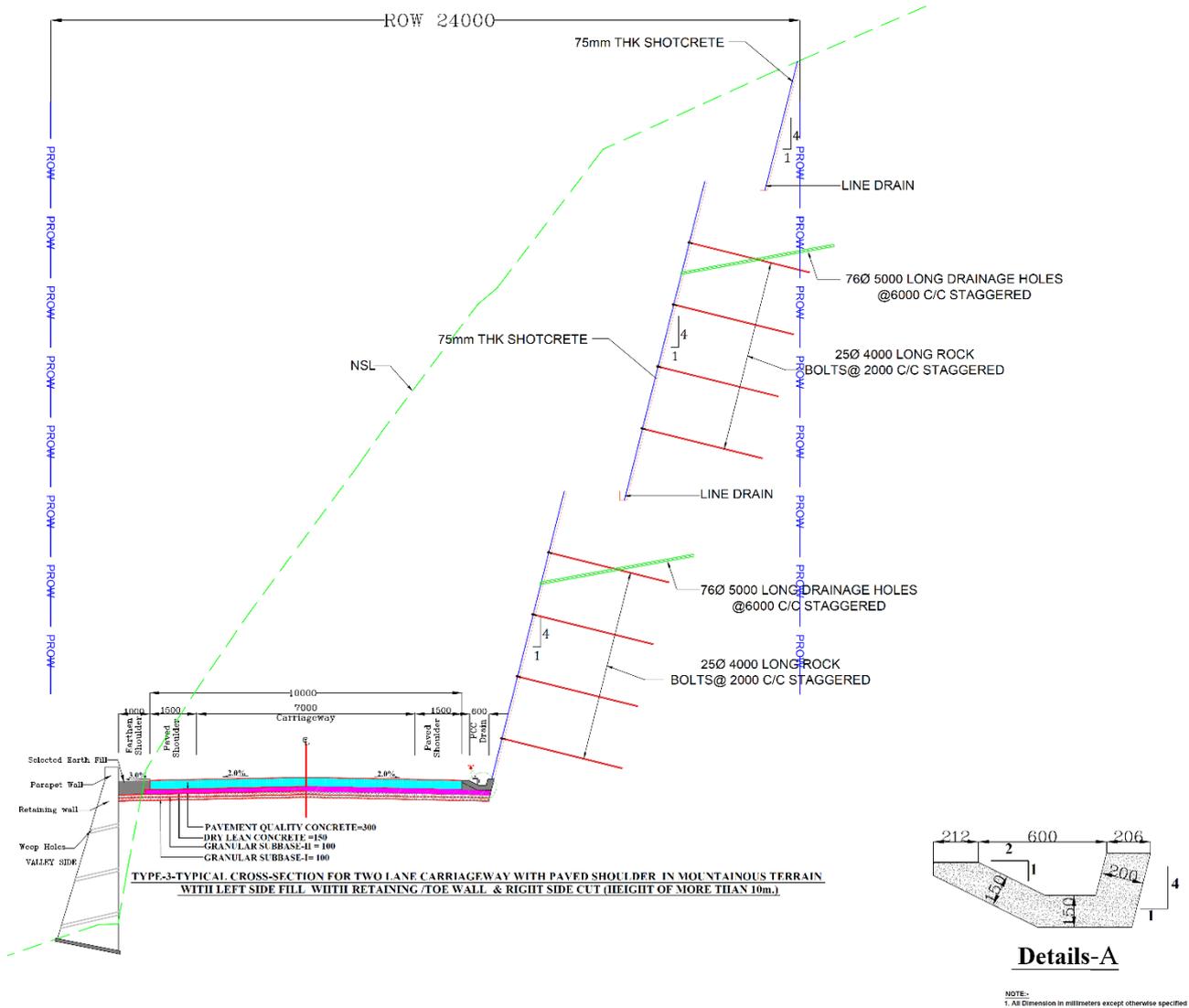
**TYPE-2-TYPICAL CROSS-SECTION FOR TWO LANE CARRIAGEWAY WITH PAVED SHOULDER IN MOUNTAINOUS TERRAIN WITH LEFT SIDE FILL WITH RETAINING /TOE WALL & RIGHT SIDE CUT (HEIGHT OF LESS THAN 10m.)**



**Details-A**

NOTE:-  
1. All Dimension in millimeters except otherwise specified

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### 1.3 Pavement Design

Flexible pavement is proposed new carriageway and reconstruction. Design period of 15 years considered for new carriageway. The Pavement improvement proposal for entire project road is presented in below Table.

**Table 3: Improvement Proposal for New Pavement**

Crust Composition for New Pavement as per IRC 37 - 2012										
Homogeneous Section	Design Chainage		CB R	MS A	Crust				S.Grade	Total Thickness
	From	To			B C	DB M	WM M	GS B		
1	0/000	1/269	10	20	40	70	250	200	500	<b>1060</b>

### 1.4 Proposed Cross Drainage Structures

There is 1 major bridge proposed in the project road.

**Table 4: Summary of Proposed Bridges and Culverts**

Sr. No.	Type	No's of structures
1	Major Bridges	1
2	Viaducts	0
3	Culverts	0
<b>Total</b>		<b>1</b>

### 1.5 Tunnel Alignment

#### Horizontal Alignment

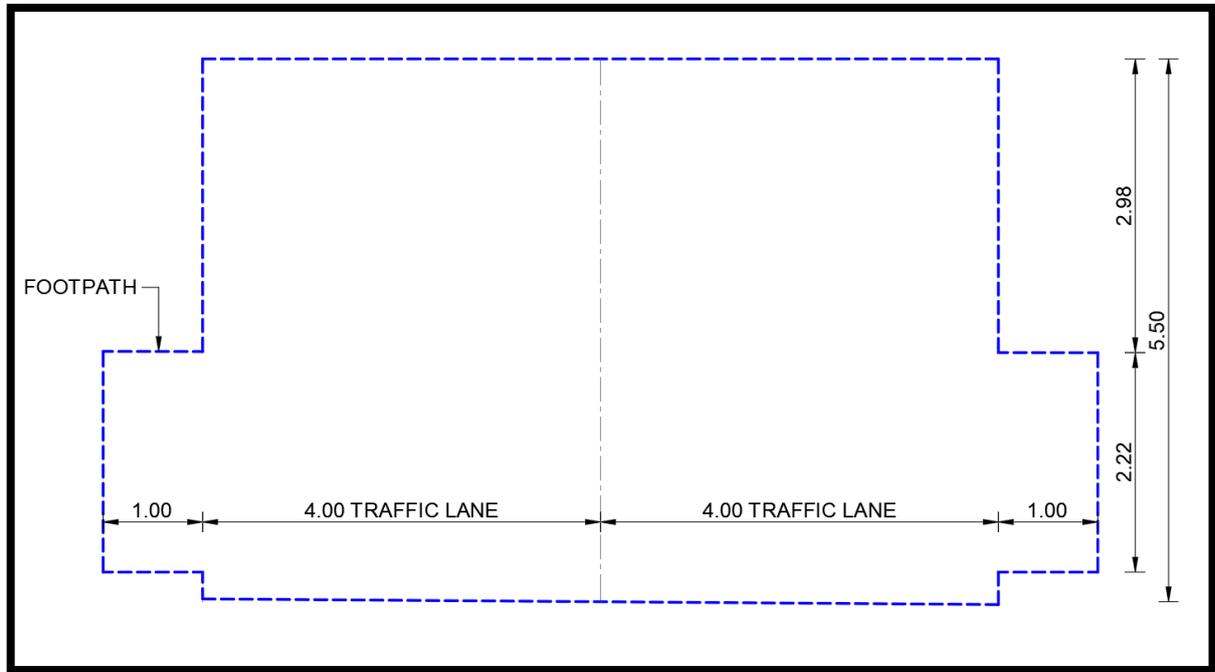
The tunnel is aligned keeping in view of the topography, length and the location such that tunnel passes through the region having adequate cover all around. The total length of tunnel is 495m. The northern portal is located about 125 m away from NH-1B on the existing village road at an El. 1007.00m. Southern portal is located on the Kishtwar highway (NH-1B) at an El. 1007.5m. A curve of radius 300m is provided in the tunnel.

#### Vertical Alignment

Northern portal & Southern portal of tunnel have been kept at El.1007.00 and El. 1007.50m respectively. Slope of 0.10% has been provided in the tunnel.

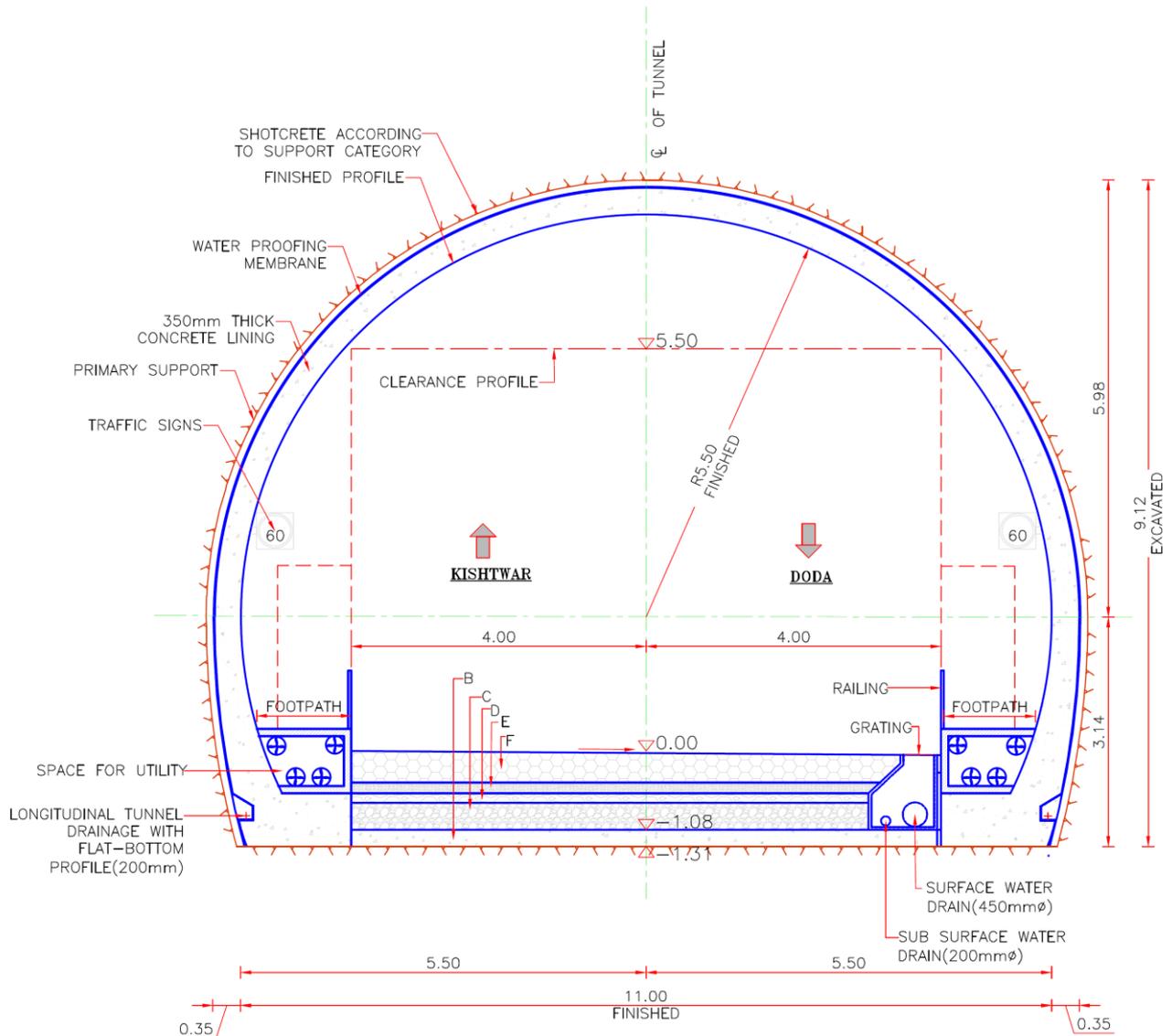
**1.5.1 Typical Cross Sections**

The typical cross section is designed according to Indian and International Standards and Guidelines for road tunnels. Clearance profile as defined in below Fig.



The typical cross sections for the main tunnel with and without invert are given in below figures.

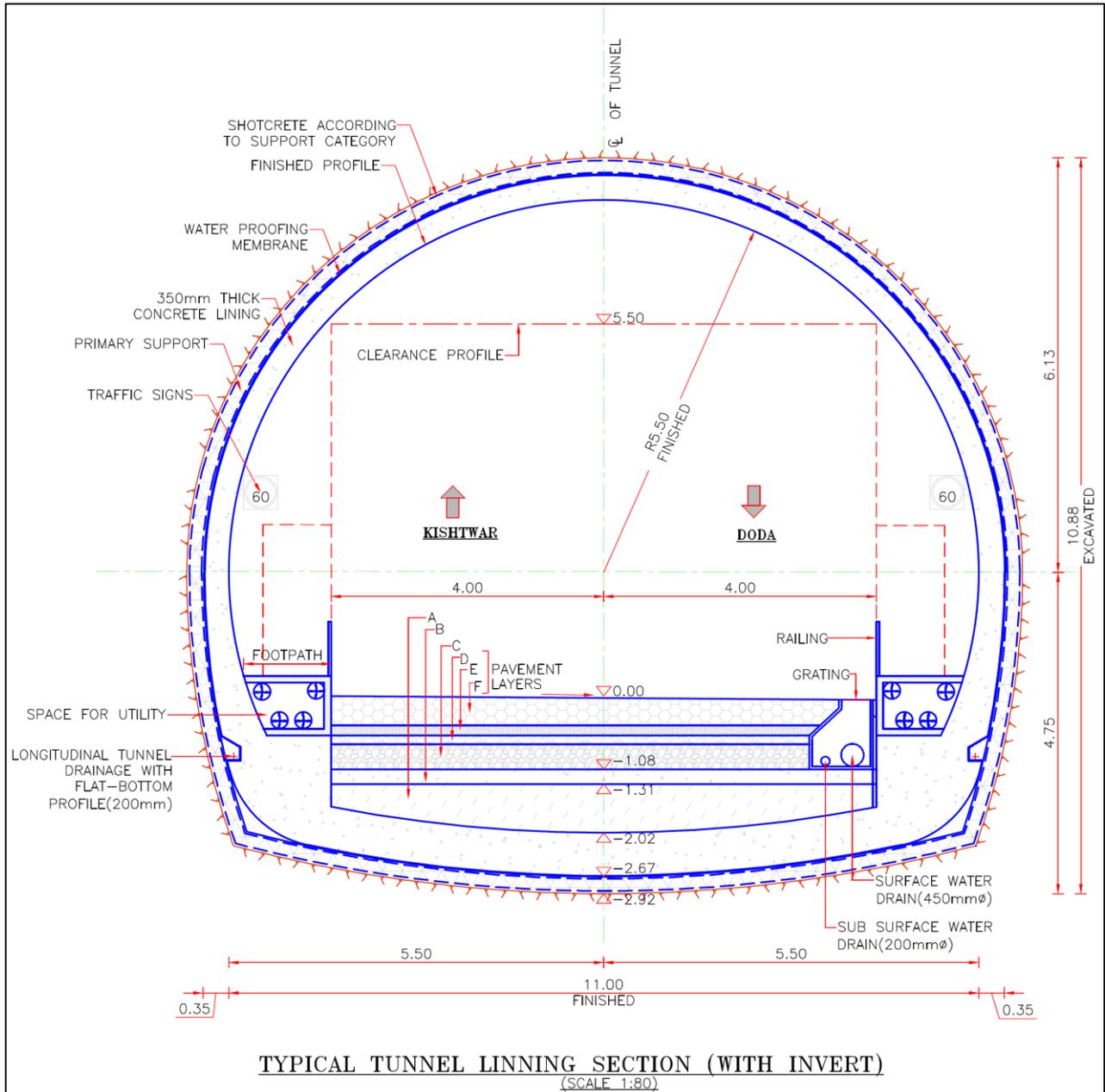
Consultancy Services for Preparation of Detailed Project Report and providing Pre-Construction activities in respect of the following stretches on NH-244 (old NH-1B) in the State of Jammu & Kashmir. (i) Sudhmahadev – Dranga Tunnel of approx. length 4.5 Km and its approach roads on Chenani – Sudhmahadev – Goha road portion. (ii) Vailoo Tunnel of approx. length 10.00 Km under Sinthan Pass and its approach roads on Goha – Khellani – Khanabal road portion.



**TYPICAL TUNNEL LINING SECTION (WITHOUT INVERT)**

(SCALE 1:80)

**Fig. Bi-directional Tunnel Cross Section without invert**



**Fig. Bi directional Tunnel Cross Section with invert**

### **1.5.2 Pavement**

The road pavement consists of the following layers:

- 300 mm Pavement Quality Concrete
- 150 mm dry lean cement concrete sub-base layer
- 450 mm GSB

### **1.5.3 Ventilation**

As per IRC:SP:91-2010, for tunnels shorter than 500m in length natural ventilation is enough. In case of tunnel more than 500 m in length, mechanical system of ventilation should be provided. Natural ventilation is caused by movement of air due to chimney stack effect created by the difference in levels between two portals of a tunnel. Difference between the ambient temperature at the two portals and wind also play a part in creating natural draft. Piston effect created by the vehicular traffic creates additional draft.

### **1.5.4 Construction Method**

The Conventional Tunneling Method (Drill & blast combined with mechanical localized excavation whenever required) is proposed for the construction of tunnel. Tunnel is designed with the principles of NATM.

### **1.5.5 Geological/Geotechnical Evaluation**

In this valley, the project area around tunnel alignment, mica schist with intercalation of quartz veins and quartz porphyries and schistose gneiss/ biotite gneiss of Salkhala Formation of Precambrian age (Raina & Aalok, 1968-69, GSI). These are best exposed along the main highway and connecting road to main highway. Exposed rock is observed all along the tunnel alignment.

### **1.6 Construction Time and Construction Cost**

The overall construction time is based on the assumptions and calculations. The construction time of Chainage 83 is estimated to approx. 24 working months. The estimation of the construction time is based on the assumptions that construction will be done from both the tunnel portals as it would be accessible during the entire year, it is also assumed that full independent construction works will be done for all the 12 months of the year at all other construction faces (Northern & Southern portals).

The construction cost evaluation is based on the unit rates and quantities determined. **The overall costs are determined with 97.108 Crores INR.** These costs are only the basic construction costs as per detailed rate analysis and cost estimates.

**Table 5: Summary of Cost**

Item	Bill No.	Description	Total Amount (Rs. in Crores)
1	Bill No. 1	Tunnel	50.936
2	Bill No. 2	Site Clearance	0.008
3	Bill No. 3	Earth Works	1.698
4	Bill No. 4	Sub-Bases and Bases Courses	0.342
5	Bill No. 5	Bituminous Courses	1.937
6	Bill No. 6	Bridge	11.527
7	Bill No. 7	Traffic Signs, Markings, Other Road Appurtenances & Breast Wall, Retaining Wall, and Drains	3.876
8	Bill No. 8	Slope Protection Work via Rock Bolting	2.000
<b>A</b>	<b>Sum</b>		<b>72.324</b>
<b>B</b>	<b>GST @ 12% payable on Civil Cost only (on A)</b>		<b>8.679</b>
<b>C</b>	<b>Sub Total (A+B)</b>		<b>81.003</b>
D	Contingency @ 2.8% of (A)		2.025
E	Supervision Charges @ 3% of (A)		3.255
F	Agency Charge @ 3% of (A)		2.170
<b>G</b>	<b>Sub Total (C+D+E+F)</b>		<b>88.452</b>
H	Maintenance During 10 Years @ 0.25% for the First 5 Years, 0.5% for the next 5 Years (on C)		3.038
I	Escalation @ 5% per annum for 2 year during construction payable to Contractor of (C).		4.056
<b>J</b>	<b>Total Project Cost (G+H+I)</b>		<b>95.540</b>
K	Land Acquisition		0.598
L	Environmental Impact Assessment		0.570
M	Utility Shifting Cost		0.400
<b>Total Capital Cost (J+K+L+M)</b>			<b>97.108</b>