

SCHEDULE - B  
(See Clause 2.1)

**Development of the Project Highway**

**1 Development of the Project Highway**

Development of the Project Stretch from Km. 21+000 to Km. 32+000 of Kohima Bypass includes design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

**2 Rehabilitation and augmentation**

NA

**3 Specifications and Standards**

The Project Highway shall be designed and constructed in conformity with the Specifications and Standards as specified in Annex-I of Schedule-D.

Annex - I  
(Schedule-B)

**Description of Two Lane with Paved Shoulder**

**1 CONSTRUCTION OF THE HIGHWAY**

**i) WIDTH OF CARRIAGEWAY**

- a) Two Lanning with paved shoulder shall be undertaken. The paved carriageway including paved shoulders shall be in accordance with the typical cross sections drawings provided in para 14 of Annexure-I Schedule-B

Note: The length of road in built-up section is tentative, and it may vary as per site condition. In case of increase of length, no positive change of scope will be payable.

- b) Except as otherwise provided in this Agreement, the width of the paved carriageway and cross-sectional features shall conform to paragraph 1(i) above.

**2. GEOMETRIC DESIGN AND GENERAL FEATURES**

**i) General**

Geometric design and general features of the Project Highway shall be in accordance with Section 2 of the IRC: SP: 73-2018

**ii) Design speed**

The design speed shall be as per IRC 73: 2018.

**iii) Improvement of the existing road geometrics**

In the following sections, where improvement of the existing road geometrics to the prescribed standards is not possible, the existing road geometrics shall be improved to the extent possible within the given right of way and proper road signs and safety measures shall be provided:

Sr. No.	Stretch (from Km to Km)	Type of deficiency	Remarks
NIL			

**iv) Right of Way**

Details of the Right of Way have been given in Annex II of Schedule A.

**v) Type of shoulders**

- a) Type of shoulders have been given in TCS mentioned in para 14, Annexure I of Schedule B.
- b) Design and specifications of the paved shoulders and granular material shall be conform to the requirements specified in paragraph 5.10 of the IRC: SP: 73-2018.

**vi) Lateral and vertical clearances at underpasses**

- a) Lateral and vertical clearances at underpasses and provision of guardrails/crash barriers shall be as per para. 2.10 of the IRC: SP: 73-2018
- b) Lateral clearance: The width of the opening at the Vehicular Under Passes (VUP) shall be as follows:

Sr. No.	Location (Design Chainage) Km	Span / Opening (m)	Vertical Clearances (m)
Nil			

**vii) Lateral and vertical clearances at overpasses**

- a) Lateral and vertical clearances at overpasses shall be as per para 2.11 of the 2-lanning Manual, however no overpass has been proposed.
- b) Lateral clearances: The width of the opening at the overpasses shall be as follows:

Sr. No.	Location (Chainage) (From Km to Km)	Span / Opening (m)	Remarks
Nil			

**viii) Service roads/Slip road**

Service roads/Slip road shall be constructed at the locations and for the lengths indicated below [Refer to paragraph 2.12 of IRC: SP: 73-2018]:

**(a) Details of service road**

Service roads shall be constructed at the locations and for the lengths indicated below:

Sr. No.	Location of service road (From Km to Km)	Right hand side(RHS) /Left hand side (LHS)/or both sides	Length (Km) of service road
Nil			

**(b) Details of Slip road**

Minimum 400 m slip road of intermediate lane width configuration shall be constructed to connect flyover with NH-150 near BSF Camp.

**ix) Grade separated structures**

- a) Grade separated structures shall be provided as per paragraph 2.13 of the IRC: SP: 73-2018. The requisite particulars are given below:

Sr. No.	Location of structure (Existing)	Location of structure (Design)	Length (m)	Number and length of Spans(m)	Approach Gradient	Remarks, if any
NIL						

- b) In the case of grade separated structures, the type of structure and the level of the Project Highway and the cross roads shall be as follows:

Sr. No.	Location (Design Chainage)	Location (Design Chainage)	Type of Structure Length	Cross road at		
				Existing level	Raised Level	Lowered Level
NIL						

- x) **Cattle and pedestrian underpass /overpass**

Cattle and pedestrian underpass/overpass shall be constructed as follows: (as per IRC SP: 73:2018)

Sr. No.	Location (Chainage) (From Km to Km)	Type of Crossing
NIL		

- xi) **Typical cross-sections of the Project Highway**

Indicative typical cross section of the Project highway has been provided as per para 14 of Annexure-I (Schedule B).

TCS		Length
TCS -I	With Retaining wall on New alignment	400
TCS-II	Without Retaining wall on New alignment	5900
TCS-III	Built up section-Mountainous Terrain	600
TCS-IV	With Retaining wall on Existing Road	50
TCS-V	Without Retaining wall on Existing Road	4050
TCS-VI	BOX cutting section	0
TOTAL		11000

### 3 INTERSECTIONS AND GRADE SEPARATORS

All intersections shall be as per Section3 of the Manual. Existing intersections which are deficient shall be improved to the prescribed standards.

There are no intersections with cross roads having bituminous surfacing. The cross roads fall into the category of VRs. The Contractor has to construct the following:

Properly designed intersections shall be provided at the locations and of the types and features given in the tables below:

**i. At-Grade intersections:**

Sr. No.	Location of Intersection	Type of intersection	Other feature
1	Nil	Nil	Nil

**ii. Grade Separated intersection with/without ramps**

S. NO	Location	Salient features	Minimum length of viaduct to be provided	Road to be carried over/under the structures
1	29+950	13 x 30m length flyover	390 m	NH-150

**4 ROAD EMBANKMENT AND CUT SECTION**

- i) Widening and improvement of the existing road embankment/cuttings and construction of new road embankment/ cuttings shall conform to the Specifications and Standards given in section 4 of IRC: SP: 73-2018 and the specified cross-sectional details. Deficiencies in the plan and profile of the existing road shall be corrected.
- ii) Raising of the existing road

The existing road shall be raised in the following sections:

Sl. No.	Section (from km to km)	Length	Extent of raising [Top of finished road level]
Nil			

**5 PAVEMENT DESIGN**

5.1 Pavement design shall be carried out in accordance with section 5 of the Manual.

**5.2 Type of pavement**

Flexible pavement shall be adopted for Project Highway. Notwithstanding anything contrary contained in this Agreement or the Manual, the pavement shall be designed as given below.

**5.3 Design requirements**

Notwithstanding anything to the contrary contained in this agreement or the manual, the contractor shall design the pavement of main carriageway for design traffic of 50 MSA with a minimum design period of 20 years. CBR value as obtained at site shall be taken for design if less than 10%. Maximum value of CBR to be

taken for design shall not exceed 10%.

Bituminous Grade VG 30 or VG 40 shall be used for BC.

#### 5.4 Reconstruction of stretches/ Realignment/ Bypass of Sections

5.4.1 The following stretches of the existing road shall be reconstructed. These shall be designed as new pavement.

Sl. No.	Existing Section (km)		Remarks
	From	To	
NIL			

#### 5.4.2 Rigid Pavement

No rigid pavement has been considered for the Project Highway.

### 6. ROAD SIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway shall be provided as per Section 6 of the Manual (IRC: SP: 73-2018).

Lined drain of following length shall be provided:

Sr. No.	Length (except CD structures)	Side of construction
	(m)	Hill side/Both
1	10202	Hill side
2	600	Both side

**The length of side drains given above are minimum and it may vary as per site condition. In case of increase of length, no positive change of scope will be payable**

### 7. DESIGN OF STRUCTURES

#### i. General

a) All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of IRC: SP: 73-2018 and referred other codes therein and shall conform to the cross-sectional features and other details specified therein

b) Width of the carriageway of new bridges and structures shall be as follows:

Sr. No.	Bridge/Flyover (km)	Length of Bridge (m)	Width of carriageway and Cross - Sectional feature
1	21+415	80	As per section 7.3 (ii) of the manual
2	30+300	390	

c) Following structures shall be provided with footpaths:

Sr. No.	Bridge (km)	Length of Bridge (m)	Remark
1	21+415	80	Footpath on both sides as per section 7 of the manual.
2	30+300	390	

d) All bridges shall be high-level bridges.

e) The following structures shall be designed to carry utility services specified in table below:

Sr. No.	Bridge (km)	utility service to be carried out on both side
1	21+415	OFC, Electricity and telephone cables
2	30+300	

f) Cross-section of the new culverts and bridges at deck level for the Project Highway shall conform to the typical cross-sections of IRC: SP: 73-2018.

ii. Culverts

a) Overall width of all culverts shall be equal to the roadway width of the approaches.

b) Reconstruction of Existing Culverts:

The existing culverts at the following locations shall be reconstructed as new culverts:

c) Widening and Repairing of existing culverts

S. No.	Existing chainage (km)	Design Chainage (km)	Proposal Details			TCS type
			Width (m)	Type of Culvert	Repairs to be carried out	
Nil						

d) New culverts shall be constructed as per tentative chainage given in the table

below. Final chainage to be decided as per the site condition by the AE.

<b>Sr. No.</b>	<b>Design Chainage (Km)</b>	<b>Span/Opening (m)</b>	<b>Type of Culvert</b>
1	21+100	1X2	BOX/ SLAB
2	21+250	1X2	BOX/ SLAB
3	21+600	1X2	BOX/ SLAB
4	21+750	1X2	BOX/ SLAB
5	21+900	1X2	BOX/ SLAB
6	22+050	1X2	BOX/ SLAB
7	22+200	1X2	BOX/ SLAB
8	22+350	1X2	BOX/ SLAB
9	22+500	1X2	BOX/ SLAB
10	22+650	1X2	BOX/ SLAB
11	22+850	1X2	BOX/ SLAB
12	23+000	1X2	BOX/ SLAB
13	23+150	1X2	BOX/ SLAB
14	23+300	1X2	BOX/ SLAB
15	23+450	1X2	BOX/ SLAB
16	23+550	1X2	BOX/ SLAB
17	23+800	1X2	BOX/ SLAB
18	23+950	1X2	BOX/ SLAB
19	24+100	1X2	BOX/ SLAB
20	24+250	1X2	BOX/ SLAB
21	24+400	1X2	BOX/ SLAB
22	24+600	1X2	BOX/ SLAB
23	24+800	1X2	BOX/ SLAB
24	24+950	1X2	BOX/ SLAB
25	25+100	1X2	BOX/ SLAB
26	25+250	1X2	BOX/ SLAB
27	25+400	1X2	BOX/ SLAB
28	25+600	1X2	BOX/ SLAB
29	25+800	1X2	BOX/ SLAB
30	25+950	1X2	BOX/ SLAB
31	26+100	1X2	BOX/ SLAB
32	26+250	1X2	BOX/ SLAB
33	26+400	1X2	BOX/ SLAB
34	26+550	1X2	BOX/ SLAB
35	26+800	1X2	BOX/ SLAB
36	26+950	1X2	BOX/ SLAB

Sr. No.	Design Chainage (Km)	Span/Opening (m)	Type of Culvert
37	27+100	1X2	BOX/ SLAB
38	27+250	1X2	BOX/ SLAB
39	27+400	1X2	BOX/ SLAB
40	27+600	1X2	BOX/ SLAB
41	27+800	1X2	BOX/ SLAB
42	27+950	1X2	BOX/ SLAB
43	28+100	1X2	BOX/ SLAB
44	28+250	1X2	BOX/ SLAB
45	28+400	1X2	BOX/ SLAB
46	28+600	1X2	BOX/ SLAB
47	28+800	1X2	BOX/ SLAB
48	28+900	1X2	BOX/ SLAB
49	29+000	1X2	BOX/ SLAB
50	29+150	1X2	BOX/ SLAB
51	29+300	1X2	BOX/ SLAB
52	29+450	1X2	BOX/ SLAB
53	29+850	1X2	BOX/ SLAB
54	30+400	1X2	BOX/ SLAB
55	30+550	1X2	BOX/ SLAB
56	30+700	1X2	BOX/ SLAB
57	30+800	1X2	BOX/ SLAB
58	30+950	1X2	BOX/ SLAB
59	31+100	1X2	BOX/ SLAB
60	31+250	1X2	BOX/ SLAB
61	31+400	1X2	BOX/ SLAB
62	31+600	1X2	BOX/ SLAB
63	31+800	1X2	BOX/ SLAB
64	31+950	1X2	BOX/ SLAB

**The numbers of culvert above are minimum, to be provided and it may increase as per site condition. In case of increase in numbers of culvert, no positive change of scope will be payable**

- e) Repairs/ Replacement of Railing/Parapets, flooring and protection works of the existing culverts shall be undertaken as follows:

Sr. No.	Location (km)	Type of Repair required
NIL		

- f) Floor Protection works of culverts shall be as specified in the relevant IRC codes

and Technical Specifications.

**iii. Bridges**

**a) Existing Bridges to be re-constructed / widened**

- i. The existing bridges at the following locations shall be re-constructed as new structures

**Major Bridges:**

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Design No. of Spans with span length (m)	Remarks
NIL				

**Minor Bridges:**

Sl. No.	Chainage		Silent Details of Existing Bridges	Adequacy or otherwise of the existing waterway, vertical clearance	Remarks
	Existing	Design			
Nil					

- (iii) The following narrow bridges shall be widened:

Sr. No	Location (Km)	Existing Width (m)	Extent of Widening (m)	Cross-section at deck level for widening
Nil				

**b) Additional New Bridges**

New bridges at the following locations on the project highway shall be constructed. GADs for the new bridges are attached in the drawings folder:

**Major Bridge:**

Sr. No.	Location (Km)		Total length (m)	Remarks
	Existing	Design		
1	-	21+415	80	2 Lane New Bridge as per section 7 of IRC SP 73:2018

**Minor Bridge:**

Sr. No.	Location (Km)		Total length (m)	Remarks
	Existing	Design		
1	Nil			

- c) **The railings of existing bridges shall be replaced by concrete crash barriers at the following locations:**

Sr. No.	Location (km)	Remarks
Nil		

- d) **Repairs/ replacements of railing/parapets of the existing bridges shall be undertaken as follows:**

Sl. No.	Existing Chainage (Km)	Design Chainage (Km)	Existing no. of Spans with span length (m)	Remarks
Nil				

- e) **Drainage system for bridge decks**

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.20 of IRC: SP: 73-2018.

- f) **Structures in marine environment**

Refer to paragraph 7.21 of The Manual and specify the necessary measures / treatments for protecting structures in marine environment, where applicable.

#### iv. **Rail - Road Bridges**

- a) Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the Manual.

- b) **Road Over-Bridges**

Road over-bridges (road over railway line) shall be provided at the following level crossings, as per manual:

Sl. No.	Location of Level crossing (Design Chainage km)	Length of bridge (m)
Nil		

- c) **Road under-Bridges**

Road under-bridges (road under railway line) shall be provided at the following level crossings, as per GAD drawings attached:

Sl. No.	Location of Level crossings(km)	Number and length of Span (m)
Nil		

**v. Grade separated structures**

The grade separated structures shall be provided at the locations and of the type and length specified in paragraphs 2(ix) and 3 of this Annex-I.

Sr. No.	Location		Span Arrangement	Total length (m)	Remarks
	Existing Chainage (Km)	Design Chainage (Km)			
1	-	30+300	13 x 30 m	390 m	BSF Camp

**vi. Repairs and strengthening of bridges and structures**

All the existing bridges and structures to be repaired / strengthened, and the nature and extent of repairs/ strengthening required are given below:

**A. Bridges**

Sl. No.	Location / Design Chainage (In km)/Span	Side (LHS/RHS)	Nature and Extent of Repairs / Strengthening to be carried out
Nil			

**B. ROB / RUB**

Sl. No.	Location / Design Chainage (In km)	Side (LHS/RHS)	Nature and Extent of Repairs / Strengthening to be carried out
Nil			

**C. Overpass / Underpass and Other structures**

Sr. No.	Location / Design Chainage (In km)	Side (LHS/RHS)	Nature and Extent of Repairs/ Strengthening to be carried out
Nil			

**vii. List of Major bridges and structures**

The following is the list the list of major bridges and structures

Sr. No.	Location (In km)
1	21+415

2	30+300
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## 8 TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

8.1 Traffic control devices and road safety works shall be provided in accordance with Section 9 of IRC: SP:73-2018.

- (a) Traffic Signs: Traffic signs include roadside signs, overhead signs and curb mounted signs along the entire Project Highway shall be provided conforming to IRC 67 and section 800 of MoRTH specification.
- (b) Pavement Marking: Pavement markings shall cover road marking for the entire Project Highway and shall be provided conforming to IRC 35-2015.
- (c) Safety Barrier: W-beam crash barrier along the project highway at all locations shall be provided as specified in section 9 of IRC: SP: 73-2018.

8.2 Specifications of the reflecting sheeting.

Retro reflective sheeting should be of high intensity grade with encapsulated lens or with micro prismatic retro reflective element in accordance with ASTM Standard D 4956-04 shall be provided conforming to section 800 of MoRTH specification.

## 9 ROADSIDE FURNITURE (SECTION 9 of IRC: SP: 73-2018)

- i. Roadside furniture shall be provided in accordance with the provisions of IRC: SP:73-2018.
  - (a) Road Boundary Stone: For the entire Project Highway.
  - (b) Pedestrian: The pedestrian facilities shall include the provision of the;
    - (i) Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location.
    - (ii) Pedestrian Crossings: Provide pedestrian crossing facilities on Junctions.
- ii. Overhead traffic signs: Location and Size
  - (a) Full width Overhead signs: Full width Overhead signs shall be provided as below:

Sl. No.	Design Chainage	Remarks
1	21.000	
2	32.000	

- (b) Cantilever Overhead signs: Overhead signs shall be provided as below:

Sl. No.	Design Chainage	Remarks
1	25.500	
2	28.500	

- (c) Delineators: Delineators for the entire Project Highway at the locations as

per section 9.4 of IRC SP 73:2018

#### 10. COMPENSATORY AFFORESTATION

Minimum 1100 nos. trees are required to be planted as compensatory afforestation.

#### 11. HAZARDOUS LOCATIONS

Metal Beam crash barrier of minimum length of 2650 m (single runner, heavy duty and W-shape) shall be provided at the locations of bridge approaches and high embankments (3.0m and more), at sharp curves on both sides on the project by the Contractor at the locations finalized in consultation with AE. Typical details of metal crash barrier are given in as per manual. Increase in length if any as per site requirement will not constitute change of scope

#### 12. SPECIAL REQUIREMENTS FOR HILL ROADS

Refer to section 13 of IRC: SP: 73-2018.

The following minimum length shall be provided:

Sr. No.	Items	Length (m)
1	Retaining wall (5 m high)	450
2	Breast Wall (upto 3 m high)	200
3	Seeding & mulching	10510 sqm

**Note-** (i) *The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter.*

(ii) *Any increase in quantity over and above the minimum qty. as mentioned in above table or through change in specifications will not be considered as change of scope. Therefore contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid*

(iii) **The length of Retaining Wall shown above is minimum, to be constructed at site for proper geometrics and will not be converted to Breast Wall. Any reduction in the total length of Retaining Wall constructed at site shall constitute of negative change of scope.**

#### 13. CHANGE OF SCOPE

The length of Structures and bridges specified here in above shall be treated as an approximate assessment. The actual lengths as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any increase in the lengths specified in this Schedule-

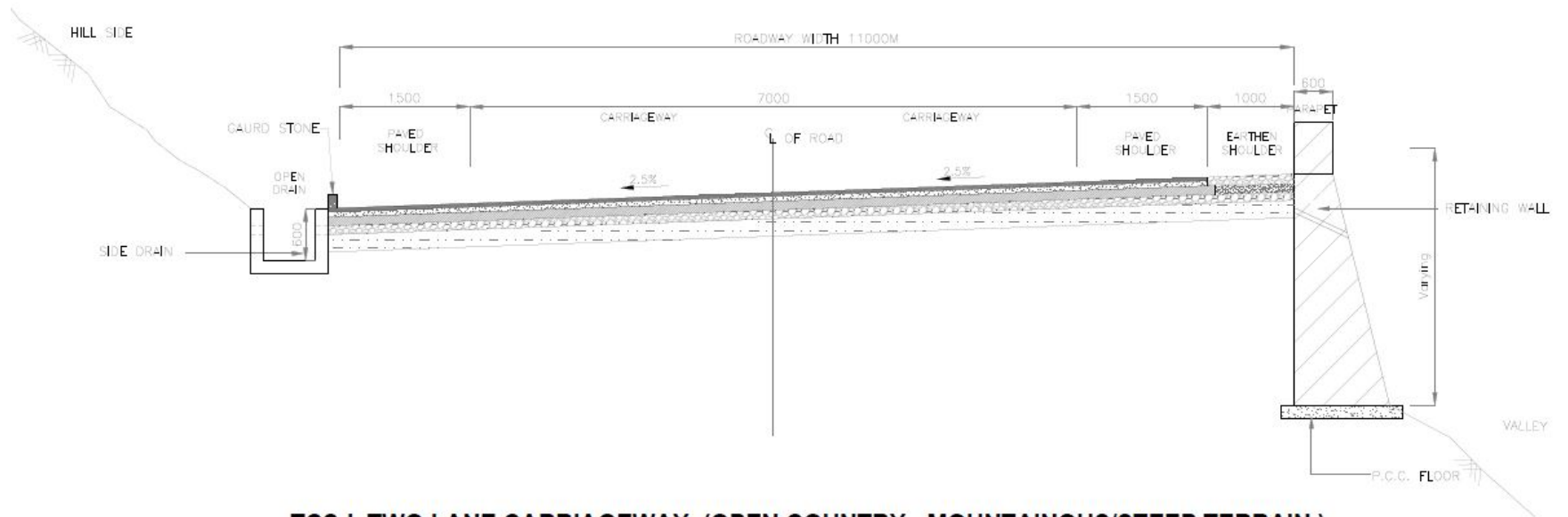
B shall not constitute a Change of Scope, save and except any variations in the length arising out of a Change of Scope expressly undertaken in accordance with the provisions of Article 13.

**14. INDICATIVE CHAINAGES WITH APPLICABLE TYPICAL CROSS SECTION:**

S.No	Design Chainage		Length	Type of TCS
	From	To		
1	21+000	23+050	2050	TCS-II
2	23+050	23+200	150	TCS-I
3	23+200	24+000	800	TCS-II
4	24+000	24+100	100	TCS-I
5	24+100	24+250	150	TCS-II
6	24+250	24+350	100	TCS-I
7	24+350	26+600	2250	TCS-II
8	26+600	26+650	50	TCS-I
9	26+650	27+300	650	TCS-II
10	27+300	27+600	300	TCS-V
11	27+600	27+650	50	TCS-IV
12	27+650	29+700	2050	TCS-V
13	29+700	30+300	600	TCS-III
14	30+300	32+000	1700	TCS-V
	<b>Total length (m)</b>		<b>11000</b>	

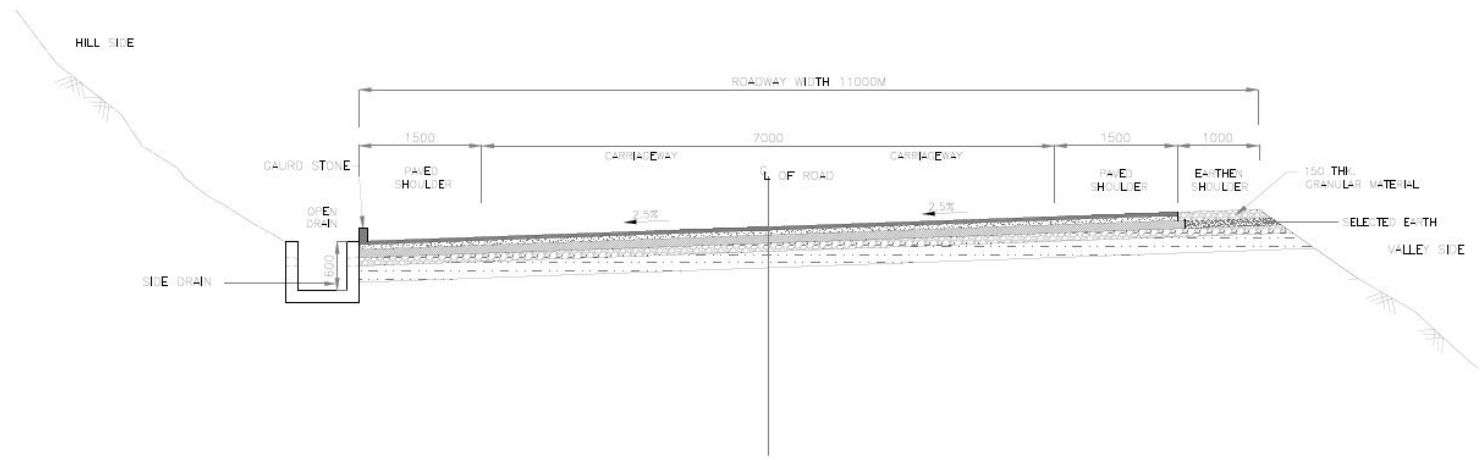


**Typical Cross Section (TCS):**

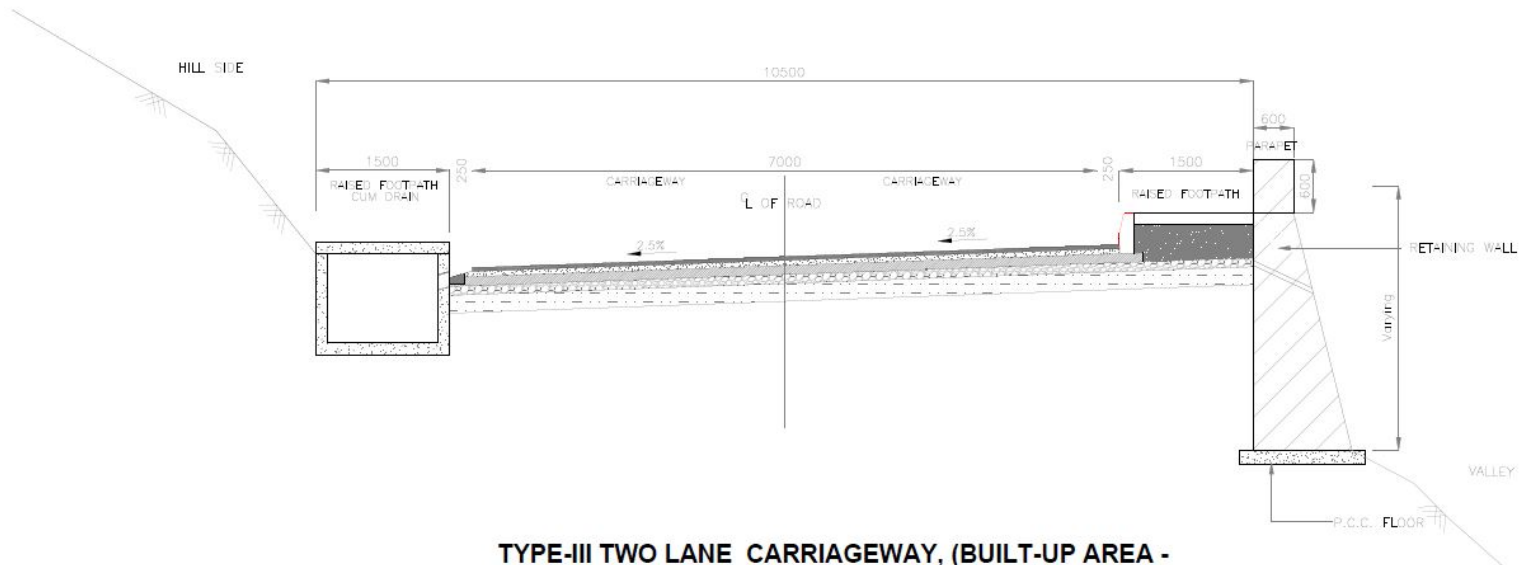


**TCS-I TWO LANE CARRIAGEWAY, (OPEN COUNTRY - MOUNTAINOUS/STEEP TERRAIN )  
WITH RETAINING WALL AND PARAPET ON NEW ALIGNMENT**

(Fig. 2.8 As per Two Lane Manual 2018)

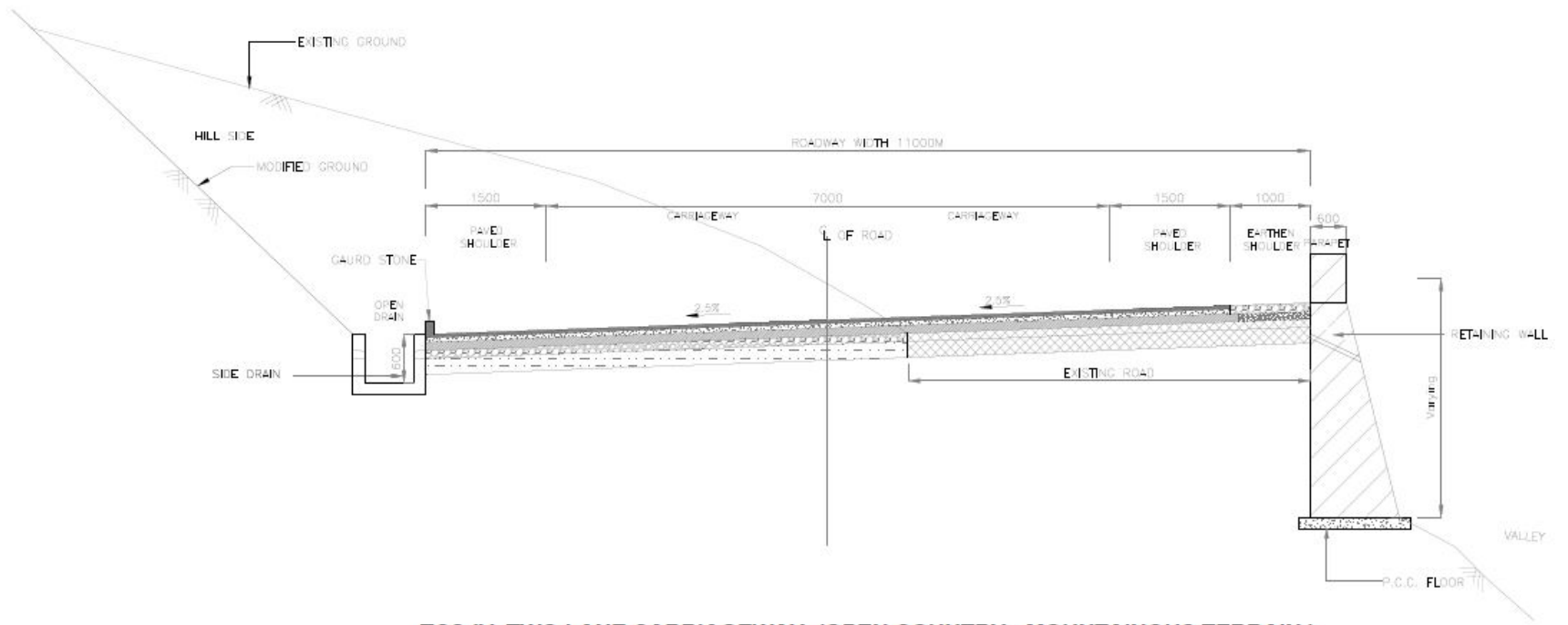


**TCS-II TWO LANE CARRIAGEWAY, (OPEN COUNTRY - MOUNTAINOUS/STEEP TERRAIN )  
WITHOUT RETAINING WALL ON NEW ALIGNMENT**  
(Fig. 2.9 As per Two Lane Manual 2018)

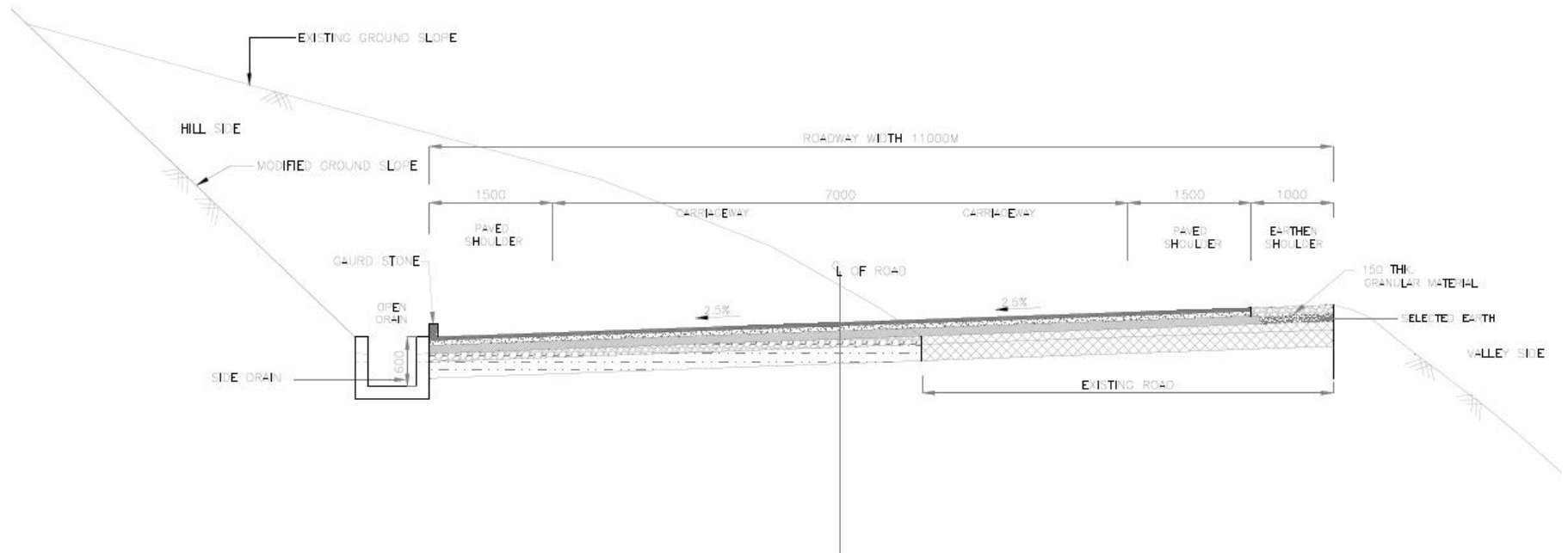


**TYPE-III TWO LANE CARRIAGEWAY, (BUILT-UP AREA - MOUNTAINOUS TERRAIN), WITH RETAINING WALL**

(Fig. 2.10 As per Two Lane Manual 2018)



**TCS-IV TWO LANE CARRIAGEWAY, (OPEN COUNTRY - MOUNTAINOUS TERRAIN )  
WITH RETAINING WALL AND PARAPET ON EXISTING ALIGNMENT**  
(Fig. 2.8 As per Two Lane Manual 2018)



**TCS-V TWO LANE CARRIAGEWAY, (OPEN COUNTRY - MOUNTAINOUS TERRAIN )  
WITHOUT RETAINING WALL ON EXISTING ALIGNMENT**

(Fig. 2.9 As per Two Lane Manual 2018)