National Highways & Infrastructure Development Corporation Limited

BUILDING INFRASTRUCTURE - BUILDING THE NATION

**Ministry of Road Transport & Highways,**
**(Govt. of India)**

# SCHEDULES

## For

**"Four laning of Vairengte - Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Silchar - Vairengte – Sairang road in the State of Mizoram under Bharatmala Pariyojna on EPC mode"**

**August, 2021**

**National Highways & Infrastructure Development Corporation Ltd**
3rd floor, PTI Building, 4-Parliament Street,

New Delhi – 110001

# *Schedule-A*

SCHEDULE - A

*(See Clauses 2.1 and 8.1)*

**SITE OF THE PROJECT**

**1. The Site**

**i.** The Site of the two-lane (proposed 4-lane divided carriageway) Project Highway shall include the land, buildings, structures and road works as described in Annex-I of this **Schedule-A**

ii. The dates of handing over the Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

iii. An inventory of the Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

iv. The alignment plans of the Project Highway are specified in Annex-III.

v. The status of the environment clearances obtained or awaited is given in Annex IV.

Four laning of Vairengte - Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Silchar - Vairengte - Sairang road in the State of Mizoram under Bharatmala Pariyojna on EPC mode.

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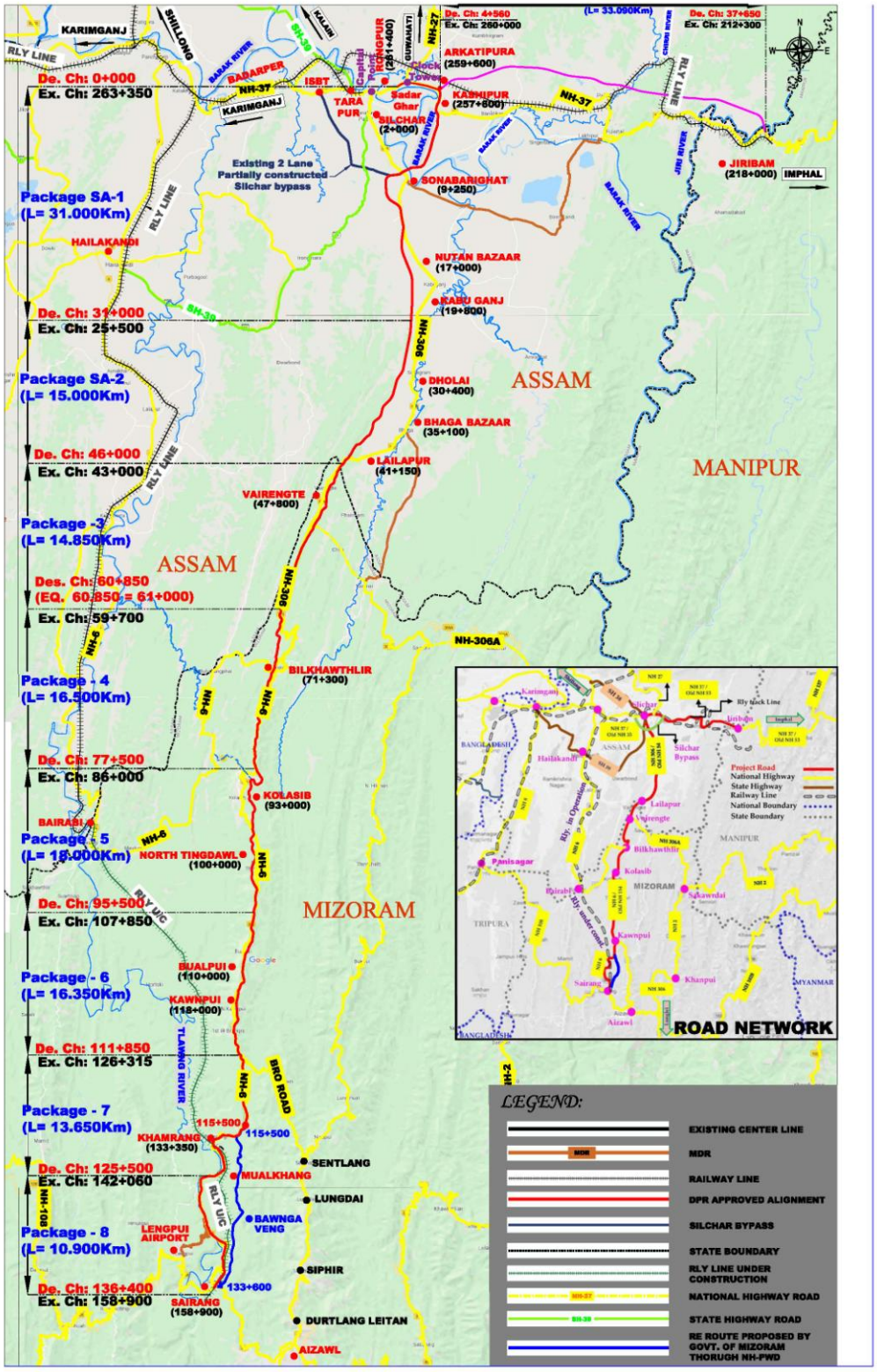
## KEY PLAN




* S= Silchar, A=Aizawl ** **EQ (km 60+850 = km 61+000)**

Annex - I

*(Schedule-A)*

**Site**

**1. Site**

The Site of the two-lane (proposed 4-lane divided carriageway) Project Highway starts from Vairengte and ends at Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Vairengte – Sairang road in the state of Mizoram. The land, carriageway and structures comprising the Site are described below.

**2. Land**

The Site of the Project Highway comprises the land described below:

| SL No. | Existing Chainage | | Length (Km) | EROW Width (m) | Remarks |
|---|---|---|---|---|---|
| | From | To | | | |
| 1 | 43+000 | 53+500 | 10.50 | NA | Vairengte Bypass |
| 2 | 53+500 | 59+700 | 6.20 | 10 | |

**3. Carriageway**

The present carriageway of the Project Highway width is 7.0m. The type of the existing pavement is flexible. The detail is given below.

| SL No. | Existing Chainage | | Length (m) | Carriageway width (m) | Remarks |
|---|---|---|---|---|---|
| | From | To | | | |
| 1 | 43+000 | 53+500 | 10.50 | NA | Vairengte Bypass |
| 2 | 53+500 | 59+700 | 6.20 | 7 | |

**4. Major Bridges**

The Site includes the following Major Bridges:

| S. No. | Chainage (km) | Type of super structures | | | No. of Spans with span length (m) | Width (m) |
|---|---|---|---|---|---|---|
| | | Foundation | Sub- structure | Superstructure | | |
| Nil | | | | | | |

**5. Road over-bridges (ROB)/ Road under-bridges (RUB)**

The Site includes the following ROB (road over railway line)/RUB (road under railway line):

| S. No. | Chainage (km) | Type of Structure | | | No. of Spans with span length (m) | Width (m) |
|---|---|---|---|---|---|---|
| | | Foundation | Sub- structure | Superstructure | | |
| NIL | | | | | | |

## 6. Grade separators

The Site includes the following grade separators:

| S. No. | Chainage (km) | Type of Structure | | No. of Spans with span length (m) | Width (m) |
|---|---|---|---|---|---|
| | | Foundation | Superstructure | | |
| NIL | | | | | |

## 7. Minor bridges

The Site includes the following Minor bridges:

| S. No. | Chainage (km) | Type of Structure | | No. of Spans with span length (m) | Width (m) |
|---|---|---|---|---|---|
| | | Foundation | Superstructure | | |
| Nil | | | | | |

## 8. Railway level crossings

The Site includes the following railway level crossings:

| S. No. | Existing Chainage (Km) | Name of the crossing | Leads to | | Remarks |
|---|---|---|---|---|---|
| | | | On LHS | On RHS | |
| Nil | | | | | |

## 9. Underpasses (vehicular, non-vehicular)

The Site includes the following underpasses:

| S. No. | Existing Chainage (Km) | Type of Structure | No. of Spans with span length (m) | Width (m) |
|---|---|---|---|---|
| NIL | | | | |

## 10. Culverts

The Site has the following culverts:

| S. No. | Existing Chainage (km) | Type of Culvert | Span /Opening with span length (m) | Width of Culvert (m) |
|---|---|---|---|---|
| 1 | 54+600 | Pipe | 1 x 0.9 | 9.9 |
| 2 | 55+100 | Pipe | Chocked | 9.9 |
| 3 | 55+300 | Pipe | Chocked | 9.9 |
| 4 | 55+400 | Pipe | 1 x 0.9 | 9.6 |
| 5 | 55+500 | Pipe | 1 x 0.9 | 10 |
| 6 | 56+300 | Pipe | 1 x 0.9 | 10 |
| 7 | 56+320 | Pipe | 1 x 0.9 | 10 |
| 8 | 56+600 | Pipe | 1 x 0.9 | 9.6 |
| 9 | 56+950 | Pipe | Chocked | 9.6 |
| 10 | 57+300 | Pipe | 1 x 0.9 | 9.6 |

## 11. Bus bays

**The details of bus shelters on the Site are as follows:**

| Sl. No. | Existing Chainage (Km) | Length (m) | Left Hand Side | Right Hand side |
|---|---|---|---|---|
| NIL | | | | |

## 12. Truck Lay byes

The details of truck lay byes are as follows:

| Sl. No. | Existing Chainage (Km) | Length (m) | Left Hand Side | Right Hand side |
|---|---|---|---|---|
| NIL | | | | |

## 13. Roadside drains

The details of the roadside drains are as follows:

| S. No. | Location | | Type | |
|---|---|---|---|---|
| | From km | to km | Masonry/cc (Pucca) | Earthen |
| NIL | | | | |

## 14. Major Junctions

Details of major junctions are as follow.

| Sl. No. | Location | | At Grade | Side | Category of crossroad |
|---|---|---|---|---|---|
| | Ex. Chainage | To-wards | | | |
| 1 | 047+800 | LHS-Phianuam | Y | LHS | NH-306A |

## 15. Minor Junctions

The details of the minor junctions are as follows:

| Sl. No. | Existing Chainge | Type of Carriageway | Type of Junctions (T, Y,+) | SIDE | Type of Road (SH/ MDR/ PMGSY/ VR) |
|---|---|---|---|---|---|
| 1 | 45+499 | BT Road | Y | RHS | Village Road |
| 2 | 45+609 | BT Road | Y | RHS | Village Road |
| 3 | 45+670 | BT Road | Y | LHS | Village Road |
| 4 | 46+127 | BT Road | X | BOTH | Village Road |
| 5 | 47+172 | BT Road | Y | RHS | Village Road |

| Sl. No. | Existing Chainge | Type of Carriageway | Type of Junctions (T, Y,+) | SIDE | Type of Road (SH/ MDR/ PMGSY/ VR) |
|---|---|---|---|---|---|
| 6 | 47+232 | BT Road | Y | RHS | Village Road |
| 7 | 48+698 | BT Road | X | BOTH | Village Road |
| 8 | 49+472 | BT Road | Y | RHS | Village Road |
| 9 | 49+752 | BT Road | Y | RHS | Village Road |
| 10 | 50+465 | BT Road | Y | LHS | Village Road |
| 11 | 51+190 | BT Road | X | BOTH | Village Road |
| 12 | 51+543 | BT Road | Y | RHS | Village Road |
| 13 | 51+750 | BT Road | T | RHS | Village Road |
| 14 | 51+908 | BT Road | T | LHS | Village Road |
| 15 | 52+206 | BT Road | T | LHS | Village Road |
| 16 | 52+337 | BT Road | Y | LHS | Village Road |
| 17 | 59+664 | BT Road | T | LHS | Village Road |

## 16. Bypasses

The details of the bypasses are as follows:

| S. No. | Name of bypass (town) | Existing Chainage (km) | Design Length (Km) | Carriageway | |
|---|---|---|---|---|---|
| | | | | Width (m) | Type |
| NIL | | | | | |

## 17. Other Structures

The Stretch passes through Built-up/ Semi built up area as given in table below:

| S. No. | Existing Chainage (Km) | | Length in m | Name of built up | Remarks |
|---|---|---|---|---|---|
| | From | To | | | |
| NIL | | | | | |

## 18. Details of Existing Utilities Schedule

The existing utilities schedules as below,

### 18. (a) Extra High-Tension Lines (EHT Lines)

| Extra High-Tension Lines (EHT LINES) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl. No | Chainage | | Length of line(km) | | | | | Nos. of Crossings | | | | |
| | From | To | 400 KV | 220 KV | 132 KV | 110 KV | 66 KV | 400 KV | 220 KV | 132 KV | 110 KV | 66 KV |
| | Nil | | | | | | | | | | | |

*Note: (1) denotes Number **of pole/towers***

### 18. (b) High Tension/Low Tension Lines (HT/LT Lines)

| High Tension/ Low Tension Lines (HT/LT LINES) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| S.No | Chainage | | Length of line(km) | | | Nos. of Crossings | | | Transformer | |
| | From | To | HT 33KV | 11KV | LT 440V | HT 33KV | 11KV | LT 440V | No | Capacity |
| 1 | 45+000 | 46+000 | | | .450(6) | | | 1 | | |
| 2 | 55+000 | 56+000 | | .900(8) | | | 1 | | | |
| 3 | 56+000 | 57+000 | | 1(8) | | | 2 | | | |
| 4 | 57+000 | 58+000 | .150(1) | .450(2) | | | | | 1 | 11KVA |
| 5 | 58+000 | 59+000 | | 1.1(7) | | | 3 | | | |
| 6 | 59+000 | 60+000 | .200(1) | .300(3) | | | | | 1 | 25KVA |
| 7 | 60+000 | 60+850 | | .750(7) | .900(3) | | | | | |

2 nos. of Distribution Transformer

*Note: (1) denotes Number* ***of pole/towers***

### 18. (c) Public Health Utilities (Water/Sewage Pipelines)

#### (i) The Site includes the following Public Health Utilities: -

| Sl. No | Chainage | | Length (in km) | | | | Crossings | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | Water Supply Line | | Sewage Line | | Water Supply Line | | Sewage Line | |
| | | | With Pumping | With Gravity Flow | With Pumping | With Gravity Flow | With Pumping | With Gravity Flow | With Pumping | With Gravity Flow |
| 1 | 45+000 | 46+000 | 0.45 | | Nil | | 0.45 | | Nil | |
| 2 | 60+800 | 60+850 | | | | | | | | |
| 3 | | | | | | | | | | |

#### (ii) Bore well/Hand Pump within Row –Nil

#### (iii) Water Tank within Row

| Sl. No. | Chainage | Water Tank | |
|---|---|---|---|
| | | No. | Remarks |
| 1 | 60+830 | 1 | 10,000 lit. however, not required to dismantle and shifting |

Annex - II

*(As per Clause 8.3 (i))*

*(Schedule-A)*

## Dates for providing Right of Way.

The dates on which the Authority shall provide Right of Way to the Contractor on different stretches of the Site are stated below:

**(i) Full Right of Way (full width)**

| Sl. No. | Design Chainage (m) | | Length (m) | Width (m) | Date of Providing ROW |
|---|---|---|---|---|---|
| | From | To | | | |
| (i) Full Right of Way (full width) | 46+000 | 46+020 | 20 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 46+020 | 46+120 | 100 | 70 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 46+120 | 46+340 | 220 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 46+340 | 46+540 | 200 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 46+540 | 46+890 | 350 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 46+890 | 46+980 | 90 | 70 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 46+980 | 47+150 | 170 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 47+150 | 47+200 | 50 | 40 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 47+200 | 47+590 | 390 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 47+590 | 47+600 | 10 | 40 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 47+600 | 47+790 | 190 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 47+790 | 47+880 | 90 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 47+880 | 48+350 | 470 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 48+350 | 48+430 | 80 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 48+430 | 48+510 | 80 | 45 | Within 30 Days of Appointed Date |

| Sl. No. | Design Chainage (m) | | Length (m) | Width (m) | Date of Providing ROW |
|---|---|---|---|---|---|
| | From | To | | | |
| (i) Full Right of Way (full width) | 48+510 | 48+640 | 130 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 48+640 | 48+790 | 150 | 70 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 48+790 | 48+850 | 60 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 48+850 | 48+960 | 110 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 48+960 | 49+090 | 130 | 70 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+090 | 49+150 | 60 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+150 | 49+260 | 110 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+260 | 49+330 | 70 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+330 | 49+390 | 60 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+390 | 49+530 | 140 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+530 | 49+610 | 80 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+610 | 49+800 | 190 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 49+800 | 50+020 | 220 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+020 | 50+150 | 130 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+150 | 50+330 | 180 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+330 | 50+430 | 100 | 40 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+430 | 50+650 | 220 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+650 | 50+690 | 40 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+690 | 50+710 | 20 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+710 | 50+890 | 180 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+890 | 50+910 | 20 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 50+910 | 51+000 | 90 | 65 | Within 30 Days of Appointed Date |

| Sl. No. | Design Chainage (m) | | Length (m) | Width (m) | Date of Providing ROW |
|---|---|---|---|---|---|
| | From | To | | | |
| (i) Full Right of Way (full width) | 51+000 | 51+170 | 170 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+170 | 51+300 | 130 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+300 | 51+390 | 90 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+390 | 51+500 | 110 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+500 | 51+560 | 60 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+560 | 51+650 | 90 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+650 | 51+690 | 40 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+690 | 51+760 | 70 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 51+760 | 52+180 | 420 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+180 | 52+300 | 120 | 70 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+300 | 52+440 | 140 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+440 | 52+550 | 110 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+550 | 52+910 | 360 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+910 | 52+940 | 30 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+940 | 52+990 | 50 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 52+990 | 53+070 | 80 | 40 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 53+070 | 53+640 | 570 | 55 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 53+640 | 54+400 | 760 | 65 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 54+400 | 54+600 | 200 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 54+600 | 54+940 | 340 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 54+940 | 55+090 | 150 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 56+190 | 56+210 | 20 | 45 | Within 30 Days of Appointed Date |

| Sl. No. | Design Chainage (m) | | Length (m) | Width (m) | Date of Providing ROW |
|---|---|---|---|---|---|
| | From | To | | | |
| (i) Full Right of Way (full width) | 56+210 | 56+450 | 240 | 40 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 56+450 | 56+470 | 20 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 56+820 | 56+890 | 70 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 56+890 | 56+950 | 60 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 57+110 | 57+160 | 50 | 50 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 57+310 | 57+410 | 100 | 40 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 57+490 | 57+590 | 100 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 58+110 | 58+220 | 110 | 45 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 59+350 | 59+420 | 70 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 59+420 | 59+430 | 10 | 60 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 59+430 | 59+640 | 210 | 35 | Within 30 Days of Appointed Date |
| (i) Full Right of Way (full width) | 60+720 | 60+770 | 50 | 50 | Within 30 Days of Appointed Date |

**(ii) Part Right of Way (part width)**

| Sl. No. | Design Chainage (km) | | Length (m) | Width (m) | Date of Providing ROW |
|---|---|---|---|---|---|
| | From | To | | | |
| (ii) Part Right of Way (part width) | 55+090 | 55+220 | 130 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 55+220 | 55+790 | 570 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 55+790 | 55+820 | 30 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 55+820 | 55+890 | 70 | 6 | On Appointed Date |
| (ii) Part Right of Way (part width) | 55+890 | 56+190 | 300 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 56+470 | 56+560 | 90 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 56+560 | 56+710 | 150 | 5 | On Appointed Date |

| | | | | | |
|---|---|---|---|---|---|
| (ii) Part Right of Way (part width) | 56+710 | 56+820 | 110 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 56+950 | 57+110 | 160 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+160 | 57+200 | 40 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+200 | 57+310 | 110 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+410 | 57+490 | 80 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+590 | 57+630 | 40 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+630 | 57+820 | 190 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+820 | 57+860 | 40 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+860 | 57+880 | 20 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 57+880 | 58+110 | 230 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 58+220 | 58+670 | 450 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 58+670 | 59+140 | 470 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 59+140 | 59+350 | 210 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 59+640 | 59+710 | 70 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 59+710 | 59+850 | 140 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 59+850 | 59+920 | 70 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 59+920 | 59+930 | 10 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 59+930 | 60+030 | 100 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 60+030 | 60+100 | 70 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 60+100 | 60+370 | 270 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 60+370 | 60+440 | 70 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 60+440 | 60+690 | 250 | 10 | On Appointed Date |
| (ii) Part Right of Way (part width) | 60+690 | 60+720 | 30 | 10 | On Appointed Date |

| | | | | | |
|---|---|---|---|---|---|
| (ii) Part Right of Way (part width) | 60+770 | 60+850 | 80 | 10 | On Appointed Date |

**(iii) Balance Right of Way (width)**

| Sl. No. | Design Chainage ( km ) | | Length (m) | Width (m) | Date of Providing ROW |
|---|---|---|---|---|---|
| | From | To | | | |
| (iii) Balance Right of Way (width | 55+090 | 55+220 | 130 | 60 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 55+220 | 55+790 | 570 | 55 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 55+790 | 55+820 | 30 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 55+820 | 55+890 | 70 | 44 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 55+890 | 56+190 | 300 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 56+470 | 56+560 | 90 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 56+560 | 56+710 | 150 | 40 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 56+710 | 56+820 | 110 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 56+950 | 57+110 | 160 | 40 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+160 | 57+200 | 40 | 40 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+200 | 57+310 | 110 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+410 | 57+490 | 80 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+590 | 57+630 | 40 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+630 | 57+820 | 190 | 25 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+820 | 57+860 | 40 | 40 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+860 | 57+880 | 20 | 25 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 57+880 | 58+110 | 230 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 58+220 | 58+670 | 450 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 58+670 | 59+140 | 470 | 40 | Within 60 Days of Appointed Date |

| | | | | | |
|---|---|---|---|---|---|
| (iii) Balance Right of Way (width | 59+140 | 59+350 | 210 | 50 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 59+640 | 59+710 | 70 | 25 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 59+710 | 59+850 | 140 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 59+850 | 59+920 | 70 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 59+920 | 59+930 | 10 | 25 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 59+930 | 60+030 | 100 | 35 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 60+030 | 60+100 | 70 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 60+100 | 60+370 | 270 | 25 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 60+370 | 60+440 | 70 | 30 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 60+440 | 60+690 | 250 | 25 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 60+690 | 60+720 | 30 | 40 | Within 60 Days of Appointed Date |
| (iii) Balance Right of Way (width | 60+770 | 60+850 | 80 | 40 | Within 60 Days of Appointed Date |

Annex - III

*(Schedule-A)*

**Alignment Plans**

The existing alignment of the Project Highway shall be modified in the following sections as per the alignment plan indicated below:

i. The alignment of the Project Highway is enclosed in alignment plan. Finished road level indicated in the alignment plan shall be followed by the EPC Contractor as minimum FRL if in Fill Section and maximum FRL if in cut section. In any case, the finished road level of the project highway shall not be less than those indicated in the alignment plan. The EPC Contractor shall, however, improve/upgrade the Road profile as indicated in Annex-III based on site/design requirement.

ii. Traffic Signages of the Project Highway shall be executed based on site/design requirement as per IRC: SP: 84 - 2019. The contractor shall, however, improve/upgrade upon the traffic signage plan as indicated in Annex-III based on site/design requirement as per the relevant specifications/IRC Codes/Manual.

Annex - IV

*(Schedule-A)*

**Environment Clearances**

As per MOEF notification F. No. 21-270/2008-1A.III (dated 22 August 2013), Environmental Clearance is not required for Mizoram state. Forest Clearance is not required.

# *Schedule-B*

SCHEDULE - B

*(See Clause 2.1)*

## Development of the Project Highway

**1 Development of the Project Highway**

Development of the Project Highway shall include design and construction of the Project Highway as described in this Schedule-B and in Schedule-C.

**2 4-Laning with Paved Shoulder**

Four Laning shall include construction of the Four Lane Project highway as described in Annex-I of this Schedule-B and in Schedule C.

**3 Specifications and Standards**

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

Annex - I

*(Schedule-B)*

## Description of Project Road (4-Laning)

Site of the Four-lane divided Project Highway comprises the section of National Highway No. 306, from Vairengte to Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Vairengte – Sairang road in the State of Mizoram under Bharatmala Pariyojna on EPC mode.in the State of Mizoram. The coordinates of start and end point of project road are given below.

**Co-ordinates of Start and End of Project Stretch**

| Location | | UTM Co-Ordinate | |
|---|---|---|---|
| Description | Design Chainage | Easting (m) | Northing (m) |
| Start of Project Road | 46+000 | 477219.1607 | 2710971.7067 |
| End of Project Road | **60+850 =61+000 | 471435.1342 | 2697625.3925 |

**1 WIDENING OF THE EXISTING HIGHWAY**

**i.** The Project Highway shall follow the existing alignment unless otherwise specified by the Authority and shown in the alignment plans specified in Annex III of Schedule-A. Geometric deficiencies, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for mountainous/ hilly terrain to the extent land is available.

**ii. WIDTH OF CARRIAGEWAY**

**(a)** Four-laning with paved shoulders shall be undertaken. The paved carriageway shall be in accordance with the typical cross-sections' drawings in the manual IRC SP 84 - 2014. The typical drawings attached in schedules.

Provided that in the built-up areas [refer to paragraphs 2.1 (ii) (a) of the Manual and provide necessary details]: the width of the carriageway shall be as specified in the following table:

| Sl. No. | Built-up stretch (Township) | Location (km to km) | Width (m) | Typical cross section (Ref. to Manual) |
|---|---|---|---|---|
| NIL | | | | |

**(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-84-2019.

### ii. Design Speed

The design speed given in table 2.1 of IRC: SP: 84-2019 shall be adopted.

### iii. Improvements 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.

a) The bypass has been provided in following location.

**Bypass**

| Sl. No | Location | Existing Chainage (Km) | | Existing Length (m) | Design Chainage (Km) | | Design Length (m) |
|---|---|---|---|---|---|---|---|
| | | Start | End | | Start | End | |
| 1 | Vairengte Bypass | 43+000 | 53+500 | 10500 | 46+000 | 55+100 | 9100 |

**b) Realignments and Geometric Improvement locations**

| Sl. No | Exist. Chainage | | Exist. Length (m) | Design Chainage | | Type of deficiency | Design Length (m) |
|---|---|---|---|---|---|---|---|
| | Start | End | | Start | End | | |
| 1 | 54+700 | 55+200 | 500 | 56+200 | 56+700 | Geometric Improvement | 500 |
| 2 | 55+400 | 55+600 | 200 | 56+800 | 57+000 | | 200 |
| 3 | 55+920 | 56+350 | 430 | 57+300 | 57+650 | | 350 |
| 4 | 58+100 | 58+300 | 200 | 59+300 | 59+500 | | 200 |
| 5 | 59+500 | 59+700 | 200 | 60+680 | 60+850 | | 170 |
| | **Total Length (m)** | | **1530** | | | | **1420** |

c) Also, if any, in the existing horizontal and vertical profiles shall be corrected as per the prescribed standards for Mountainous / Hill terrain to the extent land is available.

### iv. Right of Way

- Details of the Right of Way are given in Annex II of **Schedule A**.

### v. Type of shoulders

(a) Paved shoulder shall be provided as per enclosed (below) typical cross section.

(b) In mountainous / steep terrain, paved shoulder of 1.5m width shall be provided on either side of carriageway whereas, balance 1.0m / 1.5m width shall be provided with open /covered drain on cutting side however on valley side, 2.0m width of ES shall be covered with 150mm thick compacted layer of GSB material below chamber that is sloping down towards valley side. (ref. Typ. Cross-sections).

(c) Design and specifications of paved shoulders and granular material shall conform to the requirements specified in paragraphs 5.10 and 5.11 of the IRC: SP: 84-2019.

**vi. Lateral and Vertical Clearances at Underpasses/Flyovers**

Lateral and vertical clearances at Underpasses/Flyovers and provision of guardrails/crash barriers shall be as per the paragraph 2.10 of IRC SP 84-2019.

**a) Lateral clearance**: The size of the opening at the Underpasses shall be as follows:

| S. No. | Location (Km) | Span arrangement and Vertical clearance | Remarks |
|---|---|---|---|
| NIL | | | |

**b) Vertical clearance**: Vertical Clearance at Underpasses shall not be less than 4.0 m (urban area).

**vii. Laterals and Vertical Clearance at Overpasses**

| S. No. | Location (Km) | Span arrangement and Vertical clearance | Remarks |
|---|---|---|---|
| NIL | | | |

a) Lateral and Vertical clearances at over passes shall be as per paragraph 2.11 of the IRC SP 84-2019.

b) Lateral clearance: The width of the opening at the overpasses shall be as follows:

| S. No. | Location (Km) | Nos. x length of spans | Remarks |
|---|---|---|---|
| NIL | | | |

Vertical clearance: The vertical clearance at the underpass shall be as follows.

| S. No. | Location (Km) | Span arrangement and Vertical clearance | Remarks |
|---|---|---|---|
| NIL | | | |

**viii. Service roads /Slip Road**

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

**Details of Service Road/Slip Road**

| S. No. | Chainage | | Length of Service Road (Km) | Right Hand side (RHS) or Left-Hand side (LHS) or Both side | Width (m) |
|---|---|---|---|---|---|
| | From | To | | | |
| 1 | 55+100 | 55+780 | 680 | RHS | 7.00 |

**Note:**

(i) The above length of slip/service road is excluding the tapering length/merging length of acceleration/deceleration lane. The entry and exit of slip road should be constructed as per Fig 2.1 C and service road as per Fig 2.1 A of IRC: SP: 84: 2019.

(ii) Length of service road and slip road given in above table excludes length across the Project Highway for proper connectivity of crossroad on either side of Project Highway as given in the alignment plan enclosed at **Annex-III, Schedule-A** which shall be deemed to be included in the scope of work.

(iii) The length of slip/service road shown in above table is minimum and may increase as per actual site conditions and No Change of Scope shall be admissible on this account.

(iv) Width and locations of service road/slip road shown above are minimum and may vary as per site condition/as per design. Change in locations of slip/service road, if required, shall be deemed to be part of project.

**ix. Grade Separated Structures**

a) Grade separated structures shall be provided as per paragraph 2.13 of the IRC SP 84-2019. The requisite particulars are given below:

| Sl. No | Location of Structure | Length (m) | Number and length of clear Spans (m) | 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 crossroads shall be as follows:

| S. No. | Location (Design Chainage) | Type of Structure | Cross road at | | |
|---|---|---|---|---|---|
| | | | Existing level | Raised Level | Lowered Level |
| Nil | | | | | |

*Cross road levels shall be matched with the proposed highway at service road level and the same shall be finalized in consultation with Authority's Engineer. Any raising or lowering of crossroad covered under scope of this work.

**x. Cattle and pedestrian underpass / overpass**

Cattle and pedestrian underpass/ overpass shall be constructed as follows:

| S. No. | Chainage | | Village | Type of Crossing |
|---|---|---|---|---|
| | Design | Existing | | |
| NIL | | | | |

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

The cross-sectional elements are below with reference to Manual IRC SP : 84 2019. All the cross-sectional elements to be accommodated within the proposed ROW. If required, suitable retaining structures along with drainage system shall be provided as per site condition and this will not attract any change of scope.

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 46+000 | 46+160 | 160 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 46+160 | 46+170 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 46+170 | 46+270 | 100 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 46+270 | 46+280 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 46+280 | 46+330 | 50 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 46+330 | 46+360 | 30 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 46+360 | 46+660 | 300 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 46+660 | 46+700 | 40 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 46+700 | 46+800 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 46+800 | 46+820 | 20 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 46+820 | 46+850 | 30 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 46+850 | 46+890 | 40 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 46+890 | 47+000 | 110 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 47+000 | 47+020 | 20 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 47+020 | 47+150 | 130 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 47+150 | 47+170 | 20 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 47+170 | 47+210 | 40 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 47+210 | 47+260 | 50 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 47+260 | 47+270 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 47+270 | 47+310 | 40 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 47+310 | 47+600 | 290 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 47+600 | 47+610 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 47+610 | 47+650 | 40 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 47+650 | 47+710 | 60 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 47+710 | 47+760 | 50 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 47+760 | 47+790 | 30 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 47+790 | 47+870 | 80 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 47+870 | 47+980 | 110 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 47+980 | 48+010 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 48+010 | 48+030 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 48+030 | 48+130 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 48+130 | 48+150 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 48+150 | 48+190 | 40 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 48+190 | 48+280 | 90 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 48+280 | 48+290 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 48+290 | 48+340 | 50 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 48+340 | 48+360 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 48+360 | 48+430 | 70 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 48+430 | 48+440 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 48+440 | 48+500 | 60 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 48+500 | 48+600 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 48+600 | 48+650 | 50 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 48+650 | 48+820 | 170 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 48+820 | 48+850 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 48+850 | 49+100 | 250 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 49+100 | 49+140 | 40 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 49+140 | 49+270 | 130 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 49+270 | 49+290 | 20 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 49+290 | 49+340 | 50 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 49+340 | 49+480 | 140 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 49+480 | 49+530 | 50 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 49+530 | 49+620 | 90 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 49+620 | 49+630 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 49+630 | 49+680 | 50 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 49+680 | 49+690 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 49+690 | 49+790 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 49+790 | 49+820 | 30 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 49+820 | 49+900 | 80 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 49+900 | 49+910 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 49+910 | 49+970 | 60 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 49+970 | 50+000 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 50+000 | 50+010 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 50+010 | 50+210 | 200 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 50+210 | 50+240 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 50+240 | 50+330 | 90 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 50+330 | 50+350 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 50+350 | 50+370 | 20 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 50+370 | 50+440 | 70 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 50+440 | 50+510 | 70 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 50+510 | 50+530 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 50+530 | 50+630 | 100 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 50+630 | 50+700 | 70 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 50+700 | 50+720 | 20 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 50+720 | 50+740 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 50+740 | 50+770 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 50+770 | 50+910 | 140 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 50+910 | 51+010 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 51+010 | 51+020 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 51+020 | 51+050 | 30 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 51+050 | 51+060 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 51+060 | 51+190 | 130 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 51+190 | 51+200 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 51+200 | 51+210 | 10 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 51+210 | 51+230 | 20 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 51+230 | 51+270 | 40 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 51+270 | 51+290 | 20 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 51+290 | 51+300 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 51+300 | 51+400 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 51+400 | 51+430 | 30 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 51+430 | 51+460 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 51+460 | 51+560 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 51+560 | 51+640 | 80 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 51+640 | 51+990 | 350 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 51+990 | 52+040 | 50 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 52+040 | 52+050 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 52+050 | 52+150 | 100 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 52+150 | 52+170 | 20 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 52+170 | 52+300 | 130 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 52+300 | 52+340 | 40 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 52+340 | 52+440 | 100 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 52+440 | 52+450 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 52+450 | 52+700 | 250 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 52+700 | 52+750 | 50 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 52+750 | 52+870 | 120 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 52+870 | 52+920 | 50 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 52+920 | 52+990 | 70 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 52+990 | 53+010 | 20 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 53+010 | 53+080 | 70 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 53+080 | 53+190 | 110 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 53+190 | 53+220 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 53+220 | 53+290 | 70 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 53+290 | 53+300 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 53+300 | 53+360 | 60 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 53+360 | 53+420 | 60 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 53+420 | 53+510 | 90 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 53+510 | 53+570 | 60 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 53+570 | 53+580 | 10 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 53+580 | 53+630 | 50 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 53+630 | 53+710 | 80 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 53+710 | 53+780 | 70 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 53+780 | 53+870 | 90 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 53+870 | 53+910 | 40 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 53+910 | 54+190 | 280 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 54+190 | 54+260 | 70 | - | New Alignment | Open Area | TCS-8 | Vairengte Bypass |
| 54+260 | 54+430 | 170 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 54+430 | 54+470 | 40 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 54+470 | 54+640 | 170 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 54+640 | 54+700 | 60 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 54+700 | 54+730 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 54+730 | 54+790 | 60 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 54+790 | 54+870 | 80 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 54+870 | 54+910 | 40 | - | New Alignment | Open Area | TCS-1 | Vairengte Bypass |
| 54+910 | 54+940 | 30 | - | New Alignment | Open Area | TCS-6 | Vairengte Bypass |
| 54+940 | 55+010 | 70 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 55+010 | 55+070 | 60 | - | New Alignment | Open Area | TCS-7 | Vairengte Bypass |
| 55+070 | 55+100 | 30 | - | New Alignment | Open Area | TCS-4 | Vairengte Bypass |
| 55+100 | 55+780 | 680 | - | New Alignment | Open Area | TCS-3 | |
| 55+780 | 55+880 | 100 | - | New Alignment | Open Area | TCS-1 | |
| 55+880 | 55+910 | 30 | - | New Alignment | Open Area | TCS-6 | |
| 55+910 | 56+000 | 90 | - | New Alignment | Open Area | TCS-1 | |
| 56+000 | 56+040 | 40 | - | New Alignment | Open Area | TCS-6 | |
| 56+040 | 56+180 | 140 | - | New Alignment | Open Area | TCS-1 | |
| 56+180 | 56+200 | 20 | - | New Alignment | Open Area | TCS-6 | |
| 56+200 | 56+270 | 70 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 56+270 | 56+300 | 30 | - | New Alignment | Open Area | TCS-6 | Geometric Improvements |
| 56+300 | 56+530 | 230 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 56+530 | 56+560 | 30 | - | New Alignment | Open Area | TCS-6 | Geometric Improvements |
| 56+560 | 56+640 | 80 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 56+640 | 56+700 | 60 | - | New Alignment | Open Area | TCS-6 | Geometric Improvements |
| 56+700 | 56+740 | 40 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 56+740 | 56+760 | 20 | - | New Alignment | Open Area | TCS-6 | |
| 56+760 | 56+810 | 50 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 56+810 | 56+850 | 40 | - | New Alignment | Open Area | TCS-6 | Geometric Improvements |
| 56+850 | 56+890 | 40 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 56+890 | 56+930 | 40 | - | New Alignment | Open Area | TCS-8 | Geometric Improvements |
| 56+930 | 56+980 | 50 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 56+980 | 57+050 | 70 | - | New Alignment | Open Area | TCS-7 | Geometric Improvements |
| 57+050 | 57+080 | 30 | 7 | Following Existing Alignment | Open Area | TCS-2 | Geometric Improvements |
| 57+080 | 57+110 | 30 | - | New Alignment | Open Area | TCS-7 | Geometric Improvements |
| 57+110 | 57+170 | 60 | - | New Alignment | Open Area | TCS-1 | |
| 57+170 | 57+240 | 70 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 57+240 | 57+270 | 30 | - | New Alignment | Open Area | TCS-6 | |
| 57+270 | 57+470 | 200 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 57+470 | 57+650 | 180 | - | New Alignment | Open Area | TCS-4 | Geometric Improvements |
| 57+650 | 57+680 | 30 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 57+680 | 57+710 | 30 | - | New Alignment | Open Area | TCS-7 | |
| 57+710 | 57+750 | 40 | - | New Alignment | Open Area | TCS-6 | |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 57+750 | 57+830 | 80 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 57+830 | 57+860 | 30 | - | New Alignment | Open Area | TCS-8 | |
| 57+860 | 58+110 | 250 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 58+110 | 58+130 | 20 | - | New Alignment | Open Area | TCS-4 | |
| 58+130 | 58+160 | 30 | - | New Alignment | Open Area | TCS-6 | |
| 58+160 | 58+210 | 50 | - | New Alignment | Open Area | TCS-4 | |
| 58+210 | 58+270 | 60 | - | New Alignment | Open Area | TCS-1 | |
| 58+270 | 58+540 | 270 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 58+540 | 58+600 | 60 | - | New Alignment | Open Area | TCS-8 | |
| 58+600 | 58+650 | 50 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 58+650 | 58+780 | 130 | - | New Alignment | Open Area | TCS-4 | |
| 58+780 | 58+810 | 30 | - | New Alignment | Open Area | TCS-6 | |
| 58+810 | 58+820 | 10 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 58+820 | 58+870 | 50 | - | New Alignment | Open Area | TCS-4 | |
| 58+870 | 58+890 | 20 | - | New Alignment | Open Area | TCS-1 | |
| 58+890 | 58+940 | 50 | - | New Alignment | Open Area | TCS-7 | |
| 58+940 | 58+950 | 10 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 58+950 | 58+990 | 40 | - | New Alignment | Open Area | TCS-6 | |
| 58+990 | 59+000 | 10 | 7 | Following Existing | Open Area | TCS-2 | |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| | | | | Alignment | | | |
| 59+000 | 59+080 | 80 | - | New Alignment | Open Area | TCS-7 | |
| 59+080 | 59+090 | 10 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 59+090 | 59+170 | 80 | - | New Alignment | Open Area | TCS-6 | |
| 59+170 | 59+190 | 20 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 59+190 | 59+310 | 120 | - | New Alignment | Open Area | TCS-8 | |
| 59+310 | 59+320 | 10 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 59+320 | 59+370 | 50 | - | New Alignment | Open Area | TCS-7 | Geometric Improvements |
| 59+370 | 59+380 | 10 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 59+380 | 59+420 | 40 | - | New Alignment | Open Area | TCS-8 | Geometric Improvements |
| 59+420 | 59+440 | 20 | - | New Alignment | Open Area | TCS-6 | Geometric Improvements |
| 59+440 | 59+460 | 20 | - | New Alignment | Open Area | TCS-1 | Geometric Improvements |
| 59+460 | 59+480 | 20 | - | New Alignment | Open Area | TCS-6 | Geometric Improvements |
| 59+480 | 59+610 | 130 | - | New Alignment | Open Area | TCS-1 | |
| 59+610 | 59+640 | 30 | - | New Alignment | Open Area | TCS-7 | |
| 59+640 | 59+780 | 140 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 59+780 | 59+830 | 50 | - | New Alignment | Open Area | TCS-6 | |
| 59+830 | 59+900 | 70 | - | New Alignment | Open Area | TCS-1 | |
| 59+900 | 59+940 | 40 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 59+940 | 60+000 | 60 | - | New Alignment | Open Area | TCS-7 | |

| Chainage (m) | | Distance (m) | Existing CW | Const. Type | Area Type | TCS Type | Remarks |
|---|---|---|---|---|---|---|---|
| From | To | | | | | | |
| 60+000 | 60+090 | 90 | - | New Alignment | Open Area | TCS-6 | |
| 60+090 | 60+300 | 210 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 60+300 | 60+350 | 50 | - | New Alignment | Open Area | TCS-7 | |
| 60+350 | 60+390 | 40 | - | New Alignment | Open Area | TCS-6 | |
| 60+390 | 60+420 | 30 | 7 | Following Existing Alignment | Open Area | TCS-5 | |
| 60+420 | 60+450 | 30 | - | New Alignment | Open Area | TCS-1 | |
| 60+450 | 60+510 | 60 | - | New Alignment | Open Area | TCS-8 | |
| 60+510 | 60+680 | 170 | 7 | Following Existing Alignment | Open Area | TCS-2 | |
| 60+680 | 60+850 | 170 | - | New Alignment | Open Area | TCS-4 | Geometric Improvements |

## 3. INTERSECTIONS AND GRADE SEPARATORS

All intersections and grade separators shall be as per Section 3 of the IRC SP 84-2019. Existing intersections which are deficient shall be improved to the prescribed standards.

All intersections as per the site requirement shall be designed and constructed in accordance with the manual. List of intersections is given in below table. Draft layout of major junctions is given in indicative Plan & Profile drawings.

### (i) At-grade intersections

#### a. Major Junction

| Sl. No. | Location | | At Grade | Type of Road (SH/ MDR/ ODR/ VR) | Remarks |
|---|---|---|---|---|---|
| | Existing Chainage | Design Chainage | | | |
| 1 | Bypass | 50+920 | X | MDR | BHS |
| 2 | 54+250 | 55+780 | T | NH-306 | RHS |

#### b. Minor Junction:

| Sl. No. | Existing Chainage | Design Chainage | Type of Junctions (T, Y, +) | Side | Type of Road (SH/ MDR/ ODR/ VR) | Remarks |
|---|---|---|---|---|---|---|
| Nil | | | | | | |

***Note:*** *It is clarified that if any other junction is identified during development of the project highway in addition to those mentioned above shall also be improved with proper drainage facilities as per standards. It shall be covered within the scope of work. The Number, location & type of junction shown in above table are minimum and it may increase as per actual site condition and increase in number will not attract change of Scope on this account.*

**(ii) Grade separated intersection with/without ramps.**

| S. No. | Design Chainage (km) | Salient Feature (Formation width) m | Minimum Length of Viaduct | Road to be carried Under structure |
|---|---|---|---|---|
| NIL | | | | |

## 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 the IRC SP 84-2019 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 height of the embankment shall be measured with respect to the Finished Road Levels. The Finished Road Level of main carriageway shall be designed so that the bottom of the subgrade is minimum 1.0m above the Highest Flood Level (HFL)/ High water table/Natural Ground Level and for service road, bottom of the sub grade is minimum 0.5m high above HFL/ High water table /NGL.

The Contractor may adopt suitable slope (angle) for the embankment as per the availability of fill material/design requirements. The slopes shall be checked for safety against failure. The slopes shall be protected with turfing/geo synthetics /geo green blanket/geo cells/stone pitching or any other method as per schedule D.

Wherever required, toe wall/retaining wall/other protection works along with drainage system shall be provided to contain the toe of the earthwork, so that all the features shown in the TCS are accommodated in the ROW provided.

All of surplus cutting soils shall be transported and be disposed to the Spoil Banks in accordance with the Clause 3.1 of Schedule D.

## 5. PAVEMENT DESIGN

i. Pavement design shall be carried out in accordance with Section 5 of the IRC

SP 84-2019 and IRC SP: 59-2019.

**ii. Type of pavement**

The existing flexible pavement shall be dismantled and reconstructed as new flexible pavement from (Design Chainages) km.46+000 to km.60+850 including Bus bay, Rest Area, Truck Lay Bye and Intersection.

**iii. 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 40 MSA with a minimum design period of 20 years. CBR value as obtained at site shall be taken for design if less than 8%. Maximum value of CBR to be taken for design shall not exceed 8%.**

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

**(a) Design Period and strategy**

A) Main carriageway:

Flexible pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

B) Service road/Slip Road:

Flexible pavement shall be designed for a minimum design period of 20 years. Stage construction shall not be permitted.

**C) Strengthening of Existing pavement:**

Nil

**(b) Design Traffic**

**A) Main carriageway:**

Notwithstanding anything to the contrary contained in this Agreement or the IRC SP 84-2019, the contractor shall design the pavement for design traffic of not less than 40 million standard axles (MSA) for Main carriageway.

**B) Service Road**

As per clause 5.5.4 of IRC SP 84-2019 service road shall be designed for minimum 10 MSA.

**C) Strengthening of Existing pavement**

Nil

**iv. Reconstruction of stretches**

The existing flexible pavement shall be dismantled and reconstructed as Flexible pavement.

## 6. ROADSIDE DRAINAGE

Drainage system including surface and subsurface drains for the Project Highway shall be constructed as per Section 6 of the IRC SP 84-2019, in entire length including drains and culverts required along the crossroads at junctions/ interchanges/other locations. Any repair/ reconstruction required for the existing culverts along project highway/along crossroads at junctions shall be carried out. This will not attract any change of scope.

In the cutting sections, lined/unlined drain shall be provided at the top of cut slope. All measures shall be taken to prevent ingress of countryside runoff entering into road formation width.

*Ref. separate TCS drawings for more details*

### i) RCC cover drain:

RCC cover drain shall be provided at following locations.

| LHS | | | | RHS | | |
|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Chainage (m) | | Length (m) |
| | From | To | | From | To | |
| 1 | 55+730 | 55+890 | 160 | 55+730 | 55+890 | 160 |

**Note:** The above locations are minimum. Additional locations if any required as per site condition shall be provided as per manual. It shall not be treated as change in scope of work.

### ii) PCC open drain on hill side:

PCC open drain shall be provided on hill side at following locations.

| LHS | | | | RHS | | |
|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Chainage (m) | | Length (m) |
| | From | To | | From | To | |
| 1 | 50+590 | 50+710 | 120 | 46+000 | 46+170 | 170 |
| 2 | 50+960 | 51+010 | 50 | 46+280 | 48+280 | 2000 |
| 3 | 55+100 | 55+800 | 700 | 48+350 | 50+340 | 1990 |
| 4 | Cross Road at 50+920 | | 160 | 50+420 | 50+520 | 100 |
| 5 | | | | 50+940 | 51+180 | 240 |
| 6 | | | | 51+230 | 51+570 | 340 |
| 7 | | | | 51+620 | 52+990 | 1370 |
| 8 | | | | 53+060 | 53+300 | 240 |

| LHS | | | | RHS | | |
|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Chainage (m) | | Length (m) |
| | From | To | | From | To | |
| 9 | | | | 53+340 | 53+440 | 100 |
| 10 | | | | 53+510 | 55+730 | 2220 |
| 11 | | | | 56+710 | 56+800 | 90 |
| 12 | | | | 57+420 | 57+660 | 240 |
| 13 | | | | 58+090 | 58+260 | 170 |
| 14 | | | | 58+470 | 58+880 | 410 |
| 15 | | | | 59+660 | 59+770 | 110 |
| 16 | | | | 59+840 | 59+940 | 100 |
| 17 | | | | 60+130 | 60+310 | 180 |
| 18 | | | | 60+370 | 60+440 | 70 |
| 19 | | | | 60+610 | 60+850 | 240 |
| 20 | | | | Cross Road at 50+920 | | 185 |
| **Total Length=** | | | **1030** | | | **10565** |

**Note:** The above locations are minimum. Additional locations if any required as per site condition shall be provided as per manual. It shall not be treated as change in scope of work.

**iii) PCC open drain on valley side:**

PCC open drain shall be provided on valley side at following locations.

| LHS | | | | RHS | | |
|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Chainage (m) | | Length (m) |
| | From | To | | From | To | |
| 1 | 46+000 | 46+780 | 780 | 50+520 | 50+910 | 390 |
| 2 | 46+900 | 47+260 | 360 | 56+470 | 56+630 | 160 |
| 3 | 47+310 | 48+280 | 970 | 57+880 | 58+090 | 210 |
| 4 | 48+350 | 48+810 | 460 | 60+520 | 60+610 | 90 |
| 5 | 48+850 | 49+090 | 240 | | | |
| 6 | 49+160 | 50+530 | 1370 | | | |
| 7 | 50+840 | 50+910 | 70 | | | |
| 8 | 51+050 | 51+400 | 350 | | | |

| LHS | | | | RHS | | |
|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Chainage (m) | | Length (m) |
| | From | To | | From | To | |
| 9 | 51+650 | 51+870 | 220 | | | |
| 10 | 52+050 | 52+130 | 80 | | | |
| 11 | 52+180 | 52+320 | 140 | | | |
| 12 | 52+450 | 52+570 | 120 | | | |
| 13 | 52+680 | 53+190 | 510 | | | |
| 14 | 53+410 | 53+700 | 290 | | | |
| 15 | 54+010 | 54+180 | 170 | | | |
| 16 | 54+280 | 54+410 | 130 | | | |
| 17 | 54+480 | 54+620 | 140 | | | |
| 18 | 55+080 | 55+460 | 380 | | | |
| 19 | 55+890 | 59+970 | 4080 | | | |
| 20 | 60+090 | 60+500 | 410 | | | |
| 21 | 60+690 | 60+780 | 90 | | | |
| **Total Length=** | | | **11360** | | | **850** |

**Note:** The above locations are minimum. Additional locations if any required as per site condition shall be provided as per manual. It shall not be treated as change in scope of work.

## 7. DESIGN OF STRUCTURES

### i. General

(a) All bridges, culverts and structures shall be designed and constructed in accordance with section 7 of the IRC SP 84-2019 and shall conform to the cross- sectional features and other details specified therein.

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

Refer to paragraph 7.3 (ii) of the IRC SP 84-2019 and specified width of carriageway of all new four lane bridges shall have footpaths on either side. The cross-sectional features shall be as per Fig.7.6 of the IRC SP 84-2019.

(c) The following bridges shall be provided with footpaths:

| S. No. | Design Chainage (km) | Remarks |
|---|---|---|
| Nil | | |

(d) All bridges shall be high-level bridges.

(e) The structures shall be designed to carry utility services like electric cable, water pipeline, OFC etc. as per the requirement of site.

(f) Cross-section of the new culverts and bridges at deck level shall conform to the typical cross-sections given in section 7 of the Manual.

(g) All structures are to be planned and designed such that, widening in future can be done with least disturbance to the existing structure and its approaches. The vertical clearance at these structures shall be provided considering 4-lane carriageway on either side.

(h) IRC Class Special Vehicle loading shall be taken into account in the structural design of bridges/Flyover/VUP/ROB.

(i) Cross-section of the bridges at deck level for the Project Highway shall conform to the typical cross-sections given in section 7.3 (ii) and Fig.7.6 of the IRC SP 84-2019.

**ii. Culverts**

(a) Overall width of all culverts shall be equal to the roadway width of the approaches. Cross-section of the culverts at deck level for the Project Highway shall conform to the typical cross-sections given in section 7.3 (i), 7.3 (iii) and Fig.7.1 to Fig.7.5 of the IRC SP 84-2019.

**(b) Reconstruction of existing culverts:**

The existing culverts at the following locations shall be re-constructed as new culverts:

| S. No. | Existing Chainage (Km) | Design Chainage (Km) | Existing Type | Existing Span | Proposed Type | Proposed Span | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 56+950 | 58+700 | Pipe | Chocked | BOX | 1x2x2 | |

**(c) Widening of existing culverts**

All existing culverts which are not to be reconstructed shall be widened to the roadway width of the Project Highway as per the typical cross section given in section 7.3 (i), (iii) and Fig. 7.1 to Fig. 7.5 of the IRC SP 84-2019. Repairs and strengthening of existing structures where required shall be carried out.

| S. No | Existing Chainage (Km) | Design Chainage (Km) | Existing Type | Existing Span | Proposed Type | Proposed Span |
|---|---|---|---|---|---|---|
| Nil | | | | | | |

**(d) Additional new culverts shall be constructed as per particulars given in the table below:**

| S. No. | Existing Chainage (Km) | Design Chainage (Km) | Proposed Type | Proposed Span | Remarks |
|---|---|---|---|---|---|
| 1 | - | 46+185 | BOX | 1x2x2 | |
| 2 | - | 46+250 | BOX | 1x2x2 | |
| 3 | - | 46+348 | BOX | 1x2x2 | |
| 4 | - | 46+400 | BOX | 1x2x2 | |
| 5 | - | 46+470 | BOX | 1x2x2 | |
| 6 | - | 46+530 | BOX | 1x2x2 | |
| 7 | - | 46+590 | BOX | 1x2x2 | |
| 8 | - | 46+695 | BOX | 1x2x2 | |
| 9 | - | 46+868 | BOX | 1x2x2 | |
| 10 | - | 47+010 | BOX | 1x2x2 | |
| 11 | - | 47+185 | BOX | 1x2x2 | |
| 12 | - | 47+285 | BOX | 1x2x2 | |
| 13 | - | 47+400 | BOX | 1x2x2 | |
| 14 | - | 47+495 | BOX | 1x2x2 | |
| 15 | - | 47+670 | BOX | 1x2x2 | |
| 16 | - | 47+770 | BOX | 1x2x2 | |
| 17 | - | 47+885 | BOX | 1x2x2 | |
| 18 | - | 48+015 | BOX | 1x3x3 | |
| 19 | - | 48+170 | BOX | 1x4x4 | |
| 20 | - | 48+320 | BOX | 1x3x3 | |
| 21 | - | 48+460 | BOX | 1x3x3 | |
| 22 | - | 48+610 | BOX | 1x3x3 | |
| 23 | - | 48+820 | BOX | 1x3x3 | |
| 24 | - | 48+930 | BOX | 1x3x3 | |
| 25 | - | 49+110 | BOX | 1x2x2 | |
| 26 | - | 49+305 | BOX | 1x2x2 | |
| 27 | - | 49+490 | BOX | 1x2x2 | |
| 28 | - | 49+653 | BOX | 1x2x2 | |
| 29 | - | 49+815 | BOX | 1x2x2 | |
| 30 | - | 49+875 | BOX | 1x2x2 | |
| 31 | - | 49+990 | BOX | 1x2x2 | |
| 32 | - | 50+190 | BOX | 1x2x2 | |
| 33 | - | 50+380 | BOX | 1x2x2 | |
| 34 | - | 50+550 | BOX | 1x2x2 | |
| 35 | - | 50+780 | BOX | 1x3x3 | |
| 36 | - | 50+872 | BOX | 1x3x3 | |

| S. No. | Existing Chainage (Km) | Design Chainage (Km) | Proposed Type | Proposed Span | Remarks |
|---|---|---|---|---|---|
| 37 | - | 51+040 | BOX | 1x3x3 | |
| 38 | - | 51+215 | BOX | 1x2x2 | |
| 39 | - | 51+280 | BOX | 1x2x2 | |
| 40 | - | 51+440 | BOX | 1x2x2 | |
| 41 | - | 51+590 | BOX | 1x2x2 | |
| 42 | - | 51+786 | BOX | 1x2x2 | |
| 43 | - | 51+880 | BOX | 1x2x2 | |
| 44 | - | 52+025 | BOX | 1x2x2 | |
| 45 | - | 52+157 | BOX | 1x2x2 | |
| 46 | - | 52+330 | BOX | 1x3x3 | |
| 47 | - | 52+580 | BOX | 1x2x2 | |
| 48 | - | 52+715 | BOX | 1x2x2 | |
| 49 | - | 52+877 | BOX | 1x2x2 | |
| 50 | - | 53+037 | BOX | 1x2x2 | |
| 51 | - | 53+200 | BOX | 1x2x2 | |
| 52 | - | 53+315 | BOX | 1x2x2 | |
| 53 | - | 53+475 | BOX | 1x2x2 | |
| 54 | - | 53+590 | BOX | 1x2x2 | |
| 55 | - | 53+750 | BOX | 1x2x2 | |
| 56 | - | 53+890 | BOX | 1x2x2 | |
| 57 | - | 53+980 | BOX | 1x2x2 | |
| 58 | - | 54+100 | BOX | 1x2x2 | |
| 59 | - | 54+220 | BOX | 1x2x2 | |
| 60 | - | 54+422 | BOX | 1x2x2 | |
| 61 | - | 54+650 | BOX | 1x2x2 | |
| 62 | - | 54+800 | BOX | 1x2x2 | |
| 63 | - | 54+933 | BOX | 1x2x2 | |
| 64 | - | 55+270 | BOX | 1x2x2 | |

**At Junction and Crossroads**

| Sl. No. | Design Chainage | Type | Span (m) | Minimum Vent Height (m) |
|---|---|---|---|---|
| 1 | 11 no. at Junctions and crossroads | Box Culvert | 1x2 | 2.0 |

**Note:**

- Above vent height (Clear opening height) are minimum and vertical height to be ascertained as per site condition.

- Overall width of all culverts shall be minimum to the roadway width. Wherever Service/Slip/Connecting roads are proposed, the width of the culvert shall be planned beyond the Service/Slip/Connecting roads so as to ensure proper drainage of storm water outside ROW.
- The number of Culverts shown above is minimum, any additional culvert required as per site condition shall be provided as per manual and the culverts for the crossroads at junctions shall be provided as per the site condition in accordance with the manual. Any increase in number/length/span/height of culverts shall not be considered as COS.
- Floor protection work shall be as specified in the relevant IRC Code and Specification.

**(e) Repairs/replacements of railing/parapets, flooring and protection works of the existing culverts shall be undertaken as follows:**

| Sl. No. | Location at km | Type of repair required |
|---|---|---|
| NIL | | |

**iii. Bridges**

(a) Existing bridges to be re-constructed/widened/retain.

(i) The existing bridges at the following locations shall be re-constructed as new Structures:

| S. No. | Existing Chainage (Km) | Proposed Chainage (Km) | Proposed Type of Structure | Proposed (Span arrangement / No x Dia (m)) | Proposed width (m) | Remarks |
|---|---|---|---|---|---|---|
| NIL | | | | | | |

(ii) The following narrow bridges shall be widened:

| S. No. | Existing Chainage (Km | Proposed Chainage (Km) | Existing Type of Structure | Existing (Span arrangement / No x Dia. (m)) | Proposed Width (m) | Remarks |
|---|---|---|---|---|---|---|
| NIL | | | | | | |

(iii) The following bridges shall be retained with minor repair:

| S. No. | Existing Chainage (Km) | Proposed Chainage (Km) | Existing Width (m) | Remarks |
|---|---|---|---|---|

| |
|---|
| NIL |

**(b) Additional new bridges**

New bridges at the following locations on the Project Highway shall be proposed for new construction in Realignment, bypass & Green field Section. Refer to paragraph 7.3 (ii) of the IRC SP 84-2019and specified width of carriageway of all new Four lane bridges shall have footpaths left side of the traffic movement. The cross-sectional features shall be as per Fig.7.6 of the IRC SP 84-2019.

| S. No. | Proposed Chainage (Km) | Proposed Span (m) | Proposed width (m) | Remarks |
|---|---|---|---|---|
| a) Major Bridge | | | | |
| Nil | | | | |
| b) Minor Bridge | | | | |
| Nil | | | | |

Note:

Proposed span arrangement is minimum and the same shall be finalized as per site condition in accordance with the Manual in consent with the concerned authority. Any increase in length/span/height shall not be treated as change in scope of work.

IRC Class Special Vehicle loading shall be taken into account in the structural design of bridges/Flyover/VUP/ROB.

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

| S. No. | Bridge Location | | Remarks |
|---|---|---|---|
| | Existing Chainage (km) | Design Chainage (km) | |
| NIL | | | |

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

| S. No. | Location at km | Remarks |
|---|---|---|
| NIL | | |

(e) Drainage system for bridge decks

An effective drainage system for bridge decks shall be provided as specified in paragraph 7.21 of the IRC SP 84-2019

(f) Structures in marine environment

| S. No. | Location at km | Remarks |
|---|---|---|
| Nil | | |

**iv. Rail-road bridges**

**(a) Design, construction and detailing of ROB/RUB shall be as specified in section 7 of the IRC SP 84-2019**

**(b) Road over-bridges**

Road over-bridges (road over rail) shall be provided at the following level crossings, as per GAD drawings attached, also as per Fig. 7.9 of IRC SP 84-2019:

| S. No. | Location of Level crossing (Chainage km) | Length of bridge (m) |
|---|---|---|
| Nil | | |

Note:

- The proposed span arrangement of ROBs are minimum. It may subject to change as per availability of railway boundaries/ requirement of the railways. Any increase in the cost due to change in the span arrangement and total length shall not be treated as change of scope of work.
- ROBs shall be designed, constructed and maintained as per the requirements of Railway authorities. The construction plans shall be prepared in consultation with the concerned railway authority.
- The ROBs shall be constructed and maintained by the Contractor/ Contractor under supervision of the Railways.
- All expenditure related to construction, maintenance and supervision of ROBs (except plan and estimate (P&E) charges) shall be borne by the Contractor/ Contractor.
- During construction, at the location of the existing level crossing, diversion road with level crossing if any shall be suitably provided by the Contractor/ Contractor.

**(c) Road under-bridges**

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

| S. No. | Location of Level Crossing (chainage 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 2.9 and 3 of this Annex-I.

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

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 of bridge (km) | Nature and extent of repairs /strengthening to be carried out |
|---|---|---|
| NIL | | |

**b) ROB / RUB:**

| **Sl. No.** | **Location of ROB/RUB (km)** | **Nature and extent of repairs /strengthening to be carried out** |
|---|---|---|
| NIL | | |

**c) Overpasses/Underpasses and other structures:**

| **Sl. No.** | **Location of Structure (km)** | **Nature and extent of repairs /strengthening to be carried out** |
|---|---|---|
| NIL | | |

**vii. List of Major Bridges and Structures**

The following is the list of the Major Bridges and Structures:

| **Sl. No.** | **Location** |
|---|---|
| NIL | |

## 8. TRAFFIC CONTROL DEVICES AND ROAD SAFETY WORKS

i. Traffic control devices and road safety works shall be provided in accordance with Section 9 of the IRC SP 84-2019.

(a) Traffic Signs:

Traffic signs shall be provided all along the entire Project Highway as per schedule D. All advance direction/destination, reassurance, place identification signs along main road shall be overhead mounted on gantry. Exact location and number of overhead gantry signs to be decided by Contractor in consultation with AE and NHIDCL as per schedule D. The letter size and siting of all signs along main road shall be designed for the minimum design speed. Minimum number of full overhead gantry sign and cantilever overhead gantry sign shall be provided in accordance of

manual.

(b) Pavement Marking:

Pavement markings shall cover road marking for the entire Project Highway as per manual.

(c) Safety Barrier:

Semi rigid W-beam crash barriers shall be installed all along the project highway on earthen shoulders on either side of main carriageway except at structures where concrete crash barrier shall be provided. Minimum length of W-beam crash barrier and RCC crash barrier with/ without friction slab shall be provided as per schedule D.

(d) RoW Boundary Wall:

RCC Boundary Wall shall be constructed as per IRC: SP: 84-2019 all along the project highway on both sides at RoW edge.

**ii. Specifications of the reflective sheeting.**

All road signs shall be of Prismatic Grade Sheeting corresponding to Class 'C' Sheeting described in IRC: 67 and as described in IRC: SP:84-2019.

## 9. ROADSIDE FURNITURE

i. Roadside furniture shall be provided in accordance with the provisions of Section 9 of the IRC SP 84-2019.

Pedestrian Guard Rail: Provide pedestrian guardrail at each bus stop location and other locations as per manual.

a) Pedestrian crossing: As per manual.
b) Delineators: As per manual.
c) LED traffic blinkers: To be provided at all junctions, pedestrian crossings, exits and at other locations as per manual.
d) Noise barriers: shall be provided in accordance with manual; Locations shall be decided as per site condition in consent with Authority.

ii. Overhead traffic signs: Full width overhear signs and Cantilever signs shall be provided as per IRC SP: 84-2019

## 10. COMPULSORY AFFORESTATION

Nil

## 11. HAZARDOUS LOCATIONS

Roadside safety barriers shall be provided at all locations of hazards such as high embankment, roadside obstacles, sharp curves, Flyover and bridge approaches, overpasses, ROB and any other locations identified in consultation with Authority

Engineer during the execution of the project highway.

## 12. SPECIAL REQUIREMENT FOR HILL ROAD

As the project involve cutting of existing hill slopes, it is imperative that slopes are to be stabilized for insuring longevity of the slopes and the roads.

The contractor shall be responsible for accurate assessment of the actual requirement as per schedule D & prepare design for slope protection & stabilization as per schedule D.

Any increase in quantity over the above will not be considered as change of scope. Therefore, contractor should carry out 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.

**Disposal of Debris**: - As per Manual.

### A. RETAINING WALL/REINFORCES SOIL WALL (RS WALL) /BREAST WALL

Protection wall in the form of Breast/Retaining wall/Reinforced soil wall has also been identified and recommended in below section to mitigate landslide during rainy season, the locations of Breast wall / retaining wall/ Reinforced soil wall ((ref. typ. cross-section and standard dwgs.) are given below:

**A-1 Breast wall**

| LHS | | | | | RHS | | | |
|---|---|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 1 | 46+000 | 46+150 | 150 | 4 | 46+000 | 46+160 | 160 | 6 |
| 2 | 46+600 | 46+650 | 50 | 4 | 46+280 | 46+330 | 50 | 4 |
| 3 | 46+720 | 46+780 | 60 | 4 | 46+360 | 46+540 | 180 | 6 |
| 4 | 46+900 | 46+980 | 80 | 4 | 46+540 | 46+850 | 310 | 8 |
| 5 | 47+320 | 47+400 | 80 | 4 | 46+890 | 47+260 | 370 | 6 |
| 6 | 48+180 | 48+280 | 100 | 4 | 46+925 | 46+975 | 50 | 6 |
| 7 | 48+680 | 48+810 | 130 | 4 | 47+300 | 47+600 | 300 | 6 |
| 8 | 48+940 | 49+090 | 150 | 4 | 47+700 | 47+750 | 50 | 4 |
| 9 | 50+010 | 50+180 | 170 | 4 | 47+780 | 47+870 | 90 | 6 |

| LHS | | | | | RHS | | | |
|---|---|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 10 | 50+590 | 50+710 | 120 | 6 | 48+030 | 48+130 | 100 | 4 |
| 11 | 50+940 | 51+010 | 70 | 4 | 48+210 | 48+270 | 60 | 4 |
| 12 | 51+060 | 51+190 | 130 | 4 | 48+360 | 48+430 | 70 | 6 |
| 13 | 51+300 | 51+400 | 100 | 4 | 48+500 | 48+600 | 100 | 6 |
| 14 | 51+670 | 51+780 | 110 | 4 | 48+650 | 49+270 | 620 | 8 |
| 15 | 52+180 | 52+320 | 140 | 4 | 49+330 | 49+620 | 290 | 6 |
| 16 | 52+450 | 52+570 | 120 | 4 | 49+690 | 49+790 | 100 | 6 |
| 17 | 52+770 | 52+860 | 90 | 4 | 49+910 | 49+970 | 60 | 4 |
| 18 | 53+110 | 53+190 | 80 | 4 | 50+010 | 50+150 | 140 | 6 |
| 19 | 54+100 | 54+180 | 80 | 4 | 50+150 | 50+330 | 180 | 4 |
| 20 | 54+310 | 54+410 | 100 | 4 | 50+430 | 50+510 | 80 | 4 |
| 21 | 56+190 | 56+290 | 100 | 4 | 50+910 | 51+000 | 90 | 6 |
| 22 | 60+710 | 60+770 | 60 | 4 | 51+060 | 51+170 | 110 | 6 |
| 23 | | | | | 51+300 | 51+380 | 80 | 6 |
| 24 | | | | | 51+460 | 51+560 | 100 | 4 |
| 25 | | | | | 51+640 | 51+990 | 350 | 6 |
| 26 | | | | | 52+050 | 52+300 | 250 | 6 |
| 27 | | | | | 52+450 | 52+580 | 130 | 6 |
| 28 | | | | | 52+580 | 52+990 | 410 | 4 |
| 29 | | | | | 53+070 | 53+180 | 110 | 6 |
| 30 | | | | | 53+210 | 53+290 | 80 | 6 |
| 31 | | | | | 53+360 | 53+430 | 70 | 6 |
| 32 | | | | | 53+510 | 53+570 | 60 | 6 |
| 33 | | | | | 53+610 | 53+720 | 110 | 8 |
| 34 | | | | | 53+760 | 54+410 | 650 | 8 |
| 35 | | | | | 54+410 | 54+640 | 230 | 6 |

| LHS | | | | | RHS | | | |
|---|---|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 36 | | | | | 54+940 | 55+570 | 630 | 6 |
| 37 | | | | | 57+470 | 57+650 | 180 | 4 |
| 38 | | | | | 58+110 | 58+210 | 100 | 4 |
| 39 | | | | | 58+650 | 58+780 | 130 | 4 |
| 40 | | | | | 58+820 | 58+870 | 50 | 4 |
| 41 | | | | | 59+850 | 59+920 | 70 | 4 |
| 42 | | | | | 60+380 | 60+420 | 40 | 4 |
| 43 | At Jn 50+910 | | 120 | 2 | 60+680 | 60+850 | 170 | 4 |
| **Total Length=** | | | **2390** | | | | **7560** | |

***Note:*** *The proposed locations are minimum and any change in length/height shall not be treated as change in scope of work.*

1) Breast walls have been proposed under 2 scenarios - a) At built-up areas to restrict the width of cutting and thus the requirement of ROW b) At high cutting locations. The height of breast walls is considered as per site requirement. In general, PCC/RRM (in Cement Mortar 1:4) breast wall shall be provided for the height of 5m max, whereas Gabion/RCC breast wall shall be provided for more than 5m.

2) The protection on hill side in free fall embankment using erosion control blankets component of vegetation over erosion control/ coir blanket with "U" shaped hook and steel wire mesh shall be executed above Breast wall / as per site condition in consultation with Authority/IE.

3) At 46+950, 25m either side total 50m of length on Right hand side should be treated as an exception case due to close vicinity of settlement, additional Breast wall (RCC type) shall be provided at the top of the hill within PROW.

4) In this package, Cut Slope using Erosion Control Blankets Compartment System is provided for area of **90164sqmt** in **13690m** length.

5) 10% of total cutting slope length using erosion control blankets compartment system shall also be executed with soil nailing provision due to Weak Mountain / landslides zone as per site condition in consultation with Authority/IE.

**A-2 Retaining wall**

Retaining walls are permanent structures usually built at the toe of the slope or at shoulder edge to resist lateral pressure due to existing soil, earth filling, back fill, water pressure etc. Retaining walls have been proposed, a) where the existing ground is steep, and embankment is not feasible b) to restrict the formation width at ROW constraint location, the location is as below,

| LHS | | | | | | RHS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Height (m) | Remarks | Chainage (m) | | Length (m) | Height (m) | Remarks |
| | From | To | | | | From | To | | | |
| 1 | 46+660 | 46+700 | 40 | 7 | Gabion | 46+180 | 46+200 | 20 | 5 | Gabion |
| 2 | 46+800 | 46+820 | 20 | 9 | Gabion | 47+980 | 48+010 | 30 | 4 | PCC |
| 3 | 47+000 | 47+020 | 20 | 6 | Gabion | 48+150 | 48+190 | 40 | 6 | Gabion |
| 4 | 47+150 | 47+170 | 20 | 7 | Gabion | 49+300 | 49+320 | 20 | 3 | PCC |
| 5 | 47+610 | 47+650 | 40 | 6 | Gabion | 50+350 | 50+380 | 30 | 3 | PCC |
| 6 | 47+710 | 47+760 | 50 | 6 | Gabion | 51+200 | 51+220 | 20 | 6 | Gabion |
| 7 | 48+600 | 48+650 | 50 | 5 | PCC | 52+020 | 52+040 | 20 | 6 | Gabion |
| 8 | 48+820 | 48+850 | 30 | 5 | PCC | 53+010 | 53+040 | 30 | 4 | PCC |
| 9 | 49+970 | 50+000 | 30 | 7 | Gabion | 53+310 | 53+340 | 30 | 3 | PCC |
| 10 | 50+210 | 50+240 | 30 | 5 | PCC | 53+450 | 53+490 | 40 | 7 | Gabion |
| 11 | 50+740 | 50+770 | 30 | 7 | Gabion | 55+880 | 55+910 | 30 | 3 | PCC |
| 12 | 51+270 | 51+290 | 20 | 5 | PCC | 56+000 | 56+040 | 40 | 6 | Gabion |
| 13 | 51+430 | 51+460 | 30 | 5 | Gabion | 56+180 | 56+200 | 20 | 5 | Gabion |
| 14 | 52+150 | 52+170 | 20 | 6 | Gabion | 56+270 | 56+300 | 30 | 5 | Gabion |
| 15 | 52+870 | 52+920 | 50 | 7 | Gabion | 56+530 | 56+560 | 30 | 5 | Gabion |
| 16 | 53+190 | 53+220 | 30 | 4 | PCC | 56+640 | 56+700 | 60 | 4 | PCC |
| 17 | 53+580 | 53+630 | 50 | 8 | Gabion | 56+810 | 56+850 | 40 | 4 | PCC |
| 18 | 54+430 | 54+470 | 40 | 5 | PCC | 57+710 | 57+750 | 40 | 3 | PCC |
| 19 | 54+700 | 54+730 | 30 | 4 | PCC | 58+950 | 58+990 | 40 | 7 | Gabion |
| 20 | 54+790 | 54+870 | 80 | 7 | Gabion | 59+090 | 59+160 | 70 | 8 | Gabion |
| 21 | 54+910 | 54+940 | 30 | 8 | Gabion | 59+460 | 59+480 | 20 | 4 | PCC |
| 22 | 55+530 | 55+560 | 30 | 5 | PCC | 59+780 | 59+830 | 50 | 6 | Gabion |

| LHS | | | | | | RHS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Height (m) | Remarks | Chainage (m) | | Length (m) | Height (m) | Remarks |
| | From | To | | | | From | To | | | |
| 23 | 56+740 | 56+760 | 20 | 5 | PCC | | | | | |
| 24 | 56+900 | 56+920 | 20 | 6 | Gabion | At Jn 50910 | | 70 | 3 | |
| 25 | 57+240 | 57+270 | 30 | 8 | Gabion | Along Service Road | | | | |
| 26 | 58+130 | 58+160 | 30 | 4 | PCC | 55+670 | 55+780 | 110 | 3 | |
| 27 | 58+780 | 58+810 | 30 | 6 | Gabion | | | | | |
| 28 | 59+140 | 59+170 | 30 | 4 | PCC | | | | | |
| 29 | 59+350 | 59+440 | 90 | 4 | PCC | | | | | |
| 30 | 60+000 | 60+090 | 90 | 6 | Gabion | | | | | |
| 31 | 60+350 | 60+390 | 40 | 4 | PCC | | | | | |
| **Total Length=** | | | **1150** | | | | | **930** | | |

***Note:*** *The proposed locations are minimum and any change in length & height shall not be treated as change in scope of work.*

### A-3 Reinforced Soil Slope (RS Slope)/ Reinforcement Soil wall (RS Wall)

Geologically the project area comprises of rocks from the oldest Precambrian gneissic complex to the recent alluvium formations. Hence in valley region where more filling is required, a Reinforced Soil slope (RS Slope protection) and Reinforced soil Wall (RS wall) is provided as below.

| Reinforced Soil Slope | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LHS | | | | | RHS | | | |
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 1 | 46+170 | 46+270 | 100 | 16 | 50+700 | 50+720 | 20 | 13 |
| 2 | 46+850 | 46+890 | 40 | 11 | 50+840 | 50+890 | 50 | 12 |
| 3 | 47+270 | 47+310 | 40 | 11 | 56+890 | 56+930 | 40 | 12 |
| 4 | 47+650 | 47+710 | 60 | 13 | 57+830 | 57+860 | 30 | 12 |
| 5 | 47+760 | 47+790 | 30 | 12 | 59+190 | 59+310 | 120 | 19 |

| Reinforced Soil Slope | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LHS | | | | | RHS | | | |
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 6 | 48+290 | 48+340 | 50 | 14 | 59+380 | 59+420 | 40 | 13 |
| 7 | 49+290 | 49+340 | 50 | 15 | 60+450 | 60+510 | 60 | 12 |
| 8 | 49+630 | 49+680 | 50 | 13 | | | | |
| 9 | 50+370 | 50+440 | 70 | 10 | | | | |
| 10 | 50+770 | 50+910 | 140 | 13 | | | | |
| 11 | 53+010 | 53+080 | 70 | 12 | | | | |
| 12 | 53+300 | 53+360 | 60 | 12 | | | | |
| 13 | 53+420 | 53+510 | 90 | 17 | | | | |
| 14 | 53+710 | 53+780 | 70 | 13 | | | | |
| 15 | 54+190 | 54+260 | 70 | 12 | | | | |
| 4 | 58+540 | 58+600 | 60 | 12 | | | | |
| Total Length= | | | 1050 | | | | 360 | |

| Reinforced Soil Wall | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LHS | | | | | RHS | | | |
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 1 | 46+330 | 46+360 | 30 | 10 | 46+240 | 46+270 | 30 | 7 |
| 2 | 47+170 | 47+210 | 40 | 10 | 48+290 | 48+340 | 50 | 10 |
| 3 | 48+440 | 48+500 | 60 | 8 | 49+640 | 49+660 | 20 | 8 |
| 4 | 49+100 | 49+140 | 40 | 8 | 50+530 | 50+630 | 100 | 10 |
| 5 | 49+270 | 49+290 | 20 | 8 | 50+760 | 50+800 | 40 | 10 |
| 6 | 49+480 | 49+530 | 50 | 8 | 56+980 | 57+050 | 70 | 9 |
| 7 | 49+820 | 49+900 | 80 | 9 | 57+080 | 57+110 | 30 | 8 |

| Reinforced Soil Wall | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LHS | | | | | RHS | | | |
| Sl No | Chainage (m) | | Length (m) | Height (m) | Chainage (m) | | Length (m) | Height (m) |
| | From | To | | | From | To | | |
| 8 | 50+540 | 50+570 | 30 | 9 | 57+680 | 57+710 | 30 | 8 |
| 9 | 51+020 | 51+050 | 30 | 8 | 58+890 | 58+940 | 50 | 10 |
| 10 | 51+210 | 51+230 | 20 | 10 | 59+000 | 59+080 | 80 | 10 |
| 11 | 51+990 | 52+040 | 50 | 10 | 59+320 | 59+370 | 50 | 8 |
| 12 | 52+340 | 52+440 | 100 | 8 | 59+610 | 59+640 | 30 | 7 |
| 13 | 52+700 | 52+750 | 50 | 9 | | | | |
| 14 | 53+870 | 53+910 | 40 | 8 | | | | |
| 15 | 55+010 | 55+070 | 60 | 10 | | | | |
| 16 | 59+940 | 60+000 | 60 | 11 | | | | |
| 17 | 60+300 | 60+350 | 50 | 8 | | | | |
| **Total Length=** | | | **810** | | | | **580** | |

***Note:*** *The proposed locations are minimum and any change in length & height shall not be treated as change in scope of work.*

The protection on valley side in free fall embankment using erosion control blankets component of vegetation over erosion control coir blanket of 6 mm thick laid over topsoil and anchored with "U" shaped G.I. hook 300x100 mm 1no/sqmt, layer of organic manure and soil conditioner over topsoil layer /good earth layer of 100 to 150 mm thick shall also be executed as per site condition in consult with Authority/IE. The total fill slope using Erosion Control blanket system has been quantified for a minimum length of 4631m (31820 sqm).

## 13. CHANGE OF SCOPE

The number, length and height/width of Structures and bridges specified hereinabove shall be treated as an approximate assessment. The actual numbers, lengths and sizes as required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any variations 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. RAINWATER HARVESTING

(i) As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rainwater, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board.

(ii) Rainwater harvesting structures shall be provided at every 1000m on either side.

(iii) Rainwater harvesting structure shall be provided as per IRC: SP:42-2014 (Guideline for road drainage) and IRC: SP:50-2013 (Guidelines on Urban Drainage)

## 15. UTILITY SHIFTING

Shifting of obstructing existing utilities indicated in Schedule A to an appropriate location in accordance with the standards and specifications of concerned Utility Owning Department is part of the scope of work of the Contractor. The bidders may visit the site and assess the quantum of shifting of utilities for the projects before submission of their bid. The specifications of concerned Utility Owning Department shall be applicable and followed.

**Note-I:**

(a) The type/ spacing/ size/ specifications of poles/ towers/ lines/ cables to be used in shifting work shall be as per the guidelines of utility owning department and it is to be agreed solely between the Contractor and the utility owning department. No change of scope shall be admissible and no cost shall be paid for using different type/ spacing/ size/ specifications in shifted work in comparison to those in the existing work or for making any overhead crossings to underground as per requirement of utility owning department and/or construction of project highway. The Contractor shall carry out joint inspection with utility owning department and get the estimates from the utility owning department. The assistance of the Authority is limited to giving forwarding letter on the proposal of Contractor to utility owning department whenever asked by the Contractor. The decision/ approval of utility owning department shall be binding on the Contractor.

(b) The supervision charges at the rates/ charges applicable of the utility owning department shall be paid directly by the Authority to the Utility Owning department as and when Contractor furnishes demand of Utility Owning Department along with a copy of estimated cost given by the later.

(c) The dismantled material/scrap of existing Utility to be shifted/ dismantled shall belong to the Contractor who would be free to dispose-off the dismantled material as deemed fit by them unless the Contractor is required to deposit the dismantled material to utility owning department as per the norm and practice and in that case the amount of credit for dismantled material may be availed by the Contractor as per estimate agreed between

them.

(d) The utilities shall be handed over after shifting work is completed to Utility Owning Department to their entire satisfaction. The maintenance liability shall rest with the Utility Owning Department after handing over process is complete as far as utility shifting works are concerned.

**Note II:** - Copy of Utility shifting plan enclosed.

### 15.1 Details of proposed Utilities Schedules

Utilities Relocation Plan and its Schedule initially prepared by DPR consultant followed by joined verification with P&E&PHE department in presence of NHIDCL officers dully certified, details as shown below.

### 15.2 Electrical Utilities

The Site includes the following Electrical Utilities: -

**(a) Extra High-Tension Lines (EHT Lines)**

| Extra High-Tension Lines (EHT LINES 132KV) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S. No | Chainage | | Circuit (TC/DC/SC) | Type | Crossing (Nos.) | | Poles | | Conductor (Line Length) | | Size of Cable |
| | From | To | | | Over-Head | Under-Ground | Tower/ Truss/ Unipole | No. | KM | Size | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| High Tension Lines (HT33KV LINES) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl.No | Chainage | | Circuit (TC/DC/SC) | Type | Poles | | Conductor (Length of Line) | | Cable | | Crossings (Nos.) | | Transformer | |
| | From | To | | | Type | Nos. | Km | Size | Km | Size | Over-Head | Under-Ground | Capacity | Nos. |
| 1 | 57+500 | 57+700 | DC | HT 33 KV | Rail poles / Jose poles | 3 | *0.15 | N/A | *0.15 | N/A | | | | |
| 2 | 59+500 | 59+900 | DC | HT 33 KV | | | *0.2 | N/A | *0.2 | N/A | | | | |

Note: TC-Triple Circuit, DC-Double Circuit, SC-Single Circuit, U/G-Underground

**(b) High Tension/Low Tension Lines (HT/LT Lines)**

| Low Tension Lines (LT11 KV & LT 440V LINES) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Sl. No | Types OF | Chainage | Circuit (TC/DC/S | Poles | Conductor (Length | Cable | Crossings (Nos.) |

| | Line | | | C) | | | of Line) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | From | To | | Type | No s. | *K m | Siz e | *K m | Siz e | Over - Hea d | Under - Groun d |
| 3 | LT11K V | 55+00 0 | 56+00 0 | | Rail Pole/Jo ss Pole | 36 | 0.9 | | 0.9 | | 1 | |
| 4 | | 56+00 0 | 57+00 0 | | | | 1 | | 1 | | 2 | |
| 5 | | 57+00 0 | 58+00 0 | | | | 0.45 | | 0.45 | | | |
| 6 | | 58+00 0 | 59+00 0 | | | | 1.1 | | 1.1 | | 3 | |
| 7 | | 59+00 0 | 60+00 0 | | | | 0.3 | | 0.3 | | | |
| 8 | | 60+00 0 | 60+85 0 | | | | 0.75 | | 0.75 | | | |
| 8 | LT 440V | 45+00 0 | 46+00 0 | | | 9 | 0.45 | N/ A | 0.45 | N/ A | 1 | |
| 9 | | 60+00 0 | 60+85 0 | | | | 0.9 | | 0.9 | | | |

2 nos of Distribution Transformer

Note: TC-Triple Circuit, DC-Double Circuit, SC-Single Circuit, U/G-Underground

**15.3 Public Health Utilities (Water/Sewage Pipelines)**

(a) The Site includes the following Public Health Utilities: -

| Sl. No | Chainage | | Type of Lines, Pressure/ under Gravity | Pipe | | | Sluice Valves | Crossings | | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | | Type | No. | Size | Nos. | Nos. | Length | |
| 1 | 45+000 | 46+000 | | Galvanized Iron | 1 | 40 mm | | 1 | 0.65 | |

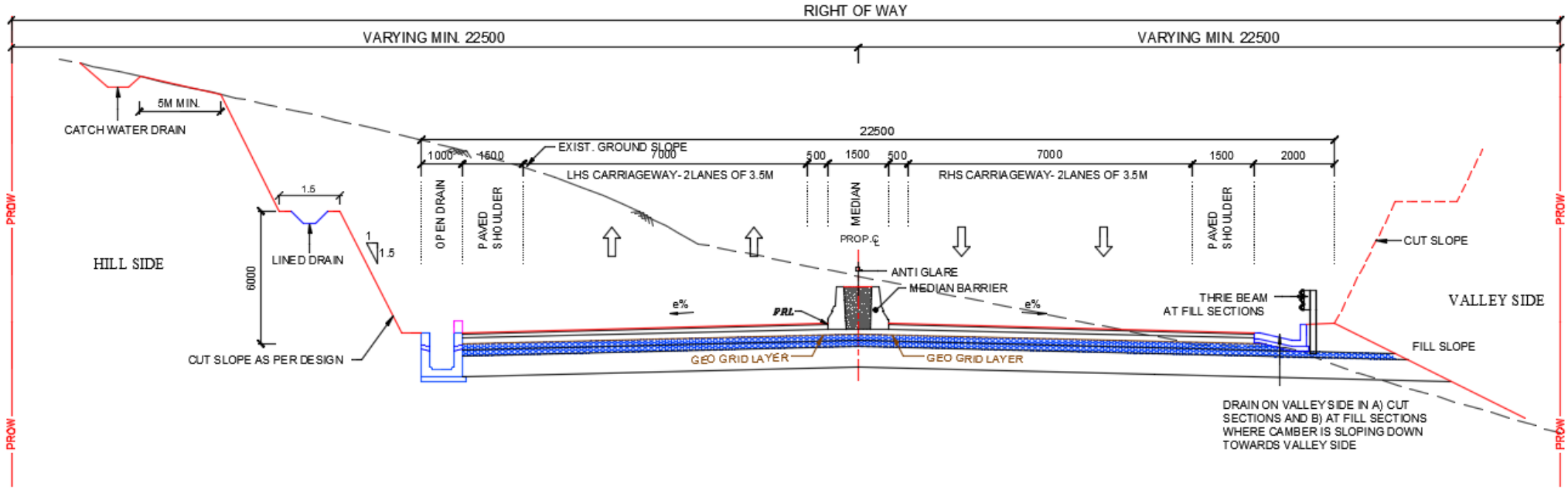
(b) Bore well/Hand Pump within ROW-Nil

(c) Water Tank

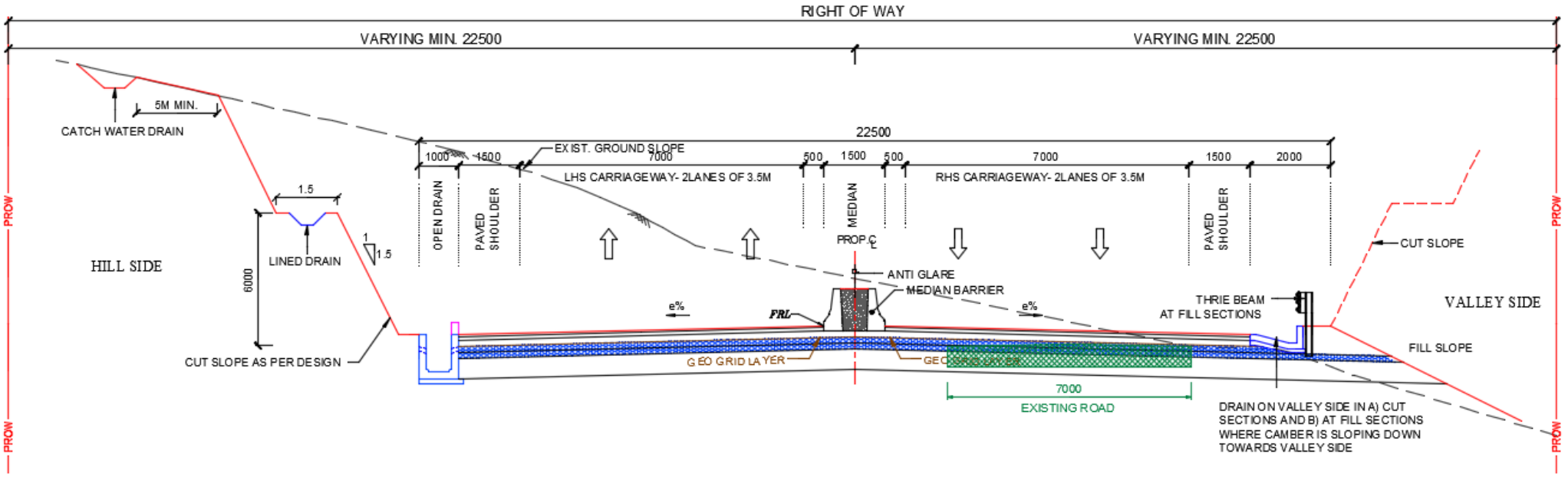
| Sl. No. | Water Tank | |
|---|---|---|
| | Chainage | No. |
| 1 | 60+830 | 01 |

**15.4** Any Other Lines-No

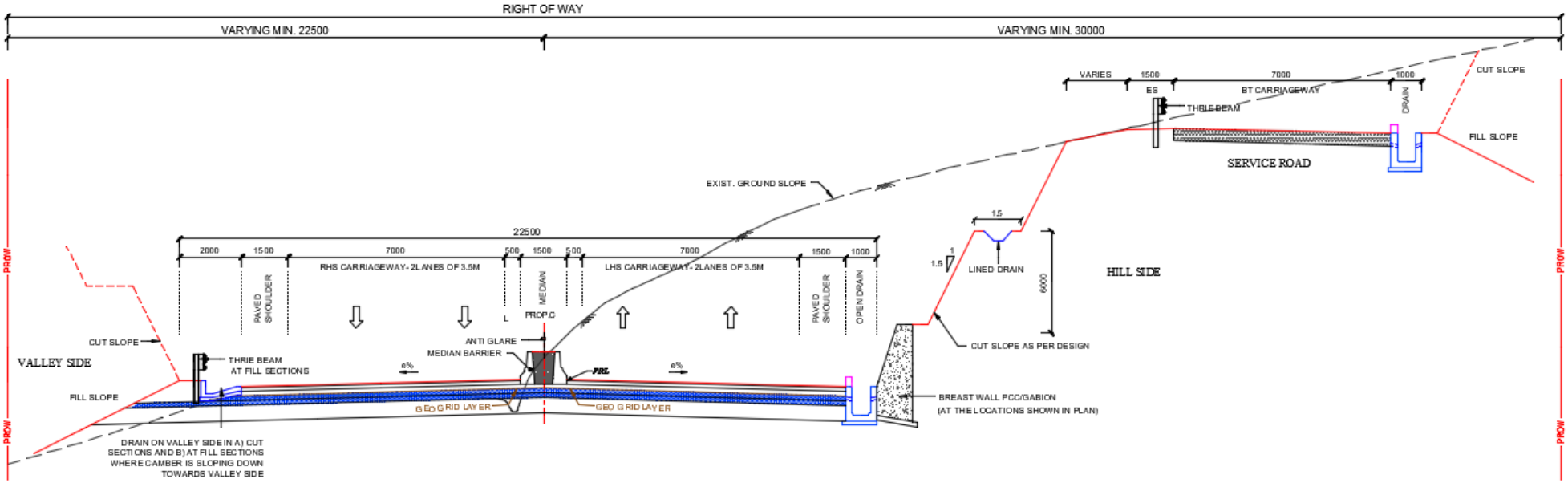
**16. Utility Duct: 15nos. (NP-4 class) of 1.0m dia. has been provided cross the project highway.**



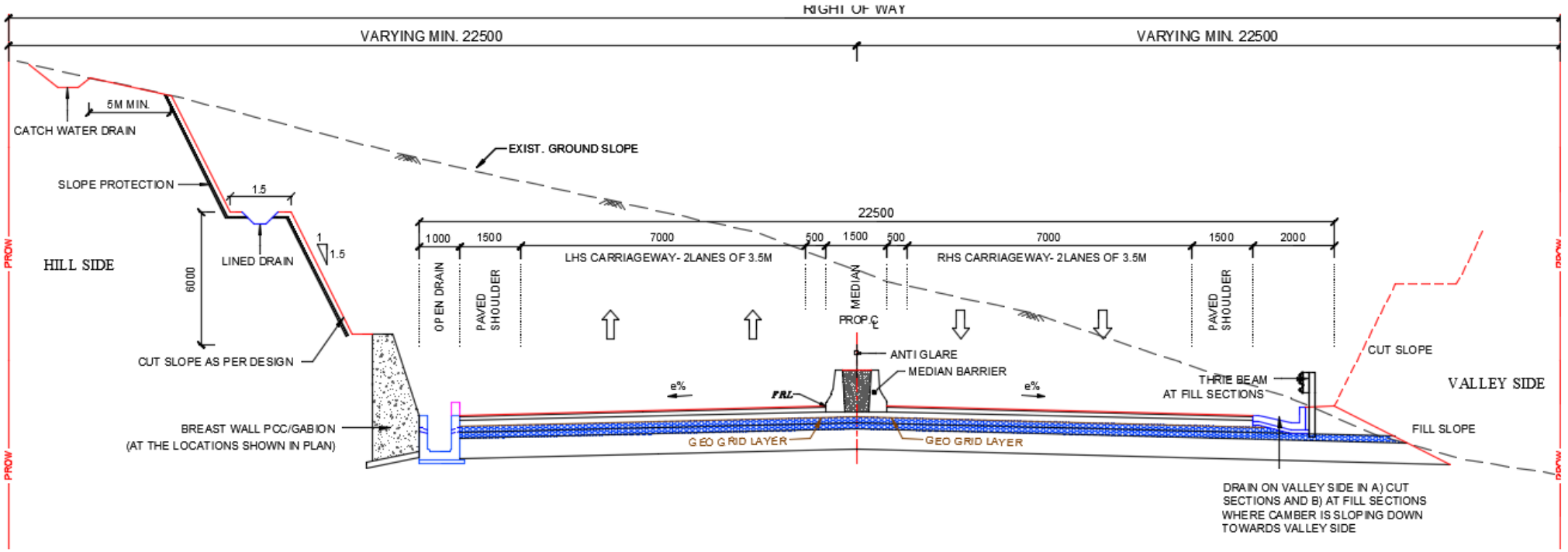

**TCS-1: 4-Lane divided highway with Cut on Hill Side and Cut/Fill on Valley Side on Bypass/ Realignment**



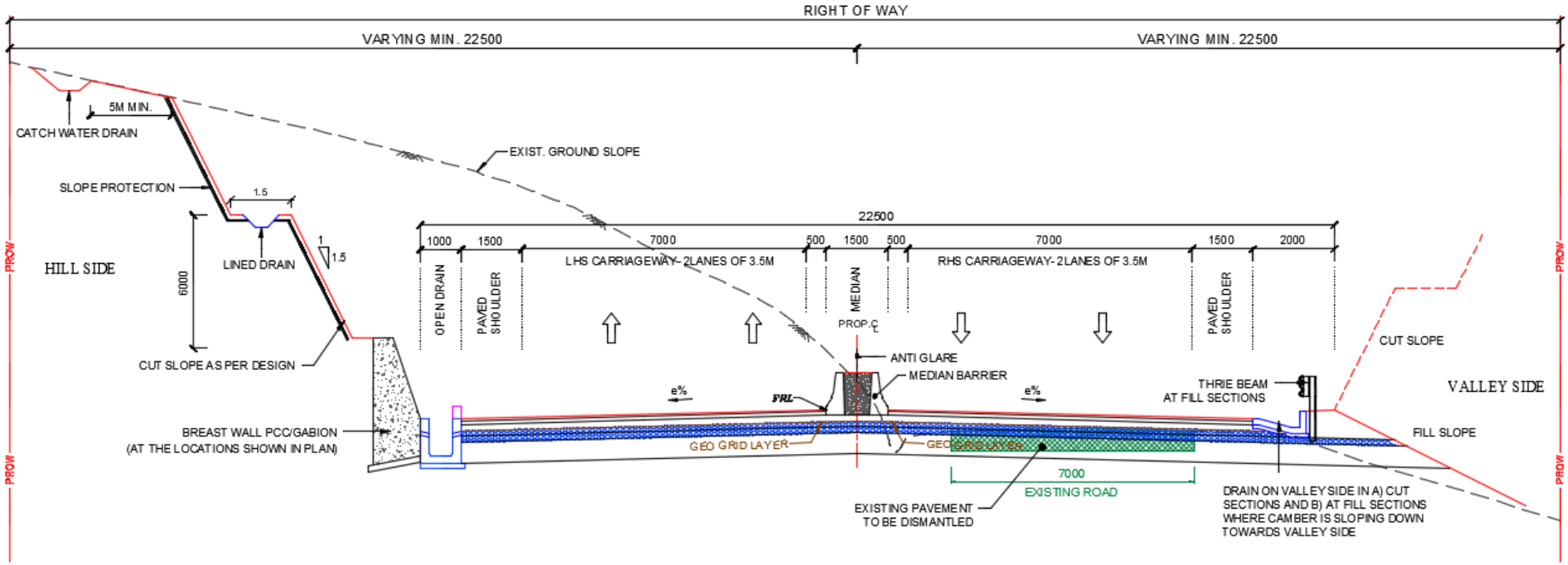

**TCS-2: 4-Lane divided highway with Cut on Hill Side and Cut/Fill on Valley Side on Existing**



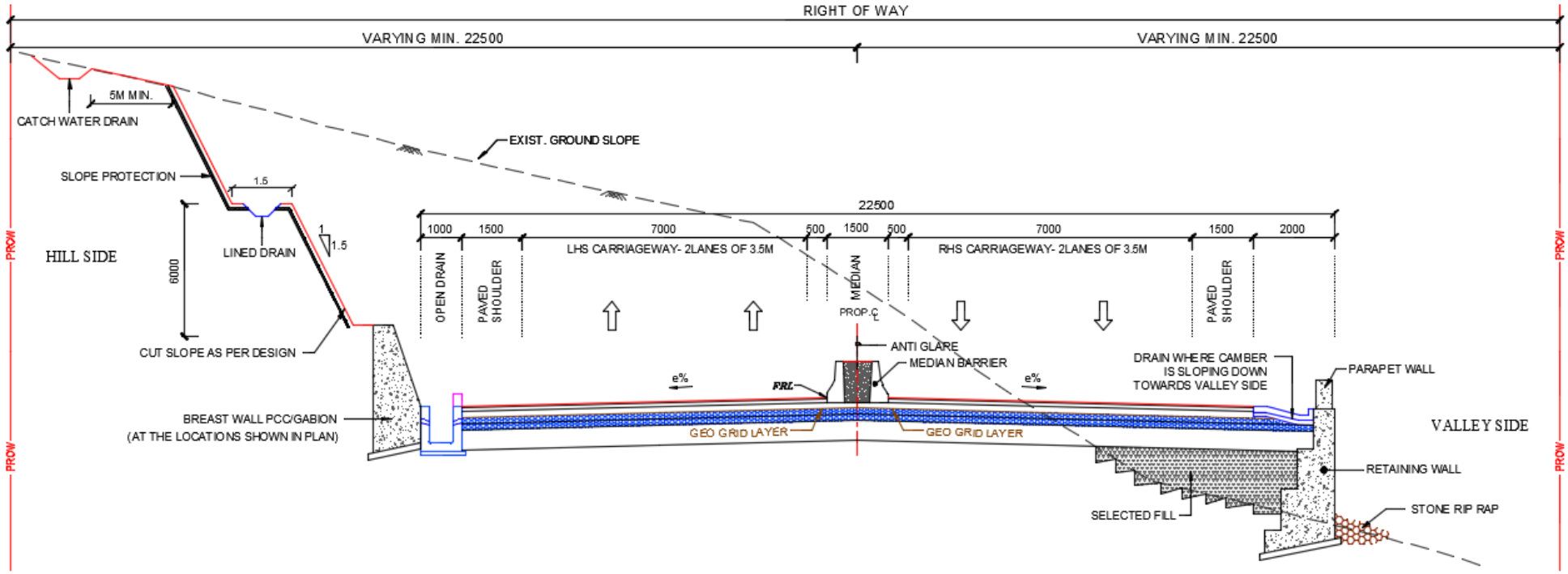

**TCS-3: 4-Lane divided highway with Service Road on RHS**



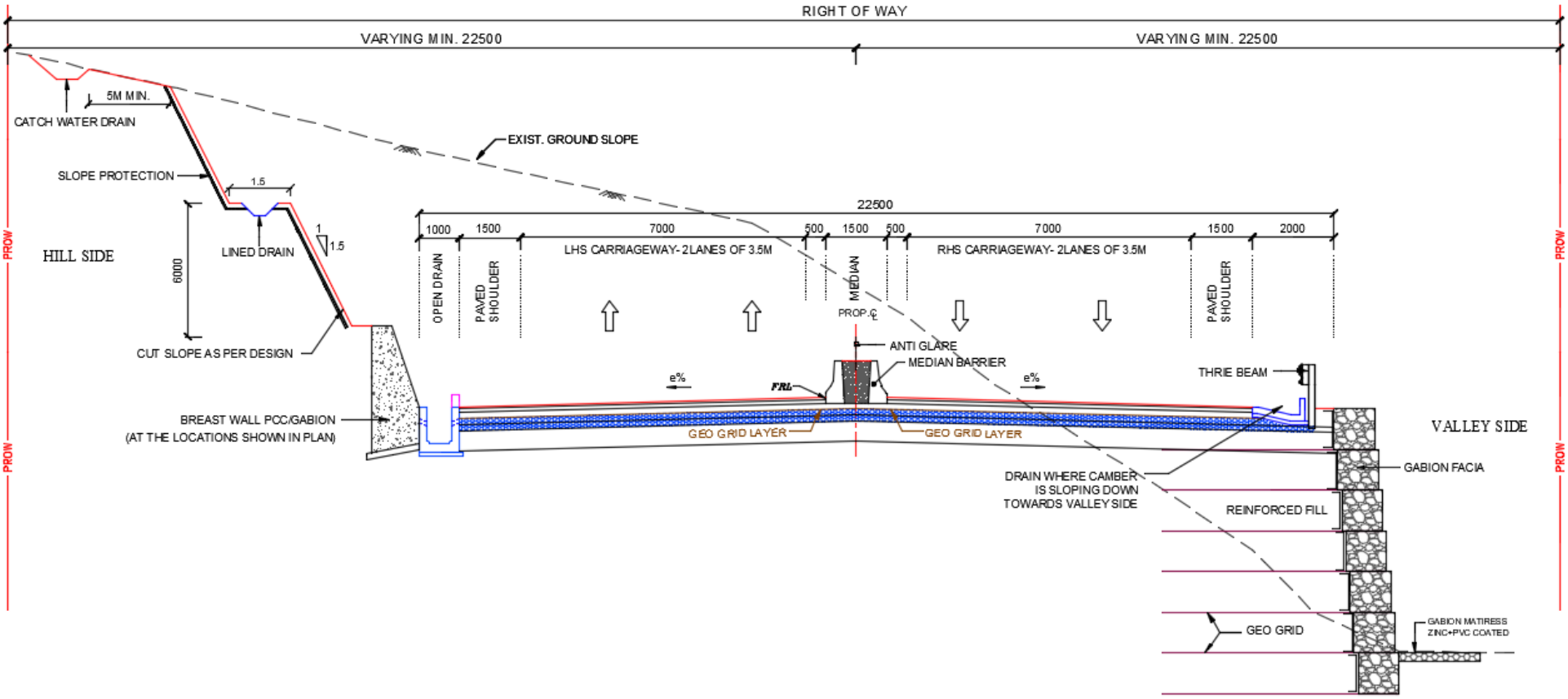

**TCS-4: 4-Lane divided highway with Breast Wall on Hill Side and Cut/Fill on Vally Side at Bypass/Re-alignment locations**



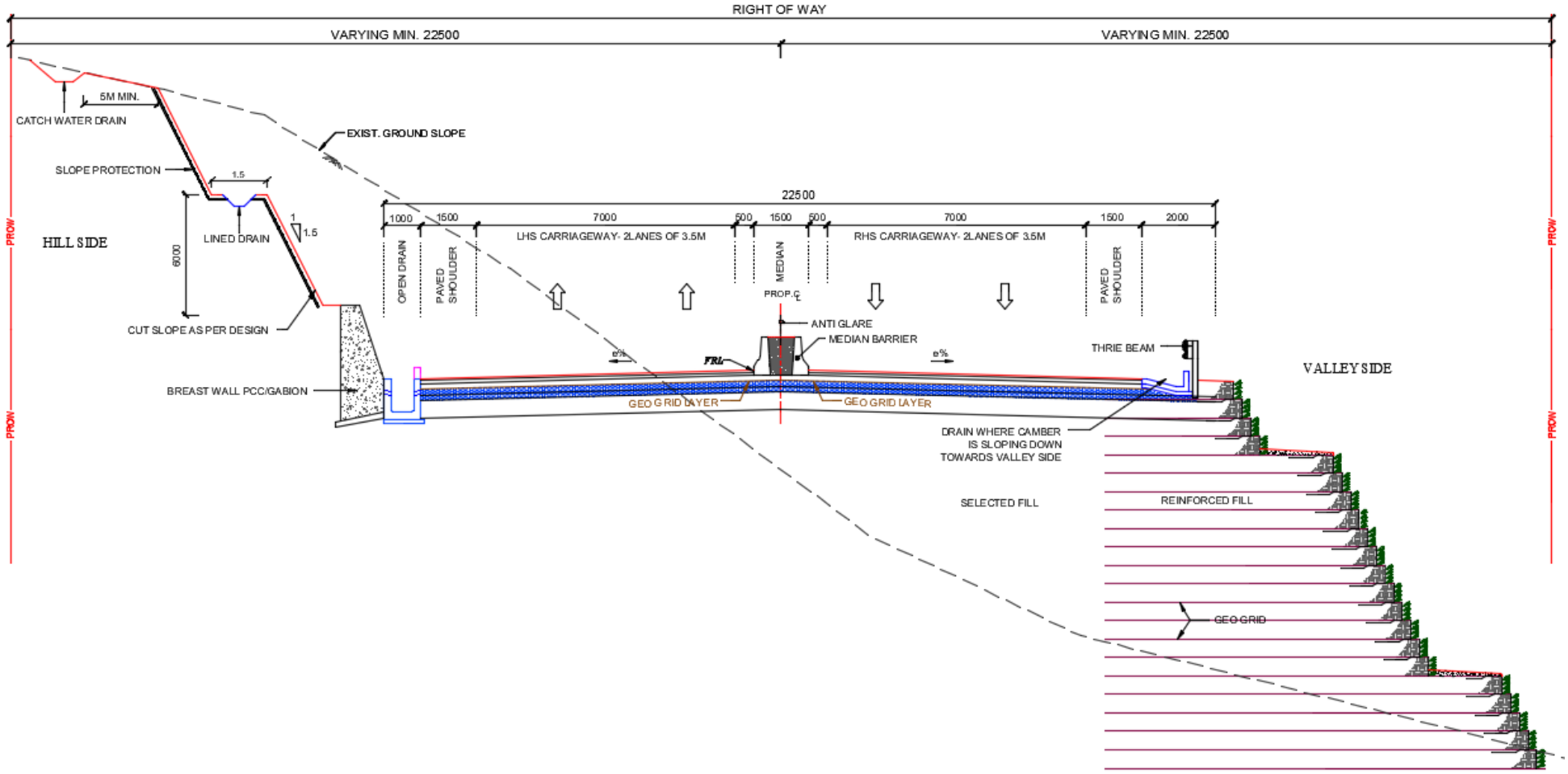

**TCS-5: 4-Lane divided highway with Breast Wall on Hill side and Cut/Fill on Valley Side at existing road locations**



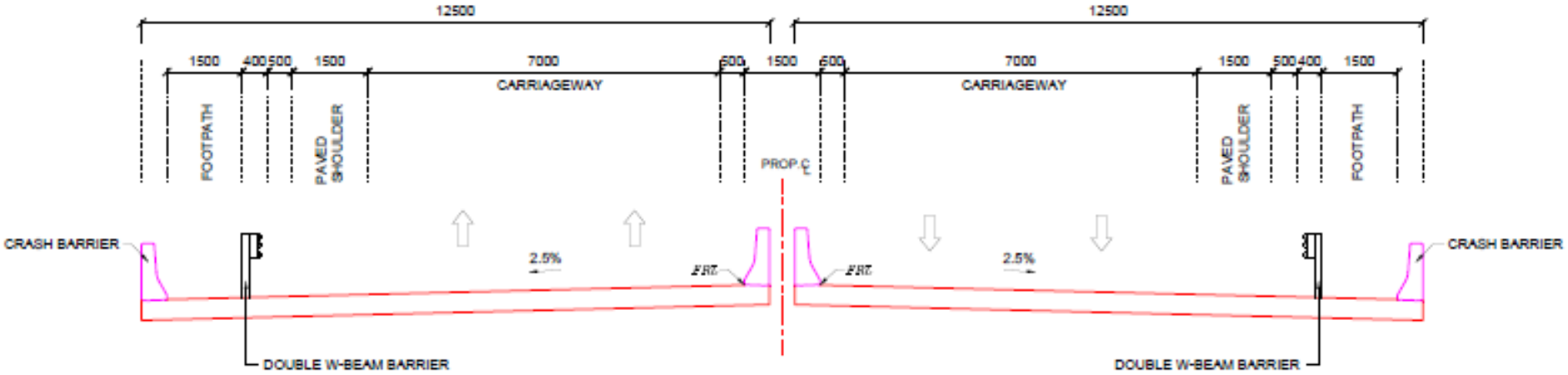

**TCS-6: 4-Lane divided highway with Breast Wall on Hill Side and Retaining Wall on Valley Side**




TCS-7: 4-Lane divided highway with Breast Wall on Hill Side and Reinforcement Soil Wall on Valley Side




TCS-8: 4-Lane divided highway with Breast Wall on Hill Side and Reinforcement Soil Slope on Valley Side




TCS-9: 4-Lane divided highway New Bridge at Deck level with Footpath

# *Schedule-C*

SCHEDULE - C

*(See Clause 2.1)*

**PROJECT FACILITIES**

**1 Project Facilities**

The Contractor shall construct the Project Facilities in accordance with the provisions of this Agreement. Such Project Facilities shall include:

**(a)** Toll plazas.

**(b)** Traffic Control Device/Road Safety Device/Roadside furniture.

**(c)** Pedestrian facilities.

**(d)** Land Scaping and Tree Plantation.

**(e)** Truck lay-byes.

**(f)** Wayside amenities.

**(g)** Bus-bays and Passenger shelters.

**(h)** Rest areas

**(i)** Building for traffic aid post

**(j)** Building for medical aid post

**(k)** Others.

**1.** Highway Patrol Units
**2.** Highway lighting
**3.** Ambulance
**4.** Crane Services
**5.** Advance Traffic Management System (A. T. M. S.)
**6.** Emergency Medical Services
**7.** Telecom System/Communication Services
**8.** Operation and Maintenance Center
**9.** Safety Barrier
**10.** Development of site for way side amenities
**11.** Vehicle rescue post.

**2 Description of Project Facilities**

Each of the Project Facilities is described below:

**(a) Toll Plaza location**

Toll Plaza location is mentioned below – Toll Plaza shall be provided as per as stipulated in section 10 of the Manual. Canopy of Toll plaza should be designed to withstand load of solar panels in addition to other design loads. There should be facility for toilet (ladies and gents separately) and dust bins and their

appropriate number shall be finalized in consultation with Authority engineer.

| S. No. | Existing Chainage(m) | | | Design Chainage(m) | | | Lanes |
|---|---|---|---|---|---|---|---|
| | From (Km) | To (Km) | Length (Km) | From (Km) | To (Km) | Length (Km) | |
| Nil | | | | | | | |

**Note:**

- All toll plaza premises shall be fenced with stone masonry boundary wall with minimum 6ft height from OGL.
- Installation of dedicated ETC lane with provision of medium speed WIM with bending plate technology in each lane, and Static Weigh Bridge (one lane in each direction) at Toll Plaza and Configuration with Advance Traffic Management System.
- Above mentioned toll lanes are minimum. However, the actual requirement of toll lanes shall be assessed by Contractor/ Contractor as per actual site condition and Manual. The increase in number of toll lanes shall not be treated as change of scope.
- Solar panels shall be erected over the Toll Plaza Canopy to generate the green energy. Same shall be utilized for toll plaza lighting and other energy requirement within toll plaza area along with conventional lighting.

**(b) Roadside furniture**

Traffic Control Device/Road Safety Device/Roadside furniture as per provisions of manual shall be provided. Yellow flashing lights using solar power with full alternative power back-up shall be provided at all junctions/pedestrian crossings/hazardous locations etc

i. **Traffic Signs -** Traffic signs include roadside signs, overhead signs and kerb mounted signs along the entire Project highway.

ii. **Pavement Marking -** Pavement marking shall cover road marking for the entire Project highway as per the IRC SP 84-2019.

iii. **LED Traffic Blinkers:** LED traffic blinker signal provided for entire project.

iv. **Roadside Furniture**: Traffic Signs and pavement markings shall include roadside signs, overhead signs, curve mounted signs and road marking along the project highway. The locations for these provisions shall be finalized in consultation with Independent Engineer.

v. **Crash barrier -** Provide W-beam crash barrier along the Project highway in accordance with Schedule D and at locations given below.

| LHS | | | | RHS | | |
|---|---|---|---|---|---|---|
| Sl No | Chainage (m) | | Length (m) | Chainage (m) | | Length (m) |
| | From | To | | From | To | |
| 1 | 46+160 | 46+270 | 110 | 50+520 | 50+910 | 390 |
| 2 | 46+320 | 48+020 | 1700 | 55+880 | 56+710 | 830 |
| 3 | 48+280 | 48+670 | 390 | 56+810 | 57+420 | 610 |
| 4 | 49+260 | 49+910 | 650 | 57+660 | 58+090 | 430 |
| 5 | 50+340 | 50+910 | 570 | 58+290 | 58+650 | 360 |
| 6 | 51+190 | 51+650 | 460 | 58+880 | 60+680 | 1800 |
| 7 | 51+880 | 52+450 | 570 | | | |
| 8 | 52+570 | 54+010 | 1440 | | | |
| 9 | 54+180 | 54+270 | 90 | | | |
| 10 | 54+620 | 55+720 | 1100 | | | |
| 11 | 57+170 | 57+450 | 280 | | | |
| 12 | 57+600 | 60+690 | 3090 | | | |
| 13 | 60+780 | 60+850 | 70 | | | |
| **Total Length=** | | | **10520** | | | **4420** |

*Note: The above proposed locations are minimum. Crash barrier/other suitable safety barriers along the Project highway shall be provided as per Schedule D. Any change in length shall not be treated as change in scope of work.*

vi. **Traffic Safety Devices wherever required.**

vii. **MS Railing -** MS Railing along the Project highway at the location as suggested in Schedule D.

viii. **Delineators -** Shall be provided as per IRC: 79-1981 and requirements & specifications as per Schedule D.

ix. **Boundary Stones -** For Entire Project highway at 200m interval.

x. **KM Stones and Hectometer Stone -** For Entire Project highway.

**(c) Location of Pedestrian facilities:**

Pedestrian Guard rails shall be provided at junctions, Truck lay byes, bus bays and near schools and hospitals as per provisions in section 12.2 of the Manual

i. Pedestrian guardrail: Provide pedestrian guardrail at each bus stop location and at other locations as per manual.

**ii.** Pedestrian Crossings: Provide pedestrian crossing facilities on locations as recommended in Schedule D.

**(d) Landscaping & Tree Plantation**

i) Landscaping at Toll plaza, Major Intersection

ii) Tree plantation shall be done as per the TCS.

**(e) Location of Truck lay-bye:**

Truck Lay bye shall be provided at the following locations in accordance with section 12.4 of the manual. Truck Lay bye shall be provided at below mentioned locations.

| Sl. No | Existing Chainage (Km) | Design Chainage (Km) | Side (Left/Right) |
|---|---|---|---|
| Nil | | | |

**(f)** Way-side Amenities

As stipulated in section 12.6 of the manual, Way-side Amenities shall be provided at the following locations:

| Sl. No | Existing Chainage (Km) | Design Chainage (Km) | Side (Left/Right) |
|---|---|---|---|
| Nil | | | |

The area of Way-side Amenities is 250 x 80 m (2 hectare). The area should accommodate the services such as parking, catering, toilets, essential shopping, repair and refueling, highway information etc.

**(g) Bus-bays and Bus shelters table is given below:**

As stipulated in section 12.5 of the Manual, Bus-bays and shelters shall be provided at below indicative locations.

**Bus Shelter:**

| Sl. No. | Design Chainage | Side | Name Of Village |
|---|---|---|---|
| 1 | 50+850 | LHS | Vairengte |
| 2 | 51+000 | RHS | Vairengte |
| 3 | 55+730 | RHS | Vairengte |
| 4 | 55+850 | LHS | Vairengte |

**Bus-bays:**

| Sl. No. | Design Chainage | Side | Name of Village |
|---|---|---|---|
| 1 | 55+850 | LHS | Vairengte |

**Note:** Above shown number of locations are minimum, however, the location of bus bays and passenger shelters shall be finalized as per suitability of location and site requirement in consultation with Client. Any change in location shall not

treated as change of scope.

**(h) Rest areas**

The rest area is 300 x 75 m (2.25 hectare) in size and is proposed at following location.

| Design Chainage (Km) | Side (Left/Right) |
|---|---|
| NIL | |

**(i) Foot Over Bridges:**

Foot Over Bridges shall be provided at the following locations:

| Sl. No. | Existing Chainge | Type of Road (SH/ MDR/ PMGSY/ VR) |
|---|---|---|
| 1 | 47+800 | NH-306A |
| 2 | 45+609 | Village Road |
| 3 | 46+127 | Village Road |
| 4 | 47+172 | Village Road |
| 5 | 48+698 | Village Road |
| 6 | 49+472 | Village Road |
| 7 | 50+465 | Village Road |
| 8 | 51+543 | Village Road |
| 9 | 52+206 | Village Road |
| 10 | 59+664 | Village Road |

**(j) Buildings for Traffic Aid Posts**

The Contractor shall, in accordance with the type designs prescribed for such police outpost buildings by the State Government or a substitute thereof, construct buildings not exceeding 25 (twenty-five) square meters of plinth area, for each of the Traffic Aid Posts, and hand them over to the Authority no later than 30 (thirty) days prior to the Scheduled Completion Date. The Traffic Aid Post(s) shall be deemed to be part of the Site and shall vest in the Client.

**(k) Building for Medical Aid Post**

The Contractor shall, at its cost and in accordance with the type designs prescribed for such buildings by the State Medical Department (or a substitute thereof to be designated by the Authority), construct an aid post building and hand it over to the Authority, no later than 30 (thirty) days prior to COD. The Medical Aid Post(s) shall be deemed to be part of the Site and shall vest in the Client.

**(l) Others to be specified.**

**i) Highway Lighting:**

Highway LED Lighting: LED Lighting shall be provided at the following locations:

a. LED Lighting shall be provided at approach to bridges, Flyover, built up areas, toll plaza, Bus stops, truck Lay-byes and rest areas as per manual recommended in Schedule D.

b. Apart from above locations lighting shall be provided at underpasses and ROB/RUB and as per site condition in consultation with Engineer and shall not be treated as change of scope. On all grade separated structures Lightings will be provided on Top & Underside as per clause 3.3.4 & 12.3 of IRC SP 84.

c. High Mast Lighting with LED light shall be provided at all Major Junctions, Toll plaza locations or any other location as per clause 12.3.3 of IRC SP 84.

**ii)** **Ambulances:** Ambulance one units with all/adequate facility as per manual.

**iii)** **Cranes:** One Cranes with 30 MT Capacity and in adequate number at Toll Plaza location.

**iv)** **Advance Traffic Management System (ATMS)** as per technical specification: Provisions of other facilities, if required may be made in similar manner.

**v)** **Emergency Medical Services:** Emergency medical Services shall be provided as per provisions of 4- lane manual (IRC: SP: 84: 2019).

**vi)** **Communication Services:** Communication Services shall be provided as per provisions of 4- lane manual (IRC: SP: 84: 2019).

**vii)** **Operation and Maintenance Centre:** Operation and Maintenance Centre shall be provided as per provisions of 4- lane manual (IRC: SP: 84: 2019).

**viii)** **Highway Patrol:** Highway patrol units in adequate number at Toll Plaza location.

**ix)** **Rainwater Harvesting –** As per Ministry of Environment and Forests Notification, New Delhi dated 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 6.11.2000), the construction of Rainwater, harvesting structure is mandatory in and around Water Crisis area, notified by the Central Ground Water Board. Minimum 1 number per 5 km has to be provided throughout the project length.

**x)** **Providing safety during construction**

**xi)** **Utility duct crossing shall be provided** as per Schedule D**.**

# *Schedule-D*

# SCHEDULE - D

*(See Clause 2.1)*

## SPECIFICATIONS AND STANDARDS

**1 Construction**

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of the Project Highway.

**2 Design Standards**

The Project Highway including Project Facilities shall conform to design requirements set out in the following documents:

{Manual of Specifications and Standards for Four Laning of Highways (IRC: SP: 84-2019), referred to herein as the Manual]

Annex - I

*(Schedule-D)*

## Specifications and Standards for Construction

### 1 Specifications and Standards

All Materials, works and construction operations shall conform to the manual of Specifications and Standards for Four-Laning of Highways with Paved Shoulder (Second Revision) (IRC : SP:84-2019), referred to as the manual, and MORTH Specifications for Road and Bridge Works. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

### 2 Deviations from the Specifications and Standards

2.1 The terms "Contractor", "Independent Engineer" and "Concession Agreement" used in the manual shall be deemed to be substituted by the terms "Contractor", "Authority's Engineer" and "Agreement" respectively.

# *Schedule-E*

## Schedule – E

*(See Clause 2.1 and 14.2)*

## MAINTENANCE REQUIREMENTS

**1 Maintenance Requirements**

i) The Contractor shall, at all-time maintain the Project Highway in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

ii) The Contractor shall repair or rectify any Defect or deficiency set forth in Paragraph 2 of this Schedule-E within the time limit specified therein and any failure in this behalf shall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 14.6 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

iii) All Materials, works and construction operations shall conform to the "SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FIFTH REVISION, April 2013)", including latest corrections slips, issued by the Ministry of Surface Transport & Highways, Government of India and published by the Indian Roads Congress.

Where the specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

**2 Repair/rectification of Defects and deficiencies**

The obligations of the Contractor in respect of Maintenance Requirements shall include repair and rectification of the Defects and deficiencies specified in Annex-I of this Schedule-E within the time limit set forth therein.

**3 Other Defects and deficiencies**

In respect of any Defect or deficiency not specified in Annex-I of this Schedule-E, the Authority's Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Contractor within the time limit specified by the Authority's Engineer.

**4 Extension of time limit**

Notwithstanding anything to the contrary specified in this Schedule-E, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority's Engineer and conveyed to the Contractor and the Authority with reasons thereof;

**5 Emergency repairs/restoration**

Notwithstanding anything to the contrary contained in this Schedule-E, if any Defect, deficiency or deterioration in the Project Highway poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

**6 Daily inspection by the Contractor**

The Contractor shall, through its engineer, undertake a daily visual inspection of the Project Highway and maintain a record thereof in a register to be kept in such form and manner as the Authority's Engineer may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Authority and the Authority's Engineer at any time during office hours.

**7 Pre-monsoon inspection / Post-monsoon inspection**

The Contractor shall carry out a detailed pre-monsoon inspection of all bridges, culverts and drainage system before [1st June] every year in accordance with the guidelines contained in IRC: SP:35. Report of this inspection together with details of proposed maintenance works as required on the basis of this inspection shall be sent to the Authority's Engineer before the [10th June] every year. The Contractor shall complete the required repairs before the onset of the monsoon and send to the Authority's Engineer a compliance report. Post monsoon inspection shall be done by the [30th September] and the inspection report together with details of any damages observed and proposed action to remedy the same shall be sent to the Authority's Engineer.

**8 Repairs on account of natural calamities**

All damages occurring to the Project Highway on account of torrential rains, floods, earthquake or other natural disasters shall be undertaken by the Contractor at its own cost and/or out of the proceeds of insurance.

## Annex -I

(Schedule-E)

# Annex –I Repair/rectification of Defects and deficiencies

The Contractor shall repair and rectify the Defects and deficiencies specified in this Annex-I of Schedule-E within the time limit set forth in the table below.

**Table -1: Maintenance Criteria for Pavements:**

| Asset Type | Performance Parameter | Level of Service (LOS) | | Frequency of Inspection | Tools/ Equipment | Standards and References for Inspection and Data Analysis | Time limit for Rectification/Repair | Maintenance Specifications |
|---|---|---|---|---|---|---|---|---|
| | | Desirable | Acceptable | | | | | |
| **Flexible Pavement (Pavement of MCW, Service Road, approaches of Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)** | Potholes | Nil | < 0.1 % of area and subject to limit of 10 mm in depth | Daily | Length Measurement Unit like Scale, Tape, odometer etc. | IRC 82: 2015 and Distress Identification Manual for Long Term Pavement Performance Program, FHWA 2003 (http://www.tfhrc.com/pavement/ltp/reports/03031/) | 24-48 hours | MORT&H Specification 3004.2 |
| | Cracking | Nil | < 5 % subject to limit of 0.5 sqm for any 50 m length | Daily | | | 7-15 days | MORT&H Specification 3004.3 |
| | Rutting | Nil | < 5 mm | Daily | Straight Edge | | 15 -30 days | MORT&H Specification 3004.2 |
| | Corrugations and Shoving | Nil | < 0.1 % of area | Daily | Length Measurement Unit like Scale, Tape, odometer etc. | | 2-7 days | IRC:82-2015 |
| | Bleeding | Nil | < 1 % of area | Daily | | | 3-7 days | MORT&H Specification 3004.4 |
| | Ravelling/ Stripping | Nil | < 1 % of area | Daily | | | 7-15 days | IRC:82-2015 read with IRC SP 81 |
| | Edge Deformation/ Breaking | Nil | < 1 m for any 100 m section and width < 0.1 m at any location, restricted to 30 cm from the edge | Daily | | | 7- 15 days | IRC:82-2015 |
| | Roughness BI | 2000 mm/km | 2400 mm/km | Bi-Annually | Class I Profilometer SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent) | Class I Profilometer : ASTM E950 (98) :2004 –Standard Test Method for measuring Longitudinal Profile of Travelled Surfaces with Accelerometer Established Inertial Profiling Reference ASTM E1656 -94: 2000- Standard Guide for Classification of Automatic Pavement Condition Survey Equipment | 180 days | IRC:82-2015 |
| | Skid Number | 60SN | 50SN | Bi-Annually | | | 180 days | BS: 7941-1: 2006 |
| | Pavement Condition Index | 3 | 2.1 | Bi-Annually | | | 180 days | IRC:82-2015 |
| | Other Pavement Distresses | | | Bi-Annually | | | 2-7 days | IRC:82-2015 |

<table>
<tr><th rowspan="2">Asset Type</th><th rowspan="2">Performance Parameter</th><th colspan="2">Level of Service (LOS)</th><th rowspan="2">Frequency of Inspection</th><th rowspan="2">Tools/ Equipment</th><th rowspan="2">Standards and References for Inspection and Data Analysis</th><th rowspan="2">Time limit for Rectification/Repair</th><th rowspan="2">Maintenance Specifications</th></tr>
<tr><th>Desirable</th><th>Acceptable</th></tr>
<tr><td></td><td>Deflection/ Remaining Life</td><td></td><td></td><td>Annually</td><td>Falling Weight Deflectometer</td><td>IRC 115: 2014</td><td>180 days</td><td>IRC:115-2014</td></tr>
<tr><td rowspan="2">Rigid Pavement (Pavement of MCW, Service Road, Grade structure, approaches of connecting roads, slip roads, lay byes etc. as applicable)</td><td>Roughness BI</td><td>2200mm/km</td><td>2400mm/km</td><td>Bi-Annually</td><td>Class I Profilometer</td><td>ASTM E950 (98) :2004 and ASTM E1656 -94: 2000</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td>Skid</td><td colspan="2">Skid Resistance no. at different speed of vehicles<br><table><tr><th>Minimum SN</th><th>Traffic Speed (Km/h)</th></tr><tr><td>36</td><td>50</td></tr><tr><td>33</td><td>65</td></tr><tr><td>32</td><td>80</td></tr><tr><td>31</td><td>95</td></tr><tr><td>31</td><td>110</td></tr></table></td><td>Bi-Annually</td><td>SCRIM (Sideway-force Coefficient Routine Investigation Machine or equivalent)</td><td>IRC:SP:83-2008</td><td>180 days</td><td>IRC:SP:83-2008</td></tr>
<tr><td rowspan="5">Embankment/ Slope</td><td>Edge drop at shoulders</td><td>Nil</td><td>40mm</td><td>Daily</td><td rowspan="3">Length Measurement Unit like Scale, Tape, odometer etc.</td><td rowspan="5">IRC</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Slope of camber/cross fall</td><td>Nil</td><td><2% variation in prescribed slope of camber /cross fall</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Embankment Slopes</td><td>Nil</td><td><15 % variation in prescribe side slope</td><td>Daily</td><td>7-15 days</td><td>MORT&H Specification 408.4</td></tr>
<tr><td>Embankment Protection</td><td>Nil</td><td>Nil</td><td>Daily</td><td>NA</td><td>7-15 days</td><td>MORT&H Specification</td></tr>
<tr><td>Rain Cuts/ Gullies in slope</td><td>Nil</td><td>Nil</td><td>Daily Specially During Rainy Season</td><td>NA</td><td>7-15 days</td><td>MORT&H Specification</td></tr>
</table>

In addition to the above performance criterion, the contractor shall strictly maintain the rigid pavements as per requirements in the following table

## Table -2: Maintenance Criteria for Rigid Pavements:

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| **CRACKING** | | | | | | |

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| 1 | **Single Discrete Cracks Not intersecting with any joint** | w = width of crack<br>L = length of crack<br>d = depth of crack<br>D = depth of slab | 0 | Nil, not discernible | No Action | Not applicable |
| | | | 1 | w < 0.2 mm. hair cracks | | |
| | | | 2 | w = 0.2 - 0.5 mm, discernible from slow-moving car | Seal without delay | Seal, and stitch if L > lm.<br>Within 7days |
| | | | 3 | w = 0.5 - 1.5 mm, discernible from fast-moving car | | |
| | | | 4 | w = 1.5 - 3.0 mm | Seal, and stitch if L > l m.<br>Within 7 days | Staple or Dowel Bar Retrofit, FDR for affected portion.<br>Within 15days |
| | | | 5 | w > 3 mm. | | |
| 2 | **Single Transverse (or Diagonal) Crack intersecting with one or more joints** | w = width of crack<br>L = length of crack<br>d = depth of crack<br>D = depth of slab | 0 | Nil, not discernible | No Action | |
| | | | 1 | w < 0.2 mm, hair cracks | Route and seal with epoxy.<br>Within 7 days | Staple or Dowel Bar Retrofit.<br>Within 15days |
| | | | 2 | w = 0.2 - 0.5 mm, discernible from slow vehicle | | |
| | | | 3 | w = 0.5 - 3.0 mm, discernible from fast vehicle | Route, seal and stitch, if L > 1 m.<br>Within 7 days | |
| | | | 4 | w = 3.0 - 6.0 mm | Dowel Bar Retrofit.<br>Within 15 days | Full Depth Repair Dismantle and reconstruct affected.<br>Portion with norms and specifications - See Para 5.5 & 9.2<br>Within 15days |
| | | | 5 | w > 6 mm, usually associated with spalling, and/or slab rocking under traffic | Not Applicable, as it may be full depth | |
| 3 | **Single Longitudinal Crack intersecting with one or more joints** | w = width of crack<br>L = length of crack<br>d = depth of crack<br>D = depth of slab | 0 | Nil, not discernible | No Action | |
| | | | 1 | w < 0.5 mm, discernable from slow moving vehicle | Seal with epoxy, if L > 1 m.<br>Within 7 days | Staple or dowel bar retrofit.<br>Within 15days |
| | | | 2 | w = 0.5 - 3.0 mm, discernible from fast vehicle | Route seal and stitch, if L > l m.<br>Within 15 days | - |
| | | | 3 | w = 3.0 - 6.0 mm | Staple, if L > 1 m.<br>Within 15 days | Partial Depth Repair with stapling.<br>Within 15 days |
| | | | 4 | w = 6.0 - 12.0 mm, usually associated with spalling | Not Applicable, as it may be full depth | |
| | | | 5 | w > 12 mm, usually associated with spalling, and/or slab rocking under traffic | | Full Depth Repair Dismantle and reconstruct affected portion as per norms and specifications - See Para 5.6.4<br>Within 15 days |
| 4 | **Multiple Cracks intersecting with one or more joints** | **w = width of crack** | 0 | Nil, not discernible | No Action | - |
| | | | **1** | w < 0.2 mm, hair cracks | Seal, and stitch if L > l m.<br>Within 15 days | |
| | | | 2 | w = 0.2 - 0.5 mm. discernible from slow vehicle | | |
| | | | 3 | w = 0.5 - 3.0 mm, discernible from fast vehicle | Full depth repair within 15 days | Dismantle, Reinstate subbase, Reconstruct whole slab as per |
| | | | 4 | w = 3.0 - 6.0 mm panel broken into 2 or 3 pieces | | |

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| | | | 5 | w > 6 mm and/or panel broken into more than 4 pieces | | specifications within 30 days |
| 5 | **Corner Break** | w = width of crack<br>L = length of crack | 0 | Nil, not discernible | No Action | - |
| | | | 1 | w < 0.5 mm; only 1 corner broken | Seal with low viscosity epoxy to secure broken parts<br>Within 7 days | Seal with epoxy seal with epoxy<br>Within 7days |
| | | | 2 | w < 1.5 mm; L < 0.6 m, only one corner broken | | |
| | | | 3 | w < 1.5 mm; L < 0.6 m, two corners broken | Partial Depth (Refer Figure 8.3 of IRC:SP: 83-2008)<br>Within 15 days | Full depth repair |
| | | | 4 | w > 1.5 mm; L > 0.6 m or three corners broken | | |
| | | | 5 | three or four corners broken | | Reinstate sub-base, and reconstruct the slab as per norms and specifications within 30days |
| 6 | **Punchout (Applicable to Continuous Reinforced Concrete Pavement (CRCP) only)** | w = width of crack<br>L = length (m/m2) | 0 | Nil, not discernible | | No Action |
| | | | 1 | w < 0.5 mm; L < 3 m/m$^2$ | Not Applicable, as it may be full depth | Seal with low viscosity epoxy to secure broken parts.<br>Within 15days |
| | | | 2 | either w > 0.5 mm or L < 3 m/m$^2$ | | |
| | | | 3 | w > 1.5 mm and L < 3 m/m$^2$ | | |
| | | | 4 | w > 3 mm, L < 3 m/m$^2$ and deformation | | Full depth repair - Cut out and replace damaged area taking care not to damage reinforcement.<br>Within 30days |
| | | | 5 | w > 3 mm, L > 3 m/m$^2$ and deformation | | |
| **Surface Defects** | | | | | | |
| 7 | Ravelling or Honeycomb type surface | r = area damaged surface/total surface of slab (%) h = maximum depth of damage | 0 | Nil, not discernible | **Short Term** | **Long Term** |
| | | | | | No action. | Not Applicable |
| | | | 1 | r < 2 % | Local repair of areas damaged and liable to be damaged.<br>Within 15 days | |
| | | | 2 | r = 2 - 10 % | | |
| | | | **3** | r = 10-25% | Bonded Inlay, 2 or 3 slabs if affecting.<br>Within 30 days | |
| | | | 4 | r = 25 - 50 % | | |
| | | | 5 | r > 50% and h > 25 mm | Reconstruct slabs, 4 or more slabs if affecting.<br>Within 30 days | |
| 8 | **Scaling** | r = damaged surface/total surface of slab (%)<br>h = maximum depth of damage | 0 | Nil, not discernible | **Short Term** | **Long Term** |
| | | | | | No action. | Not Applicable |
| | | | 1 | r < **2 %** | Local repair of areas damaged and liable to be damaged.<br>Within 7days | |
| | | | 2 | r = 2 - 10 % | | |
| | | | 3 | r = 10 - 20% | Bonded Inlay within 15 days | |

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| | | | **4** | r = 20 - 30 % | | |
| | | | 5 | r > 30 % and h > 25 mm | Reconstruct slab within 30 days | |
| 9 | **Polished Surface/Glazing** | t = texture depth, sand patch test | 0 | | No action. | Not Applicable |
| | | | 1 | t > 1 mm | | |
| | | | 2 ' | t = 1 - 0.6 mm | Monitor rate of deterioration | |
| | | | 3 | t = 0.6 - 0.3 mm | | |
| | | | 4 | t = 0.3 - 0.1 mm | | |
| | | | 5 | t < 0.1 mm | Diamond Grinding if affecting 50% or more slabs in a continuous stretch of minimum 5 km. Within 30 days | |
| 10 | **Popout (Small Hole), Pothole Refer Para 8.4** | n = number/$m^2$ d = diameter h = maximum depth | 0 | d < 50 mm; h < 25 mm; n < 1 per 5 $m^2$ | No action. | Not Applicable |
| | | | 1 | d = 50 - 100 mm; h < 50 mm; n < 1 per 5 $m^2$ | Partial depth repair 65 mm deep. Within 15 days | |
| | | | 2 | d = 50 - 100 mm; h > 50 mm; n < 1 per 5 $m^2$ | | |
| | | | 3 | d = 100 - 300 mm; h < 100 mm n < 1 per 5 $m^2$ | Partial depth repair 110mm i.e.10 mm more than the depth of the hole. Within 30 days | |
| | | | 4 | d = 100 - 300 mm; h > 100 mm; n < 1 per 5 $m^2$ | | |
| | | | 5 | d > 300 mm; h > 100 mm: n > 1 per 5 $m^2$ | Full depth repair. Within 30 days | |
| **Joint Defects** | | | | | | |
| **11** | **Joint Seal Defects** | loss or damage L = Length as % total joint length | 0 | Difficult to discern. | **Short Term** | **Long Term** |
| | | | | | No action. | Not Applicable |
| | | | 1 | Discernible, L< 25% but of little immediate consequence with regard to ingress of water or trapping incompressible material. | Clean joint, inspect later. | |
| | | | 3 | Notable. L > 25% insufficient protection against ingress of water and trapping incompressible material. | Clean and reapply sealant in selected locations. Within 7 days | |
| | | | 5 | Severe; w > 3 mm negligible protection against ingress of water and trapping incompressible material. | Clean, widen and reseal the joint. Within 7 days | |
| 12 | **Spalling of Joints** | w = width on either side of the joint L = length of spalled portion (as % | 0 | Nil, not discernible | No action. | Not Applicable |
| | | | 1 | w < 10 mm | Apply low viscosity epoxy resin/ mortar in cracked portion. | |
| | | | 2 | w = 10 - 20 mm, L < 25% | | |

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| | | joint length) | | | Within 7 days | |
| | | | 3 | w = 20 - 40 mm, L > 25% | Partial Depth Repair. Within 15 days | |
| | | | 4 | w = 40 - 80 mm, L > 25% | 30 - 50 mm deep, h = w + 20% of w, within 30 days | |
| | | | 5 | w > 80 mm, and L > 25% | 50 - 100 mm deep repair. H = w + 20% of w. Within 30 days | |
| 13 | **Faulting (or Stepping) in Cracks or Joints** | f = difference of level | 0 | not discernible, < 1 mm | No action. | No action. |
| | | | 1 | f < 3 mm | | |
| | | | 2 | f = 3 - 6 mm | Determine cause and observe, take action for diamond grinding | Replace the slab as appropriate. Within 30days |
| | | | 3 | f = 6 - 12 mm | Diamond Grinding | |
| | | | 4 | f= 12 - 18 mm | Raise sunken slab. | Replace the slab as appropriate. Within 30days |
| | | | 5 | f> 18 mm | Strengthen subgrade and sub-base by grouting and raising sunken slab | |
| 14 | **Blowup or Buckling** | h = vertical displacement from normal profile | | | **Short Term** | **Long Term** |
| | | | 0 | Nil, not discernible | No Action | |
| | | | 1 | h < 6 mm | | |
| | | | 2 | h = 6 - 12 mm | Install Signs to Warn Traffic within 7 days | |
| | | | **3** | h = 12 - 25 mm | | |
| | | | 4 | h > 25 mm | Full Depth Repair. Within 30 days | |
| | | | 5 | shattered slabs, ie 4 or more pieces | Replace broken slabs. Within 30 days | |
| 15 | **Depression** | h = negative vertical displacement from normal profile L =length | 0 | Not discernible, h < 5 mm | No action. | Not Applicable |
| | | | 1 | h = 5 - 15 mm | | |
| | | | 2 | h = 15-30 mm, Nos <20% joints | Install Signs to Warn Traffic within 7 days | |
| | | | 3 | h = 30 - 50 mm | | |
| | | | 4 | h > 50 mm or > 20% joints | Strengthen sub-grade. Reinstate pavement at normal level if L < 20 m. Within 30 days | |
| | | | 5 | h > 100 mm | | |

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| 16 | **Heave** | h = positive vertical displacement from normal profile. L = length | 0 | Not discernible. h < 5 mm | **Short Term** | **Long Term** |
| | | | | | No action. | scrabble |
| | | | 1 | h = 5 - 15 mm | Follow up. | |
| | | | 2 | h = 15 - 30 mm, Nos <20% joints | Install Signs to Warn Traffic within 7 days | |
| | | | 3 | h = 30 - 50 mm | | |
| | | | 4 | h > 50 mm or > 20% joints | Stabilise subgrade. Reinstate pavement at normal level if length < 20 m. Within 30 days | |
| | | | 5 | h > 100 mm | | |
| 17 | **Bump** | h = vertical displacement from normal profile | 0 | h < 4 mm | No action | |
| | | | 1 | h = 4 - 7 mm | Grind, in case of new construction within 7 days | Construction Limit for New Construction. |
| | | | 3 | h = 7 - 15 mm | Grind, in case of ongoing Maintenance within 15 days | Replace in case of new construction. Within 30days |
| | | | 5 | h > 15 mm | Full Depth Repair. Within 30 days | Full Depth Repair. Within 30days |
| 18 | **Lane to Shoulder Dropoff** | f = difference of level | 0 | Nil, not discernible < 3mm | **Short Term** | **Long Term** |
| | | | | | No action. | |
| | | | 1 | f = 3 - 10 mm | Spot repair of shoulder within 7 days | |
| | | | 2 | f = 10 - 25 mm | | |
| | | | 3 | f = 25 - 50 mm | Fill up shoulder within 7 days | |
| | | | 4 | f = 50 - 75 mm | | For any 100 m stretch Reconstruct shoulder, if affecting 25% or more of stretch. Within 30days |
| | | | 5 | f > 75 mm | | |
| **Drainage** | | | | | | |
| 19 | **Pumping** | quantity of fines and water expelled through open joints and cracks Nos | 0 | not discernible | No Action | |
| | | | 1 to 2 | slight/ occasional Nos < 10% | Repair cracks and joints Without delay. | Inspect and repair sub-drainage at distressed sections and upstream. |
| | | | 3 to 4 | appreciable/ Frequent 10 - 25% | Lift or jack slab within 30 days. | |
| | | Nos/100 m stretch | 5 | abundant, crack development > 25% | Repair distressed pavement sections. Strengthen subgrade and subbase. Replace slab. | |

| Sr. No. | Type of Distress | Measured Parameter | Degree of Severity | Assessment Rating | Repair Action | |
|---|---|---|---|---|---|---|
| | | | | | For the case d < D/2 | For the case d > D/2 |
| | | | | | Within 30 days | |
| 20 | **Ponding** | Ponding on slabs due to blockage of drains | 0-2 | No discernible problem | No action. | |
| | | | 3 to 4 | Blockages observed in drains, but water flowing | Clean drains etc within 7 days, Follow up | Action required to stop water damaging foundation within 30 days. |
| | | | 5 | Ponding, accumulation of water observed | -do- | |

**Table -3: Maintenance Criteria for Safety Related Items and Other Furniture Items:**

<table>
<tr><th>Asset Type</th><th>Performance Parameter</th><th>Level of Service (LOS)</th><th>Frequency of Measurement</th><th>Testing Method</th><th>Recommended Remedial measures</th><th>Time limit for Rectification</th><th>Specifications and Standards</th></tr>
<tr><td>Highway</td><td>Availability of Safe Sight Distance</td><td>As per IRC SP: 84-2014, a minimum of safe stopping sight distance shall be available throughout.<br><table><tr><th>Design Speed, kmph</th><th>Desirable Minimum Sight Distance (m)</th><th>Safe Stopping Sight Distance (m)</th></tr><tr><td>100</td><td>360</td><td>180</td></tr><tr><td>80</td><td>260</td><td>130</td></tr></table></td><td>Monthly</td><td>Manual Measurements with Odometer along with video/ image backup</td><td colspan="2">Removal of obstruction within 24 hours, in case of sight line affected by temporary objects such as trees, temporary encroachments.<br>In case of permanent structure or design deficiency:<br>Removal of obstruction/improvement of deficiency at the earliest<br>Speed Restriction boards and suitable traffic calming measures such as transverse bar marking, blinkers, etc. shall be applied during the period of rectification.</td><td>IRC:SP 84-2014</td></tr>
<tr><td rowspan="3">Pavement Marking</td><td>Wear</td><td><70% of marking remaining</td><td>Bi-Annually</td><td>Visual Assessment as per Annexure-F of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours<br>Cat-2 Defect - within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Day time Visibility</td><td>During expected life Service Time<br>Cement Road - 130mcd/m$^2$/lux<br>Bituminous Road - 100mcd/m$^2$/lux</td><td>Monthly</td><td>As per Annexure-D of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours<br>Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
<tr><td>Night Time Visibility</td><td><u>Initial and Minimum Performance for Dry Retro reflectivity during night time:</u><br><table><tr><td>Design Speed</td><td colspan="2">(RL) Retro Reflectivity (mcd/m$^2$/lux)</td></tr><tr><td></td><td>Initial (7 days)</td><td>Minimum Threshold level (TL) & warranty period required up to 2 years</td></tr><tr><td>Up to 65</td><td>200</td><td>80</td></tr><tr><td>65 - 100</td><td>250</td><td>120</td></tr><tr><td>Above 100</td><td>350</td><td>150</td></tr></table><u>Initial and Minimum Performance for Night Visibility under wet condition (Retro reflectivity):</u><br>Initial 7 days Retro reflectivity: 100</td><td>Bi-Annually</td><td>As per Annexure-E of IRC:35-2015</td><td>Re - painting</td><td>Cat-1 Defect – within 24 hours<br>Cat-2 Defect – within 2 months</td><td>IRC:35-2015</td></tr>
</table>

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| | | mcd/$m^2$/lux<br>Minimum Threshold Level: 50 mcd/$m^2$/lux | | | | | |
| | Skid Resistance | Initial and Minimum performance for Skid Resistance:<br>Initial (7days): 55BPN<br>Min. Threshold: 44BPN<br>*Note: shall be considered under urban/city traffic condition encompassing the locations like pedestrian crossings, bus bay, bus stop, cycle track intersection delineation, transverse bar markings etc | Bi-Annually | As per Annexure-G of IRC:35-2015 | | Within 24 hours | IRC:35-2015 |
| **Road Signs** | Shape and Position | Shape and Position as per IRC:67-2012. Signboard should be clearly visible for the design speed of the section. | Daily | Visual with video/image backup | Improvement of shape, in case if shape is damaged.<br><br>Relocation as per requirement | 48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs)<br><br>15 Days in case of Gantry/Cantilever Sign boards | IRC:67-2012 |
| | Retro reflectivity | As per specifications in IRC:67-2012 | Bi-Annually | Testing of each signboard using Retro Reflectivity Measuring Device. In accordance with ASTM D 4956-09. | hange of signboard | 48 hours in case of Mandatory Signs, Cautionary and Informatory Signs (Single and Dual post signs)<br><br>1 Month in case of Gantry/Cantilever Sign boards | RC:67-2012 |
| **Kerb** | Kerb Height | As per IRC 86:1983 depending upon type of Kerb | Bi-Annually | Use of distance measuring tape | Raising Kerb Height | Within 1 Month | RC 86:1983 |
| | Kerb Painting | Functionality: Functioning of Kerb painting as intended | Daily | Visual with video/image backup | Kerb Repainting | Within 7-days | RC 35:2015 |
| **Other Road Furniture** | Reflective Pavement Markers (Road Studs) | Numbers and Functionality as per specifications in IRC:SP:84-2014 and IRC:35-2015, unless specified in Schedule-B. | Daily | Counting | New Installation | Within 2 months | IRC:SP:84-2014, IRC:35-2015 |

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| | Pedestrian Guardrail | Functionality: Functioning of guardrail as intended | Daily | Visual with video/image backup | Rectification | Within 15 days | IRC:SP:84-2014 |
| | Traffic Safety Barriers | Functionality: Functioning of Safety Barriers as intended | Daily | Visual with video/image backup | Rectification | Within 7 days | IRC:SP:84-2014, IRC:119-2015 |
| | End Treatment of Traffic Safety Barriers | Functionality: Functioning of End Treatment as intended | Daily | Visual with video/image backup | Rectification | Within 7 days | IRC:SP:84-2014, IRC:119-2015 |
| | Attenuators | Functionality: Functioning of Attenuators as intended | Daily | Visual with video/image backup | Rectification | Within 7 days | IRC:SP-2014, IRC:119-2015 |
| | Guard Posts and Delineators | Functionality: Functioning of Guard Posts and Delineators as intended | Daily | Visual with video/image backup | Rectification | Within 15 days | IRC: 79 - 1981 |
| | Overhead Sign Structure | Overhead sign structure shall be structurally adequate | Daily | Visual with video/image backup | Rectification | Within 15 days | IRC:67-2012 |
| | Traffic Blinkers | Functionality: Functioning of Traffic Blinkers as intended | Daily | Visual with video/image backup | Rectification | Within 7 days | IRC:SP:84-2014 |
| **Highway Lighting System** | Highway Lights | Illumination:<br>Minimum 40 Lux illumination on the road surface | Daily | The illumination level shall be measured with luxmeter | Improvement in Lighting System | 24 hours | IRC:SP:84-2014 |
| | | No major failure in the lighting system | Daily | - | Rectification of failure | 24 hours | IRC:SP:84-2014 |
| | | No minor failure in the lighting system | Monthly | - | Rectification of failure | 8 hours | IRC:SP:84-2014 |
| | Toll Plaza Canopy Lights | Minimum 40 Lux illumination on the road surface | Daily | The illumination level shall be measured with luxmeter | Improvement in Lighting System | 24 hours | IRC:SP:84-2014 |
| | | No major/minor failure in the lighting system | Daily | - | Rectification of failure | 8 hours | IRC:SP:84-2014 |

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| **Trees and Plantation including median plantation** | Obstruction in a minimum head-room of 5.5 m above carriageway or obstruction in visibility of road signs | No obstruction due to trees | Monthly | Visual with video/image backup | Removal of trees | Immediate | IRC:SP:84-2014 |
| | Deterioration in health of trees and bushes | Health of plantation shall be as per requirement of specifications & instructions issued by Authority from time to time | Daily | Visual with video/image backup | Timely watering and treatment. Or Replacement of Trees and Bushes. | Within 90 days | IRC:SP:84-2014 |
| | Vegetation affecting sight line and road structures | Sight line shall be free from obstruction by vegetation | Daily | Visual with video/image backup | Removal of Trees | Immediate | IRC:SP 84-2014 |
| **Rest Areas** | Cleaning of toilets | - | Daily | - | - | Every 4 hours | |
| | Defects in electrical, water and sanitary installations | - | Daily | - | Rectification | 24 hours | |
| **Other Project Facilities and Approach roads** | Damage or deterioration in Approach Roads, pedestrian facilities, truck lay-bys, bus-bays, bus- shelters, cattle crossings, Traffic Aid Posts, Medical Aid Posts and other works | | Daily | - | Rectification | 15 days | IRC:SP 84-2014 |

**Table 4: Maintenance Criteria for Structures and Culverts:**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Pipe/box/ slab culverts** | Free waterway/ unobstructed flow | 85% of culvert normal flow area to available. | 2 times in a year (before | Inspection by Bridge Engineer as per IRC | Cleaning silt up soils and debris in culvert | 15 days before onset of monsoon and within 30 | IRC 5-2015, IRC SP:40-1993 and IRC |

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| | section | | and after rainy season) | SP: 35-1990 and recording of depth of silting and area of vegetation. | barrel after rainy season, removal of bushes and vegetation, U/s of barrel, under barrel and D/s of barrel before rainy season. | days after end of rainy season. | SP:13-2004 |
| | Leak-proof expansion joints if any | No leakage through expansion joints | Bi-Annually | Physical inspection of expansion joints as per IRC SP: 35-1990 if any, for leakage strains on walls at joints. | Fixing with sealant suitably | 30 days or before onset of rains whichever comes earlier | IRC SP:40-1993 and IRC SP:69-2011 |
| | Structurally sound | Spalling of concrete not more than 0.25 sqm<br>Delamination of concrete not more than 0.25 sq.m.<br>Cracks wider than 0.3 mm not more than 1m aggregate length | Bi-Annually | Detailed inspection of all components of culvert as per IRC SP:35-1990 and recording the defects | Repairs to spalling, cracking, delamination, rusting shall be followed as per IRC: SP: 40-1993. | 15 days | IRC SP 40-1993 and MORTH Specifications clause 2800 |
| | Protection works in good condition | Damaged of rough stone apron or bank revetment not more than 3 sqm, damage to solid apron (concrete apron) not more than 1 sqm | 2 times in a year (before and after rainy season) | Condition survey as per IRC SP:35-1990 | Repairs to damaged aprons and pitching | 30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier. | IRC: SP 40-1993 and IRC:SP:13-2004. |
| **Bridges including ROBs Flyover etc. as applicable** | Riding quality or user comfort | No pothole in wearing coat on bridge deck | Daily | Visual inspection as per IRC SP:35-1990 | Repairs to BC or wearing coat | 15 days | MORT&H Specification 2811 |
| **Bridge - Super Structure** | Bumps | No bump at expansion joint | Daily | Visual inspection as per IRC SP:35-1990 | Repairs to BC on either side of expansion joints, profile correction course on approach slab in case of settlement to approach | 15 days | MORT&H Specification 3004.2 & 2811. |

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| | | | | | embankment | | |
| | User safety (condition of crash barrier and guard rail) | No damaged or missing stretch of crash barrier or pedestrian hand railing | Daily | Visual inspection and detailed condition survey as per IRC SP: 35-1990. | Repairs and replacement of safety barriers as the case may be | 3days | IRC: 5-1998, IRC SP: 84-2014 and IRC SP: 40-1993. |
| | Rusted reinforcement | Not more than 0.25 sqm | Bi-Annually | Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit | All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out the repairs to affected concrete portion with epoxy mortar / concrete. | 15 days | IRC SP: 40-1993 and MORTH Specification 1600. |
| | Spalling of concrete | Not more than 0.50 sqm | | | | | |
| | Delamination | Not more than 0.50 sq.m | | | | | |
| | Cracks wider than 0.30 mm | Not more than 1m total length | Bi-Annually | Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit | Grouting with epoxy mortar, investigating causes for cracks development and carry out necessary rehabilitation. | 48 Hours | IRC SP: 40-1993 and MORTH Specification 2800. |
| | Rainwater seepage through deck slab | Leakage - nil | Quarterly | Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit | Grouting of deck slab at leakage areas, waterproofing, repairs to drainage spouts | 1 months | MORTH specifications 2600 & 2700. |
| | Deflection due to permanent loads and live loads | Within design limits. | Once in every 10 years for spans more than 40 m | Load test method | Carry out major rehabilitation works on bridge to retain original design loads capacity | 6 months | IRC SP: 51-1999. |
| | Vibrations in bridge deck due to moving trucks | Frequency of vibrations shall not be more than 5 Hz | Once in every 5 years for spans more than 30m and every 10 years for spans between 15 to | Laser displacement sensors or laser vibro-meters | Strengthening of super structure | 4 months | AASHTO LRFD specifications |

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| | | | 30 m | | | | |
| | Leakage in Expansion joints | No damage to elastomeric sealant compound in strip seal expansion joint, no leakage of rain water through expansion joint in case of buried and asphalt plug and copper strip joint. | Bi-Annually | Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit | Replace of seal in expansion joint | 15 days | MORTH specifications 2600 and IRC SP: 40-1993. |
| | Debris and dust in strip seal expansion joint | No dust or debris in expansion joint gap. | Monthly | Detailed condition survey as per IRC SP:35-1990 using Mobile Bridge Inspection Unit | Cleaning of expansion joint gaps thoroughly | 3 days | MORTH specifications 2600 and IRC SP: 40-1993. |
| | Drainage spouts | No down take pipe missing/broken below soffit of the deck slab. No silt, debris, clogging of drainage spout collection chamber. | Monthly | Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit | Cleaning of drainage spouts thoroughly. Replacement of missing/broken down take pipes with a minimum pipe extension of 500mm below soffit of slab. Providing sealant around the drainage spout if any leakages observed. | 3 days | MORTH specification 2700. |
| **Bridge-substructure** | Cracks/spalling of concrete/rusted steel | No cracks, spalling of concrete and rusted steel | Bi-Annually | Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit | All the corroded reinforcement shall need to be thoroughly cleaned from rusting and applied with anti-corrosive coating before carrying out repairs to substructure by grouting/guniting and micro concreting depending on type | 30 days | IRC SP: 40-1993 and MORTH specification 2800. |

| Asset Type | Performance Parameter | Level of Service (LOS) | Frequency of Measurement | Testing Method | Recommended Remedial measures | Time limit for Rectification | Specifications and Standards |
|---|---|---|---|---|---|---|---|
| | | | | | of defect noticed | | |
| | Bearings | Delamination of bearing reinforcement not more than 5%, cracking or tearing of rubber not more than 2 locations per side, no rupture of reinforcement or rubber | Bi-Annually | Detailed condition survey as per IRC SP: 35-1990 using Mobile Bridge Inspection Unit | In case of failure of even one bearing on any pier/abutment, all the bearings on that pier/abutment shall be replaced, in order to get uniform load transfer on to bearings. | 3 months | MORTH specification 2810 and IRC SP: 40-199. |
| **Bridge Foundations** | Scouring around foundations | Scouring shall not be lower than maximum scour level for the bridge | Bi-Annually | Condition survey and visual inspection as per IRC SP:35-1990 using Mobile Bridge Inspection Unit. In case of doubt, use Underwater camera for inspection of deep wells in major Rivers. | Suitable protection works around pier/abutment | 1 month | IRC SP: 40-1993, IRC 83-2014, MORTH specification 2500 |
| | Protection works in good condition | Damaged of rough stone apron or bank revetment not more than 3 sq.m, damage to solid apron (concrete apron) not more than 1 sq.m | 2 times in a year (before and after rainy season) | Condition survey as per IRC SP:35-1990 | Repairs to damaged aprons and pitching. | 30 days after defect observation or 2 weeks before onset of rainy season whichever is earlier. | IRC: SP 40-1993 and IRC:SP:13-2004. |
| **Note:** Any Structure during the entire contract period which is found that does not complies with all requirements of this Table will be prepared, rehabilitated or even reconstructed under the scope of the contractor. | | | | | | | |

**Table 5: Maintenance Criteria for Hill Roads**

**In addition to above, for hill roads the following provisions for maintenance is also to done.**

| **Hill Roads** | | |
|---|---|---|
| **(i)** | Damage to Retaining wall/ Breast wall | **7 (Seven) days** |
| **(ii)** | Landslides requiring clearance | **12 (Twelve) hours** |
| **(iii)** | Snow requiring clearance | **24 (Twenty Four) hours** |

**Note: For all tables 1 to 5 above, latest BIS & IRC standards (even those not indicated herewith) along with MoRTH specifications shall be binding for all maintenance activities.**

**A. Flexible Pavement**

| Nature of Defect or deficiency | | Time limit for repair/ rectification |
|---|---|---|
| | | |
| **(b)** | **Granular earth shoulders, side slopes, drains and culverts** | |
| (i) | Variation by more than 1 % in the prescribed slope of camber/cross fall (shall not be less than the camber on the main carriageway) | 7 (seven) days |
| (ii) | Edge drop at shoulders exceeding 40 mm | 7 (seven) days |
| (iii) | Variation by more than 15% in the prescribed side (embankment) slopes | 30 (thirty) days |
| (iv) | Rain cuts/gullies in slope | 7 (seven) days |
| (v) | Damage to or silting of culverts and side drains | 7 (seven) days |
| (vi) | Desilting of drains in urban/semi- urban areas | 24 (twenty four) hours |
| (vii) | Railing, parapets, crash barriers | 7 (seven) days (Restore immediately if causing safety hazard) |
| **(c)** | **Road side furniture including road sign and pavement marking** | |
| (i) | Damage to shape or position, poor visibility or loss of retro- reflectivity | 48 (forty eight) hours |
| (ii) | Painting of km stone, railing, parapets, crash barriers | As and when required/ Once every year |
| (iii) | Damaged/missing signs road requiring replacement | 7 (seven) days |
| (iv) | Damage to road mark ups | 7 (seven) days |
| **(d)** | **Road lighting** | |
| (i) | Any major failure of the system | 24 (twenty four) hours |
| (ii) | Faults and minor failures | 8 (eight) hours |
| **(e)** | **Trees and plantation** | |
| (i) | Obstruction in a minimum head- room of 5 m above carriageway or obstruction in visibility of road signs | 24 (twenty four)hours |
| (ii) | Removal of fallen trees from carriageway | 4 (four) hours |
| (iii) | Deterioration in health of trees and bushes | Timely watering and treatment |
| (iv) | Trees and bushes requiring replacement | 30 (thirty) days |
| (v) | Removal of vegetation affecting sight line and road structures | 15 (fifteen) days |
| **(f)** | **Rest area** | |
| (i) | Cleaning of toilets | Every 4 (four) hours |
| (ii) | Defects in electrical, water and sanitary installations | 24 (twenty four) hours |
| **(g)** | **[Toll Plaza]** | |
| **(h)** | **Other Project Facilities and Approach roads** | |
| (i) | Damage in approach roads, pedestrian facilities, truck lay- byes, bus-bays, bus-shelters, cattle crossings, [Traffic Aid Posts, Medical Aid Posts] and service roads | 15 (fifteen) days |

| Nature of Defect or deficiency | | Time limit for repair/ rectification |
|---|---|---|
| (ii) | Damaged vehicles or debris on the road | 4 (four) hours |
| (iii) | Malfunctioning of the mobile crane | 4 (four) hours |
| **Bridges** | | |
| **(a)** | **Superstructure** | |
| (i) | Any damage, cracks, spalling/ scaling<br>Temporary measures | within 48 (forty eight) hours |
| | Permanent measures | within15 (fifteen) days or as specified by the Authority's Engineer |
| **(b)** | **Foundations** | |
| (i) | Scouring and/or cavitation | 15 (fifteen) days |
| **(c)** | **Piers, abutments, return walls and wing walls** | |
| (i) | Cracks and damages including settlement and tilting, spalling, scaling | 30 (thirty) days |
| **(d)** | **Bearings (metallic) of bridges** | |
| (i) | Deformation, damages, tilting or shifting of bearings | 15 (fifteen) days Greasing of metallic bearings once in a year |
| **(e)** | **Joints** | |
| (i) | Malfunctioning of joints | 15 (fifteen) days |
| **(f)** | **Other items** | |
| (i) | Deforming of pads in elastomeric bearings | 7 (seven) days |
| (ii) | Gathering of dirt in bearings and joints; or clogging of spouts, weep holes and vent-holes | 3 (three) days |
| (iii) | Damage or deterioration in kerbs, parapets, handrails and crash barriers | 3 (three) days (immediately within 24 hours if posing danger to safety) |
| (iv) | Rain-cuts or erosion of banks of the side slopes of approaches | 7 (seven) days |
| (v) | Damage to wearing coat | 15 (fifteen) days |
| (vi) | Damage or deterioration in approach slabs, pitching, apron, toes, floor or guide bunds | 30 (thirty) days |
| (vii) | Growth of vegetation affecting the structure or obstructing the waterway | 15 (fifteen) days |
| **(g)** | **Hill Roads** | |
| (i) | Damage to retaining wall/breast wall | 7 (seven) days |
| (ii) | Landslides requiring clearance | 12 (twelve) hours |
| (iii) | Snow requiring clearance | 24 (twenty four) hours |

[Note: Where necessary, the Authority may modify the time limit for repair/rectification, or add to the nature of Defect or deficiency before issuing the bidding document, with the approval of the competent authority.]

# *Schedule-F*

## Schedule-F

*(See Clause 4.1 (vii)(a))*

## APPLICABLE PERMITS

**1 Applicable Permits**

i. The Contractor shall obtain, as required under the Applicable Laws, the following Applicable Permits:

(a) Permission of the State Government for extraction of boulders from quarry;

(b) Permission of Village Panchayat and Pollution Control Board for installation of crushers;

(c) License for use of explosives;

(d) Permission of the State Government for drawing water from river/reservoir;

(e) License from inspector of factories or other competent Authority for setting up batching plant;

(f) Clearance of Pollution Control Board for setting up batching plant;

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;

(h) Permission of Village Panchayats and State Government for borrow earth; and

(i) Any other permits, clearances or approvals required under Applicable Laws.

ii. Applicable permits, as required, relating to environmental protection and conservation shall have been produced by the Authority in accordance with the provisions of this Agreement

# *Schedule-G*

# Schedule-G

*(See Clauses 7.1 and 19.2)*

## Annex-I : Form of Bank Guarantee

*(See Clause 7.1)*

**[Performance Security /Additional Performance Security]**

To

_____ [name of Authority]

_____ [address of Authority]

WHEREAS_____[name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA) No. _Dated__ for construction of [name of the Project] (hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Construction Period/ Defects Liability Period and Maintenance Period} in a sum of Rs….. cr. (Rupees ……. crore) (the "**Guarantee Amount**"[1]).

AND WHEREAS we, …….. through our branch at ..... (the "**Bank**") have agreed to furnish this Bank Guarantee (hereinafter called the **"Guarantee**") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Contract, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [General Manager of National Highways & Infrastructure Development Corporation Limited], that the

[1] Guarantee Amount for Performance Security and Additional Performance Security shall be calculated as per Contract.

Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Contract and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****[$]. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Contract.

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

13. This guarantee shall also be operatable at our…….Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

14. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

[$]Insert date atleast 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 2.21 of the RFP). The Contractors can submit the BG for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the BG in one go for the entire DLP.

| S.No. | Particulars | Details |
|---|---|---|
| 1 | Name of Beneficiary | National Highways & Infrastructure Development Corporation Limited |
| 2 | Beneficiary Bank Account No. | 90621010002659 |
| 3 | Beneficiary Bank Branch IFSC | CNRB0019062 |
| 4 | Beneficiary Bank Branch Name | Transport Bhawan, New Delhi |
| 5 | Beneficiary Bank Address | Canara Bank (erstwhile Syndicate Bank) transport Bhawan, 1st Parliament Street, New Delhi-110001 |

Signed and sealed this ……. day of ……., 20…… at …….

SIGNED, SEALED AND DELIVERED
For and on behalf of the Bank by:
(Signature)
(Name)
(Designation)
(Code Number)
(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

# Annex - II

*(Schedule - G)*

*(See Clause 19.2)*

## Annex – II: Form for Guarantee for Advance Payment

To

_____ [name of Authority]

_____ [address of Authority]

WHEREAS:

(A) [name and address of contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the [name and address of the authority], (hereinafter called the "**Authority**") for the construction of the ***** section of [National Highway No. **] on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) In accordance with Clause 19.2 of the Agreement, the Authority shall make to the Contractor an interest bearing @Bank Rate + 3% advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a scheduled bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs._____cr. (Rupees_____crore) and the amount of this Guarantee is Rs._____cr. (Rupees_____crore) (the "**Guarantee Amount**")[2].

(C) We, through our branch at (the "Bank") have agreed to furnish this bank guarantee (hereinafter called the "Guarantee") for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

A letter from the Authority, under the hand of an officer not below the rank of [General Manager in the National Highways Authority of India], that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The

2 The Guarantee Amount should be equivalent to 110% of the value of the applicable instalment

Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever

2. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

3. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

4. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

5. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.

6. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

7. The Guarantee shall cease to be in force and effect on ****[3] Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

3 Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause 19.2 of the Agreement).

8. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

9. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

10. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

11. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

12. This guarantee shall also be operatable at our…….Branch at New Delhi, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

13. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of NHIDCL, details of which is as under:

| S.No. | Particulars | Details |
|---|---|---|
| 1 | Name of Beneficiary | National Highways & Infrastructure Development Corporation Limited |
| 2 | Beneficiary Bank Account No. | 90621010002659 |
| 3 | Beneficiary Bank Branch IFSC | CNRB0019062 |
| 4 | Beneficiary Bank Branch Name | Transport Bhawan, New Delhi |
| 5 | Beneficiary Bank Address | Canara Bank (erstwhile Syndicate Bank) transport Bhawan, 1st Parliament Street, New Delhi-110001 |

Signed and sealed this……day of…., 20…… at

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

# *Schedule-H*

# Schedule-H

*(See Clauses10.1 (iv) and 19.3)*

## 1 Contract Price Weightages

1.1 The Contract Price for this Agreement is Rs. ……. Cr.

1.2 Proportions of the Contract Price for different stages of Construction of the Project Highway shall be as specified below:

| Sl. no. | Item | Weightage in percentage to the Contract Price | Stage for Payment | Percentage weightage |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 1 | Road works including culverts, widening and repair of culverts. | 56.60% | **A - Widening and strengthening of existing road** | 0.00% |
| | | | **B.1 - Reconstruction/ New 2/4-lane realignment/bypass (Flexible pavement)** | 0.00% |
| | | | 1) Earthwork upto Subgrade top | 40.00% |
| | | | 2) Subbase course (GSB) | 11.55% |
| | | | 3) Non bituminous base course (WMM) | 11.16% |
| | | | 4) Bituminous base (Prime, tack and DBM) | 10.75% |
| | | | 5) Wearing coat (Tack coat, BC, shoulder) | 7.94% |
| | | | **B.2 - Reconstruction/ New 2/4-lane realignment/bypass (Rigid Pavement)** | 0.00% |
| | | | **C.1 - Reconstruction/ New Service Road (flexible Pavement)** | 0.00% |
| | | | 1) Earthwork upto Subgrade top | 0.56% |
| | | | 2) Subbase course (GSB) | 0.66% |
| | | | 3) Non bituminous base course (WMM) | 0.57% |
| | | | 4) Bituminous base (Prime, tack and DBM) | 0.66% |
| | | | 5) wearing coat (Tack coat, BC) | 0.59% |
| | | | **C.2 - Reconstruction/ New Service Road (Rigid Pavement)** | 0.00% |
| | | | **D. - Reconstruction/ New culverts on existing road and realignments, bypasses** | 15.56% |
| 2 | Other works | 42.95% | i) Toll plaza | 0.00% |
| | | | ii) Roadside drains | 13.18% |

| Sl. no. | Item | Weightage in percentage to the Contract Price | Stage for Payment | Percentage weightage |
|---|---|---|---|---|
| | | | iii) Road signs, markings, km stones, safety devices etc. | 11.20% |
| | | | iv) Project facilities | |
| | | | **a.** Bus Bay with Bus Shelter | 0.26% |
| | | | **b.** Truck lay byes | 0.00% |
| | | | **c.** Rest area | 0.00% |
| | | | **d.** Foot Over Bridges | 1.00% |
| | | | **e.** others to specified | |
| | | | (i) Streetlight | 0.03% |
| | | | (ii) Rainwater harvesting | 1.00% |
| | | | (iii) Junction improvement | 1.00% |
| | | | v) Protection works - - retaining wall / toe wall, breast wall etc. | |
| | | | a) Breast wall | 42.63% |
| | | | b) Retaining /Toe wall | 14.75% |
| | | | vi) Side Slope Protection works Turfing and stone pitching | |
| | | | a) Cut slope protection soil nailing etc. | 6.15% |
| | | | b) Fill Slope - Reinforced soil slope | 4.65% |
| | | | c) Reinforced Soil wall | 4.15% |
| **3** | Electrical utilities and public Health Utilities (Water pipelines and sewage lines) | 0.45% | (i) EHT line / (ii) EHT crossings | 0.00% |
| | | | (ii) HT/ LT line / HT/ LT crossings | 95.20% |
| | | | (iii) Water pipeline / Water pipeline crossings | 4.80% |
| | | | (iv) Sewage lines / (viii) Sewage line crossings | 0.00% |

1.3 Procedure of estimating the value of work done.

1.3.1 Road works

Procedure for estimating the value of road work done shall be as follows:

**Table 1.3.1**

| Stage of Payment | Percentage -weightage | Payment Procedure |
|---|---|---|
| **A - Widening and strengthening of existing road** | 0.00% | |
| **B.1 - Reconstruction/ New 2/4-lane realignment/bypass (Flexible pavement)** | 0.00% | Unit of measurement is linear length. Payment of each stage shall be made on pro-rata basis on completion of a stage **in a length not less than 5% (five percent) of the total length.** |
| 1) Earthwork up to Subgrade top | 40.00% | |
| 2) Subbase course (GSB) | 11.55% | |
| 3) Non bituminous base course (WMM) | 11.16% | |
| 4) Bituminous base (Prime, tack and DBM) | 10.75% | |
| 5) Wearing coat (Tack coat, BC) | 7.94% | |
| **B.2 - Reconstruction/ New 2/4-lane realignment/bypass (Rigid Pavement)** | 0.00% | |
| **C.1 - Reconstruction/ New Service Road (flexible Pavement)** | 0.00% | Unit of measurement is linear length. Payment of each stage shall be made on pro-rata basis on completion of a stage **in a length not less than 5% (five percent) of the total length.** |
| 1) Earthwork up to Subgrade top | 0.56% | |
| 2) Subbase course (GSB) | 0.66% | |
| 3) Non bituminous base course (WMM) | 0.57% | |
| 4) Bituminous base (Prime, tack and DBM) | 0.66% | |
| 5) Wearing coat (Tack coat, BC) | 0.59% | |
| **C.2 - Reconstruction/ New Service Road (Rigid Pavement)** | 0.00% | |
| **D. - Reconstruction/ New culverts** | 15.56% | Cost of each culvert shall be determined on pro rata basis with respect to the total number of culverts. Payment shall be made on the completion of at least **three** culverts. |

@. For example, if the total length of bituminous work to be done is 100 km, the cost per km of bituminous work shall be determined as follows:

Cost per km = P x weightage for road work x weightage for bituminous work x (1/L)

Where P= Contract Price. And L = Total length in km.

Similarly, the rates per km for other stages shall be worked out accordingly.

**Note: The length affected due to law-and-order problems or litigation during execution due to which the Contractor is unable to execute the work, may be deducted from the total project length for payment purposes. The total length calculated here is only for payment purposes and will not affect and referred in other clauses of the Contract Agreement.**

1.3.2 Deleted

1.3.3 Deleted

1.3.4 Other works.

Procedure for estimating the value of other works done shall be as stated in table 1.3.4:

**Table 1.3.4**

| Stage of Payment | Weightage | Payment Procedure |
|---|---|---|
| (i) Toll plaza | 0.00% | |
| (ii) Road side drains | 13.18% | Unit of measurement is linear length in km. Payment shall be made on pro rata basis on completion of a stage in a length of not less than 5 % (five per cent) of the total length. |
| (iii) Road signs, markings, km stones, safety devices | 11.20% | |
| (iv) Project Facilities | | Payment shall be made on pro rata basis for completed facilities. |
| (a) Bus bays with bus shelter | 0.26% | |
| (b) Truck lay-byes | 0.00% | |
| (c) Rest areas | 0.00% | |
| (d) Foot Over Bridges | 1.00% | |
| (e) Others to be specified | | |
| (i) Streetlight | 0.03% | |
| (ii) Rainwater harvesting | 1.00% | |
| (iii) Junction improvement | 1.00% | Unit of measurement is number; payment shall be made on pro rata basis on completion of stage in a number of not less than 10% (ten percent) of the total number. |
| (v) Protection works - - retaining wall / toe wall, breast wall etc. | | Unit of measurement is linear length. Payment shall be made on pro-rata basis on completion of a stage in a length of not less than 5% (five percent) of the total length. |
| a) Breast wall | 42.63% | |
| b) Retaining /Toe wall | 14.75% | |
| (vi) Side Slope Protection works Turfing and stone pitching | | Unit of measurement is Sqm. Payment shall be made on pro-rata basis on completion of a stage in an area of not less than 5% (five percent) of the total quantity. |
| a) Cut slope protection soil nailing etc. | 6.15% | |
| b) Fill Slope - Reinforced soil slope | 4.65% | |
| c) Reinforced Soil wall | 4.15% | |

1.3.5 Electrical utilities and public Health Utilities (Water pipelines and sewage lines)

Procedure for estimating the value of other works done shall be as stated in table 1.3.5:

**Table 1.3.5**

| Stage of Payment | Weightage | Payment Procedure |
|---|---|---|
| (i) EHT line | 0.00% | Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rate basis as per its weightage with reference to total cost of EHT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is,<br>(i) Erection of Poles-20%<br>(ii) Conductor stringing including laying of cable- 30%<br>(iii) DTR erection (if involved)-15% and<br>(iv) Charging of line including dismantling and site clearance-35% (with DTR) and 50% without DTR) |
| (ii) EHT crossings | | Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 4. |
| (iii) HT/ LT line (including transformers if any) | 95.20% | Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of LT/ HT line. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is (i) Erection of Poles-20% (ii) Conductor stringing including laying of cable- 30%, (iii) DTR erection (if involved)-10% and (iv) Charging of line including dismantling and site clearance-40% (with DTR) and 50% without DTR) |
| (iv) HT/ LT crossings | | Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 10 crossings. |
| (v) Water pipeline | 4.80% | Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipeline. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%) |

| Stage of Payment | Weightage | Payment Procedure |
|---|---|---|
| (vi) Water pipeline crossings | | Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for not less than 25% of the crossings subject to a minimum of 8 crossings. |
| (vii) Sewage lines | 0.00% | Unit of measurement is as per completed activities. Cost per activity shall be determined on pro-rata basis as per its weightage with reference to total cost of pipeline. Payment shall be made for completed activity. (The average weightage of major activities (only for payment purpose) in shifting work is laying of pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%) |
| (viii) Sewage line crossings | | Cost of each crossing shall be determined on pro-rata basis with reference to total no. of crossings. Payment shall be made for completed activity. (The average weightage of major activities in shifting work is laying pipe-50%, Charging of line including all miscellaneous works and dismantling and site clearance-50%) |

**2 Procedure for payment for Maintenance.**

2.1 The cost for maintenance shall be as stated in Clause 14.1. (i)

2.2 Payment for Maintenance shall be made in quarterly instalments in accordance with the provisions of Clause 19.7.

# *Schedule-I*

# Schedule - I

*(See Clause 10.2 (iv))*

## 1 Drawings

Drawings In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall furnish to the Authority's Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-I.

## 2 Additional Drawings

If the Authority's Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority's Engineer, as if such drawings formed part of Annex-I of this Schedule-I.

Annex – I

*(Schedule - I)*

## List of Drawings

**1** A minimum list of the drawings of the various components/elements of the project highway and project facility required to be submitted by the Contractor is given below:

a. Drawing of horizontal alignment, vertical profile and typical cross sections.

b. Drawings of cross drainage works, i.e. Bridges/Culverts/Flyovers and Other Structures;

c. Drawings of interchanges, major intersections and underpasses.

d. Drawing of control center.

e. Drawings of road furniture items including traffic signage, marking, safety barriers, etc.;

f. Drawings of traffic diversions plans and traffic control measures.

g. Drawings of road drainage measures.

h. Drawings of typical details slope protection measures.

i. Drawings of landscaping and horticulture.

j. Drawings of pedestrian crossing.

k. Drawings of street lighting.

l. General Arrangement showing Base Camp and Administrative Block.

m. Any other drawings as per instruction of Authority Engineer.

# *Schedule-J*

## Schedule-J

*(See Clause 10.3 (ii))*

## PROJECT COMPLETION SCHEDULE

**1 Project Completion Schedule**

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule J for each of the Project Milestones and the **Scheduled Completion Date.** Within 15 (fifteen) days of the date of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2 Project Milestone-I$

i. Project Milestone-I shall occur on the date falling on the 320th (Three Hundred and Twenty) day from the Appointed Date (the "**Project Milestone-I**").

ii. Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 10% (ten per cent) of the Contract Price.

3 Project Milestone-II$

(i) Project Milestone-II shall occur on the date falling on the 548th (Five hundred and Forty Eighth) day from the Appointed Date (the "**Project Milestone-II**").

(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 35% (thirty five per cent) of the Contract Price.

**4 Project Milestone-III$**

(i) Project Milestone-III shall occur on the date falling on the 776th (Seven hundred and Seventy Six) day from the Appointed Date (the "**Project Milestone-III**").

(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 70% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

## 5 Schedule Completion Date

(i) The Scheduled Completion Date shall occur on the 912th (Nine Hundred Twelve) day from the Appointed Date.

(ii) On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

## 6 Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

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**[$] If total project length is say 'L' km and the unencumbered length along existing road as handed over on the appointed date is '$L_1$' km (including bypasses, re-alignment, structure etc.) and balance length i.e. 'L2' km (L-L1) is to be handed over on a later date as per the memorandum signed under provision of Clause 8.2.1 of the Contract Document, then the Project Milestone-I, II and III shall be linked to stage payment statement for amount in percentage of the contract price worked out on prorata basis for the '$L_1$' km length handed over of balance length, the subsequent Project Milestone shall be linked to stage payment statement for amount in percentage of the total contract price.**

**For example:**

**If the date for Milestone-I and Milestone-II is 180th and 300th day from appointed date and balance '$L_2$' km length is handed over after 300th day from appointed date, then the stage payment statement required for achieving Milestone-I and Milestone-II should be linked to Contract Price worked out on prorata basis for the $L_1$ km length [i.e. for Contract Price x $L_1$/L]. Subsequent Milestone i.e. Milestone-III will be linked to stage payment statement for amount in percentage of the total contract price. In no case, there shall be any change in the schedule completion date unless extension of time has been granted by the Authority under Clause 10.3 and 10.5 of the contract agreement.**

**In order for the above dispensation to come into operation, it is necessary that a suitable mechanism (like escrow account) is evolved between the parties to the effect that the payments released to the contractor under the above dispensation would be used for completion of the project in the first instance and shall be available to the Contractor only after meeting his project related commitments**

# *Schedule-K*

## Schedule-K

*(See Clause 12.1 (ii))*

## Tests on Completion

**1 Schedule for Tests**

(i) The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority's Engineer and the Authority of its intent to subject the Project Highway to Tests, and no later than 10 (ten) days prior to the actual date of Tests, furnish to the Authority's Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

(ii) The Contractor shall notify the Authority's Engineer of its readiness to subject the Project Highway to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority's Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority's Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule K.

**2 Tests**

(i) Visual and physical test: The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include all the tests specified in IRC code, manual and MORTH specifications for the road and Bridge works, 5th revision, 2013.

(ii) Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be [2,000 (two thousand)] mm for each kilometer.

(iii) Tests for bridges: All major and minor bridges shall be subjected to the rebound hammer and ultrasonic pulse velocity tests, to be conducted in accordance with the procedure described in Special Report No. 17: 1996 of the IRC Highway Research Board on Nondestructive Testing Techniques, at two spots in every span, to be chosen at random by the Authority's Engineer. Bridges with a span of 15 (fifteen) meters or more shall also be subjected to load testing.

(iv) Other tests: The Authority's Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Project Highway with Specifications and

Standards.

(v) Environmental audit: The Authority's Engineer shall carry out a check to determine conformity of the Project Highway with the environmental requirements set forth in Applicable Laws and Applicable Permits.

(vi) Safety Audit: The Authority's Engineer shall carry out or cause to be carried out, a safety audit to determine conformity of the Project Highway with the safety requirements and Good Industry Practice.

**3 Agency for conducting Tests**

All Tests set forth in this Schedule-K shall be conducted by the Authority's Engineer or such other agency or person as it may specify in consultation with the Authority.

**4 Completion Certificate**

Upon successful completion of Tests, the Authority's Engineer shall issue the Completion Certificate in accordance with the provisions of Article 12.

**5 The Authority Engineer will carry out tests with following equipment at his own cos in the presence of contractor's representative**

| Sr. No. | Key metrics of Asset | Equipment to be used | Frequency of condition survey |
|---|---|---|---|
| 1 | Surface defects of pavement | Network Survey Vehicle (NSV) | At least twice a year (As per survey months defined for the state basis rainy season) |
| 2 | Roughness of pavement | Network Survey Vehicle (NSV) | At least twice a year (As per survey months defined for the state basis rainy season) |
| 3 | Strength of pavement | Falling Weight Deflectometer (FWD) | At least once a year |
| 4 | Bridges | Mobile Bridge Inspection Unit (MBU) | At least twice a year (As per survey months defined for the state basis rainy season) |

| | | | |
|---|---|---|---|
| 5 | Road signs | Retro-reflectometer | At least twice a year (As per survey months defined for the state basis rainy season) |

The first testing with the help of NSV shall be conducted at the time of issue of Completion Certificate.

# *Schedule-L*

## Schedule-L

*(See Clause 12.2 )*

## COMPLETION CERTIFICATE

1 I, …….(Name of the Authority's Engineer), acting as Authority's Engineer, under and in accordance with the Agreement dated ……(the "Agreement"), for construction of the "**Four laning of Vairengte - Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Silchar - Vairengte - Sairang road in the State of Mizoram under Bharatmala Pariyojna on EPC mode**." through ……. (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement, and I am satisfied that the Project Highway can be safety and reliably placed in service of the Users thereof.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Project Highway have been completed, and the Project Highway is hereby declared fit for entry into operation on this the……day of…… 20……..

SIGNED, SEALED AND DELIVERED

For and on behalf of

The Authority's Engineer by:

(Signature)

(Name)

(Designation)

(Address)

# *Schedule-M*

## Schedule-M

*(See Clauses 14.6., 15.2 and 19.7)*

## PAYMENT REDUCTION FOR NON-COMPLIANCE

**1 Payment reduction for non-compliance with the Maintenance Requirements**

(i) Monthly lump sum payments for maintenance shall be reduced in the case of non-compliance with the Maintenance Requirements set forth in Schedule-E.

(ii) Any deduction made on account of non-compliance with the maintenance Requirements shall not be paid even after compliance subsequently. The deduction shall continue to be made every month until compliance is done.

(iii) The Authority's Engineer shall calculate the amount of payment reduction on the basis of weightage in percentage assigned to non-conforming items as given in Paragraph 2.

**2 Percentage reductions in lump sum payments**

(i) The following percentages shall govern the payment reduction:

| S. No. | Item/Defect/Deficiency | Percentage |
|---|---|---|
| **(a)** | **Carriageway/Pavement** | |
| (i) | Potholes, cracks, other surface defects | 15% |
| (ii) | Repairs of Edges, Rutting | 5% |
| **(b)** | **Road, Embankment, Cuttings, Shoulders** | |
| (i) | Edge drop, inadequate crossfall, undulations, settlement, potholes, ponding, obstructions | 10% |
| (ii) | Deficient slopes, raincuts, disturbed pitching, vegetation growth, pruning of trees | 5% |
| **(c)** | **Bridges and Culverts** | |
| (i) | Desilting, cleaning. vegetation growth, damaged pitching, flooring, parapets, wearing course, footpaths, any damage to foundations | 20% |
| (ii) | Any Defects in superstructures, bearings and sub-structures | 10% |
| (iii) | Painting, repairs/replacement kerbs, railings, parapets, guideposts/crash barriers | 5% |
| **(d)** | **Roadside Drains** | |
| (i) | Cleaning and repair of drains | 5% |

| | | |
|---|---|---|
| **(e)** | **Road Furniture** | |
| (i) | Cleaning, painting, replacement of road signs, delineators, road markings, 200 m/km/5th km stones | 5% |
| **(f)** | **Miscellaneous Items** | |
| (i) | Removal of dead animals, broken down/accidented vehicles, fallen trees, road blockades or malfunctioning of mobile crane | 10% |
| (ii) | Any other Defects in accordance with paragraph 1. | 5% |
| **(g)** | **Defects in Other Project Facilities** | 5% |

(ii) The amount to be deducted from monthly lump-sum payment for non-compliance of particular item shall be calculated as under:

R=P/100 x M xL1/L

Where: P = Percentage of particular item//Defect/deficiency for deduction

M = Monthly lump-sum payment in accordance with the Bid

L1 = Non-complying length

L = Total length of the road,

R = Reduction (the amount to be deducted for noncompliance for a particular item/Defect/deficiency)

The total amount of reduction shall be arrived at by summation of reductions for such items/Defects/deficiency or noncompliance.

For any Defect in a part of one kilometer, the non-conforming length shall be taken as one kilometer.

# *Schedule-N*

# Schedule-N

*(See Clause 18.1 (i))*

## SELECTION OF AUTHORITY'S ENGINEER

**1 Selection of Authority's Engineer**

(i) The provisions of the Model Request for Proposal for Selection of Technical Consultants, issued by the Ministry of Finance in May 2009, or any substitute thereof or 'Guidelines for Employment of Consultants under Japanese ODA Loans' or a combination of certain provisions thereof shall apply for selection of an experienced firm to discharge the functions and duties of an Authority's Engineer.

(ii) In the event of termination of the Technical Consultants appointed in accordance with the provisions of above Paragraphs 1.1 to 1.3, the Authority shall appoint another firm of Technical Consultants forthwith and may engage a government-owned entity in accordance with the provisions of Paragraph 3 of this Schedule-N.

**2 Terms of Reference**

The Terms of Reference for the Authority's Engineer (the "**TOR**") shall substantially conform with Annex 1 to this Schedule N.

**3 Appointment of Government entity as Authority's Engineer**

Notwithstanding anything to the contrary contained in this Schedule, the Authority may in its discretion appoint a government-owned entity as the Authority's Engineer; provided that such entity shall be a body corporate having as one of its primary functions the provision of consulting, advisory and supervisory services for engineering projects; provided further that a government-owned entity which is owned or controlled by the Authority shall not be eligible for appointment as Authority's Engineer.

## Annex – I

*(Schedule - N)*

## TERMS OF REFERENCE FOR AUTHORITY'S ENGINEER

**1 Scope**

(i) These Terms of Reference (the "**TOR**") for the Authority's Engineer are being specified pursuant to the EPC Agreement dated..... (the "**Agreement**), which has been entered into between the NHIDCL (the "**Authority**") and ..... (the "**Contractor**") for **"Four laning of Vairengte - Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Silchar - Vairengte - Sairang road in the State of Mizoram under Bharatmala Pariyojna on EPC mode."** and a copy of which is annexed hereto and marked as Annex-A to form part of this TOR.

(ii) The TOR shall apply to construction and maintenance of the Project Highway.

**2 Definitions and interpretation**

(i) The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

(ii) References to Articles, Clauses and Schedules in this TOR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this TOR.

(iii) The rules of interpretation stated in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, mutatis mutandis, to this TOR.

**3 General**

(i) The Authority's Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

(ii) The Authority's Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority before determining:

(a) any Time extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment; or

(d) any other matter which is not specified in (a), (b) or (c) above and which creates an obligation or liability on either Party for a sum exceeding 0.2% of Contract Price.

(iii) The Authority's Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions under this Agreement. Such reports shall be submitted by the Authority's Engineer within 10 (ten) days of the beginning of every month.

(iv) The Authority's Engineer shall inform the Contractor of any delegation of its duties and responsibilities to its suitably qualified and experienced personnel; provided, however, that it shall not delegate the authority to refer any matter for the Authority's prior approval in accordance with the provisions of Clause 18.2.

(v) The Authority's Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

(vi) In the event of any disagreement between the Parties regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the authority's Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on good industry practice and authentic literature.

**4 Construction Period**

(i) During the Construction Period, the Authority's Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites, topographical surveys, and the recommendations of the Safety Consultant in accordance with the provisions of Clause 10.1.6. The Authority's Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of a Major Bridge or Structure, the aforesaid period of 15 (fifteen) days may be extended upto 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

(ii) The Authority's Engineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

(iii) The Authority's Engineer shall review the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21

(twenty-one) days stating the modifications, if any, required thereto.

(iv) The Authority's Engineer shall complete the review of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor.

(v) The Authority's Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Project Highway for purposes of maintenance during the Construction Period in accordance with the provisions of Clause 10.4.

(vi) The Authority's Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

(vii) The Authority's Engineer shall inspect the Construction Works and the Project Highway and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. In particular, the Authority's Engineer shall include in its Inspection Report, the compliance of the recommendations made by the Safety Consultant.

(viii) The Authority's Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority's Engineer may require.

(ix) For determining that the Works conform to Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out, or cause to be carried out, tests at such time and frequency and in such manner as specified in the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in the IRC Special Publication-11 (Handbook of Quality Control for Construction of Roads and Runways) and the Specifications for Road and Bridge Works issued by MORTH (the "Quality Control Manuals") or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

(x) The Authority's Engineer shall test check at least 50 (Fifty) percent of the quantity or number of tests prescribed for each category or type of test for quality control by the Contractor.

(xi) The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority's Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that

may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

(xii) In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority's Engineer shall require the Contractor to carry out remedial measures.

(xiii) The Authority's Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Project Highway, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 21.6 shall apply.

(xiv) In the event that the Contractor fails to achieve any of the Project Milestones, the Authority's Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority's Engineer shall determine that completion of the Project Highway is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority's Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

(xv) The Authority's Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.

(xvi) Authority's Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the Users and pedestrians. After the Contractor has carried out remedial measure, the Authority's Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

(xvii) In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and Users, and requires the Authority's Engineer to inspect such works, the Authority's Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

(xviii) The Authority's Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-K and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority's Engineer shall act under and in accordance

with the provisions of Article 12 and Schedule-K.

**5 Maintenance Period**

(i) The Authority's Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority's Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

(iii) The Authority's Engineer shall specify the tests, if any, that the Contractor shall carry out, or cause to be carried out, for the purpose of determining that the Project Highway is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- E, the Authority's Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

(v) The Authority's Engineer shall examine the request of the Contractor for closure of any lane(s) of the Project Highway for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 5 (five) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority's Engineer shall monitor the reopening of such lane(s), and in case of delay, determine the Damages payable by the Contractor to the Authority under Clause 14.5.

**6 Determination of costs and time**

i. The Authority's Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

ii. The Authority's Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

iii. The Authority's Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 18.5.

**7 Payments**

i. The Authority's Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority's Engineer in accordance with the provisions of Clause 10.2.4 (d).

ii. Authority's Engineer shall -

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 19.4, determine the amount due to the Contractor and recommend the release of 90 (ninety) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 15 (fifteen) days of the receipt of the Stage Payment Statement referred to in Clause 19.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor, after adjustments in accordance with the provisions of Clause 19.10.

iii. The Authority's Engineer shall, within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 19.6, verify the Contractor's monthly statement and certify the amount to be paid to the Contractor in accordance with the provisions of the Agreement.

iv. The Authority's Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance in accordance with the provisions of Clause 19.16.

**8 Other duties and functions**

The Authority's Engineer shall perform all other duties and functions as specified in the Agreement.

**9 Miscellaneous**

i. A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority's Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority's Engineer thereon, shall be furnished by the Authority's Engineer to the Authority forthwith.

ii. The Authority's Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

iii. Within 90 (ninety) days of the Project Completion Date, the Authority's Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in micro film form or in such other medium as may be acceptable to the Authority, reflecting the Project Highway as actually designed, engineered and constructed, including an

as-built survey illustrating the layout of the Project Highway and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

iv. The Authority's Engineer, if called upon by the Authority or the Contractor or both, shall mediate and assist the Parties in arriving at an amicable settlement of any Dispute between the Parties.

v. The Authority's Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

# *Schedule-O*

## SCHEDULE - O

*(See Clauses 19.4 (i), 19.6 (i), and 19.8 (i))*

### Forms of Payment Statements

**1 Stage Payment Statement for Works**

The Stage Payment Statement for Works shall state:

(a) The estimated amount for the Works executed in accordance with Clause 19.3.1 subsequent to the last claim;

(b) Amounts reflecting adjustments in price for the aforesaid claim;

(c) The estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) Amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);

(e) Total of (a), (b), (c) and (d) above;

(f) Deductions:

(i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

(ii) Any amount towards deduction of taxes; and

(iii) Total of (i) and (ii) above.

(g) Net claim: (e) – (f) (iii);

(h) The amounts received by the Contractor upto the last claim:

(i) For the Works executed (excluding Change of Scope orders);

(ii) For Change of Scope Orders, and

(iii) Taxes deducted

**2 Monthly Maintenance Payment Statement**

The monthly Statement for Maintenance Payment shall state:

(a) the monthly payment admissible in accordance with the provisions of the agreement;

(b) the deductions for maintenance work not done;

(c) net payment for maintenance due, (a) minus (b);

(d) amounts reflecting adjustments in price under Clause 19.12; and

(e) amount towards deduction of taxes

**3 Contractor's claim for Damages**

**Note**: The Contractor shall submit its claims in a form acceptable to the Authority.

**Monthly Maintenance Payment Statement**

The monthly Statement for Maintenance Payment shall state:

(f) the monthly payment admissible in accordance with the provisions of the agreement;

(g) the deductions for maintenance work not done;

(h) net payment for maintenance due, (a) minus (b);

(i) amounts reflecting adjustments in price under Clause 19.12; and

(j) amount towards deduction of taxes

**4 Contractor's claim for Damages**

**Note**: The Contractor shall submit its claims in a form acceptable to the Authority.

# *Schedule-P*

## Schedule-P

*(See Clause 20.1)*

## INSURANCE

**1 Insurance during Construction Period**

i. The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the last Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15 (fifteen)] per cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) Insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

ii. The insurance under paragraph 1.1 (a) and (b) above shall cover the authority and the Contractor against all loss or damage from whatsoever cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

**2 Insurance for Contractor's Defects Liability**

The Contractor shall effect and maintain insurance cover for the works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and arises from a cause occurring prior to the issue of Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under the Applicable Laws and in accordance with Good Industry Practice.

**3 Insurance against injury to persons and damage to property**

i. The Contractor shall insure against each Party's liability for any loss, damage, death or bodily injury which may occur to any physical property (except things insured under Paragraph l and 2 of this Schedule or to any person (except persons insured under Clause 20.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount stated below with no limit on the number of occurrences.

The insurance cover shall be not less than the Contract Price.

ii. The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

(b) Damage which is and unavoidable result of the Contractor's obligations to execute the Works.

**4 Insurance to be in joint names**

The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor and the Authority.

# *Schedule-Q*

# SCHEDULE-Q

*(See Clause 14.10)*

## Tests on Completion of Maintenance Period

**1 Riding Quality test:**

Riding quality test: Riding quality of each lane of the carriageway shall be checked with the help of a calibrated bump integrator and the maximum permissible roughness for purposes of this Test shall be 2,500 (two thousand five hundred) mm for each kilometer.

**2 Visual and physical test:**

The Authority's Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include measurement of cracking, rutting, stripping and potholes and shall be as per the requirement of maintenance mentioned in Schedule-E.

# *Schedule-R*

## SCHEDULE-R

*(See Clause 14.10)*

## Taking Over Certificate

I, …… (Name and designation of the Authority's representative) under and in accordance with the Agreement dated …… (the "Agreement"), for **"Four laning of Vairengte - Chhimluang section (Package-3) of NH-306 from Existing Chainage km 43+000 to km 59+700 (Design Chainage km 46+000 to km 60+850) on Silchar - Vairengte - Sairang road in the State of Mizoram under Bharatmala Pariyojna on EPC mode."** ……. (Name of Contractor), hereby certify that the Tests on completion of Maintenance Period in accordance with Article 14 of the Agreement have been successfully undertaken to determine compliance of the Project Highway with the provisions of the Agreement and I hereby certify that the Authority has Taken over the Project Highway from the Contractor on this day .....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative)

(Address)