Schedule A

SCHEDULE -A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1. The Site

1.1 Site of the Slope Protection works on Four Laning of Existing Dimapur- Kohima Road on EPC basis starts from design km. 152.490 to km 166.700 (Design Length 14.21 Kms) (Existing km. 156.000 to km. 172.900, Length 16.900 Kms) of NH 39 (New No. is NH-29) in the state of Nagaland shall include the land, buildings, structures and road works.

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

1.3 An inventory of the Site including the land, structures, road works 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.

1.4 The proposed alignment plans of the Project Highway are specified in Annex-III which has to be followed by the Contractor as a minimum. The Contractor shall execute slope protection works within the available Right of Way.

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

Annex-1
(Schedule-A)

Note: Through suitable drawings and description in words, the land, buildings, structures and road works comprising the Site shall be specified briefly but precisely in this Annex-1. All the chainages/location referred to in Annex- I to Schedule-A shall be Designc hainages.

1. Site

The site for slope protection works on the four lane Project Highway comprises section of Dimapur- Kohima road commencing from Km 156.000 to Km 172.900 (Existing, Length= 16.90 Km) and from Design Km 152.490 to Km 166.700 (Design Length = 14.21 Km) i.e. Dimapur – Kohima Section in the State of Nagaland. The land, carriageway and structures comprising the Site are described below.

2. Current Status of Chainages affecting the project highway:

Sl. No.	Chainage		Side	Length (M)	Remarks
	From	To			
1	155050	155150	RHS	100	loose soil strata
2	155150	155200	RHS	50	Rock strata
3	155780	155850	RHS	70	loose soil strata
4	156300	156370	RHS	70	loose soil strata
5	157500	157800	RHS	300	loose soil strata
6	158140	158240	RHS	100	loose soil strata
7	159000	159400	RHS	400	Unstable, loose hill strata
8	161250	161350	RHS	100	Loose hill strata with partial
9	162500	162700	RHS	200	Unstable, loose soil strata
10	162800	163000	RHS	200	Loose soil strata, granular
11	164000	164100	RHS	100	Unstable, loose soil strata
12	164650	165050	RHS	400	Loose soil strata, granular
13	165230	165550	RHS	320	Partially unstable, loose soil
14	165650	165850	RHS	200	Loose boulder with loose
15	166050	166250	RHS	200	Loose soil strata, granular
16	166600	166700	RHS	100	Loose soil strata, granular
	Total			**2910**	

3. Land

The Site of the Project Highway as described below:

Sl. No.	Existing Chainage		Design Chainage		Length (m)	Available ROW (m)	Remarks
	From	To	From	To			
1	156.000	172.900	152.490	166.700	14210	45	Slope Protection works shall be executed along the project highway within RoW as per scope in Schedule-B

4. Critical section

The sliding areas in the project stretch are mentioned in Schedule-B. The Geotechnical investigation, engineering solution to stabilize / protect such areas / locations within ROW shall be under the obligation of the Contractor. Neither Change of Scope (COS) nor additional ROW shall be provided on this account by the Authority. Hence, Bidders are required to arrive at Geotechnical, Engineering solution at these unstable sliding areas after carrying out their own survey & geotechnical investigation of the project site. It is advised to visit the site thoroughly before bidding.

Annex-II
(Schedule-A)

Date of providing RoW

Sl. No.	Existing Chainage		Design Chainage		Length (m)	Available ROW (m)	Date of Providing RoW
	From	To	From	To			
1	156.000	172.900	152.490	166.700	14210	45	On Appointed Date

Annex-Ill
(Schedule-A)

Alignment Plans

The existing alignment of the Project Highway may be modified in some sections as per the site condition.

Annex-IV
(Schedule-A)

Environment Clearances

Environment Clearance for the Project Road Section has been obtained on 22.10.2007.

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 execution of slope protection works for Four Lane Dimapur — Kohima Road from design km 152.490 to km 166.700 (Existing km 156.000 to km 172.900) Excluding Dimapur & Kohima Bypass, in the state of Nagaland under SARDP-NE through Engineering, Procurement and Construction (EPC) Contract Basis as described in this Schedule-B.

2. Upgradation to 4 lane highway

DELETED

3. Specifications and Standards

The slope protection works shall be designed and executed in conformity with the Specifications and Standards specified in Annex-I of Schedule-D.

Annex – I

(SCHEDULE-B)

Description of Slope Protection Works

1. SPECIAL REQUIREMENT FOR HILL ROADS

All special features shall be provided as per Manual. The side slope shall be protected by using suitable slope protection measures all along the highway on Hill side and valley side as per site requirements.

1.1 Landslide Mitigation:

Landslide Mitigation has to be provided at the specified chainages mentioned below. The following are the Landslide Mitigation measures to be adopted with the technical specification mentioned below.

The Contractor shall be responsible for accurate assessment of the actual site requirement as per site condition & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in Schedule 'D' and submit the same to the Authority's Engineer for review through the proof consultant and implement it accordingly thereafter. Further the Proof and Safety Consultancy for the above work shall be done only through IIT.

1.1.1 System for reinforcing the earth

It includes reinforcing and strengthening of the unstable slopes while doing the excavation in a top down manner by in-situ soil reinforcement of the excavated slope surface based on the detail soil investigation and slope stability analysis.

System for reinforcing the earth shall consist of reinforced earth wall structure as per the specification below and soil nailing/ ground anchors. The backfilled reinforced earth wall is to be mechanically connected with the soil nailed/ ground anchored stabilized slope.

(i) **Fascia :** The fascia element shall be of prefabricated and hot deep galvanized mild steel bar steel mesh having minimum bar diameter of 8mm and minimum galvanization thickness in accordance with BS 729: 1971 (1994).

(ii) **Soil Reinforcing Element:** High Adherence Geosynthetic Straps with grooves on both sides to generate high friction and having coating for better durability as soil reinforcing element. Any other similar material for Soil Reinforcement can be used after the approval from AE.

(iii) **Connection between fascia and soil reinforcing element:** mechanical connection system shall be used, using rust/corrosion resistant steel meeting the long term strength criteria.

(iv) **Fill material:** Backfill material shall be reasonably free from organic or other deleterious material confirming to MoRTH "Specification of Road and Bridges Works",

Fifth Revision or IRC: SP: 102-2014.

(v) **Drainage:** Drainage gallery minimum 600mm wide having 20mm down aggregates as per MoRTH specification.

(vi) **Soil Nailing:** To be done as per AS 4678:2002 or any other relevant code as per site condition with approval of AE.

(vii) **Ground Anchors:** Depending on the soil strata, height of the structure and slope stability design, the excavated slope surface to be strengthened by Permanent Ground Anchors.

(viii) **Connection System:** The connection between the reinforced soil slope and soil nail and/ or ground anchors shall be mechanical in nature for full load transfer mechanism. All steel components of the connection shall be hot-dip galvanized to BS 729:1971 requirements or IS 4759:1996.

The Contractor shall be responsible for accurate assessment of the actual requirement as per site situation & prepare designs for slope protection & stabilization as per the specifications & standards stipulated in schedule 'D' and submit the same to the AE for review through the proof consultant and implement it accordingly thereafter. Further the Proof and Safety Consultancy for the above work will only be done through IIT/CBRI/CSIR.

1.1.2 A brief chainage-wise summary of the slope stabilization solutions is given below which is to be implemented in consultation with Authority's Engineer.

Sl. No.	**Chainage**		**Length (m)**	**Avg. Height(m)**	**Area (sqm.)**	**Suggested Slope Stability Solution**
	From	**To**				
1	153.150	153.350	200	15	3000	Hydroseeding with Coir Mat
2	155.050	155.150	100	15	1500	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Rhomboidal wire mesh, Hydroseeding etc.
3	155.150	155.200	50	15	750	Rock netting with Primary and secondary DT mesh with Self drilling Anchors of 32mm dia.
4	155.800	155.870	70	15	1050	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Hydroseeding etc.
5	155.870	156.370	500	15	7500	Hydroseeding with Coir Mat
6	157.200	157.800	600	25	15000	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Rhomboidal wire mesh, Hydroseeding etc.
7	158.850 162.500	159.900 162.700	250	15	3750	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Hydroseeding etc.
8	158.140	158.240	100	20	2000	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Hydroseeding, concrete drain/Anchor trench at top etc.

9	159.000	159.400	400	15	6000	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Hydroseeding etc.
10	161.250	161.350	200	20	4000	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Rhomboidal wire mesh, Hydroseeding, concrete drain/Anchor trench at top etc.
11	162.800	163.000	200	25	5000	Self drilling Anchors of 25mm/32mm dia, DT mesh, Coir mat, Hydroseeding, concrete drain/Anchor trench at top etc.
12	164.000	164.100	100	20	2000	Self drilling Anchors of 25mm/32mm dia, DT mesh, Coir mat, Hydroseeding, concrete drain/Anchor trench at top etc.
13	164.650	165.050	400	15	6000	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Hydroseeding etc.
14	165.230	165.550	320	20	6400	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Hydroseeding etc.
15	165.650	165.850	200	25	5000	Self drilling Anchors of 25mm/32mm dia, 3D steel reinforced monofilament erosion control mat, Rhomboidal wire mesh, Hydroseeding, concrete drain/Anchor trench at top etc.
22	166.200	166.250	50	20	1000	Hydroseeding with Coir Mat
23	166.600	166.700	100	15	1500	Hydroseeding With Coir Mat

1.2 Slope Protection/Stabilization work includes Jute netting with Hydroseeding, nailing, wire Mess/Cable Net and Geogrid etc. The land for muck dumping to be leased/procured by the contractor and generated muck to be deposited in the leased/purchased ground. The muck dumping ground to be stabilized as per NGT orders and shall be covered with bio-engineering.

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

Note : The contractor shall be responsible for accurate assessment and design of the actual requirement as per site condition and prepare design for slope protection and stabilization as per specification and standards stipulated in Schedule-D and submit the same to the Authority's Engineer/Authority for review through the Proof/Safety Consultant only through IIT/CBRI/CSIR and implement it accordingly thereafter. Therefore, contractor shall make thorough investigation at site and assess the requirement of slope protection and slide prone zone and other safety features at his own before submission of bid. However, mechanical bio-engineering is essentially to be done for uniform vegetation all over the treated area.

1.3 Change of Scope

The length of slope protection measures (either on hill side or on valley side) specified here in above shall be treated as per present site assessment within available ROW. The actual lengths as

required on the basis of detailed investigations shall be determined by the Contractor in accordance with the Specifications and Standards. Any 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 under taken in accordance with the provisions of Article 13.

SCHEDULE - C

(See Clause 2.1)

PROJECT FACILITIES

1 Project Facilities

DELETED

2 Description of Project Facilities

a) **Road Side Furniture**

DELETED

b) **Pedestrian Facilities**

DELETED

c) **Tree plantation**

DELETED

d) **Bus-bays and bus shelters**

DELETED

e) Others to be specified:

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 execution of slope protection works.

2. Design Standards

The Slope Protection works shall conform to design requirements set out in the IRC 56: Recommended Practice for Treatment of Embankment and Roadside Slopes for Erosion Control; IRC: SP: 102-2014 Guidelines for Design and construction of Reinforced Soil Walls; IRC:89-2019 Guidelines for Design and Construction of River Training and Control Works for Road Bridges. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer. The IRC: SP: 84 – 2014, Hill Road Manual IRC SP 48 -1998 and IRC:52-2019 should also be referred.

Annex – I

(Schedule-D)

Specifications and Standards for Construction

1. Specifications and Standards

All Materials, works and construction operations shall conform IRC 56: Recommended Practice for Treatment of Embankment and Roadside Slopes for Erosion Control; IRC: SP: 102-2014 Guidelines for Design and construction of Reinforced Soil Walls; IRC:89-2019 Guidelines for Design and Construction of River Training and Control Works for Road Bridges. Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer. The IRC: SP: 84 – 2014, Hill Road Manual IRC SP 48 -1998 and IRC:52-2019 should also be referred.

Schedule - I

(See Clause 10.2 (iv))

Drawings

1. 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. The Project drawings, as defined in Clause 1.1, Definitions, Article 1, Definitions and Interpretation, Part-I: Preliminary, of the Contract Agreement shall consist:

   (a) Working Drawings of all the components/elements of the Project as determined by Authority Engineer/Authority, and

   (b) As-built drawings for the Project components/elements as determined by AE/Authority. As-built drawings shall be duly certified by Authority Engineer.

2. A minimum list of the drawings of the various components/elements of the Project required to be submitted by the Contractor is given below:

   Slope Protection Works

   Detailed Drawings of works specified in Schedule-B along with cross-sections

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 [128th]** day from the Appointed Date (the "**Project Milestone-I**").

(ii) Prior to the occurrence of Project Milestone-I, the Contractor shall have commenced Slope Protection works on 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 **[219th]** day from the Appointed Date (the "**Project Milestone- II**").

(ii) Prior to the occurrence of Project Milestone-II, the Contractor shall have continued with execution of Slope Protection works on the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 30% (thirty-five per cent) of the Contract Price and should have started construction of all bridges.

4. Project Milestone-III

(i) Project Milestone-III shall occur on the date falling on the **[310th]** day from the Appointed Date (the "**Project Milestone- III**").

(ii) Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with execution of Slope Protection works on the Project Highway and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 60% (seventy per cent) of the Contract Price and should have started construction of all project facilities.

5. Scheduled Completion Date

(i) The Scheduled Completion Date shall occur on the **[365th day]** from the Appointed Date.

(ii) On or before the Scheduled Completion Date, the Contractor shall have completed the execution of Slope Protection works 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.

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 Execution of Slope protection works 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 Slope Protection Works 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

A. Visual and physical test: The Authority's Engineer shall conduct a visual and physical check to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

B. 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.

C. Other Tests

(i) 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.

(ii) Safety Audit: The Authority's Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the slope protection works 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. Deleted

.

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 deductions 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 calculated on pro rata basis as per Schedule-H.

Schedule-Q

(See Clause 14.10)

Tests on Completion of Maintenance Period

1. Test

The Authority's Engineer shall conduct a visual and physical check of Slope Protection Works to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The Authority's Engineer shall also conduct other tests as per manual specified in Schedule-D and Good Industry Practice.