No. RW/NH-33044/29/2021-S&R(P&B) Part (Comp No 248404)
Government of India
Ministry of Road Transport & Highways
Transport Bhawan, 1, Parliament Street, New Delhi-110001

Dated: 07th July, 2025

Office Memorandum

Sub: Invitation for Public Comments on Proposed Amendments to the RFP for Appointment of Consultancy Services for Preparation of DPR for National Highways and Centrally Sponsored Road Works

The Ministry had issued the Request for Proposal (RFP) for appointment of consultancy services for preparation of Detailed Project Reports (DPR) for National Highways and Centrally Sponsored Road Works on 09.02.2024.

The Ministry is in the process of amending the above RFP. A concept note outlining the proposed amendments is enclosed herewith for reference.

Comments/suggestions on the proposed concept note, if any, may kindly be submitted within twenty one (21) days from the date of this communication i.e. upto 28.07.2025, to the email address srdivisionmorth@gmail.com .

Encl: As above,

(Akil Ahmad)
Superintending Engineer (S&R)
For Director General (RD) & SS

To

NIC- for uploading on Ministry website under 'whats new'/ any other appropriate place, for obtaining Public comments

Copy for kind information to:

5. Sr. PPS to Secretary (RT&H)
6. Sr PPS to DG(RD)&SS
7. Sr. PPS/PPS to AS (RT&H)/ AS&FA
8. PS to all ADGs / JSs

Concept Note on Modifications in DPR

Basic Structure of Changes

The Single Stage RFP document (Without EOI) shall be based on 'Model Tender Document for procurement of Consultancy Services', issued by Department of Expenditure, Ministry of Finance dated 21.04.2023 with following modifications.

1. The mode of bidding as well as JV provisions shall be categorized as under: -

For Normal Highway Projects:

a) Tentative Project Cost <=100 Cr (Excluding GST and Excluding Land Cost)
   i) Cost to be Quoted by the Bidders
   ii) Standard QCBS mode with **30 (Technical Score):30 (DPR Rating): 40(Financial) weightages**
   iii) PBG @ 10 %
   iv) Only 1 JV partner allowed meeting at least 40% minimum eligibility criteria. Lead Partner to meet 60% eligibility criteria.

b) 100 Cr<Tentative Project Cost <=500 Cr (Excluding GST and Excluding Land Cost)

   i) Fixed Cost assessed by Tender Inviting Agency- No financial proposal to be submitted by bidders
   ii) PBG to be quoted by Bidder
   iii) Modified QCBS mode with **30 (Technical Score):30 (DPR Rating):** 40 (PBG quote) weightages
   iv) Only 1 JV partner allowed meeting at least 40% minimum eligibility criteria. Lead Partner to meet 60% eligibility criteria.

c) 500 Cr<Tentative Project Cost <=1000 Cr (Excluding GST and Excluding Land Cost)

Fixed Cost assessed by Tender Inviting Agency- No financial proposal to be submitted by bidders

PBG to be quoted by Bidder

Modified QCBS mode with **30 (Technical Score):30 (DPR Rating)**: 40 (PBG quote) weightages

Only 1 JV partner allowed meeting at least 50% minimum eligibility criteria. Lead Partner to meet at least 75% eligibility criteria.

d) Tentative Project Cost >1000 Cr (Excluding GST and Excluding Land Cost)

Fixed Cost assessed by Tender Inviting Agency- No financial proposal to be submitted by bidders

PBG to be quoted by Bidder

Concept Note on Modifications in DPR

Modified QCBS mode with **30 (Technical Score):30 (DPR Rating)**: 40 (PBG quote) weightages

Only 1 JV partner allowed who should be an international firm of repute i.e. having experience of DPR of Highway Projects for multilateral agencies such as ADB/World Bank/JICA with aggregate length equal to or greater than DPR length under bidding besides meeting at least 40% minimum eligibility criteria. Lead Partner to meet 60% eligibility criteria.

Note:

1. Bidders from only those countries shall be allowed to participate in bidding process which comply with the restrictions imposed under rule 144 (xi) of General Financial Rules (GFR) and/or any other restrictions imposed by Govt. of India through Ministry of Home Affairs or Ministry of External Affairs or Ministry of Finance.

2. The Performance Bank Guarantee has to be submitted by both the JV Partners separately and in same proportion as is the share of each member in the JV.

For Standalone Bridge Projects:

i) Fixed Cost assessed by Tender Inviting Agency- No financial proposal to be submitted by bidders
ii) PBG to be quoted by Bidder
iii) Modified QCBS mode with 60 (Technical including Rating): 40 (PBG quote) weightages
iv) Only 1 JV partner is allowed fulfilling at least 50% minimum eligibility criteria and only sub-contracting for specialized survey & investigation works upto 10% of project cost is allowed with prior approval of the Implementing Agency. The Lead Partner to fulfil at least 75% of eligibility criteria.

For Standalone Tunnel Projects:

i) Fixed Cost assessed by Tender Inviting Agency- No financial proposal to be submitted by bidders
ii) PBG to be quoted by Bidder
iii) Modified QCBS mode with 60 (Technical including Rating): 40 (PBG quote) weightages

iv) Only 1 JV partner is allowed fulfilling at least 50% minimum eligibility criteria and only sub-contracting for specialized survey & investigation works upto 10% of project cost is allowed with prior approval of the Implementing Agency. The Lead Partner to fulfil at least 75% of eligibility criteria.

2. For project falling in category 1(b), (c) and (d) and standalone structure projects as defined above, No Financial proposal for the package / projects are to be submitted separately. The most preferred bidder (H-1) for each package would be determined on the basis of **Quality (i.e. highest technical scorer), and PBG Value** as mentioned in the RFP. The PBG Quote of the all technically qualified bidders **(i.e. 70% or more marks in technical proposals for consultants with available DPR Rating and 60% or more marks for consultants without rating i.e. new entrants)** shall be opened.
3. Generally, no DPR work to be awarded before inclusion of the project in any of the future/existing scheme of Government.
4. First Feasibility Study to be completed then only the consultancy assignment shall be taken to DPR stage after specific instructions from Authority based on the outcome of the feasibility study. A separate Notice to Proceed to DPR stage shall be issued by the Authority in this regard. There should be exit clause in RFP / Agreement to that extent.
5. All Key Personnel should have part site man-month input and part design office man-month input.
6. For any repetition of work, provision may be made for additional payment.
7. Acceptance or rejection or proposing modification of any deliverable should be done in a time-based manner by Authority.
8. Modifications in payment deliverables to maintain cash flow of the consultants.
9. LA to be done through qualified personnel (such as **Retired or Ex-Patwari Naib Tahsildars/ Tahsildars /SDM/ADMs (or equivalent State Government Designations) and senior Officers** having at least 10 years experience in LA related activities). However, payment to them would be given by the DPR consultants. Financial proposal/ Fixed cost estimate (as is relevant) will include the support team for CALA.

Concept Note on Modifications in DPR

10. The environmental & wildlife clearances and compliance related formalities to be done through accredited and specialized agencies / qualified personnel (such as **Ex Indian Forest Service officer / retired or Ex State Forest Service officers on regular payroll each with over 15 years of service in Forest & Wildlife Department**).. The acceptance criteria shall be pre-defined in the RFP.
11. Geotechnical Investigations tests shall be done through NABL Accredited labs. It is to be noted that accreditation of such specific tests including collection of samples shall have to be available.
12. Duration of DPR to be kept as 12 months for greenfield projects and 9 months for brownfield projects. Which can be reduced only in compelling circumstances with approval of higher management.
13. Usage of innovative and latest Technological Tools to be made part of evaluation criteria.

Components of Feasibility Study (To be completed in First 3 Months):

1. Traffic Study including axle load surveys
2. Alignment Options after verification through PMG Gati Shakti Portal

3. i Limited / Broad topographical study

3. ii Broad Geo-engineering parameter (Additional for hill roads geological parameters including identification of faults etc.)

3. Broad Structural features including lane configuration
4. Lane Configuration and intersections/junctions/Service Roads
5. Utility Shifting Requirement along with Tentative Estimates
6. Forest/Environmental/CRZ Clearance Requirement
7. Tentative/Normative Cost estimate with reasonable accuracy
8. Land Acquisition Tentative cost assessment
9. Financial Feasibility of the Project for Authority from Socio-Economic Prospect and strictly in Financial Prospects (**for both flexible & rigid pavements**).

10. Proposing Mode of Contract Execution-EPC/HAM/BOT (Toll)/BOT (Annuity).
11. PM GatiShakti NMP Portal to be mandatorily used.

Note: The consultancy assignment shall be taken to DPR stage only after specific instructions from Authority based on the results of the feasibility study. In case feasibility study is not to be done, the activities relevant to the DPR should be added to the scope of work DPR below.

Components of DPR Study (To be started from 4th Month onwards):

1. NSV (using 3D-laser based NSV technology) and FWD testing of existing pavements of brownfield alignments
2. Detailed Geotechnical Investigations
3. Hydrological Investigations
4. Detailed Pavement & Embankment Design and Costing (showing different alternatives with cost comparison)
5. Detailed Structural Design
6. Detailed Designs of intersection/interchange
7. Road Furniture & Traffic Signage Plan
8. Drainage Plan
9. GIS mapping of ROW with sub-meter accuracy
10. Land Acquisition Activities (including laying of Row Boundary Stones)
11. Utility Shifting Estimates and relocation plan
12. Activities for obtaining Forest/Environmental/CRZ Clearance/Tree Cutting Permission.
13. Detailed Cost Estimation and comparison with normative costs
14. Tolling Scheme
15. ATMS scheme

Concept Note on Modifications in DPR

16. Proofing of All Traffic Studies for the selected alignment
17. Financial Feasibility of the Project for Authority from Socio-Economic Prospect and strictly in Financial Prospects (with detailed cost analysis)
18. Proposing Mode of Contract Execution-EPC/HAM/BOT (Toll)/BOT (Annuity)
19. Detailed Topographical Study
20. PM GatiShakti NMP Portal to be mandatorily used.

TO SPECIFICALLY INCLUDE IN TOR

1. The DPR Consultant shall identify the surplus land parcels available with the Authority on the approved project alignment and submit the detailed plan and profile and layout of such land parcels and propose a suitable plan of action for suitable utilisation of such land parcels. The DPR consultant shall also assist in mutation of ownership of such surplus land parcels in the name of the Central Government.

2. Public consultation*, including consultation with Communities located along the road, NGOs working in the area, other stake-holders and relevant Government departments at all the different stages of assignment (such as inception stage, feasibility stage, preliminary design stage and once final designs are concretized).

Note :- *Public consultation means:-

a) for Brown Field Projects or mixed projects: - Consultation with Village Sarpanch, Mayor/ Chairman of Municipal Corporation, Deputy Commissioner/ District Magistrate and State PWD/ State Govt.

b) for Green Field Projects: - In addition to above, concerned MPs/MLAs of areas will also be consulted.

3. **Standards and Codes of Practices**

1. All activities related to field studies, design and documentation shall be done as per the latest guidelines/ circulars of MoRT&H and relevant publications of the Indian Roads Congress (IRC) and Bureau of Indian Standards (BIS). For aspects not covered by IRC and BIS, international standards practices, may be adopted. The Consultants, upon award of the Contract, may finalize this in consultation with NHAI and reflect the same in the inception report. The DPR consultant can also propose specifications and designs as per Euro (EN)/AASHTO codes with due comparison of the same with respect to IRC/BIS provisions.

Bifurcation of Man-Months of Key-personnel on site and at HQ

Sr. No	Key Personnel	Total Project Assignment: **<to be kept as per costing guidelines>**		
		At site (% of man month)*	At design office (% of man month)*	Total Time (man month)*
1	Team Leader Cum Senior Highway Engineer	50%	50%	**<to be kept as per costing guidelines>**
2	Senior Bridge Design Engineer	30%	70%	
3	Highway Design Engineer	40%	60%	
4	Material-cum-Geo-technical Engineer-Geologist	70%	30%	
5	Senior Survey Engineer	70%	30%	
6	Traffic and Road Safety expert	50%	50%	
7	Environmental Specialist	70%	30%	
8	Quantity Surveyor / Documentation Expert	40%	60%	
9	Land Acquisition Expert	80%	20%	
10	Utility Expert	80%	20%	

11	Tunnel Design Expert	50%	50%	
12	Geophysicist	50%	50%	
	Note: *May be modified by Technical Divisions as per project specific requirement with approval from Member Concerned.			

Schedule for submission of Reports and Documents (Enclosure-III):

Stage No.	Activity	**Time Period in days from date of commencement**			
	Total Project Duration	**5 months**	**7 months**	**9 months**	**12 months**
1	Monthly Reports	**By 10th day of every month**			
2	Inception Report (i) Draft Inception Report including QAP document (ii) Inception Report including QAP document	 **7** **15**	 **10** **20**	 **15** **25**	 21 30
3	F.S. REPORT i) Draft Feasibility Study Report including option study report including draft 3(a) report ii) Comments of client iii) Final Feasibility Study Report incorporating compliance of comments of Client	 **20** **25** **32**	 **35** **40** **54**	 **45** **55** **75**	 60 75 90
4	LA & Clearances I Report				

	i) Draft LA & Clearances I Report including draft 3(A) report	**40**	**65**	**85**	105
	ii) Comments of client	**45**	**70**	**95**	120
	iii) Final LA & Clearances I Report incorporating compliance of comments of Client	**60**	**90**	**110**	135
5	Detailed Project Report				
	i) Draft DPR	**95**	**120**	**135**	180
	ii) Comments of client	**100**	**130**	**145**	210
	iii) Final DPR incorporating compliance of comments of Client	**107**	**150**	**160**	240
6	Technical Schedules				
	i) Draft Technical Schedules	**95**	**120**	**135**	180
	ii) Comments of client	**100**	**130**	**145**	210
	iii) Final technical schedule	**107**	**150**	**160**	240
7	Land Acquisition II Submission of draft 3D publication report	**95**	**120**	**135**	180
8	Land Acquisition III, Award determination (3G)	**135**	**180**	**195**	240
9	Project Clearances & LA IV Report Approval of Project clearances from Concerned agencies e.g. from MOEF; Rly for approval of GAD and detail engineering drawing of ROB/RUB; Irrigation Dept., Utility Report and Possession of Land	**150**	**210**	**270**	365

DPR Payment Schedule

The Consultant will be paid stage-wise as a percentage of the contract value as per the schedule given below. The Performance Bank guarantee shall also be released in Stages defined below:

Concept Note on Modifications in DPR

S. No.	Item	Payment % of Contract Price	% Release of PBG
1	Submission of final QAP and Inception Report	2.5 %	-
2	Approval of final Alignment Report, Traffic Study, Topographical Study and Submission of ToR for EAC	10%	-
3	Submission of final feasibility Report#	7.5%	-
4	Submission of complete Land Acquisition Proposal (LAC proposals in case of NHAI)	10%	-
5	Submission Of 3a Notification, Draft 3 A and Publication of 3a, 3A notifications	5%	-
6	Submission of all utilities shifting proposals to utility owning agencies and submission of utilities relocation plan to Authority	5%	-
7	Submission of Bidding Documents and Technical Schedules	5%	-
8	3D publication for all land parcels identified in item 4 above and submission of Land Acquisition II report	5%	-
9	Completion of award declaration (3G) for 90% of land parcels identified and submission of Land Award report	5%	-
10	Submission of all stage I clearance (Forest, Wildlife, EC) proposals on Parivesh portal and acceptance by Nodal Officer	5%	-
11	Submission and Approval of Final DPR Report, documents and drawings	5%	-
12	Clearance of the project by NPG (if applicable) and Appraisal of Project by SFC (if applicable). In case none of above is applicable then payment shall be released on technical approval of Project	5%	10%

	by Competent Authority of the implementing agency.		
13	Administrative & Financial Approval of Project by the Competent Authority	5%	-
14	Stage II clearance approval (Receiving approval of Forest, Wildlife, EC from Concerned agencies) and submission of final clearances II report	5%	5%
15	Final approval of utilities shifting estimates and submission of Utilities report, ROB GADs from Railway, Irrigation other concerned departments	5%	5%
16	Receipt of land possession certificates (3H) for 90% of all land parcels identified in LAC report and submission of Land Possession report	5%	5%
17	Completion of Condition Precedent on Part of Authority	5%	50%
18	Amount to be released at earlier of project's COD or 3 years from start of civil work	5%	25%
19	**Total:**	**100%**	**100%**
	Bonus Provision		
20.	**In case Appointed Date is declared within the timeline of the contract/concession agreement**	**1.5%**	**-**
21.	**In case the project is completed within SPCD provided in the contract/concession agreement without any EOT**	**1.5%**	**-**
22.	**In case total COS in the project till issuance of Completion Certificate is within 0.5% of Estimated Civil Project Cost.**	**2%**	**-**

 # - There should be exit clause in RFP / Agreement for foreclosure of assignment after feasibility report stage

Note: 1. In case, no comments on any of the stages above are received from Authority within 15 days and thereafter major changes to that deliverable are proposed by the Authority then in such cases, repetition charges up to 50% of the original payment milestone shall be payable to the DPR consultant, except in case of traffic, topographical, geotechnical or other surveys for which payment shall be as per BOQ.

Concept Note on Modifications in DPR

2. The consultant shall give the engagement schedule of the Key-Personnel at site as well as at Design Office and the attendance of the Key-Personnel shall have to be recorded through geotagged app based attendance module and accordingly the 40% of payment of the deliverables would be made based on the record of attendance of the Key-Personnel.

3. As far as possible the meetings with MoRTH/PIU/RO/HQ may be arranged through VC & all submissions be done through email as well.

4. The DPR Consultants can raise bills once every two months for all completed stages.

Modification in Contractual Provisions

Existing Clause	Proposed Modification
7.3. Penalty **7.3.1. Penalty for Error/Variation** i. If **variation in project** cost occurs due to Change of scope requests of **more than 10%** of the total project cost as estimated by the consultant and these change of scope requests arise due to deficiencies in the design provided by the consultant, the **penalty equivalent to 4% of the contract value** shall be imposed. For this purpose retention money equivalent to 4% of the contract value will be forfeited. This shall exclude any additional/deletion of items/works ordered by the client during the execution ii. If there is a **discrepancy in land** to be acquired during the execution of the project upto an extent of **+/- 2%** of the area of land, a **penalty equivalent to 3%** of the contract value shall be imposed. For this purpose retention money equivalent to 3% of	**7.3. Penalty** **7.3.1. Penalty for Error/Variation** i. If **variation in project** cost occurs due to Change of scope due to deficiencies in the design provided by the consultant (such as errors due to inadequate traffic survey, incorrect geotechnical investigations, variations in geotechnical parameters, variations in physical / geographical features at site, incorrect hydraulic data, calculation errors in design of pavement layers, incorrect geometric design considerations, calculation errors in cost estimates, incomplete scope of work in schedule-B/C, errors in estimation of payment weightages in Schedule-H), the penalties as tabulated under shall be levied on the DPR consultant. The penalty will be forfeited from the pending bills/retention money/PBG. This shall exclude any additional/deletion of items/works ordered by the client during the execution.

the contract value will be forfeited. This shall exclude any additional/deletion of items/works ordered by the client during the execution. For discrepancy of more than + / - 2% of the area of land to be acquired, the firm shall be declared as non performing as per para 7.4.2.

iii. If there is a **variation in quantities of various items of utilities shifting** during the execution of the project upto an extent of **+/- 10% of the quantity estimated** by the design consultant, a **penalty equivalent to 3%** of the contract value shall be imposed. For this purpose retention money equivalent to 3% of the contract value will be forfeited. This shall exclude any additional/deletion of items/works ordered by the client during the execution

iv) For **inaccuracies in survey/investigation/design work** the penalties shall be imposed as per details given in Table below:

Sr. No.	Item	Penalty (%age of contract value)
1	Topographic Surveys	1.0 to 1.5
	a) The horizontal alignment does not match with ground condition.	
	b) The cross sections do not match with existing ground.	

COS request as % of total project cost (excluding utility shifting estimates) as estimated by the DPR consultant	**Penalty on DPR Consultant**	
	Monetary Penalty	**Administrative Penalty**
Upto 2%	Nil	
2-5%	3.5% of PBG Value	-
5-10%	7.5% of PBG Value	-
10-20%	25 % of PBG Value	Debarment upto 1 Year
More Than 20%	25% of PBG Value	Debarment upto 3 Years

ii. If there is a **discrepancy in land** to be acquired during the execution of the project, the penalties as tabulated under shall be levied on the DPR consultant. The penalty will be forfeited from the pending bills/retention money/PBG. This shall exclude any additional/deletion of items/works ordered by the client during the execution.

	c) The co-ordinates are defective as instruments of desired accuracy not used.	
2	Geotechnical Surveys	1.0 to 1.5
	a)-Incomplete surveys	
	b) Data not analyzed properly	
	c) The substrata substantially different from the actual strata found during construction.	
3	Traffic data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.	0.5 to 1.0
4	Axle load data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.	0.5 to 1.0
5	Structural Designs found to be unsafe or grossly over designed	The firm shall be considered as non-performing as per para 7.4.2.

7.3.2 Penalty for delay

In case of delay in completion of services, a penalty equal to **0.05% of the contract price per day subject to a maximum 5%** of the contract value will be imposed and shall be recovered from payments due/performance security. However in case of

Discrepancy in Land Acquisition % (of Total Land to be actually acquired)	**Penalty on DPR Consultant**	
	Monetary Penalty	**Administrative Penalty**
Upto 2%	3% of PBG Value	-
2-5%	5% of PBG Value	Debarment upto 6 Months
>5%	10% of PBG Value	Debarment upto 1 Year

iii. If any additional utility is observed for shifting from the project during the execution of the project besides that specified by the DPR consultant, the penalties as tabulated under shall be levied on the DPR consultant. The penalty will be forfeited from the pending bills/retention money/PBG. This shall exclude any additional/deletion of items/works ordered by the client during the execution.

COS on account of utility shifting as % of total estimated project cost by the DPR consultant	**Penalty on DPR Consultant**
Upto 0.5%	**Monetary Penalty**
0.5-1%	2.5% of PBG Value

delay due to reasons beyond the control of the consultant, suitable extension of time will be granted on case to case basis.

7.3.3 Total amount of recovery from all penalties **shall be limited to 15%** of the Consultancy Fee.

7.3.4 <Agency> is in process of evolving performance based rating system for DPR Consultants. Performance of Consultants shall be monitored by <Agency> and will be taken into account in technical evaluation of future DPR projects. For this purpose, performance of Consultant in the current project shall also be taken into account to create rating of Consultant.

7.4 ACTION FOR DEFICIENCY IN SERVICES

7.4.1 Consultants liability towards the Client

Consultant shall be liable to indemnify the client for any direct loss or damage accrued or likely to accrue due to deficiency in service rendered by him.

7.4.2 Debarring / Non-Performing

In the case of **major deficiencies** in the Detailed Project Report **involving time and cost overrun and adverse effect on reputation** of <Agency>, the firm shall be **declared as non-performing** and the firm will not be eligible for participating in future projects of the Ministry (including NHAI, NHIDCL, BRO,

2-3%	5% of PBG Value
More than 3%	10% of PBG Value
No. of Overhead Poles/Towers/Transformers/Sub-Station etc. (electricity utility/ telecom utility) missed by the DPR consultant as % of total Overhead Poles/Towers estimated in Technical Schedules.	**Penalty on DPR Consultant** **Monetary Penalty**
Upto 5%	2.5% of PBG Value
More than 5% but less than 15%	5% of PBG Value
More than 15% but less than 25%	7.5% of PBG Value
More than 25%	10% of PBG Value
Length of electricity line or pipelines (water/ waste/ gas/ petroleum/OFC) missed by the DPR consultant as % of total length of electricity line or pipelines estimated in Technical Schedules.	**Penalty on DPR Consultant** **Monetary Penalty**
Upto 5%	2.5% of PBG Value
More than 5% but less than 15%	5% of PBG Value
More than 15% but less than 25%	7.5% of PBG Value
More than 25%	10% of PBG Value

iv) For **inaccuracies in survey/investigation/design work** the penalties shall be imposed as per details given in Table below:

Sr. No.	Item		Penalty (%age of PBG Value)
1	Topographic Surveys		
	a) The horizontal alignment does not match with ground condition.	Upto 5% project length	2.5%
		more than 5% project length	5%

etc.) for a **period of 5 years or as specifically stipulated under relevant provisions**.

	b) The cross sections do not match with existing ground.	Upto 5% project length	2.5%
		more than 5% project length	5%
	c) The co-ordinates are defective as instruments of desired accuracy not used.	Upto 5% project length	2.5%
		more than 5% project length	5%
2	Geotechnical Surveys		
	a)-Incomplete surveys		5%
	b) Data not analyzed properly		7.5%
	c) The substrata substantially different from the actual strata found during construction.		10 %
3	Traffic data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.		10%
4	Axle load data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.		20%
5	Structural Designs found to be unsafe or grossly over designed		10%

Note: In case of any major deviations, Authority reserves the right to debar the DPR consultant for upto 3 years.

7.3.2 Penalty for delay

In case of delay in completion of services, a penalty equal to **0.05% of the contract price per day subject to a maximum 5%** of the contract value will be imposed and shall be recovered from

	payments due/performance security. However in case of delay due to reasons beyond the control of the consultant, suitable extension of time will be granted on case to case basis. **7.3.3 Total cumulative amount of recovery** from all penalties shall be limited to **100% of the PBG value.** **7.3.4** <Agency> is in process of evolving performance based rating system for DPR Consultants. Performance of Consultants shall be monitored by <Agency> and will be taken into account in technical evaluation of future DPR projects. For this purpose, performance of Consultant in the current project shall also be taken into account to create rating of Consultant. 7.4 ACTION FOR DEFICIENCY IN SERVICES **7.4.1** Consultants liability towards the Client Consultant shall be liable to indemnify the client for any direct loss or damage accrued or likely to accrue due to deficiency in service rendered by him. **Total cumulative amount of recovery** from all penalties shall be limited to **100% of the PBG value.** **7.4.2** Debarring / Non-Performing In the case of **major deficiencies** in the Detailed Project Report **involving time and cost overrun and adverse effect on reputation** of <Agency>, besides those mentioned in clause 7.3 above, the firm shall be **declared as non-performing** and the firm

	will not be eligible for participating in future projects of the Ministry (including NHAI, NHIDCL, BRO, etc.) for a **period of upto 3 years**.

Existing Clause	**Proposed Modification**
GCC Clause 6.3 (c) **No payment shall become eligible for the next stage till the consultant completes to the satisfaction of the client the work pertaining to the preceding stage.** The payment for the work of sub-soil investigation (Boring)will be as per plan approved by the client and will be paid as per actual at the rates quoted by the consultants. The payment for the quantity given by the client for boring will be deemed to be included in the above mentioned payment schedule. Any adjustment in the payment to the consultants will be made in the final payment only	6.3 (c) **No payment shall become eligible till the consultant completes to the satisfaction of the client the work pertaining to that stage**. The payment for the work of sub-soil investigation (Boring) will be as per plan approved by the client and will be paid as per actual at the rates quoted by the consultants. The payment for the quantity given by the client for boring will be deemed to be included in the above mentioned payment schedule. Any adjustment in the payment to the consultants will be made in the final payment only
GCC Clause 7.2 Retention Money An amount equivalent to 8% of the contract value shall be retained at the end of the contract for accuracy of design and quantities submitted and the same will be released after the completion of civil contract works or after 3 years from completion of consultancy services, whichever is earlier. The retention money will however be released by the Client on substitution by	GCC Clause 7.2: **Deleted**

Bank Guarantee of the same amount valid upto the period as above. Out of this 8%, 3% shall be in the form of Bank Guarantee and 5% shall be the amount retained from Consultancy fee payable to the Consultant.	

Existing Clause	**Proposed Modification**
To added to TOR Clause 3.3, Role and Responsibilities at different stages of Land Acquisition	TOR Clause 3.3, Role and Responsibilities at different stages of Land Acquisition: **For Taking up land acquisition the DPR Consultant must possess the following experience and manpower:** **(i) Total Experience of Land Acquisition for Any Central/State Government Agency in last 7 Financial Years: More than 500 Hectares** **(ii) Total Experience of Land Acquisition for Any Central/State Government Agency under NH Act in last 7 Financial Years: More than 100 Hectares** **(iii) Experience in digitization of cadastral maps for land surveys in last 7 Financial Years** **(iv) Has atleast 5 on-roll Land Acquisition Experts ~~in form of Retired~~**

	~~or Ex-Patwari Naib Tahsildars/ Tahsildars /SDM/ADMs (or equivalent State Government Designations) and senior Officers~~ **with at least 10 years of experience in LA matters.** **(v) Has defined LA sub-professional team on the regular roll of at least 25 people (Excluding Experts) in the last 3 Financial Years** **(vi) Should have average annual Turnover of Atleast 2.5 Crores in last 3 Financial Years.** **payment to such LA agencies would be made by the DPR consultants. Further, the responsibility of Deliverables shall be solely that of the DPR Consultant.** **Financial proposal/** Fixed cost estimate (as is relevant) **is inclusive of the financial implications for support team for CALA.** **Further, for Environmental & Wildlife Clearances the firm should have been accredited by National Accreditation Board for Education and Training (NABET) for EIA.**

	In case NABET accreditation is not available, the DPR consultant should have at least 1 retired or Ex Indian Forest Service officer and 2 retired or Ex State Forest Service officers on regular payroll each with over 15 years of service in Forest & Wildlife Department.
TOR Clause 4.2 While carrying out the field studies, investigations and design, the development plans being implemented or proposed for future implementation by the local bodies, should be taken into account. Such aspect should be clearly brought out in the reports and drawings.	TOR Clause 4.2 While carrying out the field studies, geotechnical investigations and design, the development plans being implemented or proposed for future implementation by the local bodies, should be taken into account. Such aspect should be clearly brought out in the reports and drawings. **It must be noted that the DPR consultant shall get all the geotechnical investigations and testing done through the agencies satisfying the NABL accreditation Criteria attached as Annexure-I.** **All samples are to be sealed and retained by the Geotechnical Agency as per relevant IRC/IS codal provisions and good industry practice, at the space provided by NHAI/MoRTH/ NHIDCL/ BRO PIU till approval of all designs by the AE/IE during the actual construction stage.** **Alternatively, DPR Agencies can conduct geotechnical investigations and testing through agencies empanelled by Ministry of RT&H / NHIDCL/ NHAI.**
GCC Clause 3.7: **Consultants' Actions requiring Client's prior Approval**	GCC Clause 3.7: **Consultants' Actions requiring Client's prior Approval**

The Consultants shall obtain the Client's prior approval in writing before taking any of the following actions: **(30)** appointing such members of the Personnel as are listed in Appendix B; (b) **entering into a subcontract for the performance of any part of the Services, it being understood (i)that the selection of the Sub-consultant and the terms and conditions of the subcontract shall have been approved in writing by the Client prior to the execution of the subcontract, and (ii) that the Consultants shall remain fully liable for the performance of the Services by the Sub-consultant and its Personnel pursuant to this Contract;** (c) any other action that may be specified in the SC.	The Consultants shall obtain the Client's prior approval in writing before taking any of the following actions: **(30)** appointing such members of the Personnel as are listed in Appendix B; (b) **entering into a subcontract for the performance of any part of the Services is not permitted except for specific survey and investigation work after approval of Authority. Failure to comply with this provision shall lead to debarment of the DPR consultant for a minimum of 2 years apart from recovery of entire contract amount as penalty for the same;** (c) any other action that may be specified in the SC.

Modifications in Bid Capacity

S No.		
	Requirements with respect to Technical Capacity Provisions for maximum worksto be permitted with one consultant: (i) The maximum number of works to be permitted with one consultant is restricted as per thefollowing ceilings.	**The Residual DPR Bid Capacity viz., "R" shall be more than the tentative length of the Project for which DPR assignment bids have been invited.** **For Normal Highway Projects**

Sr. No.	Col. (2)	Col. (3)	Col. (4)	Col. (5)	Col. (6)
1	**Average Annual Turnover of Firm in last 3 Financial Years (from consultancy works)**	**Up to Rs. 10 Crores**	**More than Rs. 10 to 30 Crores**	**More than Rs.30 to 60 Crores**	**More than Rs.60 Crores**
2.	No. of Key Professionals on fulltime rolls (minimum for one last year)	10	25	40	60
3.	Max no. of projects/DPR Assignments to be allotted to one particular consultant including ongoing projects at atime in NHAI.	6	12	25	40
4 (i)	Maximum no. of DPR Assignments out of those given at Sr. No. 3 above	6	12	25	40
4 (ii)	Maximum no. of IE/AE Assignments (cap of 75%) out of those given at Sr. No. 3 above	4	9	18	30

The Residual Bid Capacity "R" of the Bidder shall be evaluated in terms of Length as per methodology specified hereunder:

R= CL x TF – RP

Wherein:

Completed Length (CL) = Total Length of DPR/Feasibility completed for 2/4/6 laning of National Highways/Expressways in the last 5 Financial Years.

Note:
For DPR of two laning projects, the length shall be considered after multiplication of factor of 0.50

2. For Feasibility Projects the length shall be considered after multiplication of factor of 0.60

3. Completed DPR/Feasibility projects shall be those for which either Completion Certification of the Consultancy Assignment has been issued by Executing Government Agency or the Tender of the Civil Work has been awarded by the Executing Government Agency.

4. In case of experience as JV, weighted average based on their share in the JV shall be considered for experience.

5. In case of experience of Associate, the share as per MoU subject to Maximum 25% shall be considered. In case MoU does not specify the share the same can be considered as per certification of Statutory Auditors of the Associate Member.

Turnover Factor (TF)= Multiplication factor based on Turnover*

***Note: The TF shall be decided as under:**

Average Turnover of Last 5 Financial Years	Factor "TF"
Upto 50 Cr	1.00
50-250 Cr	1.25
>250 Cr	1.50

Running Projects (RP)= Length of DPR/Feasibility Projects in Hand wherein Completion Certificate has not been issued by Executing Government Agency or the Tender of the Civil Work has not been awarded by the Executing Government Agency. This length shall also include the projects for which the firm has emerged as the H-1 bidder but the LOA have not been issued. However, DPR which have not been put to tender since 5 years of signing of DPR Agreement shall not be considered as part of Running Projects nor as part of Competed Length.

R shall be calculated for each JV member who has bid for the consultancy assignment and the weighted average as per Share in JV shall be calculated.

For Standalone Tunnel Projects

Residual DPR Bid Capacity viz., "R" shall be more than the tentative length of the Project for which DPR assignment bids have been invited.

The Residual Bid Capacity "R" of the Bidder shall be evaluated in terms of Length as per methodology specified hereunder:

		R= CLxTFxLFxSF **Wherein:** **Completed Length (CL) = Total Length of DPR/Feasibility completed for 2/4/6 laning of Highway/Railway Tunnels in the last 5 Financial Years.** **1. Completed DPR/Feasibility projects shall be those for which either Completion Certification of the Consultancy Assignment has been issued by Executing Government Agency or the Tender of the Civil Work has been awarded by the Executing Government Agency. This length would also include the individual tunnels planned as part of normal highway projects.** **2. In case of experience as JV, weighted average based on their share in the JV shall be considered for experience.** **3. In case of experience of Associate, the share as per MoU subject to Maximum 25% shall be considered. In case MoU does not specify the share the same can be considered as per certification of Statutory Auditors of the Associate Member.** **Turnover Factor (TF)= Multiplication factor based on Turnover*** ***Note: The TF shall be decided as under:**

Average Turnover of Last 5 Financial Years	Factor "TF"
Upto 50 Cr	1.00
50-100 Cr	1.1
100-200 Cr	1.2
>>200 Cr	1.25

Lane Factor (LF): wherein lane Factor will be considered based on the completed projects for which DPR experience is considered
Single tube two lane: 1.0
Twin Tube single lane: 1.50
Twin Tube Two or more lane: 1.75
More than 2 tubes: 2.0

$LF= (L_{ST2L}$ x1.0 + L_{TTSL} x1.5 + L_{TTML} x1.75 + L_{MT} x2.0) / (L_{ST2L} + L_{TTSL}+ L_{TTML}+ L_{MT})

L_{ST2L}=Total Length of single tube 2 lane tunnel in completed DPR projects (in meters)
L_{TTSL}=Total Length of twin tube single lane tunnel in completed DPR projects (in meters)
L_{TTML}=Total Length of twin tube two or more lanes in completed DPR projects (in meters)
L_{MT}=Total Length of tunnels with more than 2 tubes in completed DPR projects (in meters)

Special Factor: it will be considered only for those projects where the bidder has experience of Special Tunnel like Underwater/Under River/Immersed Tube Tunnels/Multi Deck Tunnel otherwise its value to be taken as 1.0 only.

		SF: 2.0 **Note: Consultant to submit the copy of corresponding schedule-B to corroborate the claim of LF and SF.** **R shall be calculated for each JV member who has bid for the consultancy assignment and the weighted average as per Share in JV shall be calculated.** **For Standalone Bridge Projects** **Residual DPR Bid Capacity viz., "R" shall be more than the tentative length of the Project for which DPR assignment bids have been invited.** **The Residual Bid Capacity "R" of the Bidder shall be evaluated in terms of Length as per methodology specified hereunder:** **R= CL x TF x SLF x SF** **Wherein:** **Completed Length (CL) = Total Length of DPR/Feasibility completed for 2/4/6 laning of Highway Bridges (NH/SH/Expressways) in the last 5 Financial Years.** **1. Completed DPR/Feasibility projects shall be those for which either Completion Certification of the Consultancy Assignment has been issued by Executing Government**

Agency or the Tender of the Civil Work has been awarded by the Executing Government Agency. This length would also include the individual tunnels planned as part of normal highway projects.

2. In case of experience as JV, weighted average based on their share in the JV shall be considered for experience.

3. In case of experience of Associate, the share as per MoU subject to Maximum 25% shall be considered. In case MoU does not specify the share the same can be considered as per certification of Statutory Auditors of the Associate Member.

Turnover Factor (TF)= Multiplication factor based on Turnover*

***Note: The TF shall be decided as under:**

Average Turnover of Last 5 Financial Years	Factor "TF"
Upto 50 Cr	1.00
50-100 Cr	1.1
100-200 Cr	1.2
>>200 Cr	1.25

Span Length Factor (SLF): wherein span lane Factor will be considered based on the completed projects for which DPR experience is considered
Maximum Span length upto 50 m: 1.0
Maximum Span length more than 50 m upto 100 m: 1.50
Maximum Span length more than 100 m upto 200 m: 1.75

		Maximum Span length more than 200 m: 2.00 **SLF= ($N_{span\ max\leq 50}$ x1.0 + $N_{50<span\ max\leq 100}$ x1.5 + $N_{100<span\ max\leq 200}$ x1.75 + $N_{span\ max>200}$ x2.0) / ($N_{span\ max\leq 50}$ + $N_{50<span\ max\leq 100}$ + $N_{100<span\ max\leq 200}$ + $N_{span\ max>200}$)** **$N_{span\ max\leq 50}$ =Total No. of Bridges in completed DPR projects where maximum span is less than equal to 50 metres** **$N_{50<span\ max\leq 100}$ =Total No. of Bridges in completed DPR projects where maximum span is more than 50 meters but less than equal to 100 metres.** **$N_{100<span\ max\leq 200}$ =Total No. of Bridges in completed DPR projects where maximum span is more than 100 meters but less than equal to 200 metres.** **$N_{span\ max>200}$ =Total No. of Bridges in completed DPR projects where maximum span is more than 200 metres.** **Special Factor: it will be considered only for those projects where the bidder has experience of Special Bridges i.e. extra dozed Bridges/cable stayed bridges/Suspension Bridges.** **SF: 1.5** **R shall be calculated for each JV member who has bid for the consultancy assignment and the weighted average as per Share in JV shall be calculated.** **Note: Consultant to submit the copy of corresponding schedule-B to corroborate the claim of SLF and SF.**

Minimum Eligibility Requirements

Concept Note on Modifications in DPR

Minimum experience and performance of Preparation of DPR of Normal Highways Projects in the last 7 years (NH/SH/Equivalent) (for past performance attach undertaking for any litigation history/ and arbitration).	**Annual average turnover**
A Firm applying for a package should have Experience of preparation of Detailed Project Report of two/four/six lane / Feasibility of Two/ four/ six lane projects of aggregate length equal to the indicative length of the package (i.e. 100km if the indicative length of the package is 100 km). Firm should have also prepared DPR for at least one project of 2/4/6laning of minimum 40% of the indicative length of the package (i.e. 40 km if the indicative length of the package is 100 km) or Feasibility Study of two/four/six laning of minimum 60% of the indicative length of the package (i.e. 60 km if the indicative length of the package is 100 km) Note: The experience of a firm in preparation of DPR for a private concessionaire/contractor shall not be considered.	Annual average turnover for last 5 years of the firm should be equal to or more than **Rs.5.00 Crores.**
Minimum experience and performance of Preparation of DPR of Highways Projects in Hilly/Mountains Terrain in the last 7 years (NH/SH/Equivalent) (for past performance attach undertaking for any litigation history/ and arbitration).	**Annual average turnover**
A Firm applying for a package should have Experience of preparation of Detailed Project Report of two/four/six lane / Feasibility of Two/ four/ six lane projects of aggregate length equal to the indicative length of the package (i.e. 100km if the indicative length of the package is 100 km) in Hilly/Mountainous Terrain. Firm should have also prepared DPR for at least one project of 2/4/6laning of minimum 40% of the indicative length of the package (i.e. 40 km if the indicative length of the package is 100 km) or Feasibility Study of two/four/six laning of minimum 60% of the indicative length of the package (i.e. 60 km if the indicative length of the package is 100 km) in Hilly/mountainous terrain. The applicant should have experience of at least 02 similar projects having atleast consultancy fee of Rs 50 lakhs each regarding Preparation of DPR including detailed Geological, Geotechnical and Topographical Surveys/Investigations and Design of Cost Effective and Suitable remedial measures for prevention of landslides/rockfall in the last 7 years. Similar work means: Preparation of detailed project report (DPR) for Highway/Airport/Railway /Irrigation works/Hill roads/Hydel projects for slope stabilization/landslide mitigation/rockfall protection/ bank protections/ river training/ flood mitigations. The Consultant must have done topographic survey, geological mapping, providing analysis and design of slope stabilization/Slope protection works/landslide mitigation/rock fall mitigation works in hilly terrain Note: 1. The experience of a firm in preparation of DPR for a private concessionaire/contractor shall not be considered.	Annual average turnover for last 5 years of the firm should be equal to or more than **Rs.5.00 Crores.**

2. For project to be considered as hilly or mountain terrain more than 50% length of such project shall have hilly/mountainous terrain.	
Minimum experience and performance of Preparation of DPR of Bridge Projects in the last 7 years (NH/SH/Equivalent) (for past performance attach undertaking for any litigation history/ and arbitration).	**Annual average turnover**
A Firm applying for the project should have Experience of preparation of Detailed Project Report of two/four/six lane Major Bridge of length equal or greater to the indicative length of the proposed bridge (i.e. 2 km if the indicative length of the bridge is 2 km) for Indian Railways/Metro Corporations/State Bridge Corporations/PSUs/State Government/Central government agencies. Note: 1. The experience of a firm in preparation of DPR for a private concessionaire/contractor shall not be considered. 2. The experience of feasibility study shall not be considered. 3. Length of bridge is excluding approaches.	Annual average turnover for last 5 years of the firm should be equal to or more than **Rs.10.00 Crores.**
Minimum experience and performance of Preparation of DPR of Tunnel Projects in Hilly/Mountains Terrain in the last 7 years (NH/SH/Equivalent) (for past performance attach undertaking for any litigation history/ and arbitration).	**Annual average turnover**
A Firm applying for the project should have Experience of preparation of Detailed Project Report of Tunnel of length equal or greater to the indicative length of the package (i.e. 1 km if the indicative length of the tunnel is 1 km) and diameter equal to or greater than the indicative diameter of the proposed tunnel, for Indian Railways/Metro Corporations/State Bridge Corporations/PSUs/State Government/Central government agencies. Note: 1. The experience of a firm in preparation of DPR for a private concessionaire/contractor shall not be considered. 2. The experience of feasibility study shall not be considered. 3. Length of tunnel is excluding approaches.	Annual average turnover for last 5 years of the firm should be equal to or more than **Rs.10.00 Crores.**

Concept Note on Modifications in DPR

Modifications in Marking Scheme

S. No.	Description	Existing Points	Proposed Points
A1	Firm's Profile, turnover and professionals working with the firm	40	**5**
A2	Firm's relevant experience in last 7 years for DPR work		**30**
B1	Material testing, survey & investigation, equipment and software proposed to be used for DPR work	20	**2.5**
B2	Experience in use of technology for road inspection in supervision work/quality/safety audit		**2.5**
C	Qualification and Relevant experience of the proposed key personnel	40	**60**
	Total	100	**100**

Further break-up of each criteria has been detailed out below:

A1. Firm's Profile, turnover and professionals working with the firm (5)

For standard highways, the following is the break-up:

S. No.	Description	Max Points	Sub-Points
1	**Nos. of Key Professionals with the firm for more than 1 years***	**3**	
1.1	<10		**0**
1.2	>10 but ≤25		**1.5**
1.3	>25 but ≤40		**2**
1.4	>40 but ≤60		**2.5**

S. No.	Description	Max Points	Sub-Points
1.5	>60		**3**
	Note* The key professionals who possess degree in Civil Engineering/Transport Planning /Transport Economics/Traffic Management / Geology/ Environment Science or Engineering and 8 years' experience in highway/bridge /tunnel with employment in the firm for more than one year. The current Employment Certificate shall be uploaded by Key Personnel on INFRACON. These Key-Personnel should be inclusive of at least 3 Sr Highway Design Engineer, 2 Senior Pavement/material Specialist, 2 Senior Bridge design Engineer, 2 geotechnical Engineer and 2 Traffic/Road Safety Expert on employee roll at Head Office or Site Office of the Consultant to be eligible for marks in this criteria.		
2	**Specific experience of firms in terms of turnover in last five Financial Years (from civil engineering project consultancy only)**	**2**	
2.1	Firm's Average Turnover of last 5 years >250 crore		~~2~~
2.2	Firm Average Turnover of last 5 years 50 - 250 crore		1.5
2.3	Firm Average Turnover of last 5 years - >5 but < 50 crore		1
	Total	**5**	

A2. Firm's relevant experience in last 7 years for DPR work (30)

For Normal Highway Projects

For standard highways, the following is the break-up:

S.No.	Description	Max Points	Sub-Points
1	**Specific experience of the DPR consultancy related to the assignment for eligibility in last 7 Financial Years.**	**20**	
1.1	**Aggregate Length of DPR / Feasibility study of 2/4/ 6 lane NH/SH/Expressway projects**		

Concept Note on Modifications in DPR

S.No.	Description	Max Points	Sub-Points
	Note: For Projects in Hill/mountainous terrain- only Aggregate Length of DPR / Feasibility study of 2/4/ 6 lane NH/SH/Expressway projects in Hill/mountainous terrain shall be considered for evaluation.		
1.1.1	More than the indicative Length of the package applied for		8
1.1.2	More than 2 times the indicative length of the package applied for		10
1.1.3	More than 3 times the indicative length of the package applied for		12
1.1.4	More than 4 times the indicative length of the package applied for		15
1.1.5	More than 5 times the indicative length of the package applied for		18
1.1.6	More than 6 times the indicative length of the package applied for		20
1.2	**DPR for 2/4/6 laning NH/SH/Expressway projects each equal to or more than 40 % of indicative length of a package applied for (or Feasibility Study for 2/4/6 laning NH/SH/Expressway projects each equal to or more than 60 % of indicative length of a package applied for** Note: For Projects in Hill/mountainous terrain- only Aggregate Length of DPR / Feasibility study of 2/4/ 6 lane NH/SH/Expressway projects in Hill/mountainous terrain shall be considered for evaluation.	**5**	
1.2.1	1 project		1
1.2.2	2 projects		2
1.2.3	3 projects		3
1.2.4	4 projects		4
1.2.5	>=5 projects		5
2	**DPR of Major Bridges/ROBs/Viaducts having length more than 1000 m (excluding approaches)**	**5**	

S.No.	Description	Max Points	Sub-Points
2.1	2 bridge		2
2.2	3 bridges		3
2.3	4 bridges		4
2.4	≥5 bridges		5

Note: 1. In case feasibility study is a part of DPR services the experience shall be counted in DPR only.

2.In case bridge is included as part of DPR of highway the experience will be counted in both Sl No. (1) and (2).

3. For Projects of Cost <=500 CR and upto 1000 Cr (Excluding GST and Excluding Land Cost), Only 1 JV partner allowed meeting at least 40% minimum eligibility criteria. Lead Partner to meet 60% eligibility criteria.

4. For Projects of Cost >1000 Cr (Excluding Land Cost), Only 1 JV partner allowed who should be an international firm of repute i.e. having experience of DPR of Highway for multilateral agencies such as ADB/World Bank/JICA with aggregate length equal to or greater than DPR length under bidding besides meeting at least 40% minimum eligibility criteria. Lead Partner to meet 60% eligibility criteria.

For Standalone Bridge Projects

The following is the break-up:

S.No.	Description	Max Points	Sub-Points
1	**Specific experience of the DPR consultancy related to the assignment for eligibility in last 7 Financial Years.**	**22.5**	
1.1	**Aggregate Length of standalone DPR of 2/4/ 6 lane Major Bridge projects (excluding approaches)**	**10**	
1.1.1	More than the indicative Length of the bridge applied for		1.5
1.1.2	More than 2 times the indicative length of the bridge applied for		2.5

S.No.	Description	Max Points	Sub-Points
1.1.3	More than 3 times the indicative length of the bridge applied for		5
1.1.4	More than 4 times the indicative length of the bridge applied for		7
1.1.5	More than 5 times the indicative length of the bridge applied for		9
1.1.6	More than 6 times the indicative length of the bridge applied for		10
1.2	**DPR for 2/4/ 6 lane standalone Major Bridge projects (excluding approaches) each equal to or more than 80% of indicative length of a bridge applied for**	**12.5**	
1.2.1	1 project		2.5
1.2.2	2 projects		5
1.2.3	3 projects		7.5
1.2.4	4 projects		10
1.2.5	>=5 projects		12.5
2	**DPR of standalone Major Bridges/ROBs/Viaducts having length more than 1500 m (excluding approaches)**	**7.5**	
2.1	2 bridge		1.5
2.2	3 bridges		3
2.3	4 bridges		5
2.4	≥5 bridges		7.5

Note: 1. Experience in Feasibility study shall not be considered for Bridges.

2.In case bridge is included as part of DPR of highway then the experience will be counted in both Sl No. (1) and (2) with a multiplication factor of 0.50.

3. Only 1 JV partner is allowed fulfilling at least 50% minimum eligibility criteria. Lead Partner to meet 75% eligibility criteria; and only sub-contracting for specialized survey & investigation works upto 10% of project cost is allowed with prior approval of the Implementing Agency.

Concept Note on Modifications in DPR

For Standalone Tunnel Projects

The following is the break-up:

S.No.	Description	Max Points	Sub-Points
1	**Specific experience of the DPR consultancy related to the assignment for eligibility in last 7 Financial Years.**	**22.5**	
1.1	**Aggregate Length of standalone DPR of tunnel projects (excluding approaches)**	**10**	
1.1.1	More than the indicative Length of the tunnel applied for		1.5
1.1.2	More than 2 times the indicative length of the tunnel applied for		2.5
1.1.3	More than 3 times the indicative length of the tunnel applied for		5
1.1.4	More than 4 times the indicative length of the tunnel applied for		7
1.1.5	More than 5 times the indicative length of the tunnel applied for		9
1.1.6	More than 6 times the indicative length of the tunnel applied for		10
1.2	**DPR for 2/4/ 6 lane standalone tunnel projects (excluding approaches) each equal to or more than 80% of indicative length of a tunnel applied for**	**12.5**	
1.2.1	1 project		2.5
1.2.2	2 projects		5
1.2.3	3 projects		7.5
1.2.4	4 projects		10
1.2.5	>=5 projects		12.5
2	**DPR of standalone tunnel having length more than 1500 m (excluding approaches)**	**7.5**	
2.1	2 tunnels		1.5
2.2	3 tunnels		3

S.No.	Description	Max Points	Sub-Points
2.3	4 tunnels		5
2.4	≥5 tunnels		7.5

Note: 1. Experience in Feasibility study shall not be considered for tunnels.

2.In case bridge is included as part of DPR of highway then the experience will be counted in both Sl No. (1) and (2) with a multiplication factor of 0.50.

3. Only 1 JV partner is allowed fulfilling at least 50% minimum eligibility criteria. Lead Partner to meet 75% eligibility criteria; and only sub-contracting for specialized survey & investigation works upto 10% of project cost is allowed with prior approval of the Implementing Agency.

Concept Note on Modifications in DPR

Current DPR Rating (30 Marks)

For Normal Highway Projects:

S No.	Current DPR Rating for Normal Highway projects as on bid due date	Max Points
1.	100-90	30
2.	90-80	20
3.	80-70	15
4.	70-60	10
5.	Less than 60	0

For Standalone Bridge Projects:

S No.	Current DPR Rating for Standalone Bridge projects as on bid due date	Max Points
1.	100-95	30
2.	95-90	20
3.	90-85	15
4.	85-80	10
5.	Less than 80	0

For Standalone Tunnel Projects:

S No.	Current DPR Rating for Standalone Tunnel projects as on bid due date	Max Points
1.	90-100	30
2.	90-80	20
3.	80-70	15
4.	70-60	10
5.	Less than 60	0

B1. Material testing, survey and investigation, equipment and software proposed to be used (2.5)

S. No.	Description	Max Points	Sub-Points
1	**Availability of minimum Material Testing Facilities with persons/resources having operational skills of the equipment – (as per details given below the table)**	**0.5**	
1.1	Owned* (Available In House) or Outsourced (Hire basis/Through Associate) supported by MOU / lease Agreement		0.5
1.2	Not available		0
*** Shall be ascertained through the ownership evidence uploaded on INFRACON in regard to major equipment required for testing of materials to be used for construction of Highway Project.**			
2	**Availability of minimum Field Investigation Facilities with persons/resources having operational skills of the equipment (as per details given below the table)**	**0.50**	
2.1	Owned** (Available In House) or Outsourced (Hire basis/Through Associate) supported by MOU / lease Agreement		0.50
2.2	Not available		0
**** Shall be ascertained through ownership evidence uploaded on INFRACON for construction of Highway Project.**			
3	**Availability of minimum Office Equipment and Software with persons/resources having operational skills of the equipment (as per details given below the table)**	**0.5**	
3.1	Owned*** (Available In House) or Outsourced (Hire basis/Through Associate) supported by MOU / lease Agreement		0.5
3.2	Not available		0
***** Shall be ascertained through ownership evidence uploaded on INFRACON for key hardware/software required for Highway consultancy assignment.**			
4	**Experience in use of LiDAR or better technology for topographic survey (Infrastructure sector) in last 7 Financial Years**	**0.5**	
4.1	1project		0.10
4.2	2 projects		0.20

S. No.	Description	Max Points	Sub-Points
4.3	3 projects		0.30
4.4	4 projects		0.40
4.5	≥ 5 projects		0.50
5	**Experience in using GPR and Induction Locator or better technologies for detection of sub-surface utilities (Infrastructure sector) in last 7 Financial Years**	**0.50**	
5.1	1project		0.1
5.2	2 projects		0.20
5.3	3 projects		0.30
5.4	≥ 4 projects		0.50
6	**Experience in digitization of cadastral maps for land surveys in last 7 Financial Years**	**0.50**	
6.1	Area upto 100 ha		0.15
6.2	Area between 100-500 ha		0.35
6.3	Area > 500 ha		0.50

List of minimum essential equipment which the firm must possess for securing marks in respective categories:

Material Testing Facilities (All should be available to be eligible for full marks)
a. Aggregate testing facility including flakiness index, elongation index, abrasion, impact, crushing, stripping value, unconfined compressive strength, setting time.
b. Soil testing facility including Atterrberg limits, soil classifications, moisture content, density, CBR value.
Field Investigation Facilities (All should be available to be eligible for full marks)
a. **Falling Weight Deflectometer** or equivalent / better
b. **Laser Profilometer** or equivalent / better
c. DGPS and Total station with appropriate software or equivalent / better
Office Equipment and Software (All should be available to be eligible for full marks)

a. Office equipment setup including Computer, plotter, A0 printer etc.
b. MX/ MOSS or equivalent / better software for road design
c. AutoCAD
d. STAAD or equivalent / better

Note: The experience of firm in Lidar or equivalent technology, GPR and Induction Locator or equivalent technologies and Experience in digitization of cadastral maps for land acquisition shall be supported by experience certificate. The experience of a firm in Lidar or equivalent technology, GPR and Induction Locator or equivalent technologies and Experience in Digitization of cadastral maps for land acquisition for a private concessionaire/contractor shall be considered only if the experience certificate is authenticated by the concerned competent Government department/authority. In case of overseas experience the weightage to be assigned to the certificate for experience in use of the equipment, a self-certificate followed by the client certificate with Apostille Certificate may be accepted.

B2: Experience in use of technology (2.5)

S. No	Description	Max Marks	Sub-Points
1	**Experience of Aerial LiDAR or equivalent technology for topographic survey (Infrastructure sector) with persons/resources having operational skills of the equipment with the firm Experience through owned or outsourced equipment supported by MOU / lease Agreement**	**0.75**	
(i)	1 project		0.25
(ii)	2 projects		0.50
(iii)	>2 projects		0.75
2	**Experience of using Geo Physical Survey Equipment (Seismic Reflection / Seismic Refraction / Electrical Resistivity / AEM etc.) for subsurface investigation with the firm through owned or outsourced equipment supported by MOU / lease Agreement**	**0.50**	
(i)	1 Project		0.25
(ii)	>1 Projects		0.50
3	**Experience of use of advanced structural health monitoring systems which consists of accelerometers, Sensors, inclinometers, anemometer, Load measuring pin etc. with**	**0.75**	

	software to analyze the data and infer the structural health and residual life. The experience can be through owned or outsourced equipment & software supported by MOU / lease Agreement.		
(i)	1-2 Major Bridges		0.25
(ii)	3-5 Major Bridges		0.50
(iii)	> 5 Major Bridges		0.75
4	**Availability and experience in Processing of satellite imagery for the creation of Digital Elevation Model (DEM) and Digital Terrain Model (DTM) with the firm through owned or outsourced equipment supported by MOU / lease Agreement**	**0.50**	
(i)	1 Project		0.25
(ii)	>1 Projects		0.50
	Total	**2.5**	

*** Ownership Shall be ascertained through the ownership evidence.**

Notes:

(i) The Consultants owning the equipment shall be required to submit proof of ownership.

(ii) The experience of firm/associate in use of technology shall be supported by experience certificate. The experience of a firm/associate for a private concessionaire/ contractor (client) shall be considered on self-certification along with the client certificate of Government agencies not below the rank of EE/PD/GM or equivalent officer. In case of overseas experience the weightage to be assigned to the certificate for experience in use of the equipment, a self-certificate followed by the client certificate with Apostille Certificate may be accepted. Any false certification shall attract provisions of Clause 1.8, Section -2 (letter of Invitation) read with Clause 2.9.1(g) of GCC.

C. In case, ownership document of equipment Consultancy/Associate firm is found to be false, (i) The consultancy/Associate firm, as the case may be, shall be put on holiday listing (temporary debarment) for a period of 12 months.

D. Qualification and relevant experience of the proposed key personnel (40)

The weightage for various key staff is as under:

Concept Note on Modifications in DPR

D-1 Normal Highway Project:

S.No.	Key personnel	Existing Points	Proposed Points
1	Team Leader cum Senior Highway Engineer	12	**12**
2	Senior Bridge Design Engineer	10	**10**
3	Highway Design Engineer	10	**7.5**
4	Traffic / Road Signage / Marking and Safety Expert	8	**7**
5	Environmental Specialist	NA	**4**
6	Material-cum-Geo-technical Engineer*	NA	**4.5**
7	Senior Survey Engineer	NA	**4.5**
8	Quantity Surveyor / Documentation Expert	NA	**2.5**
9	Land Acquisition Expert	NA	**4**
10	Utility Expert*	NA	**2**
11	Tunnel Design Expert	NA	**1**
12	Geophysicist	NA	**1**
	Total	40	**60**

Note:

1. In case tunnels are proposed in the final alignment approved by the Authority then only the deployment of Tunnel Design Expert and Geophysicist would be done along with start of any tunnel specific geotechnical investigations by the DPR Consultant only on written instructions of the Authority for the same. The site/design office duration of the same shall also be approved by Authority based on its requirements. Further, the cost of DPR is exclusive of the cost of tunnel specific key-personnel as well as the tunnel specific geotechnical investigations. The same shall be reimbursed as per rates given below:

- **Additional Cost for Tunnel Design Expert@ Rs. 5,00,000 per month for 4 months**
- **Additional Cost for Senior Geophysicist @ Rs. 3,50,000 per month for 4 months**
- **Payment for geophysical investigation shall be made at the rate of Rs. 20 lakh for each 500 m length of tunnel**

2. For Projects in Hilly/Mountainous terrain, Material-cum-Geo-technical Engineer is to be replaced by Senior Geomatics Expert and Utility Expert is to be replaced by Senior Hydrology and Hydraulics Expert @ Rs. 3,50,000 per month for each key-position for 4 months each.

D-2 Standalone Bridge/Structure Project

S.No.	Key personnel	Existing Points	Proposed Points
1	Team Leader cum Bridge Engineer	12	**15**
2	Highway cum Pavement Engineer	10	**10**
3	Bridge Structural Engineer	10	**12**
4	Material Cum Geotechnical Engineer	8	**6**
5	Environmental Specialist	NA	**5**
6	Senior Survey Engineer	NA	~~**NA**~~
7	Senior Geotechnical Engineer	NA	**9**
8	Quantity Surveyor/Documentation Expert	NA	~~**3**~~
	Total	40	**60**

D-3 Standalone Tunnel Project

S.No.	Key personnel	Existing Points	Proposed Points
1	Team Leader cum Tunnel Expert	12	**13.5**

Concept Note on Modifications in DPR

S.No.	Key personnel	Existing Points	Proposed Points
2	Tunnel Design Expert	10	**11**
3	Senior Geotechnical Engineer	10	**9**
4	Senior Geophysicist	8	**9**
5	Environmental Specialist	NA	**4**
6	Senior Survey Engineer	NA	**4**
7	Senior Geologist	NA	**6.5**
8	Senior E&M Expert	NA	**3**
	Total	40	**60**

Concept Note on Modifications in DPR

Draft Cost Estimate

Normal Highway Projects without Tunnels

Cost Estimate by Tender Issuing Authority		
Summary of Cost in Local Currency		
-	**Name of Firm**	-
S. No.	**Description**	**Amount (LC)* (INR)**
I	**Local Consultants** Remuneration for Local Staff (inclusive of per diem allowance)	27355000
II	Support Staff (inclusive of per diem Allowance)	1380000
III	Transportation	2700000
IV	Duty Travel to Site	600000
V	Office Rent	300000
VI	Office Supplies, Utilities and Communication	360000
VII	Office Furniture and Equipment (Rental)	1000000
VIII	Report and Document Printing	77500
IX	Surveys & Investigation	
A	Topographic Survey**	2000000
B	Investigation**	7900000
C	Network Survey and GPR**	200000
X	Cost of supply and fixing of boundary pillars**	3500000
XI	Land acquisition team including support staff and logistics/transportation	1250000
	Subtotal Local Consultant:	**48622500**
	Foreign Consultant	
	Total Cost Net of Tax:	**48622500**
	Total cost net of Goods and Services Tax	

		48622500
	Goods and Service Tax	8752050
	TOTAL COST (Including Goods and Services Tax)	**57374550**
	Per km DPR cost (without GST)	**486225**
	Per km DPR cost (with GST)	**573745.5**
	Total Project Length Considered for Analysis	**100 km**

LC* Local Currency

** This is an approximate estimate based on estimated input for the project. However, the payment shall be done as per actual survey/investigation done subject to condition that positive variation of upto 10% variation would be borne by the consultant.

Note: No escalation will be payable during the services.

Insurances shall not be allowed separately. These will be incidental to main items. All costs are inclusive of consultants' profits and overheads.

Normal Highway Projects with Tunnels

~~Format of Financial Proposal~~ Cost Estimate by Tender Issuing Authority

Summary of Cost in Local Currency

-	**Name of Firm**	-
S. No.	**Description**	**Amount (LC)* (INR)**
I	**Local Consultants** Remuneration for Local Staff (inclusive of per diem allowance)	27355000
II	Support Staff (inclusive of per diem Allowance)	1380000
III	Transportation	2700000
IV	Duty Travel to Site	600000
V	Office Rent	300000

VI	Office Supplies, Utilities and Communication	360000
VII	Office Furniture and Equipment (Rental)	1000000
VIII	Report and Document Printing	77500
IX	Surveys & Investigation	
A	Topographic Survey**	2000000
B	Investigation**	7900000
C	Network Survey and GPR**	200000
X	Cost of supply and fixing of boundary pillars**	3500000
XI	Land acquisition team including support staff and logistics/transportation	1250000
	Subtotal Local Consultant:	**48622500**
	Foreign Consultant	
	Total Cost Net of Tax:	**48622500**
	Total cost net of Goods and Services Tax* **	**48622500**
	Total Project Length Considered for Analysis	**100 km**
	Additional Cost for Tunnel Design Expert@ Rs. 5,00,000 per month for 4 months	**2000000**
	Additional Cost for Senior Geophysicist @ Rs. 3,50,000 per month for 4 months	**1400000**
	Payment for geophysical investigation shall be made at the rate of Rs. 20 lakh for each tunnel of 500m length. (consider 2 tunnel of 700 m and 800 m in project)	**6000000**
	Total cost including Tunnel net of Goods and Services Tax	**58022500**
	Goods and Service Tax	**10444050**

	TOTAL COST with Tunnel (Including Goods and Services Tax)	**68466550**
	Per km DPR cost for projects with tunnels (without GST)	**580225**
	Per km DPR cost for projects with tunnels (with GST)	**684665.5**

LC* Local Currency

** This is an approximate estimate based on estimated input for the project. However, the payment shall be done as per actual survey/investigation done subject to condition that positive variation of upto 10% variation would be borne by the consultant.

Note: No escalation will be payable during the services.

Insurances shall not be allowed separately. These will be incidental to main items. All costs are inclusive of consultants' profits and overheads.

Estimate of Local Currency Costs (all rates are inclusive of consultant's profits and overheads)

I. Remuneration for Local Staff (including per diem allowance)					
I(a)					
S. No.	**Position**	**Name**	**Rate (INR)**	**SM**	**Amt. (INR)**
	Professional Staff				
1	Team Leader Cum Senior Highway Engineer		500000	12	6000000
2	Bridge Design Engineer		500000	5	2500000
3	Highway Design Engineer		350000	5	1750000
4	Traffic and Road Safety expert		350000	8	2800000
5	Environmental Specialist		150000	7	1050000
6	Material-cum-Geo-technical Engineer – Geologist		350000	4	1400000
7	Senior Survey Engineer		200000	5	1000000

8	Quantity Surveyor / Documentation Expert		150000	8	1200000
9	Land Acquisition Expert		150000	10	1500000
10	Utility Expert		150000	4	600000
	Sub-Total			68	**19800000**
	Sub-Professional Staff	(To be assessed by Consultant as per requirement of Assignment subject to minimum below and one sub-professional be a fresh graduate)			
1	Assistant Highway Engineer	(one every 50 km)	85,000	12	1020000
2	Assistant Bridge Engineer		1,00,000	5	500000
3	Assistant Quantity Surveyor	(one every 50 km)	85000	8	680000
4	Assistant Survey Engineer	(one every 50 km)	85000	10	850000
5	LA Team Member	(5 Sub KP every 50 km with 5 man months each with one Sub-Key dedicated for Forest/ Environment Clearance)	85000	50	4250000
6	Assistant Material and Quality Engineer		85000	3	255000
	Sub-Total:				**7555000**
	TOTAL				**27355000**
II. Support Staff					

S. No.	Position	Name	Staff Months	Billing Rate (INR)	Amount (INR)
1	Office Manager		12	50000	600000
2	Typist		12	25000	300000
3	Office Boy		12	20000	240000
4	Night Watchman		12	20000	240000
				Total	**1380000**
III. Transportation (Fixed Cost)					
S. No.	**Description**	**Qty.**	**Nos. of Months**	**Rate/Months (INR)**	**Amount (INCR)**
1	The vehicles provided by the Consultants shall include the cost for rental, drivers, operation, maintenance, repairs, insurance, etc. A. For use of Consultants	3	12	75000	2700000
	Total				**2700000**
IV. Duty Travel to Site (Fixed Costs)					
	Trips	**No.**	**Rate (INR)**	**Amount (INR)**	
	trips of each KP to site 10x6	60	5000	300000	
	Guest House Stay	12	25000	300000	
			Total	**600000**	
	V. Office Rent Fixed Costs)				

S. No.	Description	No. of Month	Monthly Rate (INR)	Amount (INR)	
1	The rent cost includes maintenance, cleaning, repairs, etc.	12	25000	300000	
			Total	**300000**	
	VI. Office Supplies, Utilities and Communication (Fixed Costs)				
S. No.	**Item**	**Months**	**Monthly Rate (INR)**	**Amount In INR**	
1	Office Supplies Drafting	12	10000	120000	
2	Supplies Computer	12	5000	60000	
3	Running Costs	12	10000	120000	
4	Domestic and International Communication	12	5000	60000	
			TOTAL	**360000**	
	VII. Office Furniture and Equipment (Rental)				
S. No.	**Description**	**Unit**	**Quantity**	**Rate (INR)**	**Amount (INR)**
1	Office Furniture and Equipment	1	LS	1000000	1000000
				Total	**1000000**
	VIII. Report and document Printing.				
No.	**Description**				
1	Monthly report (3 Per month)				
2	Inception Report & QAP				

3	Submission of Preliminary Alignment report including preliminary cost estimate for preferred alignment along with cost of land acquisition, traffic study and outcome	Lumpsum amount of Rs 77,500/-	
4	Environment and Social Impact Screening Report		
5	Draft Feasibility Report		
6	Final Feasibility Report		
7	Strip Plan with L.A. reports		
8	Draft LA & Clearances 1 Report		
9	Final LA & Clearances 1 Report		
10	Draft Environmental Assessment Report and RAP		
11	Final Environmental Assessment Report and RAP		
	Draft Detailed Design Report and Drawing etc.		
12	Draft EMP		
13	Draft Bidding Documents		
14	Final Detailed Project Report with Bill of Quantities, Cost Estimates, Updated Drawings etc. Final EMP.		
15	Final Bidding Documents		
16	Draft 3(a), 3(A) and 3(D) notification for land acquisition (3 copies each)		
17	LA and Clearances II reports		

			Total	**77500**	
	IX. Survey and Investigation				
	A. Topographic Survey and sub-surface utilities detection Survey (Fixed Rate)				
	Item	**km**	**Rate per km (INR)**	**Amount (INR)**	
	Detailed topographic surveys using Mobile/Aerial LIDAR or better Technology Topographic Survey including hire charges for equipment and supplies of survey teams comprising of project survey filed staff etc. inclusive of cost of materials, labourer.	100	20000	2000000	To paid as per actual survey subject to condition that positive variation of upto 10% variation would be borne by the consultant
	Total			**2000000**	
	B. Investigation (Fixed Cost)				
S.No.	**Description**		**Quantity**	**Amount (INR)**	
1	Road and bridge Inventory (through 3D NSV and MBIU)		200 lane km @1500 lane km	300000	To paid as per actual survey subject to condition that positive variation of upto 10% variation would be
2	FWD Test and Pavement Evaluation		200 lane km @1500 lane km	300000	

				borne by the consultant
3	Roughness survey	NA	0	
4	Axle Load Survey	NA	0	
5	Material Survey and Investigation	For two quarry location one test for coarse aggregate and one for fine aggregates @Rs, 25,000 per Test	100000	To paid as per actual testing subject to condition that positive variation of upto 10% variation would be borne by the consultant
6	Sub-grade Investigation	one sample for CBR or K value at every sub-grade/ embankment source say 1 test for every 5 km depending upon topography @ Rs 10000 per test	200000	To paid as per actual testing subject to condition that positive variation of upto 10% variation would be borne by the consultant
7	Traffic Survey (including all sub-surveys such as axle load Surveys, O&D survey etc. as per TOR)	For all proposed alignments	2500000	

8	Special Investigation for Hill Roads for slope stabilisation	LS	500000	
9	Land Acquisition Studies including GIS Mapping	LS	500000	
10	Hydrological Models for Major Bridges	LS	500000	This BOQ item **is for mathematical modelling based on CWC data.** **Physical Model Study to be done through IITs/CWPRS on specific instructions of Authority as per recommendation of DPR Consultants, for which payments shall directly be done by NHAI/MoRTH to that organisation separately.**
11	***Geotechnical Investigation** **Rate/m**	**Qty (in m)**	**Amount (INR.)**	
	To be done as per frequency and rates as per Annexure-I of RFP. Provisional Sum to be taken as per costing guidelines			To be taken as per costing guidelines
	Note: Payment shall be made on the actual quantity of boring at rates given in **Enclosure-V** subject to condition that positive variation of upto 10% variation would be borne by the consultant.		3000000	

	Total			**7900000**	
Note: * Quantities of boring shall be taken from Annexure-A to Annexure-I However, Payment shall be made on the actual quantity of boring at rates provided in Annexure-I..					
	C. GPR				
No.	**Description**	**Unit**	**Quantity**	**Rate (INR)**	**Amount (INR)**
1	GPR Survey for detection of underground utilities Note: To paid as per actual survey subject to condition that positive variation of upto 10% variation would be borne by the consultant	Job	for 10% of project length @INR 10000 per lane km. To be paid only on actual survey	200000	200000
				Total	200000
12	Provisional Sum towards Environment Clearance/ Wildlife Clearance	LS	To be taken as per costing guidelines		To be paid only if Environment/ Wildlife Clearance is required in the approved alignment.
	X. Cost of Supply & Fixing Boundary pillars				
	Item	**Amount**		**Amount (INR.)**	

	Procuring and fixing boundary pillars and its installation, complete in all respect as per IRC 25:1967: Wherever the proposed alignment follows the existing alignment, the boundary pillars shall be fixed at an interval of 200m on either side of proposed Right of Way. Wherever there is a proposal of realignment of the existing Highway and/or construction of New Bypasses, Consultant shall fix boundary pillars along the proposed alignment on the extreme boundary on either side of the project Highway at 50 m interval. **(on lumpsum basis)**	3500000	3500000	
	Assumed that 25% length in urban area, new bypassess and realignment of existing highways with Rs. 2000 per boundary pillar			

XI Land acquisition team including support staff and logistics

S. No.	Item	Amount (INR)
1	Land acquisition support staff and logistics for land acquisition team as detailed below @Rs 2,50,000 per month for 5 months for each district.	**1250000 (considering only 1 district)**

Concept Note on Modifications in DPR

Details of land acquisition teams including support staff, logistics support for land acquisition teams to be deployed by the consultant for each CALA as detailed below. The requirements is minimum. However, the consultant has to ensure adequate manpower given to CALA in terms of area under acquisition in the jurisdiction of each CALA in consultation with NHAI/MoRTH, to ensure completion of land acquisition proceedings in time frame stipulated in contract agreement. Cost variation in this regard is not admissible.

(A) Land acquisition team including support staff

S. No.	Position	Name	Number	Man months
1	Ex-land Revenue Inspector/Officer or equivalent	TBN	1	5
2	Ex Kanoogo/Girdwar or equivalent	TBN	1	5
3	Ex-Patwari or equivalent	TBN	1	5
4	Typist	TBN	2	5
5	Peon	TBN	1	5

(B) Logistics for land acquisition teams

S. No.	Position	Number	Months
1	Computer including necessary peripherals	2	5
2	Printers	2	5
3	Vehicles (Bolero or equivalent) with monthly running limit of 4000 km	1	5

Note: The Consultant shall provide allied team and supporting logistic **for each district** along with Land Acquisition Expert for man months as defined in the BOQ.

Concept Note on Modifications in DPR

Marking Scheme for Key-Personnel

1. TEAM LEADER cum SENIOR HIGHWAY ENGINEER

	Existing Provision		Proposed Provision		
S. No.	**Description**	**Max. Points**	**Description**	**Max. Points**	**Remarks**
I	**General Qualification**	**25**	**Desirable Qualification**	**25**	
i)	Degree in Civil Engineering or equivalent [AICTE Approved]	20	**Full Time Graduationin Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15	
ii)	Post Graduation in Highway Engg. /Structures / Traffic and Transportation / Soil Mechanics and Foundation Engineering / Construction Management / Transportation [AICTE Approved]	5	**Post-Graduation**		
			Full Time/Regular Post-Graduation in Construction Management / Transportation/ Highway Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks **For other AICTE approved colleges give 50% marks i.e. 5 marks]**	10	
			Part Time Post-Graduation in Construction Management / Transportation/ Highway Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks	7	

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	**Remarks**
				For other AICTE approved colleges give 50% marks i.e 3.5 marks]			
II	**Relevant Experience & Adequacy for the Project**		**70**	**Relevant Experience & Adequacy for the Project**		**70**	
a)	**Total Professional Experience**		**15**	**Total Professional Experience**		**15**	
	<15years	0		<15years	0		
	15-18 years	11		15-18 years	11		
	>18-21 years	13		>18-21 years	13		
	>21 years	15		>21 years	15		
(b)	**Experience in Highway Projects-Experience in Planning, project preparation and design of Highway Projects (2/4/6 laning of NH/SH/Expressways)**		**25**	**Experience in Highway Projects-Experience in Planning, project preparation and design of Highway Projects or Construction Supervision of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways (2/4/6 laning of NH/SH/Expressways)**		**15**	
	<12 years	0		<12 years	0		
	12-15 years	19		12-15 years	10		
	>15-18 years	22		>15-18 years	12.5		
	>18 years	25		>18 years	15		
c)	**Experience in Similar Capacity**		**30**	**Experience in Similar Capacity**		**40**	
(i)	**In Feasibility of 2/4/6 laning works or DPR/IC/Construction Supervision of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways in Similar Capacity (Minimum Aggregate length of 80 km in hill roads with altitude more than 500m)**		20	**In Feasibility of 2/4/6 laning works or DPR of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways in Similar Capacity (Minimum Aggregate length of 80 km)**		30	
	< 80km	0		< 80km	0		
	80 km-150km	15		80 km-150km	17		
	>150km-250km	17		>150km-250km	20		
	> 250km	20		> 250km -300km	23		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	**Remarks**
				> 300km -400km	26		
				Add 1 point for each additional 50 km subject to max 4 points			
(ii)	**In Feasibility of 2/4/6 laning works or DPR/IC/Construction Supervision of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways in Similar Capacity- Number of Projects in hill roads (Minimum length 20km)**		10	**In Feasibility of 2/4/6 laning works or DPR of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways in Similar Capacity- Number of Projects in hill roads (Minimum length 20km)**		10	
	< 2 projects	0		< 1 project	0		
	2 projects	8		1 project	4		
	3- 5 projects	9		2- 3 projects	6		
	> 5 projects	10		4-6 projects	8		
				More than 6 projects	10		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	> 1 Year	0		< 1 Year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**	**Total**		**100**	

2. SENIOR BRIDGE DESIGN ENGINEER

	Existing Provision		Proposed Provision		Remarks
S. No.	**Description**	**Max. Points**	**Description**	**Max. Points**	
I	**General Qualification**	**25**	**Desirable Qualification**	**30**	
i)	Degree in Civil Engineering or equivalent[AICTE Approved]	20	**Full Time Graduation in Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 5 marks**	15	
ii)	Post Graduation in Structural Engineering/ Bridge Engineering [AICTE Approved]	5	**Post-Graduation**		
			Full Time/Regular Post-Graduation in Structural/Bridge Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15	

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
				Part Time Post-Graduation in Structural/Bridge Engineering from IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks. **For other AICTE approved colleges give 50% marks i.e. 5 marks**		**10**	
II	**Relevant Experience & Adequacy for the Project**		**70**	**Relevant Experience & Adequacy for the Project**		**65**	
a)	**Total Professional Experience**		**15**	**Deleted**			
	<10 years	0					
	10-12years	11					
	>12-15 years	13					
	>15 years	15					
b)	**Experience in Bridge Projects in hill roads**		**25**	**Total Experience in Bridge Projects**			
(i)	**Experience in project preparation and design of bridge projects**		20	**Experience in Design/Construction of bridge projects**		15	
	<8 years	0		<8 years	0		
	8-10 years	15		8-10 years	5		
	>10-12 years	17		>10-12 years	8		
	>12years	20		12-15years	10		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
				For each additional year add 1 marks subject to a maximum additional 5 marks			
(ii)	**Experience of 2/4 lane configuration bridges**		5	**Experience of Design 2/4 lane configuration bridges**		15	
	<2 Projects	0		<2 Projects	0		
	2-4 Projects	4		2-4 Projects	3		
	> 4 projects	5		5-7 projects	6		
				8-10	9		
				11-13	12		
				For each additional project add 0.5 marks subject to a maximum additional 3 marks			
c)	**Experience as Senior Bridge in Engineer or Similar Capacity in Highway Design Consultancy Projects (2/4/6 laning of NH/SH/Expressways) involving design of Major Bridges (minimum 2 nos. of length more than 100m each in hill roads with altitude more than 500m)**		**30**	**Experience as Senior Bridge Design Engineer or Similar Capacity in Highway Design Consultancy Projects (2/4/6 laning of NH/SH/Expressways) involving design of Major Bridges (minimum 2 nos. of length more than 100m each)**		**35**	
	<2 numbers	0		<2 numbers	0		
	2-4 numbers	24		2-4 numbers	10		
	5-6 numbers	27		5-6 numbers	15		
	> 6 numbers	30		7-8 numbers	20		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
				9-10 numbers	25		
				For design of each additional project add 1 mark subject to a maximum additional 5 marks			
III	**Employment with Firm**		**5**				
	Less than 1 Year	0		< 1 Year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**			**100**	

3. HIGHWAY Design ENGINEER

	Existing Provision		Proposed Provision		Remarks
S.No.	Description	Max. Points	Description	Max. Points	
I	General Qualification	25	Desirable Qualification	25	
i)	Degree in Civil Engineering or equivalent [AICTE Approved]	20	**Full Time Graduation in Civil Engineering or Equivalent IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks]**	15	
ii)	Post graduation in Highway Engg/ Transportation Engineering [AICTE Approved]	5	**Post-Graduation**		
			Full Time/Regular Post-Graduation in Transportation/Highway Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks **For other AICTE approved colleges give 50% marks i.e. 5 marks]**	10	
			Part Time Post-Graduation in Transportation/Highway Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks **For other AICTE approved colleges give 50% marks i.e. 3.5 marks]**	7	

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S.No.	Description	Max. Points		Description		Max. Points	
II	Relevant Experience & Adequacy for the Project	70				70	
a)	Total Professional Experience		1`5	Deleted			
	<8years	0					
	8-12 years	11					
	>12-15 years	13					
	>15 years	15					
(b)	Experience in Highway Projects - Experience in Design/ Pavement Design of Highway Projects (2/4/6 laning of NH/SH/Expressways) in hill roads with altitude more than 500m	25		Experience in Design/ Pavement Design of Highway Projects (2/4/6 laning of NH/SH/Expressways)		20	
	<6 years	0		<6 years	0		
	6-10years	19		6-10years	10		
	>10-15 years	22		>10-15 years	15		
	>15years	25		>15years	20		
c)	Experience in Similar Capacity	30				50	
(i)	In Design/ Pavement Design of Highway Projects (2/4/6 laning of NH/SH/ Expressways) in Similar Capacity (Minimum aggregate length 80 km) in hill roads	20		In Design/ Pavement Design of Highway Projects (2/4/6 laning of NH/SH/ Expressways) in Similar Capacity (Minimum aggregate length 120 km)		30	
	<80km	0		<120km	0		
	80km-150km	15		120km-200km	10		
	>150km-250km	17		>200km-300km	12.5		
	>250km	20		>300km-400km	15		
				>400km-500km	17.5		
				>500km-600km	20		
				>600-700km	22.5		
				>700-800km	25		
				Add 2.5 marks for each additional 100 km length subject to max 5 additional marks.			
(ii)	In Design/Pavement Design of Highway Projects (2/4/6 laning of NH/SH/ Expressways) in Similar	10		In Design/Pavement Design of Highway Projects (2/4/6 laning of NH/SH/ Expressways) in Similar		20	

	Existing Provision			Proposed Provision			Remarks
S.No.	Description	Max. Points		Description		Max. Points	
	Capacity – Number of Projects in hill roads (Minimum length 20km)			**Capacity – Number of Projects (Minimum length 25km)**			
	2 projects	8		2 projects		8	
	3- 5 projects	9		3- 5 projects		10	
	> 5 projects	10		> 5 -8 projects		12.5	
				>8 – 10 projects		15	
				>10-15 projects		20	
III	**Employment with Firm**		**5**			**5**	
	Less than 1 Year	0		<1 year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		100			**100**	

4. Traffic / Road Signage / Marking and Safety Expert

	Existing Provision		Proposed Provision		Remarks
S. No.	Description	Max. Points	Description	Max. Points	
I	**General Qualification**	**25**	**Desirable Qualification**	**25**	
i)	Degree in Civil Engineering [AICTE Approved]	20	**Full Time Graduation in Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 5 marks**	15	
ii)		5	**Post-Graduation**		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
	Post graduation in Traffic Engineering /Transportation Engineering /Transportation Planning[AICTE Approved]			**Full Time/Regular Post-Graduation in Traffic/ Transportation/ Safety Engineering or equivalent.** **Post-Graduation in Transportation planning will also be considered provided it is obtained after Graduation in Civil Engineering.** **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 5 marks**		10	
				Part Time Post-Graduation in Traffic/ Transportation/ Safety Engineering or equivalent. **Post-Graduation in Transportation planning will also be considered provided it is obtained after Graduation in Civil Engineering.** **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 3.5 marks**		7	
II	**Relevant Experience & Adequacy for the Project**		**70**				
a)	**Total Professional Experience**		**15**	**Total Professional Experience**		**10**	
	<6 years	`		<6 years	**0**		
	6-10years	11		6-10years	**5**		
	>10-15 years	13		>10-15 years	**7.5**		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
	>15years	15		>15years	10		
b)	**Experience in Highway Projects – Experience on Similar Projects (2/4/6 laning of NH/SH/ Expressways)**		**25**	**Experience on Similar Projects (2/4/6 laning of NH/SH/ Expressways) in Similar Capacity**		**30**	
	<5years	0		<5years	0		
	5-6years	19		5-8years	15		
	>6-10 years	22		>8-10 years	18		
	>10years	25		>10-12 years	20		
				>12-15 years	25		
				>15-18 years	28		
				>18 years	30		
c)	**Experience as Traffic and Safety Expert / Traffic Engineer or in Similar Capacity in Highway Projects(2/4/6 laning of NH/SH/Expressways) (Minimum aggregate length 80 km)**		**30**	**Experience as Traffic and Safety Expert / Traffic Engineer or in Similar Capacity in Highway Projects(2/4/6 laning of NH/SH/Expressways) (Minimum aggregate length 120 km)**		**30**	
	<80km	0		<120km	0		
	80km-150km	24		120km-200km	10		
	>150km -250km	27		>200km -300km	15		
	>250km	30		>300km-400km	20		
				>400km-500km	25		
				>500km-600km	27.5		
				>600km	30		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 Year	0		

	Existing Provision			Proposed Provision			Remarks
S. No.	Description		Max. Points	Description		Max. Points	
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
	Total		**100**			**100**	

5. ENVIRONMENTAL SPECIALIST

	Existing Provision			Proposed Provision		Remarks
S. No.	Description		Max. Points	Description	Max. Points	
I	**General Qualification**		**25**	**Desirable Qualification**		
i)	Degree in Civil Engineering / Environmental Engineering or Post Graduate in Environmental Sciences[AICTE Approved]		20	Full Time Graduation Graduate in Civil Engineering / Environment Engineering / Masters in Environment Science from any **IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** For other AICTE approved colleges give 50% marks i.e. 7.5 marks.	15	
ii)	Post-Graduation in Environmental Engineering [AICTE Approved]		5	Post-Graduation		
				Full Time/Regular Post-Graduation or Doctorate in Environmental Engineering/Environment Management or equivalent. For PG from any **IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks**	10	

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
				For other colleges give 50% marks i.e. 5 marks			
				Part-Time Post-Graduation or Doctorate in Environmental Engineering/Environment Management or equivalent. For PG from any **IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** For other colleges give 50% marks i.e. 3.5 marks		7	
II	**Relevant Experience & Adequacy for the Project**		**70**	**Relevant Experience & Adequacy for the Project**		**70**	
a)	**Total Professional Experience**		**15**	**Total Professional Experience**		**15**	
	<6 years	0		<6 years	0		**No Change**
	6-8 years	11		6-8 years	11		
	>8-10 years	13		>8-10 years	13		
	>10 years	15		>10 years	15		
b)	**Experience in Highway Projects- Experience in Environment impact assessment of Highway Projects (2/4/6 laning of NH/SH/Expressways)**		**25**	**Experience in Highway Projects- Experience in Environment impact assessment of Highway Projects (2/4/6 laning of NH/SH/Expressways)**		**25**	**No Change**
	<5 years	0		<5 years	0		
	5 -7 years	19		5 -7 years	19		
	>7-10 years	22		>7-10 years	22		
	>10 years	25		>10 years	25		
c)	**Experience as Environmental Specialist or in Similar Capacity in Highway Projects(2/4/6 laning of NH/SH/Expressways)**		**15**	**Experience as Environmental Specialist or in Similar Capacity in Highway Projects(2/4/6 laning of NH/SH/Expressways)**		**15**	**No Change**

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
	<2 projects	0		<2 projects	0		
	2- 4 projects	12		2- 4 projects	12		
	5-7 projects	14		5-7 projects	14		
	>7 projects	15		>7 projects	15		
d)	**Experience as Environmental Specialist or in Similar Capacity in Highway Projects(2/4/6 laning of NH/SH/Expressways)**		**15**	**Experience as Environmental Specialist or in Similar Capacity in Highway Projects(2/4/6 laning of NH/SH/Expressways)**		**15**	**No Change**
	<1 projects	0		<5 years	0		
	1 - 2 projects	12		5 -7 years	12		
	3-4 projects	14		>7-10 years	14		
	>4 projects	15		>10 years	15		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
	Total		**100**			**100**	

6. MATERIAL ENGINEER cum GEOTECHNICAL ENGINEER cum GEOLOGIST

	Existing Provision		Proposed Provision		Remarks
S. No.	**Description**	**Max. Points**	**Description**	**Max. Points**	
I	**General Qualification**	25	**Desirable Qualification**	25	
I)	Degree in Civil Engineering /M. Sc. in Geology [AICTE Approved]	20	Full Time Graduation in Civil Engineering or Equivalent or M.Sc. in Geology from any **IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** For other AICTE approved colleges give 50% marks i.e. 7.5 marks.	15	
ii)	Post graduation in Foundation Engineering / Soil Mechanics / Geo Tech Engineering or Phd in Geology [AICTE Approved]	5	Post Graduation		
			Full Time/Regular Post-Graduation in Foundation Engineering / Soil Mechanics / Geo Tech Engineering or Phd in Geology. **For PG/Doctorate from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50%marks i.e. 5 marks**	10	
			Part Time Post-Graduation in Foundation Engineering / Soil Mechanics / Geo Tech Engineering or Phd in Geology. **For PG/Doctorate from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks**	7	

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
				For other colleges give 50%marks i.e. 3.5 marks			
II	**Relevant Experience & Adequacy for the Project**		70			70	
a)	**Total Professional Experience**		15	**Total Professional Experience**		15	NO Change
	<10 years	0		<10 years	0		
	10-12 years	11		10-12 years	11		
	>12-15 years	13		>12-15 years	13		
	>15 years	15		>15 years	15		
b)	**Experience in Highway Projects–In Similar Projects (2/4/6 laning of NH/SH/Expressways) in design and or Construction/ Construction Supervision**		20	**Experience in Highway Projects–In Similar Projects (2/4/6 laning of NH/SH/Expressways) in design and or Construction/ Construction Supervision**		20	NO Change
	<7 years	0		<7 years	0		
	7-10 years	15		7-10 years	15		
	>10 -12 years	17.50		>10 -12 years	17.50		
	>12years	20		>12years	20		
c)	**Experience as Material cum Geo-technical Engineer or in Similar capacity on Highway Projects (2/4/6 laning of NH/SH/Expressways) (Minimum aggregate length 80 km) in hill roads with altitude more than 500m**		20	**Experience as Material cum Geo-technical Engineer or in Similar capacity on Highway Projects (2/4/6 laning of NH/SH/Expressways) (Minimum aggregate length 120 km)**		20	
	<80km	0		<120km	0		
	80km-150km	15		120km-200km	15		
	>150km – 250km	17.50		>200km – 300km	17.50		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
	>250km	20		>300km	20		
d)	Experience in Similar capacity on Highway Projects (2/4/6 laning of NH/SH/Expressways) in DPR preparation of slope protection measures and land slide management in hill roads (Traditional protection works such as Retaining wall, breast wall, gabion wall etc. shall not be considered)		15	Experience in Similar capacity on Highway Projects (2/4/6 laning of NH/SH/Expressways) in DPR preparation of slope protection measures and land slide management in hill roads (Traditional protection works such as Retaining wall, breast wall, gabion wall shall not be considered) Please mention the slope protection works and land slide management measures used in each project		15	
	<1 Projects	0		<1 Projects	0		
	1-2 Projects	10		1-2 Projects	10		
	> 2 projects	15		> 2 projects	15		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
	Total		100			100	

7. SENIOR SURVEY ENGINEER

	Existing Provision			Proposed Provision		Remarks
S. No.	**Description**		**Max. Points**	**Description**	**Max. Points**	
I	**General Qualification**		25	**Desirable Qualification**	25	
i)	Degree or equivalent in Civil Engineering / Diploma in Civil Engineering / Diploma in Surveying[AICTE Approved]		20	**For Full Time Diploma in Civil Engg or Diploma in Surveying or equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other govt. approved colleges give 75% marks i.e. 13.5 marks.**	**18**	
ii)	Post Graduation in Survey Engineering / Surveying / Remote Sensing[AICTE Approved]		5	**Full Time/Part Time Graduation or Post Graduation in Civil Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 75% marks i.e. 18.75 marks.**	**25**	
II	**Relevant Experience & Adequacy for the Project**		**70**	**Relevant Experience & Adequacy for the Project**	**70**	
a)	**Total Professional Experience**		15	**Total Professional Experience**	15	
	<10 years	0		<10 years	0	
	10-12 years	11		10-12 years	11	
	>12-15 years	13		>12-15 years	13	
	>15 years	15		>15 years	15	

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
b)	**Experience in Highway Projects**		25	**Experience in Highway Projects**		25	
i)	**Experience in Similar Projects(2/4/6laningofNH / SH / Expressways) in project preparation/ Construction / Construction Supervision**		20	**Experience in Similar Projects(2/4/6 laning of NH / SH / Expressways) in project preparation/ Construction / Construction Supervision**		20	
	<8years	0		<8years		0	
	8 -10 years	15		8 -10 years		15	
	>10-12 years	17		>10-12 years		17	
	>12 years	20		>12 years		20	
ii)	**Knowledge and understanding of modern Computer based method of Surveying**		**5**	**Knowledge and understanding of modern Computer based method of Surveying such as LIDAR Survey (ground or aerial), remote sensing, GIS mapping etc.** **Certification from an accredited institute to be submitted for validation.**		**5**	
	Yes	5		Yes	5		
	No	0		No	0		
c)	**Experience as Survey Engineer or in Similar Capacity for project preparation of highway project (2/4/6 laning of NH/SH/Expressways) (Minimum Aggregate Length of to 80km) in Hill roads with altitude more than 500m**		**30**	**Experience as Survey Engineer or in Similar Capacity for project preparation of highway project (2/4/6 laning of NH/SH/Expressways) (Minimum Aggregate Length of 120km)**		**30**	
	<80km	0		<120km	0		
	80km-150km	24		120km-200km	10		
	>150km-250km	27		>200km-300km	15		
	>250km	30		>300km-400km	20		
				>400km-500km	25		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
				>500km	30		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
	Total		**100**			**100**	

8. QUANTITY SURVEYOR/DOCUMENTATION EXPERT

	Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	
I	**Desirable Qualification**		**25**	
i)	Full Time Graduation in Civil Engineering. For Graduation from any **IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks**. For other colleges give 50%marks i.e. 7.50 marks		15	
ii)	Full Time Post-Graduate Degree or Diploma in Quantity Surveying [AICTE/UGC Approved]		10	
II	**Relevant Experience & Adequacy for the Project**		70	
a)	**Total Professional Experience**		15	No Change
	<10 years	0		
	10-12 years	11		
	>12-15 years	13		
	>15 years	15		
b)	**Experience in Highway Projects- Experience in preparation of Bill of Quantities, Contract documents and documentation for major highway projects (2/4/6 laning of NH/SH/Expressways) in Assistant Quantity Surveyor capacity or Higher Designation**		25	
	<8 years	0		
	8 -10 years	12.5		
	>10-12 years	15		
	>12-15 years	17.5		
	>15-18 years	20		
	>18-20 years	22.5		

	Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	
	>20 years	25		
c)	**Experience as Quantity Surveyor or in Similar Capacity in Highway Projects (2/4/6 laning of NH/SH/Expressways) (Minimum Aggregate length of 120 km)** **Consider full length experience in Quantity Surveyor or in Similar Capacity and consider 2/3 length experience in case of Assistant Quantity Surveyor or in Similar Capacity**		30	
	<120km	0		
	120km-200km	15		
	>200km – 300km	17.5		
	>300km -400km	20		
	>400km -500km	22.5		
	>500km -600km	25		
	>600km add 2.5 marks for each additional 100 km experience subject maximum 5 additional marks			
III	**Employment with Firm**		**5**	
	<1 year	0		
	1 year	2		
	Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
			100	

9. LAND ACQUISITION EXPERT

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
I	**General Qualification**		**25**	**General Qualification**		**25**	
i)	Graduation or equivalent		20	Graduation or equivalent in any discipline from Top 50 **ranked universities as per NIRF ranking released by Ministry of Education (available as on bid due date) or Colleges of repute of Foreign Countries give full marks**. For Other Colleges give 75% marks.		20	
ii)	Post-Graduation		5	Post-Graduation in Law		5	
II	**Relevant Experience & Adequacy for the Project**		**70**	**Relevant Experience & Adequacy for the Project**		**70**	
a)	**Total Professional Experience**		**15**	**Total Professional Experience**		**15**	No Change
	<15 years	0		<15 years	0		
	15-17 years	11		15-17 years	11		
	>17-20 years	13		>17-20 years	13		
	>20 years	15		>20 years	15		
b)	**Experience in Land Acquisition works of Government/Authority**		**20**	**Experience in Land Acquisition works of Government/Authority**		**20**	No **Change**
	<10 years	0		<10 years	0		
	10 -12 years	15		10 -12 years	15		
	>12-15 years	17		>12-15 years	17		
	>15 years	20		>15 years	20		
c)	**Experience in Land Acquisition works in Highway/road sector**		25	**Experience in Land Acquisition works in Highway/road sector**		**25**	No **Change**
	Nil project	0		Nil project	0		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
	1 project	19		1 project	19		
	2 projects	22		2 projects	22		
	3 projects	25		3 projects	25		
d)	**Retired Revenue officer at the level of ADM/SDM / Tehsildar**		**10**	**Retired Revenue officer at the level of ADM/SDM / Tehsildar**		**10**	No **Change**
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
	Total		**100**			**100**	

10. UTILITY EXPERT

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
I	**General Qualification**		**25**	**General Qualification**		**25**	
i)	Graduation or equivalent		20	Full Time Graduation in Electrical Engineering. For Graduation from **IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks**. For other AICTE approved colleges give 50% marks i.e. 12.50 marks			
ii)	Post Graduation		5				
II	**Relevant Experience & Adequacy for the Project**		**70**	**Relevant Experience & Adequacy for the Project**		**70**	
a)	**Total Professional Experience**		**15**	**Total Professional Experience**		**15**	No Change
	<10 years	0		<10 years	0		
	10-12 years	11		10-15 years	11		
	>12-15 years	13		>15-20 years	13		
	>15 years	15		>20 years	15		
b)	Experience in Utility estimation and its laying/ erection		**30**	Experience in Utility estimation and its laying/ erection		**30**	
	<8 years	0		<8 years	0		
	8 -10 years	24		8 -10 years	15		
	>10-12 years	27		>10-15 years	17.5		
	>12 years	30		>15-20 years	22.5		
				>20-25 years	27.5		
				>25 years	30		

Concept Note on Modifications in DPR

	Existing Provision			Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max. Points**	
c)	Experience in Utility shifting estimation and its laying/ erection along Highway/ roads		25	Experience in Utility shifting estimation and its laying/ erection along Highway/ roads		25	
	Nil project	0		Nil project	0		
	1 project	19		1 -3project	15		
	2 projects	22		4-6 projects	20		
	3 projects	25		>6 projects	25		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subje maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 additional marks			
	Total		**100**	**Total**		**100**	

Concept Note on Modifications in DPR

11 TEAM LEADER cum SENIOR BRIDGE ENGINEER

Existing Provision				Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max Points**	
I	**General Qualification**		**25**	**Desirable Qualification**	**Sub-points**	**30**	
i)	Degree in Civil Engineering or equivalent [AICTE Approved]		20	**Full Time Graduation in Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15		
ii)	Post Graduation in Structural Engineering, Degree/Diploma/Certificate in Construction Management		5	**Post-Graduation**			
				Full Time/Regular Post-Graduation in Structural/Bridge Engineering **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15		
				Part Time Post-Graduation (PG) in Structural/Bridge Engineering	10		

Concept Note on Modifications in DPR

Existing Provision				Proposed Provision				Remarks
S. No.	Description		Max. Points	Description			Max Points	
				For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks For other AICTE approved colleges give 50% marks i.e. 5 marks				
II	Relevant Experience & Adequacy for the Project		70	Relevant Experience & Adequacy for the Project			65	
a)	Total Professional Experience		15	Total Professional Experience		10		
	<15 years	0		<15 years	0			
	15-18 years	11		15-18 years	5			
	>18-21 years	13		>18-21 years	8			
	> 21 years	15		> 21 years	10			
(b)	Experience in Bridge Project - Experience in major Bridge Construction / Development Project		25	Experience in Bridge Project - Experience in major Bridge Construction / Development Project		25		
	< 5 years	0		< 5 years	0			
	6-8 years	19		6-8 years	12			
	>8-10 years	22		>8-10 years	15			
	>10 years	25		>10-15 years	20			
				>15-20 years	23			
				>20 years	25			

Concept Note on Modifications in DPR

Existing Provision				Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max Points**	
c)	**Experience in Similar Capacity**		**30**	**Experience in Similar Capacity**		**30**	
(i)	**As Team Leader/Project Manager or similar capacity of at least Two projects in Construction Supervision / IC involving 4 laning/6-laning/ Expressway of minimum 50km length and atleast two major bridge of a length 500 mtr. (Excluding approaches).**		20	**As Team Leader/Project Manager or similar capacity of at least Two projects in Construction Supervision / IC involving 4 laning/6-laning/ Expressway of minimum 50km length and atleast two major bridge of a length 500 mtr. (Excluding approaches).**	20		
	< 80km	0		<2 Projects	0		
	80 km-150km	15		2-3 Projects	10		
	>150km-250km	17		4-6 Projects	12		
	> 250km	20		7-9 Projects	15		
				10-12 Projects	18		
				>12 Projects	20		
(ii)	**In Feasibility of 2/4/6 laning works or DPR/IC/Construction Supervision of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways in Similar Capacity- Number of Projects**		10	**In Feasibility of 2/4/6 laning works or DPR/IC/Construction Supervision of major highway projects i.e. 2/4/6 laning of NH/SH/Expressways in Similar Capacity- Number of Projects**		10	
	< 2 projects	0		< 2 projects	0		
	2 projects	8		2 projects	5		
	3- 5 projects	9		3- 5 projects	8		
	> 5 projects	10		> 5 projects	10		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	< 1 Year	0		< 1 Year	0		
	1 year	3		1 year	2		

Concept Note on Modifications in DPR

Existing Provision				Proposed Provision			Remarks
S. No.	**Description**		**Max. Points**	**Description**		**Max Points**	
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 mark			
	Total		**100**	**Total**		**100**	

2.4.12 Bridge Structural Engineer

Existing Provisions				Proposed Provisions			Remarks
S. No.	Description		Max. Points	Description		Max. Points	
I	**General Qualification**		**25**	**General Qualification**		**30**	
i)	Degree in Civil Engineering or equivalent[AICTE Approved]		20	**Full Time Graduation in Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 5 marks**	**15**		
ii)	Post Graduation in Structural Engineering/ Bridge Engineering[AICTE Approved]		5	**Post-Graduation**			
				Full Time/ Regular Post-Graduation in Structural/ Bridge Engineering **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	**15**		
				Part Time Post-Graduation in Structural/Bridge Engineering **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education**	**10**		

Concept Note on Modifications in DPR

Existing Provisions				Proposed Provisions			Remarks
S. No.	Description		Max. Points	Description		Max. Points	
				(available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks. For other AICTE approved colleges give 50% marks i.e. 5 marks			
II	Relevant Experience & Adequacy for the Project		70	Relevant Experience & Adequacy for the Project		65	
a)	Total Professional Experience		15	Total Professional Experience		10	
	<8 years	0		<8 years	0		
	8-10 years	11		8-10 years	5		
	>10-15=12 years	13		>10-15=12 years	8		
	>12 years	15		>12 years	10		
b)	Experience in Bridge Projects		25	Experience in Bridge Projects		25	
(i)	Experience in project preparation and design of bridge projects		25	Experience in project preparation and design of bridge projects		25	
	<5 years	0		< 5 years	0		
	5-8 years	19		6-8 years	12		
	>8-10 years	22		>8-10 years	15		
	>10 years	25		>10-15 years	20		
				>15-20 years	23		
				>20 years	25		
c)	Experience as Senior Bridge Engineer or Similar Capacity in Highway Design Consultancy Projects (2/4/6 laning of NH/SH/Expressways) involving		30	Experience as Senior Bridge Engineer or Similar Capacity in Highway Design Consultancy Projects (2/4/6 laning of NH/SH/Expressways) involving		30	

Concept Note on Modifications in DPR

Existing Provisions				Proposed Provisions			Remarks
S. No.	Description		Max. Points	Description		Max. Points	
	design of Major Bridges (minimum 2 nos. of length more than 200m)			**design of Major Bridges (minimum 2 nos. of length more than 200m)**			
	<2 numbers	0		<2 Projects	0		
	2-4 numbers	24		2-3 Projects	10		
	5-6 numbers	27		4-6 Projects	12		
	> 6 numbers	30		7-9 Projects	15		
				10-12 Projects	18		
				>12 Projects	20		
III	**Employment with Firm**		**5**	**Employment with Firm**		**5**	
	Less than 1 Year	0		<1 Year	0		
	1 year	3		1 year	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**	**Total**		**100**	

2.4.13 Team Leader cum Senior Tunnel Engineer

S. No.	Description	Max. Points	Description		Max. Points	Remarks
I	**General Qualification**	**25**	**General Qualification**		**30**	
i)	Degree in Civil Engineering/Tunnel Engineering / Mining Engineering	20	**Full Time Graduation in Civil Engineering/ Tunnel Engineering / Mining Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	**15**		
ii)	Post Graduation in Civil Engineering /Tunnel Engineering/Mining Engineering	5	**Post-Graduation** **Full Time/Regular Post-Graduation in Tunnel Engineering/Mining Engineering or equivalent.** **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.**	**15**		

Concept Note on Modifications in DPR

S. No.	Description		Max. Points	Description		Max. Points	Remarks
				For other AICTE approved colleges give 50% marks i.e. 7.5 marks			
				Part Time Post-Graduation in Tunnel Engineering/Mining Engineering or equivalent **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.** **For other AICTE approved colleges give 50% marks i.e. 5 marks**	**10**		
II	**Relevant Experience & Adequacy for the Project**		**65**	**Relevant Experience & Adequacy for the Project**		**65**	
a)	**Total Professional Experience**		10	**Total Professional Experience**		10	
	<20 years	0		<20 years	0		
	20-25 years	8		20-25 years	8		
	>25-28 years	9		>25-28 years	9		
	>28 years	10		>28 years	10		
(b)	**Experience in Tunnel Projects**		**40**	**Experience in Tunnel Projects**		**40**	
	(i) Professional experience in handling major tunnel projects (Road/Rail/Metro)		8	**(i) Professional experience in handling major tunnel projects (Road/Rail/Metro)**		8	

Concept Note on Modifications in DPR

S. No.	Description		Max. Points	Description		Max. Points	Remarks
	<12 years	0		<12 years	0		
	>=12 – 14 years	6		>=12 – 14 years	6		
	>14 – 15 years	7		>14 – 15 years	7		
	>15years	8		>15years	8		
	(ii) Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)		8	**(ii) Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		8	
	<10 years	0		**<**10 years	0		
	>=10 – 12 years	7		>=10 – 12 years	7		
	>12 years	8		>12 years	8		
	(iii)**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		8	(iii)**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		8	
	<10 years	0		**<**10 years	0		
	>=10 – 12 years	7		>=10 – 12 years	7		
	>12 years	8		>12 years	8		
	(iv) Experience in DPR preparation of minimum 5 km Tunnel length		8	**(iv) Experience in DPR preparation of minimum 5 km Tunnel length**		8	
	< 3 projects	0		**< 3 projects**	0		
	3 or more projects	8		**3-5 or more projects** **6 or more projects**	**5** 8		
(d)	**Experience in construction/construction supervision/ preparation of DPR/feasibility report of major tunnel projects (Road/Rail/metro) using NATM**		8	**Experience in construction/construction supervision/ preparation of DPR/feasibility report of major tunnel projects (Road/Rail/metro) using NATM**		8	

Concept Note on Modifications in DPR

S. No.	Description		Max. Points	Description		Max. Points	Remarks
	<10 years	0		<10 years	0		
	>=10 – 12 years	7		>=10 – 12 years	7		
	>12 years	8		>12 years	8		
c)	**Experience in Similar Capacity**		**15**	**Experience in Similar Capacity**		**15**	
	(i) Experience as Team Leader or similar capacity in major tunnel construction/construction supervision projects (Road/Rail/Metro)		7	**(i) Experience as Team Leader or similar capacity in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		7	
	=2 projects	5		=2 projects	5		
	= 3 to 5 projects	6		= 3 to 5 projects	6		
	> 5 or more	7		> 5 or more	7		
	(ii) Experience as Team Leader or similar capacity in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)		8	**(ii) Experience as Team Leader or similar capacity in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		8	
	=2 projects			=2 projects	4		
	= 3 to 5 projects			= 3 to 5 projects	6		
	> 5 or more			> 5 or more	8		
III	**Employment with Firm**		**10**			**5**	
	Less than 1 Year	0		Less than 1 Year	0		
	1-2 years	7.5		1-2 years	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2.5 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**	**Total**		**100**	

2.4.14 Tunnel Design Expert

Sr. No.	Description	Max. Points	Description		Max. Points	Remarks
I	**General Qualification**	**25**	**General Qualification**		**30**	
i)	Degree in Civil/ Mining Engineering	20	**Full Time Graduation in Civil Engineering/ Tunnel Engineering / Mining Engineering from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	**15**		
ii)	Post Graduation in Design/Structural Engineering or equivalent	5	**Post-Graduation**			
			Full Time/Regular Post-Graduation in Tunnel Engineering/Mining Engineering or equivalent **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	**15**		
			Part Time Post-Graduation in Tunnel Engineering/Mining Engineering or equivalent	**10**		

Concept Note on Modifications in DPR

Sr. No.	Description		Max. Points	Description		Max. Points	Remarks
				For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks **For other AICTE approved colleges give 50% marks i.e. 5 marks**			
II	**Relevant Experience & Adequacy for the Project**		**65**	**Relevant Experience & Adequacy for the Project**		**65**	
a)	**Total Professional Experience**		10	**Total Professional Experience**		**10**	
	<15 years	0		<15 years	0		
	15-20 years	8		15-20 years	8		
	>20 -25years	9		>20 -25years	9		
	>25years	10		>25years	10		
b)	**Experience in Tunnel Projects**		**24**	**Experience in Tunnel Projects**		**24**	
	(i) Professional Experience in handling major tunnel projects (Road/Rail/Metro)		8	**(i) Professional Experience in handling major tunnel projects (Road/Rail/Metro)**		**8**	
	<10 years	0		<10 years	0		
	>=10-12 years	6		>=10-12 years	6		
	>12 -14 years	7		>12 -14 years	7		
	>14 years	8		>14 years	8		
	(ii) Experience of major tunnel construction/construction supervision projects (Road/Rail/Metro)		8	**(ii) Experience of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**	

Concept Note on Modifications in DPR

Sr. No.	Description		Max. Points	Description		Max. Points	Remarks
	<10 years	0		<10 years	0		
	>=10-12 years	6		>=10-12 years	6		
	>12 -14 years	7		>12 -14 years	7		
	>14 years	8		>14 years	8		
	(iii) Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)		8	**(iii) Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**			
	<10 years	0		<10 years	0		
	>=10-12 years	6		>=10-12 years	6		
	>12 -14 years	7		>12 -14 years	7		
	>14 years	8		>14 years	8		
c)	**Experience in Similar Capacity**		**31**	**Experience in Similar Capacity**		**31**	
	(i) Professional Experience as Tunnel Design Engineer (Structural)		8	**(i) Professional Experience as Tunnel Design Engineer (Structural)**		**8**	
	<8 years	0		<8 years	0		
	>=8-10 years	6		>=8-10 years	6		
	>10 – 12 years	7		>10 – 12 years	7		
	>12 years	8		>12 years			
	(ii) Experience as Tunnel Design Engineer (Structural) of major tunnel construction/construction supervision projects (Road/Rail/Metro)		8	**(ii) Experience as Tunnel Design Engineer (Structural) of major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**	
	<8 years	0		<8 years			
	>=8 – 10 years	6		>=8 – 10 years			
	>10-12 years	7		>10-12 years			

Concept Note on Modifications in DPR

Sr. No.	Description		Max. Points	Description		Max. Points	Remarks
	>12 years8	8		>12 years8			
	(iii) Experience as Tunnel Design Engineer (Structural) of major tunnel for preparation of DPR projects (Road/Rail/Metro)		8	**(iii) Experience as Tunnel Design Engineer (Structural) of major tunnel for preparation of DPR projects (Road/Rail/Metro)**		**8**	
	<8 years	0		<8 years			
	>=8 – 10 years	6		>=8 – 10 years			
	>10-12 years	7		>10-12 years			
	>12 years	8		>12 years			
	(iv)Experience as Tunnel Design Engineer (Structural) in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro) using NATM		**7**	**(iv)Experience as Tunnel Design Engineer (Structural) in preparation of DPR/ Feasibility report of major tunnel projects (Road/Rail/Metro) using NATM**		**7**	
	< 3 projects	0		< 3 projects			
	>=3-5 projects	6		>=3-5 projects			
	5 or more projects	7		5 or more projects			
III	**Employment with Firm**		**10**	**Employment with Firm**		**5**	
	Less than 1 Year	0		Less than 1 Year	**0**		
	1-2 years	7.5		1-2 years	**2**		
	Add 0.5 marks for each subsequent year subject to maximum of 2.5 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**			**100**	

2.4.15 Senior Geotechnical Engineer

S. No.	Description	Max. Points	Description		Max Points	Remarks
I	**General Qualification**	**25**	**General Qualification**		**30**	
i)	Degree in Civil Engineering/Mining Engineering / Engineering Geology	20	**Full Time Graduation in Civil Engineering/Mining Engineering / Engineering Geology from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15		
ii)	Post Graduation in Geotechnical Engineering /Foundation Engineering/Rock Mechanics/Geo science or equivalent	5	**Post-Graduation**			
			Full Time/Regular Post-Graduation in Geotechnical Engineering /Foundation Engineering/Rock Mechanics/Geo science or equivalent **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15		
			Part Time Post-Graduation in Geotechnical Engineering /Foundation Engineering/Rock Mechanics/Geo science or equivalent **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking**	10		

Concept Note on Modifications in DPR

S. No.	Description		Max. Points	Description		Max Points	Remarks
				released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks **For other AICTE approved colleges give 50% marks i.e. 5 marks**			
II	**Relevant Experience & Adequacy for the Project**		**65**	**Relevant Experience & Adequacy for the Project**		**65**	
a)	**Total Professional Experience**		10	**Total Professional Experience**			
	<15 years	0		<15 years	0		
	15-20 years	8		15-20 years	8		
	>20 -25years	9		>20 -25years	9		
	>25years	10		>25years	10		
(b)	**Experience in Tunnel Projects**		**24**	**Experience in Tunnel Projects**		**24**	
	(i) Professional experience in handling major tunnel projects (Road/Rail/Metro)		8	**(i) Professional experience in handling major tunnel projects (Road/Rail/Metro)**		8	
	<10 years	0		<10 years	0		
	>=10-12 years	6		>=10-12 years	6		
	>12 -14 years	7		>12 -14 years	7		
	>14 years	8		>14 years	8		
	(ii) Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)		8	**(ii) Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		8	
	<10 years	0		<10 years	0		
	>=10-12 years	6		>=10-12 years	6		
	>12 -14 years	7		>12 -14 years	7		
	>14 years	8		>14 years	8		

Concept Note on Modifications in DPR

S. No.	Description		Max. Points	Description		Max Points	Remarks
	(iii)**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		8	(iii)**Experience in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		8	
	<10 years	0		<10 years	0		
	>=10-12 years	6		>=10-12 years	6		
	>12 -14 years	7		>12 -14 years	7		
	>14 years	8		>14 years	8		
c)	**Experience in Similar Capacity**		**31**	**Experience in Similar Capacity**		**31**	
	(i) Professional Experience as Tunnel Design Engineer (Structural)		**8**	**(i) Professional Experience as Tunnel Design Engineer (Structural)**	**8**		
	<8 years	0		<8 years	0		
	>=8-10 years	6		>=8-10 years	6		
	>10 – 12 years	7		>10 – 12 years	7		
	>12 years	8		>12 years	8		
	(ii) Experience as Senior Geotechnical Engineer or similar capacity in major tunnel construction/construction supervision projects (Road/Rail/Metro)		**8**	**(ii) Experience as Senior Geotechnical Engineer or similar capacity in major tunnel construction/construction supervision projects (Road/Rail/Metro)**		**8**	
	<8 years	0		<8 years	0		
	>=8 – 10 years	6		>=8 – 10 years	6		
	>10-12 years	7		>10-12 years	7		
	>12 years	8		>12 years	8		
	(iii) Experience as Senior Geotechnical Engineer or similar capacity in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)		**8**	**(iii) Experience as Senior Geotechnical Engineer or similar capacity in preparation of DPR or Feasibility report of major tunnel projects (Road/Rail/Metro)**		**8**	
	<8 years	0		<8 years	0		
	>=8 – 10 years	6		>=8 – 10 years	6		

Concept Note on Modifications in DPR

S. No.	Description		Max. Points	Description		Max Points	Remarks
	>10-12 years	7		>10-12 years	7		
	>12 years8	8		>12 years8	8		
	(iv) Experience in construction/construction supervision/ preparation of DPR/feasibility report of major tunnel projects (Road/Rail/metro) using NATM		**7**	**(iv) Experience in construction/construction supervision/ preparation of DPR/feasibility report of major tunnel projects (Road/Rail/metro) using NATM**		**7**	
	<8 years	0		<8 years	0		
	>=8 – 10 years	6		>=8 – 10 years	6		
	>10-12 years	7		>10-12 years	7		
	<8 years	0		<8 years	0		
III	**Employment with Firm**		**10**	**Employment with Firm**		**5**	
	Less than 1 Year	0		Less than 1 Year	0		
	1-2 years	7.5		1-2 years	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2.5 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**	**Total**		**100**	

2.4.16 Senior Geophysicist

Sr. No.	Description	Max. Points	Description		Max. Points	Remarks
I	**General Qualification**	**25**	**General Qualification**		**30**	
i)	Graduate in Geophysics/Geo science/ Earth science or equivalent	20	**Full Time Graduation in Geophysics/Geo science/ Earth science or equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15		
ii)	Post Graduation in Geophysics/Geo science/ Earth Science or equivalent	5	**Post-Graduation**			
			Full Time/Regular Post-Graduation in Geophysics/Geo science/ Earth Science or equivalent **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.** **For other AICTE approved colleges give 50% marks i.e. 7.5 marks**	15		
			Part Time Post-Graduation in Geophysics/Geo science/ Earth Science or equivalent **For PG from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks.**	10		

Concept Note on Modifications in DPR

Sr. No.	Description		Max. Points	Description		Max. Points	Remarks
				For other AICTE approved colleges give 50% marks i.e. 5 marks			
II	**Relevant Experience & Adequacy for the Project**		**65**	**Relevant Experience & Adequacy for the Project**		**65**	
a)	**Total Professional Experience**		15	**Total Professional Experience**	15		
	<15 years	0		<15 years	0		
	15-20 years	10		15-20 years	10		
	>20 -25years	13		>20 -25years	13		
	>25years	15		>25years	15		
b)	**Experience in Relevant works**		**50**	**Experience in Relevant works**	**50**		
	(i) Professional Experience in handling tunnel/ mineral and oil exploration projects		12	**(i) Professional Experience in handling tunnel/ mineral and oil exploration projects**	12		
	<10 years	0		<10 years	0		
	>=10-12 years	9		>=10-12 years	9		
	>12 -14 years	11		>12 -14 years	11		
	>14 years	12		>14 years	12		
	(ii) Experience of carrying out AEM survey for tunneling/ mineral and oil exploration or any other similar work for area of more than 2.7 sq km		12	**(ii) Experience of carrying out AEM survey for tunneling/ mineral and oil exploration or any other similar work for area of more than 2.7 sq km**		12	
	< 2 projects	**0**		< 2 projects	**0**		
	2 projects	9		2 projects	9		
	3 projects	11		3 projects	11		
	4 or more projects	12		4 or more projects	12		
	(iii) Processing, Interpreting, generating 3D resistivity model of AEM survey's raw data		12	**(iii) Processing, Interpreting, generating 3D resistivity model of AEM survey's raw data for tunneling/ mineral**		12	

Concept Note on Modifications in DPR

Sr. No.	Description		Max. Points	Description		Max. Points	Remarks
	for tunneling/ mineral and oil exploration or any other similar work for area of more than 2.7 sq km			**and oil exploration or any other similar work for area of more than 2.7 sq km**			
	< 2 projects	**0**		< 2 projects	**0**		
	2 projects	9		2 projects	9		
	3 projects	11		3 projects	11		
	4 or more projects	12		4 or more projects	12		
	(iv) Experience in carrying out AEM survey, processing, interpreting, generating 3D resistivity of AEM survey's raw data for major tunnel work (Rail/Road/Metro)		14	**(iv) Experience in carrying out AEM survey, processing, interpreting, generating 3D resistivity of AEM survey's raw data for major tunnel work (Rail/Road/Metro)**		14	
	< 3 projects	**0**		< 3 projects	**0**		
	3 projects	9		3 projects	9		
	4 projects	12		4 projects	12		
	5 or more projects	14		5 or more projects	14		
II	**Employment with Firm**		**10**	**Employment with Firm**		**5**	
	Less than 1 Year	0		Less than 1 Year	0		
	1-2 years	7.5		1-2 years	2		
	Add 0.5 marks for each subsequent year subject to maximum of 2.5 marks			Add 1 marks for each subsequent year subject to maximum of 3 marks			
	Total		**100**	**Total**	**100**		

Concept Note on Modifications in DPR

Guidelines for assessing Cost estimate of DPR of Normal Highway Projects

	Projects upto 25 km length	**Projects more than 25 km upto 50 km**	**Brownfield Projects more than 50 km upto 100 km**	**Projects more than 100 km upto 200 km Or Green Field Projects**	**Projects more than 200 km upto 400 km Or Green Field Projects**	**Projects more than 400 km (additional inputs for every 100 km)**
	Man Months					
Total Project Duration / Key-Position	5 (no separate timeline for feasibility)	7 (no separate timeline for feasibility)	9 (no separate timeline for feasibility)	12	12	NA
Team Leader Cum Senior Highway Engineer	5	7	9	12	12	0
Bridge Design Engineer	1	2	3	5	7	2
Highway Design Engineer	1.5	2.5	4	6	8	2
Traffic and Road Safety expert	0.5	1	2	3	4	1
Environmental Specialist	1	2	3	5	6	1
Material-cum-Geo-technical Engineer – Geologist	1.5	3	5	6	8	2
Senior Survey Engineer	2.5	3.5	5	7	9	2
Quantity Surveyor / Documentation Expert	1	1	2	4	5	1
Land Acquisition Expert	3	5	7	9	11	2
Utility Expert	1	1	2	4	6	2
Assistant Highway Engineer (one to be provided every 50 km)	5	7	18	24	48	5
Assistant Bridge Engineer	2	3	5	7	9	2
Assistant Quantity Surveyor (one to be provided every 50 km)	2	3	5	7	9	2
Assistant Survey Engineer (one to be provided every 50 km)	5	7	18	24	48	3

Concept Note on Modifications in DPR

	Projects upto 25 km length	Projects more than 25 km upto 50 km	Brownfield Projects more than 50 km upto 100 km	Projects more than 100 km upto 200 km Or Green Field Projects	Projects more than 200 km upto 400 km Or Green Field Projects	Projects more than 400 km (additional inputs for every 100 km)
LA Team Member (5 Sub KP every 50 km with 5 man months each)	20*	25	50	100	150	50
Assistant Material and Quality Engineer	1.5	3	5	6	8	2
GIS Expert @Rs. 85,000/- per month	1	1.5	3	5	7	2
CAD Draftsman @Rs. 50,000/- per month	3	4.5	6	8	10	2
Hydrologist @Rs. 2,00,000/- per month	0.40	0.75	1	2	3	1
Social Expert @Rs. 1,50,000/- per month	0.15	0.25	0.5	0.75	1	0.25
ATMS & Toll Expert @Rs. 1,50,000/- per month	0.10	0.20	0.25	0.50	1	0.25

Total Project Duration / **Items**	**Projects upto 25 km length**	**Projects more than 25 km upto 50 km**	**Projects more than 50 km upto 100 km**	**Projects more than 100 km upto 200 km**	**Projects more than 200 km upto 400 km**	**Inputs for every additional 100 km**
	Description					
No. of vehicles for use of consultants with months equal to length of project duration	2	2	3	4	4	1
Traffic Survey (including all sub-surveys such as axle load Surveys, O&D survey, analysis etc. as per TOR)	Rs. 15,00,000/-	Rs. 20,00,000/-	Rs. 30,00,000/-	Rs. 40,00,000/-	Rs. 50,00,000/-	Rs. 10,00,000/-

Concept Note on Modifications in DPR

Total Project Duration / Items	Projects upto 25 km length	Projects more than 25 km upto 50 km	Projects more than 50 km upto 100 km	Projects more than 100 km upto 200 km	Projects more than 200 km upto 400 km	Inputs for every additional 100 km
	Description					
Socio-economic & Census Survey/Studies	Rs. 1,25,000/-	Rs. 2,50,000/-	Rs. 5,00,000/-	Rs. 5,00,000/-	Rs. 7,50,000/-	Rs. 1,50,000/-
Land Acquisition Studies including GIS Mapping	Rs. 2,50,000/-	Rs. 5,00,000/-	Rs. 7,50,000/-	Rs. 10,00,000/-	Rs. 15,00,000/-	Rs. 2,50,000/-
Provisional Sum for Geotechnical Investigation	Rs. 7,50,000/-	Rs. 15,00,000/-	Rs. 25,00,000/-	Rs. 35,00,000/-	Rs. 50,00,000/-	Rs. 10,00,000/-
Provisional Sum for Environment Clearance/ Wildlife Clearance	Rs. 2,50,000/-	Rs. 5,00,000/-	Rs. 7,50,000/-	Rs. 10,00,000/-	Rs. 15,00,000/-	Rs. 5,00,000/-
Office Rent Fixed Costs	Duration of BOQ item should not be more than Total Project Duration as per rates given in the RFP					
Man-months of support staff and Office						
Office Supplies, Utilities and Communication (Fixed Costs)						
Detailed topographic surveys using Mobile/Aerial LIDAR or better Technology	scope (in Km) to be kept equal to length of the project @Rs. 20,000/- per km for plain and rolling terrain and @Rs. 30,000/- per km for hilly & mountainous terrain.					
Road and bridge Inventory (through NSV and MBIU)	scope (in lane Km) to be kept equal to existing length of the brownfield portion of the project					
FWD Test and Pavement Evaluation	For two quarry location per 100 km one test to be done for coarse aggregate and one for fine aggregates as per rates given in the RFP					
Material Survey and Investigation	For two quarry location per 100 km one test to be done for coarse aggregate and one for fine aggregates as per rates given in the RFP					
Sub-grade Investigation	One sample for CBR or K value for sub-grade/ embankment source say 1 test for every 5 km as per rates given in the RFP					

Concept Note on Modifications in DPR

Total Project Duration / Items	Projects upto 25 km length	Projects more than 25 km upto 50 km	Projects more than 50 km upto 100 km	Projects more than 100 km upto 200 km	Projects more than 200 km upto 400 km	Inputs for every additional 100 km
	Description					
GPR Survey for detection of under ground utilities	Scope to be considered as 10% of project length as per lane km rates given in the RFP.					
Cost of Supply & Fixing Boundary pillars	Assumed that 25% length in urban area, new bypasses and realignment of existing highways with Rs. 2000 per boundary pillar which are to be given @50m on both sides of RoW. On all other locations boundary pillar to be given @200m on both sides of RoW. Any additional requirement beyond that stipulated in the cost estimate to be paid as per actual no.s of boundary pillars fixed.					
Land acquisition support staff and logistics for land acquisition team	Cost to be worked out @Rs 2,50,000 per month upto length of project duration but subject to maximum 8 months per CALA support team. One (1) No. of CALA support Teams to be considered for every district in the project reach.					

Notes:	**1. Technical Division may modify the man-months of Key-Personnel/Sub-Key Personnel as per project specific requirements with the approval of Member concerned.** **2. Above guidelines only indicate man month. The No. of Key-Personnel/Sub-Key Personnel to be deployed in the given man months may be decided by Technical Division** **3. All testing/investigations/survey payments shall be made only on completion of the actual testing/investigation** **4. Rates for items not included in this Chart may be considered the same as given in the RFP issued vide Policy Circular no. 11.57/2024 dated 14.06.2024.** **5. Amount for Geotechnical Investigation & Testing given in the cost estimate is indicative and final payments are to be done as per details given in Enclosure-V.** **6. Additional payments for geotechnical investigation beyond the provisioned amount in the financial form or any recovery from the same to be done after appraisal of the project.**

	7. Technical Divisions should generally avoid inviting DPR for Projects less than 50 Km in length. For smaller projects, divisions are advised to bundle nearby projects for DPR in order to utilise the benefits of economies of scale. 8. All payments for survey and investigations to paid as per actual work done subject to condition that positive variation in the corresponding BOQ items of upto 10% variation would be borne by the consultant.

Annexure-I

Empanelment Criteria for Geotechnical Investigation Agencies

A. For Normal Highway Projects the testing agency should have the following:

1. NABL Accreditation: In-situ & Laboratory Testing

(i) Site & Laboratory testing agency shall in-house equipment's & testing laboratory holding valid NABL accreditation under ISO 17025: 2017 for the following:

Discipline	Product/Material of test	Specific Test Performed	Test method
In-Situ	Soil	Drilling in Soil Standard Penetration Test (SPT) by Automatic and Manual method	IS 2131: 1981

(ii) Site & Laboratory testing agency shall in-house equipment's & testing laboratory **holding** valid NABL accreditation under ISO 17025: 2017 for at least 80% (i.e 19 no.s out of 23) testing parameters of soil & rock as mentioned below:

S No.	Discipline	Product/Material of test	Specific Test Performed	Test method
1	Mechanical	Soil	Atterberg's Limit	IS 2720 (Part 5) 1985 RA: 2020 & 2021
2	Mechanical	Soil	California Bearing Ratio (CBR)	IS 2720 (Part 16) 1987 RA: 2021
3	Mechanical	Soil	Triaxial Shear test	IS 2720 (Part 12) 1981 RA: 2021
4	Mechanical	Soil	Direct Shear Test	IS 2720 (Part 13) 1986 RA: 2021
5	Mechanical	Soil	Consolidation Test	IS 2720 (Part 15) 1965 RA:2021
6	Mechanical	Soil	Free Swell Index	IS 2720 (Part 40) 1977 RA:2021
7	Mechanical	Soil	Grain Size Analysis (Hydrometer)	IS 2720 (Part 4) 1985 RA: 2020

8	Mechanical	Soil	Grain Size Analysis/Sieve Analysis	IS 2720 (Part 4) 1985 RA: 2020
9	Mechanical	Soil	Standard/ Modified Proctor Compaction (OMC/MDD)	IS 2720 (Part 7) 1980 RA: 2021 /IS 2720 (Part 8) 1983 RA: 2020
10	Mechanical	Soil	Permeability test	IS 2720 (Part 17) 1986 RA:2021
11	Mechanical	Soil	Specific Gravity	IS 2720 (Part 3) 1980 RA: 2021
12	Mechanical	Soil	Swelling Pressure	IS 2720 (Part 41) 1977 RA:2021
13	Mechanical	Soil	Unconfined Compressive Strength	IS 2720 (Part X) 1991 RA: 2020
14	Mechanical	Soil	Water Content	IS 2720 (Part 2) 1973 RA: 2020
15	Mechanical	Rock	Bulk Density of Rock	IS 13030 1991 RA: 2016
16	Mechanical	Rock	Modulus of Elasticity	IS 9221 1979 RA: 2016
17	Mechanical	Rock	Point Load Strength Index	IS 8764 1998 RA: 2019
18	Mechanical	Rock	Poisson's Ratio	IS 9221 1979 RA: 2016
19	Mechanical	Rock	Porosity	IS 13030 1991 RA: 2016
20	Mechanical	Rock	Relative Density	IS 13030 1991 RA: 2016
21	Mechanical	Rock	Unconfined Compressive Strength	IS 9143 1979 RA: 2016
22	Mechanical	Rock	Water Content/Absorption	IS 13030 1991 RA: 2016
23	Mechanical	Rock	Slake Durability Test	IS 10050 1981 RA: 2016

2. Ownership of field-testing equipment's:

II. Ownership of field-testing equipment's:

Bidder shall have ownership of minimum 5 Nos. in-house Hydraulic/ Rotary drilling rigs, 5 Nos. power winch/shell & auger drilling rigs.

In case where bidders manufacture equipment on their own, they need to list all the parts used in the equipment and submit bills of purchase of all those parts as evidence of ownership along with photograph of the finally assembled equipment.

3. Technical Manpower on-roll:

S. No.	Position	Minimum Qualification	Nos.	Minimum Experience
1	Team Leader	M.Tech (Geotech)	1	5 years in geotechnical investigation work, testing and recommendations /advisory services.

2	Lab In charge	Graduate in Civil Engg or Diploma/ITI in Civil Engg	1	5 years in geotechnical investigation works for Graduate in Civil Engg 10 years in geotechnical investigation works for Diploma/ITI Holders in Civil Engg
3	Site-In charge (Project Manager)	Graduate in Civil Engg or Geologist (MSc Geology) or Diploma in Civil Engg	1	10 years in geotechnical investigation works. or 12 years in geotechnical investigation works for MSc Geology and Diploma Holders in Civil Engg.
4	Civil Engineer/ Site Supervisor/Geologists	Graduate/Diploma/ITI in Civil Engg/M.sc in Geology (for Geologists)	3	2 years in geotechnical investigation work.

B. For Highway Projects in Hilly/Mountainous Area the testing agency should fulfil the following requirements in addition to all eligibility requirement for Normal Highway Projects:

1. NABL Accreditation: In-situ & Laboratory Testing

(i) In addition to requirement for normal highway projects the Site & Laboratory testing agency shall in-house equipment's & testing laboratory **holding** valid NABL accreditation under ISO 17025: 2017 for at least 80% (8 No.s out of 10) of the following tests:

S No.	Discipline	Product/ Material of test	Specific Test Performed	Test method
1.	Mechanical	Rock	Bulk Density of Rock	IS 13030 1991 RA: 2016
2.	Mechanical	Rock	Modulus of Elasticity	IS 9221 1979 RA: 2016
3.	Mechanical	Rock	Point Load Strength Index	IS 8764 1998 RA: 2019
4.	Mechanical	Rock	Poisson's Ratio	IS 9221 1979 RA: 2016
5.	Mechanical	Rock	Porosity	IS 13030 1991 RA: 2016
6.	Mechanical	Rock	Relative Density	IS 13030 1991 RA: 2016
7.	Mechanical	Rock	Unconfined Compressive Strength	IS 9143 1979 RA: 2016
8.	Mechanical	Rock	Water Content/Absorption	IS 13030 1991 RA: 2016

9.	Mechanical	Rock	Slake Durability Test	IS 10050 1981 RA: 2016
10.	Mechanical	Rock	Brazilian Tensile Test	IS 10082 1981 RA: 2016

2. Work Experience: The testing agency should have carried out geotechnical investigation for a cumulative of 10 kms of Highway/Railway projects in hilly/mountainous areas.

3. Technical Manpower on-roll:

Position	Minimum Qualification	Nos.	Minimum Experience
Geologist	M.sc in Geology	1	5 years in geotechnical investigation work (To oversee investigation work with suitable geological description & strata details).

C. For Highway Projects in Tunnel Projects the testing agency should fulfil the following requirements in addition to all eligibility requirement for Highway Projects in Hilly/Mountainous Area:

1. NABL Accreditation: In-situ & Laboratory Testing

(i) NABL Accreditation: In-situ & Laboratory Testing: In addition to requirement for normal highway projects and projects in hilly/mountainous area the Site & Laboratory testing agency shall in-house equipment's & testing laboratory holding valid NABL accreditation under ISO 17025: 2017 for at least 80% (i.e 7 no.s out of 9) testing parameters of soil & rock as mentioned below:

S No.	Discipline	Product/ Material of test	Specific Test Performed	Test method
1.	Mechanical	Rock	Cerchar Abrasivity Index test	ASTM-D (7625): 2010
2.	Mechanical	Rock	Pressure Meter Test (Menard Method)	IS 1892
3.	Mechanical	Rock	Pressure Meter test (OYO Method)	IS 12955 (Part 2)
4.	Mechanical	Rock	Insitu Permeability Test in Rock	IS 5529 (Part 2)
5.	Mechanical	Soil & Rock	Seismic Refraction Test	IS 15681
6.	Mechanical	Soil & Rock	2D Electrical Resistivity Tomography (ERT)	ASTM D6431-99 / IS 1892
7.	Mechanical	Rock	Petrography	BS EN 12407

8.	Mechanical	Soil & Rock	Cross Hole Seismic Test	ASTM D4428M
9.	Mechanical	Soil & Rock	Down Hole Seismic Test	ASTM D4428M

2. Work Experience: The testing agency should have carried out geotechnical investigation for a cumulative of at least 500 m of tunnels for Highway/Railway/Metro/ Hydropower Projects with minimum tunnel length of 100m of individual project.

3. Ownership of field-testing equipment's: Bidder shall have ownership of minimum 1 Multi-Point Bore Hole Extensometer, 1 Pillar Strain Meter, 1 Vibrating Wire Load Cell, 1 Shotcrete Stress Gauge, 1 Convergence indicator.

D. The scope of work for geotechnical investigation agencies:

1. Mobilization and de-mobilization of Drilling Rigs and all other required equipments, tools & tackles for carrying out investigation work on-land/in-water investigations.

2. Drilling in Soil, Standard Penetration Test (SPT-NABL accredited) and UDS according to the respective Indian Standard Code. Drilling in rock to be done only by either double/Triple tube core barrel.

3. Shifting from one structure/borehole to other and set up of rigs and manpower along with other tools.

4. Conducting All 18 NABL accredited Laboratory test of soil listed in eligibility according to the respective Indian Standard Code.

5. Conducting All 10 NABL accredited Laboratory test of rock listed in eligibility according to the respective Indian Standard Code. For hill/mountain projects Brazilian Tensile Test shall also be conducted. For tunnel projects Cerchar Abrasivity Index test, Pressure Meter Test (Menard Method), Pressure Meter test (OYO Method) & Insitu Permeability Test in Rock shall also be conducted.

6. All tests are to be conducted in frequency as specified in the RFP.

7. All Preparation and Submission of report with recommendation of type of foundation and allowable bearing pressures for the soil/rock at various depths.

8. It should be ensured that at least 90% of all the mechanical tests for soils and rocks are conducted by the empaneled Agency themselves.

9. All remaining mechanical and chemical tests, if any, are to be conducted through labs accredited by NABL for those tests.

10. Reports of all Tests conducted by the Agency directly or through other NBAL accredited labs must contain the Unique Laboratory Report (ULR) Number as per NABL guidelines and all the reports must mandatorily be uploaded on NABL Portal for the same.

11. The bore log/core log for testing in tunnels should mention all the parameters for determination of RMR and Q value used for tunnel design as per IRC SP:91 2019 (or latest edition published at the time of testing)

12. The minimum man-power as described in the eligibility clause 2 of NIT, shall have to be deployed by the agency during field and lab testing, as the case may be.

E. The BOQ are as under (Rates to be revised every 2 years to compete with market rates)

S.No.	Item	Unit	Quantity	Rate* (INR.)
1	Sub-Soil Investigation (Boring)			
a	Drilling of borehole in all type of soil up to required depth from EGL and conducting Standard Penetration test at 1.50 mtr interval or every change of strata as per IS: 2131-1981 including collection of disturbed / undisturbed soil samples at every 3.0 mtr Intervals and Recording depth of ground water table.	Per Meter	To be decided as per Annexure-A	2000
b	Drilling of NX size borehole using Double/Triple tube core barrel with diamond core bit in all type of Rock (CR>0%)	Per Meter	To be decided as per Annexure-A	4000
2.	Sub-Soil Investigation (Boring) in Hilly & Mountainous Terrain or Tunnels			
a.	Drilling of borehole in all type of soil up to required depth from EGL and conducting Standard Penetration test at 1.50 mtr interval or every change of strata as per IS: 2131-1981 including collection of disturbed / undisturbed soil samples at every 3.0 mtr Intervals and Recording depth of ground water table.	Per Meter	To be decided as per Annexure-A	3000
b.	Drilling of NX size borehole using Double/Triple tube core barrel with diamond core bit in all type of Rock (CR>0%)	Per Meter	To be decided as per Annexure-A	6000

Additional investigation for Hill Roads are as under:

Concept Note on Modifications in DPR

S No.	Item	Unit	Quantity	Rate* (INR.)
1.	**Field test according to the Indian standards codes/ASTM**			
a	Conducting Petrography of rock	Nos.	To be decided as per Annexure-A	5,000
b	Geological Mapping (SRT): 1 test at 115 m length	Nos.	To be decided as per Annexure-A	75,000
3.	Slope stability analysis	lumpsum		5,00,000

Additional investigation for Tunnel Projects are as under:

S No.	Item	Unit	Quantity	Rate* (INR.)
1.	**Field test according to the Indian standards codes/ASTM**			
a	Conducting Pressure meter test in soil (Menard type)	Nos.	To be decided as per Annexure-A	15,000
b	Conducting Pressure meter test in rock (OYO type)	Nos.	To be decided as per Annexure-A	20,000
c	Conducting Petrography of rock	Nos.	To be decided as per Annexure-A	5,000
d	Conducting Cerchar Abrasivity test	Nos.	To be decided as per Annexure-A	1,000
e	**Geophysical Investigation**			
i	Seismic Refraction test (SRT): 1 test at 115 m length	Nos.	To be decided as per Annexure-A	75,000
ii	Cross hole seismic test (CHST): up to 30 m including drilling of 3 bore holes	Nos.	To be decided as per Annexure-A	3,50,000
f	Insitu Permeability test	Nos.	To be decided as per Annexure-A	7,500
3	Slope stability analysis	lumpsum		5,00,000

Note*: All rates to be reviewed by Technical Divisions before issue of tender

Annexure-A to Annexure-I

Quantity Estimation for testing

(I) For Normal Highway Projects as well as Projects in Hilly/Mountainous Regions

Type of Structure	Span length	Guideline for No of Boreholes	No. of Boreholes		Termination Criteria (m)						
					Case 1	Case 2	Rock Strata			Maximum Combined Bore Hole Depth not to Exceed	
			Abutment / Approach Location	Intermediate/ Pier Location	Soil Open Foundation (Refusal Encountered at shallow depth upto 10 m)	Soil Pile Foundation	Soft Rock Open Foundation	Soft Rock Pile Foundation	Hard Rock (RQD>75 %)	Open Foundation	Pile Foundation
MJBR / MNBR	15-30m	one borehole on one abutment location	1	-	20	40	5	15	3	20	40
	30m-60m	one borehole on one abutment location and one borehole on one intermediate pier location	1	1	-	40	-	15	3	-	40
	Greater than 60m	borehole on each abutment and each pier location.	2	1*	-	40	-	15	3	-	40
Flyover / ROB / RUB	15-30m	one borehole on intermediate section	-	1	20	40	5	15	3	20	40
		two borehole on each approach side	4	-	20	-	5	-	3	20	-
	30m-60m	one borehole on one abutment location and one borehole on one intermediate pier location	1	1	20	40	5	15	3	20	40
		two borehole on each approach side	4	-	20	-	5	-	3	20	-
	Greater than 60m	borehole on each abutment and each pier location.	2	1*	-	40	-	15	3	-	40
		two borehole on each approach side	4	-	20	-	5	-	3	20	-
	1*12*4.5	one borehole on intermediate section	-	1	20	-	5	-	3	20	-
	1*12*5.5	one borehole on intermediate section	-	1	20	-	5	-	3	20	-

VUP		one borehole on each approach side	2	-	20	-	5	-	3	20	-
	1*20*4.5	one borehole on intermediate section	-	1	20	30	5	-	3	20	30
		one borehole on each approach side	2	-	20	-	5	-	3	20	-
	1.20*5..5	one borehole on intermediate section	-	1	20	30	5	-	3	20	30
		two borehole on each approach side	4	-	20	-	5	-	3	20	-
Culvert	Size as per IRC SP 13:2004	one trial pit	Trial pit 1 / culvert		15	20	5		3	15	-
Embankment along road portion	height<6m	Trial Pit at each km	1 Trial Pit / km		1.5 x Embankment height or up to the rock strata which is earlier						
	height>6m	1 Bore hole at each km	1 Bore hole / km								

NOTE:- 1). * depends on the number of piers in the structure
2). Refusal in soil strata as N>100.
3). Case 1:-In case, only soil Strata encountered and open foundation recommended.
4). Case 2 :- In case, only soil Strata encountered and pile foundation recommended.
5). Maximum Borehole depth in case of Open foundation: -Depth of soil + 5 m in soft rock or 3m in hard rock or limiting to maximum borehole depth as mentioned in case 1.
6). Maximum Borehole depth in case of Pile foundation:-Depth of soil + 15 m in soft rock or 3m in hard rock or limiting to maximum borehole depth as mentioned in case 2.
7). Above guidelines as per clause no. 3.2 of IRC-78:2014 & clause no. 1102.1 of MORTH 5th revision

Strata Classification	
Soil	Drilling in all type of soils, Core Recovery upto 0%
Soft Rock	Drilling in weathered rock, Core Recovery > 0%; and 0<RQD<75%
Hard Rock	Drilling in rock - RQD >75%

(II) For tunnels:

S No.	Type of tunnel	Nos.	Depth of Bore hole
1	Length < 1 km	1 borehole at each portal and 1 bore hole in center	1.5 times of the diameter belowtunnel invert level
2	Length > 1 km	1 borehole at each portal, 1 borehole in center and Intermediate boreholes at every 1 km	

Appendix – H

Format for Bank Guarantee for Performance Security BANK GUARANTEE FOR PERFORMANCE SECURITY

To,

<Agency, Address>

In consideration of NHAI (hereinafter referred as the "Client", which expression shall, unless repugnant to the context or meaning thereof include its successors, administrators and assigns) having awarded to M/s……having its office at …….. (Hereinafter referred to as the "Consultant" which expression shall repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns), a contract by issue of client's Contract Agreement no. / Letter of Acceptance No. …… dated …… and the same having been unequivocally accepted by the Consultant, resulting in a Contract valued at Rs……../- (Rupees……) excluding Goods & service tax for "Consultancy Services for Preparation of DPR for development of Nagpur-Hyderabad high speed corridor under Master Plan of National Highways with vision 2047 in the State of Maharashtra and Telangana (Total Length- 461km) (Hereinafter called the "Contract"), and the Consultant having agreed to furnish a Bank Guarantee to the Client as "Performance Security as stipulated by the Client in the said contract for performance of the above Contract amounting to Rs……./- (Rupees……).

We, ……..having registered office at ……., a body registered/constituted under the ……(hereinafter referred to as the Bank), which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the client immediately on demand any or, all money payable by the Consultant to the extent of Rs. ……(Rupees……..) as aforesaid at any time up to ……..without any demur, reservation, contest, recourse or protest and/or without any reference to the consultant. Any such demand made by the client on the bank shall be conclusive and binding notwithstanding any difference between the Client and the Consultant or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. We agree that the Guarantee herein contained shall be irrevocable and shall continue to be enforceable till the Client discharges this guarantee.

The Client shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee, from time to time to vary or to extend the time for performance of the contract by the Consultant. The Client shall have the fullest liberty without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the consultant and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the Client and the Consultant any other course or remedy or security available to the Client. The client shall also have the fullest liberty to release the liability of the Bank Guarantee in parts or full as per the conditions of the contract agreement of the said consultancy assignment through written request to the bank. The bank shall not be relieved of its obligations under these presents by any exercise by the Client of its liberty with reference to the matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Client or any other indulgence shown by the Client or by any other matter or thing whatsoever which under law would but for this provision have the effect of relieving the Bank.

The Bank also agrees that the Client at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Consultant and notwithstanding any security or other guarantee that the Client may have in relation to the Consultant's liabilities.

Notwithstanding anything contained herein,

a) Our liability under this Bank Guarantee is limited to Rs. ……(Rupees……) and it shall remain in force up to and including ……and shall be extended from time to time for such period as may be desired by M/s……, on whose behalf this guarantee has been given.

b) This Bank Guarantee shall be valid up to …….

c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ……(date of expiry of Guarantee).

(Signature of the Authorized Official)

(Name & Designation with Bank Stamp)

NOTE:

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

(ii)The address, telephone no. 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.

(iii)The bank guarantee for Rs 10,000 and above is signed by at least two officials (or as per the norms prescribed by the RBI in this regard).

APPENDIX-I

TERMS OF REFERENCE (TOR)

Consultancy Services for Preparation of DPR for development of Nagpur-Hyderabad high speed corridor under Master Plan of National Highways with vision 2047 in the State of Maharashtra and Telangana

Terms of Reference for Consultancy Services (TOR)

1. General

1.1 The NHAI has been entrusted with the assignment of Consultancy Services for Preparation of DPR for development of Nagpur-Hyderabad high speed corridor under Master Plan of National Highways with vision 2047 in the State of Maharashtra and Telangana. NHAI now invites proposal from Technical consultants for carrying out detailed project report as per details given in Annexure-1.

1.2 NHAI will be the employer and executing agency for the consultancy services and the standards of output required from the appointed consultants are of international level both in terms of quality and adherence to the agreed time schedule. The consultancy firm will solely be responsible for submission of quality work in stipulated period.

1.3 Ministry has recently awarded works of consultancy services for construction of ROBs for replacing level crossings in various states. In case a level crossing exists in a project reach, consultant is required to co-ordinate with those consultants and finalize the alignment & configuration of road accordingly. However, if the same is not covered in the above assignment of DPR/feasibility study awarded by Ministry, the consultant under this assignment shall be responsible for preparing DPR for such level crossings.

2. Objective

2.1 The main objective of the consultancy service is to establish the technical, economical, and financial viability of the project and prepare detailed project reports for development of …….

2.2 The viability of the project shall be established taking into account the requirements with regard to rehabilitation, upgrading and improvement based on highway design, pavement design, provision of service roads wherever necessary, type of intersections, rehabilitation and widening of existing and/or construction of new bridges and structures, road safety features, quantities of various items of works and cost estimates and economic analysis within the given time frame.

2.3 The Detailed Project Report (DPR) would inter-alia include detailed highway design, design of pavement and overlay with options for flexible or rigid pavements, design of bridges and cross drainage structures and grade separated structures, design of service roads, quantities of various items, detailed working drawings, detailed cost estimates, economic and financial viability analyses, environmental and social feasibility, social and environmental action plans as appropriate and documents required for tendering the project on commercial basis for international / local competitive bidding.

2.4 The DPR consultant should ensure detailed project preparation incorporating aspects of value engineering, quality audit and safety audit requirement in design and implementation. The Consultant shall ensure to carry out Road Safety Audit at various stages as per supplement-III (Additional Requirement for Safety Audit) of TOR.

2.5 The consultant should, along with Feasibility Report, clearly bring out through financial analysis

the preferred mode of implementation on which the Civil Works for the stretches are to be taken up. The consultant should also give cost estimates along with feasibility report/ detailed Project Report.

2.6 If at inception stage or feasibility stage, employer desires to terminate the contract, the contract will be terminated after payment up to that stage.

3. Scope of Services

The general scope of services is given in the sections that follow. However, the entire scope of services would, inter-alia, include the items mentioned in the Letter of Invitation, terms of reference, general contract and any supplements and appendices to these documents.

3.1 RoW and Land related aspects

3.1.1 The Right of Way norms for National Highways should be as under:

(i)	Expressways	90 m
(ii)	Economic Corridors and major National Highways requiring provisions for Service Roads and planned for expansion to 8-lanes	70 m
(iii)	National Highways with planed capacity to 6-lane Configuration	60 m
(iv)	National Highways with planned capacity to 4-lane	45 m
(v)	NH with planned capacity to two-lane + PS configuration requiring provision of Service Roads	30 m

3.1.2 In case of upgradation of an existing two lane Highway to a 4/6/8 lane configuration, a comparative cost-benefit analysis shall necessarily be carried out while recommending development of existing route/alignment vis-a-vis alternate option of a green –field alignment. While carrying out the cost benefit analysis of both the options, the following factors shall be considered:

(i) Extant of land acquisition and the associated costs;

(ii) Number of structures required to be acquired along their extant and costs.

(iii) The quantum of utilities and costs required for their shifting.

(iv) The extent of tree –felling and the associated cost & time for obtaining the requisite permissions.

3.1.3 However, green-field option may not be resorted to in cases where growth of traffic is such that ultimate capacity does not require widening beyond 4 lanes in future.

3.1.4 In case the green field alignment option works out to be a preferred option, then-

(i) Entire ROW (60m -70m) may be acquired for a maximum capacity of 8 lane main carriage way with provision for service roads.

(ii) Initially 4 lane carriage-way with 4 lane structures shall be developed with additional land left in the median for future expansion.

(iii) The highway shall have provision for service roads in inhabited areas, preferably of 10 mtrs width, with maximum access –control for the main carriage way .

(iv) Access to the towns/cities/establishments located on the existing National Highway, may be provided through spurs from the green field route.

3.1.5 All efforts shall be made to avoid any road alignment through National Parks and Wildlife

Sanctuaries, even if it requires taking a longer route / bypass. However, where it becomes absolutely unavoidable and necessary to keep the alignment through such reserve forest / restricted areas, land would be acquired with RoW of not more than 30 mtrs.

3.1.6 Similarly, though it may be difficult, while determining the alignment for any bypass, efforts be made to see if these could be along the revenue boundaries of two revenue estates thereby minimizing the compulsions of land owners / farmers for cross-overs to the other side. In case such an alignment is not found feasible, it should be ensured that access to common facilities for the local people (e.g. schools, Healthcare facilities etc.) is maintained only on one side of the alignment, thereby minimizing the need for cross-over for day-to-day life.

3.1.7 Protection of the acquired RoW against any possible encroachments is extremely important. Boundary stones be provided at the end of the RoW as per provisions of IRC:SP:84 and also supplemented as per Circular dated 08.12.2015 issued by NHAI. The boundary pillars alone, which are subject to removal with passage of time, may not be enough to save against encroachments. As such, the typical cross-section of a Highway Road is being re-visited separately with the intention of providing permanent features in this behalf. For a typical RoW of 60 mtrs, starting from one end, these will require the following:

(a) Use barricading of the RoW with plantation of hedge-like species (Ficus / Poplars) within a 3m wide strip area, dug up to 0.6 to 0.9 mtrs, of which 2.0 mtrs to serve as a Utility Corridor.

(b) Provision of a Service Road (along the inhabited area) with its drainage slope towards the drain / area reserved for Strip Plantation, for a width of 9.0 mtrs.

(c) Earmark width of 1.5 mtrs for construction of a drain so as to be able to capture the rainwater flow from the Service Road (wherever provided) and the main carriageway.

(d) Three lane with paved shoulders: Main carriageway – 10.5 mtrs, paved shoulder – 2.5 mtr and earthen shoulder – 1.5 mtr.

(e) Median – 5.0 mtrs (effective width 4.5 m), and

(f) A Mirror Image on the other end.

3.1.8 With regard to land acquisition, tree felling, utility shifting across the alignment, Ministry's Guidelines issued vide letter no. NH -15017/21/2018-P&M dated 10th May, 2018, or any amendment thereof, may be adhered to.

3.2 Provisions of short bypasses, service roads, alignment corrections, improvement of intersections shall be made wherever considered necessary, practicable and cost effective. However, bypasses proposals should also be considered, wherever in urban areas, improvement to 6 laning of the existing road is not possible.

3.3 Role and Responsibilities at different stages of Land Acquisition

The Consultant in the process of his deliverables, is expected to:

(i) To delineate and propose the most optimal alignment and take care of geometrics of the road to meet safety parameters while finalizing the DPR;

(ii) Identify and avoid (to the extent feasible) all such structures (religious structures, public utilities cremation grounds, private structures) in the RoW of the road project that could become major hindrances at the time of project execution;

(iii) Procure or create digitized, geo referenced cadastral/land revenue maps for the purpose of land acquisition activities. Where state governments of local agencies have already digitize cadastral maps, the consultant shall arrange to procure such maps. The digitized map should exactly match the original map so that the dimensions and area of plots can be extracted from the map itself.

(iv) Co-ordinate collection of all relevant land revenue records (including Khasra maps, Khatiyan, Jamabandi etc.) from the local land revenue administration office required for preparation of Draft notification under Section 3A of the NH Act.

(v) Identify and list all land parcels that need to be acquired as part of project road. Conduct Joint measurement survey in conjunction with CALA, the Executing Agency and the Land Revenue Department to verify land records.

(vi) Assist the CALA and the Project Executing agency in preparation of statutory notification under Sections 3A, the CALA during hearing of objections received under Section 3C, recording of hearings and completion of this process, preparation of draft notification under Section 3D and completion of the LA process at every stage, timely publication of notifications and public notices in newspapers at every stage;

(vii) Clear identification and preparation of an inventory of the assets attached to the land under acquisition (e.g. Structures, trees, crops or any such assets which should be valued for payment of compensation);

(viii) Co-ordination with offices of various departments like Land Revenue Office (or Tehsil), Registrar office and other State departments (public works department, horticulture department, forest department etc.) for evaluation of assets (Structures, tree, crops etc.) attached to the land and liaison with respective State authority for authentication of the valuation.

(ix) Prepare and inventory of all the utilities (electrical/water supply lines/gas pipelines etc.–

(x) both linear and cross overs) and all such structures (religious structure, public utilities, cremation grounds, private structures) in the RoW of the road project that could become major hindrances at the time of project execution;

(xi) Carefully avoid location of any Flyover/VUP/elevated structure where a high tension electricity line (66/132/220/400 KV etc.) is crossing over so as to avoid raising of such line at such point, while designing the road projects;

(xii) Assist in demarcation of the acquired land and installation of the boundary stones/pillars/peg makings along the RoW of the alignment;

(xiii) Identification of land parcels missed out from acquisition in the first round and assist the Authority and the CALA in preparation of Draft Notification for acquisition of the land under missing plots.

(xiv) All Land Acquisition (LA) shall be done through empanelled LA agencies. However, payment to such LA agencies would be made by the DPR consultants. However, the responsibility of Deliverables shall be solely that of the DPR Consultant. Alternatively, in case the Consulting Firm itself satisfies the criteria of empanelment or is itself empanelled as LA agency, then there is no need to engage any other empanelled LA Agency. Financial proposal of given the RFP is inclusive of the implications for support team for CALA. Registration and empanelment of the LAAgencies shall be done by NHAI. The rolling portal for the same shall be available throughout the year without any closing date for the purpose of registration and the evaluation. The empanelment criteria for LA consultants is described as under:

a) Total Experience of Land Acquisition for Any Central/State Government Agency in last 7 Financial Years: More than 1000 Hectares

b) Total Experience of Land Acquisition for Any Central/State Government Agency under NH Act in last 7 Financial Years: More than 225 Hectares

c) Experience in digitization of cadastral maps for land surveys in last 7 Financial Years: More than 100 Hectares

d) Has atleast 5 on-roll Land Acquisition Experts in form of Retired or Ex-Patwari Naib Tahsildars/ Tahsildars /SDM/ADMs (or equivalent State Government Designations) and senior Officers with at least 10 years of experience in their respective Post

e) Has defined LA sub-professional team on the regular roll of at least 25 people (Excluding

Experts) in the last 3 Financial Years

f) Should have average annual Turnover of Atleast 2.5 Crores in last 3 Financial Years.

g) Experience of each member of JV shall be considered in proportion to the JV share give in the Joint Bidding Agreement.

h) Empanelment shall only be of a sole firm and not of any JV or Associate.
Note: Till the Empanelment process of LA Agencies has been completed by NHAI, the DPR consultant shall utilise the services of such agencies which fulfil the above said criteria which shall be verified by Authority before commencement of the consultancy assignment.

3.4 Approach to the provision and specifications for Structures:

3.4.1 The structures on roads viz. Bridges, ROBs (Road Over Bridges, and Flyovers), RUBs (Road Under Bridges) etc. are designed for more than 50 years. It is difficult to increase the width of the structures at a later date which may also have larger financial implications apart from construction related issues in running traffic. Therefore, it has been decided to keep provision for all the structures including approaches comprising of retaining structures as 6-lane (length of such approaches shall, in no case, be less than 30m on either side) on all the four-lane highways except in the following cases (i) Reserve Forest (ii) Wild life Areas (iii) Hilly Areas (iv) Urban Areas where site condition do not permit this. Wherever elevated sections are designed through any inhabited areas, these should be six-lane structures supported on single piers so that the road underneath serves as effective service roads on both sides.

3.4.2 Highway projects shall be designed for separation of local traffic especially for Vulnerable Road Users (VRUs), for longitudinal movements and crossing facilities through viaduct(s) located at convenient walking distance. Provision of PUPs and CUPs with size of 7.0m x 3.0m, as specified in para 2.10 of the IRC specifications, has proved to be insufficient keeping in view the increased use of mechanization in agriculture practices. These structures do not support the easy passage / crossing for the tractors with trolleys so often used for agricultural operations. As traffic on cross roads is increasing day-by-day, it has been decided to substitute the provision of Pedestrian Underpass (PUP) / Cattle Underpass (CUP) [for para 2.10 of IRC specifies the dimensions of 7.0m x 3.0m] with a LVUP with a minimum size of 12 (lateral clearance) x 4m (vertical clearance). Out of 12m lateral width, 2.5m width on one side shall be raised for pedestrian sidewalks with grills to make pedestrian movement convenient and safe. A third smaller dimension VUP-SVUP (4m*7m) for all cross roads carriageway width lesser than 5.5m may also be considered. Thus VUPs would be of three grades i.e.VUP-5.5mx20m; LVUP-4mx12m; and SVUP-4mx7m These structures shall be located at the most preferred place of pedestrian / cattle / day-to-day crossings. Depending on the site conditions, feasibility of clubbing the crossing facilities through service roads shall also be explored. Further, the bed level of these crossings shall not be depressed as any such depression, in the absence of proper drainage facilities becomes water-logged rendering the same unusable. Ideally, the bed level of the crossings should be a bit higher with proper connectivity to a drain, which could serve the drainage requirements of the main carriageway, the underpass and the service road as well.

3.4.3 Wherever the alignment of 4-lane Highway Road project is retained in-situ while passing through inhabited areas (e.g. villages), it should be ensured that Service Roads are provided on both sides of the carriageway, connected underneath with a cross-over structure (VUP/ LVUP/SVUP). Thus each habitation should preferably have crossing facility at the highways with

a vertical clearance of 4 mtrs.

3.4.4 To ensure that bypass once constructed serves the intended purpose during its life, all the bypasses shall be well designed and access controlled. The entry / exit from / to side roads shall be controlled such that they are grade separated at major roads or at spacing not less than 5 kms. Side roads at closer spacing shall be connected to the service roads on either side and taken to major roads for provision of grade separated interchange.

3.5 The provision of embankments shall be kept minimum so as to save land as well as earth which are scarce resources. This can be decided on case to case basis with due deliberations. However, economic considerations may also be given due weightage before deciding the issue.

3.6 The Consultant shall study the possible locations and design of toll plaza if applicable to the project. Wayside amenities Land (minimum 5 acres, length and depth preferably in the ratio of 3:2) shall also be acquired for establishment of Way-side amenities at suitable locations at distances varying between 30 to 50 kms on both sides of the Highway. The local and slow traffic may need segregation from the main traffic and provision of service roads and fencing may be considered, wherever necessary to improve efficiency and safety.

3.7 The Consultant will also make suitable proposals for widening/improvement of the existing road and strengthening of the carriageways, as required at the appropriate time to maintain the level of service over the design period. The Consultants shall prepare documents for EPC/PPP contracts for each DPR assignment.

3.8 All ready to implement 'good for construction' drawings shall be prepared incorporating all the details.

3.9 Environmental Impact Assessment, Environmental Management Plan and Rehabilitation and Resettlement Studies shall be carried out by the Consultant meeting the requirements of the lending agencies like ADB/ World Bank/JICA, etc.

3.10 Wherever required, consultant will liaise with concerned authorities and arrange all clarifications. Approval of all drawings including GAD and detail engineering drawings will be got done by the consultant from the Railways. However, if Railways require proof checking of the drawings prepared by the consultants, the same will be got done by NHAI and payment to the proof consultant shall be made by NHAI directly. Consultant will also obtain final approval from Ministry of Environment and Forest for all applicable clearances. Consultant will also obtain approval for estimates for shifting of utilities of all types from the concerned authorities and NHAI. Consultant is also required to prepare all Land Acquisition papers (i.e. all necessary schedule and draft 3a, 3A, and 3D, 3G notification as per L.A. act) for acquisition of land either under NH Act or State Act.

3.11 The DPR consultant may be required to prepare the Bid Documents, based on the feasibility report, due to exigency of the project for execution if desired by NHAI.

3.12 Consultant shall obtain all types of necessary clearances required for implementation of the project on the ground from the concerned agencies. The client shall provide the necessary supporting letters and any official fees as per the demand note issued by such concerned agencies from whom the clearances are being sought to enable implementation.

3.13 The consultant shall prepare separate documents for BoT as well as EPC contracts at Feasibility stage / DPR stage. The studies for financing options like BoT, Annuity, EPC will be undertaken in feasibility study stage.

3.14 The consultant shall be guided in its assignment by the Model Concession/ Contract Agreements for PPP/ EPC projects, as applicable and the Manual of Specifications and Standards for two/ four/ six laning of highways published by IRC (IRC:SP:73 or IRC:SP:84 or IRC:SP:87, as applicable) along with relevant IRC codes for design of long bridges.

3.15 The consultant shall prepare the bid documents including required schedules (as mentioned above) as per EPC/ PPP documents. For that it is suggested that consultant should also go through the EPC/PPP documents of ministry before bidding the project. The Consultant shall assist the NHAI and the Legal Adviser by furnishing clarifications as required for the financial appraisal and legal scrutiny of the Project Highway and Bid Documents.

3.16 Consultant shall be responsible for sharing the findings from the preparation stages during the bid process. During the bid process for a project, the consultant shall support the authority in responding to all technical queries, and shall ensure participation of senior team members of the consultant during all interaction with potential bidders including pre-bid conference, meetings, site visits etc. In addition, the consultant shall also support preparation of detailed responses to the written queries raised by the bidders.

3.17 The DPR Consultant shall identify the surplus land parcels available with the Authority on the approved project alignment and submit the detailed plan and profile and layout of such land parcels and propose a suitable plan of action for suitable utilisation of such land parcels. The DPR consultant shall also assist in mutation of ownership of such surplus land parcels in the name of the Central Government.

4. General

First, the Feasibility Study of the project shall have to be completed then only the consultancy assignment shall be taken to DPR stage after specific instructions from Authority based on the outcome of the feasibility study. The Duration of entire assignment shall be **<to be kept as per costing guidelines>** which can be reduced only in compelling circumstances with approval of NHAI. The broad components of Feasibility Study and DPR Study are (but not limited to) the following:

Part-I: Components of Feasibility Study* (To be completed in <to be kept as per costing guidelines>):

1. Traffic Study including axle load surveys
2. Alignment Options after verification through PMG Gati Shakti Portal
3. **Preliminary** Topographical Study
4. Broad Structural features including lane configuration
5. Lane Configuration and intersections/junctions/Service Roads
6. Utility Shifting Requirement along with Tentative Estimates
7. Forest/Environmental/CRZ Clearance Requirement
8. Tentative/Normative Cost estimate with reasonable accuracy
9. Land Acquisition Tentative cost assessment
10. Financial Feasibility of the Project for Authority from Socio-Economic Prospect and strictly in Financial Prospects (**for both flexible & rigid pavements**).
11. Proposing Mode of Contract Execution-EPC/HAM/BOT (Toll)/BOT (Annuity).

Note: In case feasibility study is not to be done, the activities relevant to the DPR should be added to the scope of work DPR i.e. Part-II below.

Part-II Components of DPR Study (To be started from <to be kept as per costing guidelines>):

1. NSV and FWD testing of existing pavements of brownfield alignments
2. Detailed Geotechnical Investigations
3. Hydrological Investigations
4. Detailed Pavement & Embankment Design and Costing (showing different alternatives with cost comparison)
5. Detailed Structural Design
6. Detailed Designs of intersection
7. Road Furniture & Traffic Signage Plan
8. Drainage Plan
9. GIS mapping of ROW with sub-meter accuracy
10. Land Acquisition Activities (including laying of Row Boundary Stones)
11. Utility Shifting Estimates and relocation plan
12. Activities for obtaining Forest/Environmental/CRZ Clearance/Tree Cutting Permission.
13. Detailed Cost Estimation and comparison with normative costs
14. Tolling Scheme
15. ATMS scheme
16. Proofing of All Traffic Studies for the selected alignment
17. Financial Feasibility of the Project for Authority from Socio-Economic Prospect and strictly in Financial Prospects (with detailed cost analysis)
18. Proposing Mode of Contract Execution-EPC/HAM/BOT (Toll)/BOT (Annuity)
19. Detailed Topographical Study

4.1 Primary Tasks

General Scope of Services shall cover but be not limited to the following major tasks (additional requirements for Preparation of Detailed Project Report for Hill Roads and Major Bridges are given in Supplement I and II respectively):

i. Review of all available reports and published information about the project road and the project influence area;

ii. Environmental and social impact assessment, including such as related to cultural properties, natural habitats, involuntary resettlement etc.

ii (a). Public consultation*, including consultation with Communities located along the road, NGOs working in the area, other stake-holders and relevant Government departments at all the different stages of assignment (such as inception stage, feasibility stage, preliminary design stage and once final designs are concretized).

Note :- *Public consultation means:-

a) for Brown Field Projects or mixed projects: - Consultation with Village Sarpanch, Mayor/ Chairman of Municipal Corporation, Deputy Commissioner/ District Magistrate and State PWD/ State Govt.

b) for Green Field Projects: - In addition to above, concerned MPs/MLAs of areas will also be consulted.

iii. Detailed Reconnaissance;

iv. Identification of possible improvements in the existing alignment and bypassing congested locations with alternatives, evaluation of different alternatives comparison on techno-economic and other considerations and recommendations regarding most appropriate option;

v. Traffic studies including traffic surveys and Axle load survey and demand forecasting for next thirty years;

vi. Inventory and condition surveys for road;

vii. Inventory and condition surveys for bridges, cross-drainage structures, other Structures, river Bank training/Protection works and drainage provisions;

viii. Detailed topographic surveys using LiDAR equipped with minimum engineering grade system or any other better technology having output accuracy not less than (a) specified in IRC SP 19 (b) Total Station (c) GPS/ DGPS. The use of conventional high precision instruments i.e Total Station or equivalent can be used at locations such as major bypasses, water bodies etc. where it may not be possible to survey using LiDAR. Use of mobile / Aerial LiDAR survey is preferable.

ix. Pavement investigations;

x. Sub-grade characteristics and strength: investigation of required sub-grade and sub-soil characteristics and strength for road and embankment design and sub soil investigation;

xi. Identification of sources of construction materials;

xii. Detailed design of road, its x-sections, horizontal and vertical alignment and design of embankment of height more than 6m and also in poor soil conditions and where density consideration require, even lesser height embankment. Detailed design of structures preparation of GAD and construction drawings and cross-drainage structures and underpasses etc.

xiii. Identification of the type and the design of intersections;

xiv. Design of complete drainage system and disposal point for storm water

xv. Value analysis / value engineering and project costing;

xvi. Economic and financial analyses;

xvii. Contract packaging and implementation schedule.

xviii Strip plan indicating the scheme for carriageway widening, location of all existing utility services (both over- and underground) and the scheme for their relocation, trees to be felled, transplanted and planted and land acquisition requirements including schedule for LA: reports documents and drawings arrangement of estimates for cutting/ transplanting of trees and shifting of utilities from the concerned department;

xix Develop 3D engineered models of terrain and elevation, as-is project highway, proposed and project highway along with all features, current and proposed structures, current and proposed utilities and land acquisition plans.

xx To find out financial viability of project for implementation and suggest the preferred mode on

which the project is to be taken up.

xxi. Preparation of detailed project report, cost estimate, approved for construction Drawings, rate analysis, detailed bill of quantities, bid documents for execution of civil works through budgeting resources.

xxii. Design of toll plaza and identification of their numbers and location and office cum residential complex including working drawings

xxiii. Design of weighing stations, parking areas and rest areas.

xxiv. Any other user oriented facility en-route toll facility.

xxv. Tie-in of on-going/sanctioned works of MORT&H/ NHAI / other agencies.

xxvi. Preparation of social plans for the project affected people as per policy of the lending agencies/ Govt. of India R&R Policy.

4.2 While carrying out the field studies, investigations and design, the development plans being implemented or proposed for future implementation by the local bodies, should be taken into account. Such aspect should be clearly brought out in the reports and drawings. It must be noted that the DPR consultant shall get all the geotechnical investigations and testing done through the agencies satisfying the NABL accreditation Criteria attached with the RFP.

All samples are to be sealed and retained by the Geotechnical Agency as per relevant IRC/IS codal provisions and good industry practice, at the space provided by NHAI/MoRTH/ NHIDCL/ BRO PIU till approval of all designs by the AE/IE during the actual construction stage.

Alternatively, DPR Agencies can conduct geotechnical investigations and testing through agencies empanelled by Ministry of RT&H / NHIDCL/ NHAI.

4.3 The consultant shall study the possible locations and design of toll plaza, wayside amenities required and arboriculture along the highway shall also be planned.

4.4 The local and slow traffic may need segregation from the main traffic and provision of service roads and physical barrier including fencing may be considered, wherever necessary to improve efficiency and safety.

4.5 Standards and Codes of Practices

1. All activities related to field studies, design and documentation shall be done as per the latest guidelines/ circulars of MoRT&H and relevant publications of the Indian Roads Congress (IRC) and Bureau of Indian Standards (BIS). For aspects not covered by IRC and BIS, international standards practices, may be adopted. The Consultants, upon award of the Contract, may finalize this in consultation with NHAI and reflect the same in the inception report. The DPR consultant can also propose specifications and designs as per Euro (EN)/ASHTO codes with due comparison of the same with respect to IRC/BIS provisions.

2. All notations, abbreviations and symbols used in the reports, documents and drawings shall be as per IRC:71.

4.6 Quality Assurance Plan (QAP)

1. (i) The Consultants should have detailed Quality Assurance Plan (QAP) for all field studies including topographic surveys, traffic surveys, engineering surveys and investigations, design and documentation activities. The quality assurance plans/procedures for different field studies, engineering surveys and investigation, design and documentation activities should be presented as separate sections like engineering surveys and investigations, traffic surveys, material geo-technical and sub-soil investigations, road and pavement investigations, investigation and design of bridges & structures, environment and R&R assessment, economic

& financial analysis, drawings and documentation, preparation, checking, approval and filing of calculations, identification and tractability of project documents etc. Further, additional information as per format shall be furnished regarding the details of personal who shall be responsible for carrying out/preparing and checking/verifying various activities forming part of feasibility study and project preparation, since inception to the completion of work. The detailed Draft QAP Document must be discussed and finalized with the concerned NHAI officers immediately upon the award of the Contract and submitted as part of the inception report.

(ii) It is imperative that the QAP is approved by NHAI before the Consultants start the field work.

2. Data formats for report and investigation results

i. Required data formats for some reports, investigations and documents are discussed in **Error! Reference source not found.**.

ii. The consultants will need to propose data formats for use in all other field studies and investigations not covered in enclosure IV.

iii. The proposed data forms will need to be submitted for the approval of NHAI after the commencement of services.

4.7 Review of Data and Documents

1. The Consultants shall collect the available data and information relevant for the Study. The data and documents of major interest shall include, but not be limited to, the following:

i. Climate;

ii. Road inventory

iii Road condition, year of original construction, year and type of major maintenance/rehabilitation works;

iv. Condition of bridges and cross-drainage structures;

v. sub-surface and geo-technical data for existing bridges;

vi. Hydrological data, drawings and details of existing bridges;

vii Existing geological maps, catchment area maps, contour plans etc. for the project area

viii Condition of existing river bank / protection works, if any.

ix. Details of sanctioned / on-going works on the stretch sanctioned by MoRT&H/other agencies for Tie-in purposes

x. Survey and evaluation of locally available construction materials;

xi. Historical data on classified traffic volume (preferably for 5 years or more);

xii. Origin-destination and commodity movement characteristics; if available

xiii. Speed and delay characteristics; if available;

xiv. Commodity-wise traffic volume; if available;

xv. Accident statistics; and,

xvi. Vehicle loading behavior (axle load spectrum), if available.

xvii Type and location of existing utility services (e.g. Fibre Optical Cable, O/H and U/G Electric, Telephone line, Water mains, Sewer, Trees etc.)

xviii Environmental setting and social baseline of the project.

4.8. Social Analysis

The social analysis study shall be carried out in accordance with the MORT&H/World Bank/ADB Guidelines. The social analysis report will, among other things, provide a socio-economic profile of the project area and address in particular, indigenous people, communicable disease particularly HIV/AIDS poverty alleviation, gender, local population, industry, agriculture, employment, health, education, health, child labor, land acquisition and resettlement .

4.9 Traffic Surveys

All traffic surveys and studies will be completed in feasibility studies.

4.9.1 Number and Location of Survey Stations

1. The type of traffic surveys and the minimum number of survey stations shall normally be as under, unless otherwise specifically mentioned.

Sl. No.	Description	Number of Survey Stations
1.	Classified Traffic Volume Count	3
2.	Origin-Destination and Commodity Movement Characteristics	Minimum 2
3.	Axle Loading Characteristics	2
4.	Intersection Volume Count	All Major Intersections
5.	Speed-Delay Characteristics	Project Road Section
6.	Pedestrian/animal cross traffic count	All major inhabitations along the highway
7.	Turning movement surveys	For all major intersections

2. The number of survey locations indicated in the table above are indicative only for each road stretch under a package. The Consultants shall, immediately upon award of the work, submit to NHAI, proposals regarding the total number as well as the locations of the traffic survey stations as of inception report. Suitable maps and charts should accompany the proposals clearly indicating the rationale for selecting the location of survey Station.

3. The methodology of collection and analysis of data, number and location of traffic survey stations shall be finalized in consultation with NHAI prior to start of the traffic survey.

4.9.2. Classified Traffic Volume Count Survey

1. Consultant shall make use of traffic survey done by Indian Highways Management Company Limited (IHMCL) using ATCC systems. However in isolated locations where there are site constraints, manual counting can be done. If required, especially in cases where a particular stretch is not covered by IHMCL, DPR consultant should carry out classified traffic volume count survey using ATCC systems or latest modern technologies.

2. Consultant shall use ATCC systems that can meet the following accuracy levels after validation/ calibration:

   (a) Classification of vehicles: better than 95%

   (b) Counting of vehicles: better than 98%

   Before validation and calibration, the ATCC system shall meet the following accuracy levels:

   (a) Classification of vehicles: better than 90%

   (b) Counting of vehicles: better than 95%

For verification of above accuracy levels, audit of raw ATCC shall be done by the consultant on a sampling basis and should submit a certificate in this regard.

3. ATCC systems such as Pneumatic Tube Detector, Inductive Detector Loop, Video Image Detection, and Infrared Sensor or latest technologies shall be adopted.

4. The classified traffic volume count surveys shall be carried out for 7 days (continuous, direction-wise) at the selected survey stations. The vehicle classification system as given in relevant IRC code may be followed. However, the following generalized classification system is suggested in view of the requirements of traffic demand estimates and economic analysis:

<table>
<tr><td colspan="3">Motorised Traffic</td><td>Non-Motorised Traffic</td></tr>
<tr><td colspan="3">2-Wheeler</td><td>Bi-Cycle</td></tr>
<tr><td colspan="3">3-Wheeler</td><td>Cycle-Rickshaw</td></tr>
<tr><td colspan="3">Passenger Car</td><td>Animal Drawn Vehicle (ADV)</td></tr>
<tr><td colspan="3">Utility Vehicle (Jeep, Van etc.)</td><td>Hand Cart</td></tr>
<tr><td colspan="3"></td><td>Other Non-Motorised Vehicle</td></tr>
<tr><td>Bus</td><td colspan="2">Mini Bus
Standard Bus</td><td rowspan="7"></td></tr>
<tr><td>LCV</td><td colspan="2">LCV-Passenger
LCV-Freight</td></tr>
<tr><td>Truck</td><td colspan="2">MCV : 2-Axle Rigid Chassis</td></tr>
<tr><td></td><td colspan="2">HCV : 3-Axle Rigid Chassis</td></tr>
<tr><td></td><td>MAV</td><td>Semi Articulated</td></tr>
<tr><td></td><td></td><td>Articulated</td></tr>
</table>

5. All results shall be presented in tabular and graphical form. The survey data shall be analyzed to bring out the hourly and daily variations. The traffic volume count per day shall be averaged to show a weekly average daily traffic (ADT) by vehicle type. The annual average daily traffic (AADT) shall be worked out by applying seasonal factors.

6. The consultant shall compile the relevant traffic volume data from secondary sources also. The salient features of traffic volume characteristics shall be brought out and variations if any, from the traffic census carried out by the State PWD shall be suitably explained.

4.9.3. Origin Destination and Commodity Movements Surveys

1. The consultants shall carry out 1-day (24 hour, both directions) O-D and commodity movement surveys at locations finalized in consultation with NHAI. These will be essentially required around congested towns to delineate through traffic. The road side interviews shall be carried out on random sample basis and cover all four-wheeled vehicles. The location of the O-D survey and commodity movement surveys shall normally be same as for the classified traffic count.

2. The location of origin and destination zones shall be determined in relation to each individual station and the possibility of traffic diversion to the Project Road from/to other road routes including bypasses.

3. The trip matrices shall be worked out for each vehicle type information on weight for trucks should be summed up by commodity type and the results tabulated, giving total weight and average weight per truck for the various commodity types. The sample size for each vehicle

type shall be indicated on the table and also in the graphical representations.

4. The data derived from surveys shall also be analyzed to bring out the lead and load characteristics and desire line diagrams. The data analysis should also bring out the requirement for the construction of bypasses.

1. The distribution of lead and load obtained from the surveys should be compared. The axle load surveys shall normally be done using axle load pads or other sophisticated instruments. The location(s) of count station(s) and the survey with those derived from the axle load studies.

6. The commodity movement data should be duly taken into consideration while making the traffic demand estimates.

4.9.4. Turning Movement Surveys

1. The turning movement surveys for estimation of peak hour traffic for the design of major and minor intersections shall be carried out for the Study. The details regarding composition and directional movement of traffic shall be furnished by the Consultant.

2. The methodology for the surveys shall be as per IRC: SP: 41-1994. The details including location and duration of surveys shall be finalized in consultation with NHAI officials. The proposal in response to this TOR shall clearly indicate the number of locations that the Consultants wish to conduct turning movement surveys and the rationale for the same.

3. The data derived from the survey should be analyzed to identify requirements of suitable remedial measures, such as construction of underpasses, fly-overs, interchanges, grade-separated intersections along the project road alignment. Intersections with high traffic volume requiring special treatments either presently or in future shall be identified.

4.9.5. Axle Load Surveys

1. Axle load surveys in both directions shall be carried out at suitable location(s) in the project road stretch on a random sample basis normally for trucks only (both empty and loaded trucks) for 2 normal days - (24 hours) at special count stations to be finalized in consultation with NHAI. However, a few buses may be weighed in order to get an idea about their loading behavior. While selecting the location(s) of axle load survey station(s), the locations of existing bridges with load restrictions, if any, should be taken into account and such sites should be avoided.

2. Axle load surveys shall normally be done using axle load pads or other sophisticated instruments. The location(s) of count station(s) and the survey methodology including the data formats and the instrument type to be used shall be finalized before taking up the axle load surveys

3. The axle load data should be collected axle configuration-wise. The number of equivalent standard axles per truck shall be calculated on the basis of results obtained. The results of the survey should bring out the VDF for each truck type (axle configuration, if the calculated VDF is found to be below the national average, then national average shall be used. Furthermore, the data from axle load surveys should be analyzed to bring out the Gross Vehicle Weight (GVW) and Single Axle Load (SAL) Distributions by truck type (axle configuration).

4. The Consultant shall ascertain from local enquiries about the exceptional live loads that have used the highway in the past in order to assess the suitability of existing bridges to carry such loads.

4.9.6. Speed-Delay Surveys

The Consultants shall carry out appropriate field studies such as moving car survey to determine running speed and journey speed. The data should be analyzed to identify sections with typical traffic flow problems and congestion. The objective of the survey would be to

recommend suitable measures for segregation of local traffic, smooth flow of through traffic and traffic safety. These measures would include the provision of bypasses, under-passes, fly-overs, interchanges, grade-separated intersections and service roads.

4.9.7 Pedestrian / animal cross traffic surveys:

1. These shall be conducted to determine if provision of viaduct for pedestrians/animals is necessary to improve the traffic safety.
2. Consultant shall leverage information from local consultations, inputs from local governmental/ non-governmental agencies in selecting sites for checking pedestrian/ animal crossing traffic surveys.
3. Surveys for provision of pedestrian crossings shall minimum be conducted at all junctions being replaced by grade separators.

4.9.8 Truck Terminal Surveys

The data derived from the O-D, speed-delay, other surveys and also supplementary surveys should be analyzed to assess requirements for present and future development of truck terminals at suitable locations en route.

4.10. Traffic Demand Estimates

1. The consultants shall make traffic demand estimates and establish possible traffic growth rates in respect of all categories of vehicles, taking into account the past trends, annual population and real per capita growth rate, elasticity of transport demand in relation to income and estimated annual production increase. The other aspects including socio-economic development plans and the land use patterns of the region having impact on the traffic growth, the projections of vehicle manufacturing industry in the country, development plans for the other modes of transport, O-D and commodity movement behavior should also be taken into account while working out the traffic demand estimates.
2. The values of elasticity of transport demand shall be based on the prevailing practices in the country. The Consultants shall give complete background including references for selecting the value of transport demand elasticity.
3. It is envisaged that the project road sections covered under this TOR would be completed and opened to traffic after 3 years. The traffic demand estimates shall be done for a further period of 30 years from completion of two/four lane. The demand estimates shall be done assuming three scenarios, namely, optimistic, pessimistic and most likely traffic growth. The growth factors shall be worked out for five-yearly intervals.
4. Traffic projections should be based on sound and proven forecasting techniques. In case traffic demand estimated is to be made on the basis of a model, the application of the model in the similar situation with the validation of the results should be established. The traffic projections should also bring out the possible impact of implementation of any competing facility in the near future. The demand estimates should also take into account the freight and passenger traffic along the major corridors that may interconnect with the project. Impact of toll charges on the traffic estimates should be estimated.
5. The methodology for traffic demand estimates described in the preceding paragraphs is for normal traffic only. In addition to the estimates for normal traffic, the Consultants shall also work out the estimates for generated, induced and diverted traffic.
6. The traffic forecasts shall also be made for both diverted and generated traffic.
7. Overall traffic forecast thus made shall form the basis for the design of each pavement type and other facilities/ancillary works.

4.11. Engineering Surveys and Investigations

4.11.1. Reconnaissance and Alignment

1. The Consultants should make an in-depth study of the available land width (ROW) topographic maps, satellite imageries and air photographs of the project area, geological maps, catchment area maps, contour plans, flood flow data and seismological data and other available relevant information collected by them concerning the existing alignment. Consultant himself has to arrange the required maps and the information needed by him from the potential sources. Consultant should make efforts for minimizing land acquisition. Greater use of technology for LA be adopted by the consultant at the DPR stage so as to have a precise land acquisition process.

2. The detailed ground reconnaissance may be taken up immediately after the study of maps and other data. The primary tasks to be accomplished during the reconnaissance surveys include;

   (i). topographical features of the area;

   (ii). typical physical features along the existing alignment within and outside ROW i.e. land use Pattern;

   (iii). possible alignment alternatives, vis-a-vis, scheme for the construction of additional lanes parallel to the existing road;

   (iv). realignment requirements including the provision of bypasses, ROBs / Flyovers and via-duct for pedestrian crossings with possible alignment alternatives;

   (v). preliminary identification of improvement requirements including treatments and measures needed for the cross-roads;

   (vi). traffic pattern and preliminary identification of traffic homogenous links;

   (vii). sections through congested areas;

   (viii). inventory of major aspects including land width, terrain, pavement type, carriageway type, bridges and structures (type, size and location), intersections(type, cross-road category, location) urban areas (location, extent), geologically sensitive areas, environmental features:

   (ix). critical areas requiring detailed investigations; and,

   (x). Requirements for carrying out supplementary investigations.

   (xi). soil (textural classifications) and drainage conditions

   (xii). Type and extent of existing utility services along the alignment (within ROW).

   (xiii). Typical physical features along the approach roads

   Possible bridge locations, land acquisition problems, nature of crossings, likely length of approaches and bridge, firmness of banks, suitability of alignment of approach roads.

3. The data derived from the reconnaissance surveys are normally utilized for planning and programming the detailed surveys and investigations. All field studies including the traffic surveys should be taken up on the basis of information derived from the reconnaissance surveys.

4. The data and information obtained from the reconnaissance surveys should be documented. The data analysis and the recommendations concerning alignment and the field studies should be included in the Inception Report. The data obtained from the reconnaissance surveys should form the core of the database which would be supplemented and augmented using the data obtained from detailed field studies and investigations.

5. The data obtained from the reconnaissance surveys should be compiled in the tabular as well as graphical (chart) form indicating the major physical features and the proposed widening

scheme for NHAI's comments. The data and the charts should also accompany the rationale for the selection of traffic survey stations.

4.11.2. Topographic Surveys

1. The basic objective of the topographic survey would be to capture the essential ground features along the alignment in order to consider improvements and for working out improvements, rehabilitation and upgrading costs. The detailed topographic surveys should normally be taken up after the completion of reconnaissance surveys.

2. The carrying out of topographic surveys will be one of the most important and crucial field tasks under the project. Technologies which can meet the following accuracy levels shall be adopted. For land based surveys (a) Fundamental horizontal accuracy of 5cm or better (b) Fundamental vertical accuracy of 5cm or better (c) More than 50 points shall be measured per sq. m and for aerial based surveys (a) Fundamental horizontal accuracy of 5 cm or better (b) Fundamental vertical accuracy of 5 cm or better (c) More than 10 points shall be measured per sq. m. To establish accuracy, a check point survey using DGPS (for horizontal accuracy) and Auto Level (for vertical accuracy) shall be carried out to establish the fundamental horizontal and vertical accuracy. A minimum of 25 check points, or check points once every 4 km should be established, and these should be strictly different from any geo-referencing or control network points.

3. The following are the set of deliverables which should be submitted after completion of survey:

   (a). Raw DGPS data for the entire highway length and adjoining areas of interest

   (b). Point cloud data or equivalent for the entire highway length and adjoining areas of interest in a format/ platform as per industry good practice which shall be amenable to operations by NHAI / Consultant. NHAI may decide about format/ platform of point cloud data

   (c). Topographic map of scale 1:1000 of the entire highway length and adjoining areas of interest

   (d). Contour map of 50 cm of entire highway length and adjoining areas of interest

   (e). Cross section of the highway at every 50 m in drawing format.

   (f). Develop a digital elevation/surface model (bare earth model from survey data) digital terrain model combining topographic data from LiDAR, road inventory and other available sources of data for use while modeling the road alignment and road and structure design.

   (g). For land based surveys, Mobile LiDAR (Light Detection and Ranging) or better technology that can meet above requirements shall be adopted. For aerial based surveys, Aerial Mobile LiDAR (Light Detection and Ranging) or better technology that can meet above requirements shall be adopted. Where possible, mobile/terrestrial LiDAR and total station or better studies should be used to supplement aerial LiDAR for the final alignment chosen. Aerial based surveys shall be used as the primary source of topographical data only in cases where a new/green field alignment is being planned and/or major junctions are being planned where it is necessary to significantly increase the survey corridor beyond the capabilities of mobile LiDAR. In shadow areas such as invert levels below culverts, terrestrial LiDAR shall be used where LiDAR or better technologies cannot survey accurately, traditional methods of Total Station/ Auto Level shall be used to complete the study.

   (h). In case of mobile LiDAR or better technology, 360 degree panoramic images of the entire highway length and adjoining areas of interest shall be submitted. In case of aerial LiDAR or better technology, ortho-images of the entire highway length and adjoining areas of interest shall be submitted.

   (i). The detailed field surveys would essentially include the following activities:

      i. Topographic Surveys along the Existing Right of Way (ROW): Carrying out topographic survey using LiDAR or better technology along the existing road and realignments, wherever required and properly referencing the same with reference pillars fixed on either

side of the centre-line at safe places within the ROW

ii. The detailed field surveys would essentially include the topographic surveys along the proposed location of bridge and alignment of approach road.

iii. The detailed topographic surveys should be carried out along the approach roads alignment and location of bridge approved by NHAI.

iv. Collection/ Extraction of details for all features such as structures (bridges, culverts etc.) utilities, existing roads, electric and telephone installations (both O/H as well as underground), huts, buildings, fencing and trees (with girth greater than 0.3metre) oil and gas lines etc. falling within the extent of survey.

4. The width of survey corridor will generally be as given under:

(i). The width of the survey corridor should take into account the layout of the existing alignment including the extent of embankment and cut slopes and the general ground profile. While carrying out the field surveys, the widening scheme (i.e. right, left or symmetrical to the centre line of the existing carriageway) should be taken into consideration so that the topographic surveys cover sufficient width beyond the centre line of the proposed divided carriageway. Normally the surveys should extend a minimum of 30 m beyond either side of the centre line of the proposed divided carriageway or land boundary whichever is more

(ii). In case the reconnaissance survey reveals the need for bypassing the congested locations, the traverse lines would be run along the possible alignments in order to identify and select the most suitable alignment for the bypass. The detailed topographic surveys should be carried out along the bypass alignment approved by NHAI. At locations where grade separated intersections could be the obvious choice, the survey area will be suitably increased. Field notes of the survey should be maintained which would also provide information about traffic, soil, drainage etc.

(iii). The width of the surveyed corridor will be widened appropriately where developments and / or encroachments have resulted in a requirement for adjustment in the alignment, or where it is felt that the existing alignment can be improved upon through minor adjustments.

(iv). Where existing roads cross the alignments, the survey will extend a minimum of100 m either side of the road centre line and will be of sufficient width to allow improvements, including at grade intersection to be designed.

8. The surveyed alignment shall be transferred on to the ground as under:

i. Reference Pillar and Bench Mark / Reference pillar of size 15 cm X 15 cm X 45cm shall be cast in RCC of grade M 15 with a nail fixed in the centre of the top surface. The reference pillar shall be embedded in concrete upto a depth of 30cm with CC M10 (5 cm wide all around). The balance 15 cm above ground shall be painted yellow. The spacing shall be 250m apart, incase Bench Mark Pillar coincides with Reference Pillar, only one of the two need be provided.

ii. Establishing Bench marks at site connected to GTS Bench marks at a interval of250 metres on Bench mark pillar made of RCC as mentioned above with RL and BM No. marked on it with red paint.

iii. Boundary Pillars- Wherever the proposed alignment follows the existing alignment, the boundary pillars shall be fixed by the DPR consultant at an interval of 200m on either side of proposed Right of Way. Wherever there is a proposal of realignment of the existing Highway and/or construction of New Bypasses, Consultant shall fix boundary pillars along the proposed alignment on the extreme boundary on either side of the project Highway at 50 m interval. Boundary pillars shall be strictly provided as per IRC:25:1967.

4.11.2.1 Longitudinal and Cross-Sections

The topographic surveys for longitudinal and cross-sections shall cover the following:

i. Longitudinal section levels along final centre line shall be taken at every 10 m interval. The levels shall be taken at closer intervals at the curve points, small streams, and intersections and

at the locations of change in elevation. The interval shall also be modified as per IRC:SP-19 for rolling, mountainous & steep terrain.

ii. Cross sections at every 50 m interval in full extent of survey covering sufficient number of spot levels on existing carriageway and adjacent ground for profile correction course and earth work calculations. Cross sections shall be taken at closer interval at curves. The interval shall be modified as per IRC SP 19 for rolling, mountainous & steep terrain.

iii. Longitudinal section for cross roads for length adequate for design and quantity estimation purposes.

iv. Longitudinal and cross sections for major and minor streams shall cover Cross section of the channel at the site of proposed crossing and few cross sections at suitable distance both upstream and downstream, bed level upto top of banks and ground levels to a sufficient distance beyond the edges of channel, nature of existing surface soil in bed, banks & approaches, longitudinal section of channel showing site of bridge etc. These shall be as per recommendations contained in IRC Special Publication No. 13 (Guidelines for the Design of Small Bridges and Culverts) and provisions of IRC:5 ("Standard Specifications & Code of Practice for Road Bridges, Section 1 – General Features of Design").

2. At feasibility study stage cross sections at 50m interval may be taken.

3. Consultants shall also develop an as-is map of the road including:

i. Geo-referenced digital map of as-is project highway

ii. Earth surface, road layers, utilities, buildings and trees with feature data extracted and mapped in layers, marked on the map and tabulated data provided separately.

iii. All road, surface, sub surface inventory, pavement investigation and soil survey data to be super-imposed as layers using geo-referencing data

4.11.2.2Details of utility Services and Other Physical Features

1. The Consultants shall collect details of all important physical features along the alignment. These features affect the project proposals and should normally include buildings and structures, monuments, burial grounds, cremation grounds, places of worship, railway lines, stream / river / canal, water mains, sewers, gas/oil pipes, crossings, trees, plantations, utility services such as electric, and telephone lines (O/H & U/G) and poles, optical fibre cables (OFC) etc. The survey would cover the entire right-of-way of the road on the adequate allowance for possible shifting of the central lines at some of the intersections locations.

2. Consultant shall also map out sub-surface utilities. Accurate mapping and resolution of all sub-surface utilities up to a depth of 4 m shall be carried out. Differentiation between sub-surface utilities such as live electric cables, metallic utilities and other utilities shall be indicated and sub-surface utilities radargrams further processed into utility maps in formats such as PDF, JPEG and AutoCAD shall be furnished. To meet the accuracy levels, consultant shall use Ground Penetrating Radar, Induction Locator or better technologies.

3. The information collected during reconnaissance and field surveys shall be shown on a strip plan so that the proposed improvements can be appreciated and the extent of land acquisition with LA schedule, utility removals of each type etc. assessed and suitable actions can be initiated. Separate strip plan for each of the services involved shall be prepared for submission to the concerned agency.

4.11.3. Road and Pavement Investigations

The Consultants shall carry out detailed field studies in respect of road and pavement. The data collected through road inventory and pavement investigations should be sufficient to meet the input requirements of HDM-IV.

4.11.3.1 Road Inventory Surveys

1. Detailed road inventory surveys shall be carried out to collect details of all existing road and pavement features along the existing road sections. The inventory data shall include but not limited to the following:

   i. Terrain (flat, rolling, mountainous);

   ii. Land-use (agricultural, commercial, forest, residential etc) @ every kilometre;

   iii. Carriageway width, surfacing type @ every 500m and every change of feature whichever is earlier;

   iv. Shoulder surfacing type and width @ every 500m and every change of feature whichever is earlier;

   v. Sub-grade / local soil type (textural classification) @ every 500m and every change of feature whichever is earlier;

   vi. Horizontal curve; vertical curve

   vii. Road intersection type and details, at every occurrence;

   viii. Retaining structures and details, at every occurrence;

   ix. Location of water bodies (lakes and reservoirs), at every occurrence;

   x. Height of embankment or depth of cut @ every 200m and every change of feature whichever is earlier.

   xi. Land width i.e. ROW

   xii. Culverts, bridges and other structures (type, size, span arrangement and location)

   xiii. Roadside arboriculture

   xiv. Existing utility services on either side within ROW. There shall be a provision of utility corridor for appropriate categories / combination of utilities in the construction of new 4/6 laning of National Highways. Such structures shall be located at appropriate location preferably as close to the extreme edge of Right of Way (RoW). In this connection, guidelines contained in IRC:98 shall be followed.

   xv. General drainage conditions

   xvi. Design speed of existing road

2. The data should be collected in sufficient detail. The data should be compiled and presented in tabular as well as graphical form. The inventory data would be stored in computer files using simple utility packages, such as EXCEL.

4.11.3.2 Pavement Investigation

1. Pavement Composition

   i. The data concerning the pavement composition may be already available with the PWD. However, the consultants shall make trial pits to ascertain the pavement composition. The test pit interval will be as per Para 4 below.

   ii. For each test pit, the following information shall be recorded:

   - test pit reference (Identification number, location):
   - pavement composition (material type and thickness); and
   - subgrade type (textural classification) and condition (dry, wet)
   - embankment (composition and geometry)

2. Road and Pavement Condition Surveys

i. Detailed field studies shall be carried out to collect road and pavement surface conditions. The data should generally cover:

- pavement condition (surface distress type and extent);
- shoulder condition;
- embankment condition; and
- drainage condition

Pavement Condition

- cracking (narrow and wide cracking), % of pavement area affected;
- raveling, % of pavement area affected;
- potholing, % of pavement area affected;
- edge break, length (m); and,
- rut depth, mm

Shoulder Condition

- Paved: Same as for pavement
- Unpaved: material loss, rut depth and corrugation,
- Edge drop, mm.

Embankment Condition

- general condition; and
- extent of slope erosion

ii. The objective of the road and pavement condition surveys shall be to identify defects and sections with similar characteristics. All defects shall be systematically referenced, recorded and quantified for the purpose of determining the mode of rehabilitation.

iii. In addition to visual means, the pavement condition surveys shall be carried out using Network Survey vehicles mounted with equipments such as high resolution cameras, digital laser profilometer, transverse profiler- the data from which should be geo-referenced using a DGPS receiver and in vehicle data processing software or equivalent technology to accurately measure the pavement surface properties covered earlier. This pavement condition survey shall also be used as a repository for civil work and shall be carried out as per the directions of NHAI.

iv. Supplemented by actual measurements and in accordance with the widely accepted methodology (AASHTO, IRC, OECD, TRL and World Bank Publications) adapted to meet the study requirements. The measurement of rut depth would be made using standard straight edges.

v. The shoulder and embankment conditions shall be evaluated by visual means and the existence of distress modes (cuts, erosion marks, failure, drops) and extent (none, moderate, frequent and very frequent) of such distress manifestations would be recorded.

vi. For sections with severe distresses, additional investigations as appropriate shall be carried out to determine the cause of such distresses.

vii. Middle 200m could be considered as representative sample for each one km. of road and incase all other things are considered similar.

Drainage Condition

- General condition
- Connectivity of drainage turnouts into the natural topography

- Condition in cut sections
- Condition at high embankments

The data obtained from the condition surveys should be analyzed and the road segments of more or less equal performance may be identified using the criteria given in IRC: 81-1997.

3. Pavement Roughness

i. The roughness surveys shall be carried out using a network survey vehicle mounted laser profilometer or better technology with specifications as described in para 2 above

i (a) In addition, the following criteria should be met by the process of defect detection:

- Roughness measurement with outputs of both raw longitudinal profiles and IRI calculation shall be reported at 100m referenced to the preceding LRP. The roughness must meet ASTM-E950 (equivalent to Class I road profiler).
- The IRI shall be determined for both wheelpaths over a minimum length of 250m for a minimum of 6 calibration sites with a roughness range between 2m/km and 8m/km. Calibration shall be made for speeds of 20, 30, 40, 50, 60 km/h.

ii. The surveys shall be carried out along the outer wheel paths. The surveys shall cover a minimum of two runs along the wheel paths for each direction.

iii. The results of the survey shall be expressed in terms of BI and IRI and shall be presented in tabular and graphical forms. The processed data shall be analyzed using the cumulative difference approach to identify road segments homogenous with respect to surface roughness.

4. Pavement Structural Strength

1. The Consultants shall carry out structural strength surveys for existing pavements using Falling Weight Deflectometer metre (FWD) in accordance with IRC 115 or IRC 117 as the case may be.

i. It is suggested that the deflection surveys may be carried out as per the scheme given below:

- mainline testing; and,
- Control section testing.

ii. The deflection tests for the mainline shall be carried out at every 500 m along the road sections covered under the study. The control section testing shall involve carrying out deflection testing for each 100 m long homogenous road segment along the road sections. The selection of homogenous segment shall be based on the data derived from pavement condition surveys. The total length of such homogenous segments shall not be less than 100 m per kilometre. The deflection measurements for the control section testing should be at an interval of not more than 10 m.

iii. Test pits shall be dug at every 500 m and also along each homogeneous road segment to obtain pavement composition details (pavement course, material type and thickness) so as to be able to study if a correlation exists between deflection and composition. If so, the relationship may be used while working out the overlay thickness for the existing pavement.

iv. Falling weight deflectometre surveys may not be carried out for severely distressed sections of the road warranting reconstruction. The Consultants, immediately upon the award of the contract, shall submit to NHAI the scheme describing the testing schedule including the interval. The testing scheme shall be supported by data from detailed reconnaissance surveys.

v. It is mandatory for the consultant to use Falling weight deflectometre or alternative better technique for the evaluation of pavement strength, details of such methods or innovative features for deflection testing using Falling weight deflectometre along with the methodology for data analysis, interpretation and the use of such data for pavement overlay design purposes using IRC or any other widely used practices, such as AASHTO guidelines, should be

got approved by NHAI. The sources of such methods should be properly referenced.

4.11.3.3 Subgrade Characteristics and Strength

2. Based on the data derived from condition (surface condition, roughness) and structural strength surveys, the project road section should be divided into segments homogenous with respect to pavement condition and strength. The delineation of segments homogenous with respect to roughness and strength should be done using the cumulative difference approach (AASHTO, 1993).

2. The data on soil classification and mechanical characteristics for soils along the existing alignments may already be available with the PWD. The testing scheme is, therefore, proposed as given under:

   (i). For the widening (2-Laning) of existing road within the ROW, the Consultants shall test at least three sub-grade soil samples for each homogenous road segment or three samples for each soil type encountered, whichever is more.

   (ii). For the roads along new alignments, the test pits for sub grade soil shall be @5km or for each soil type, whichever is more. A minimum of three samples should be tested corresponding to each homogenous segment.

3. The testing for subgrade soil shall include:

   (i). in-situ density and moisture content at each test pit

   (ii). Field CBR using DCP at each test pit

   (iii). Characterization (grain size and Atterberg limits) at each test pit and,

   (iv). Laboratory moisture-density characteristics (modified AASHTO compaction);

   (v). Laboratory CBR (unsoaked and 4-day soak compacted at three energy levels) and swell.

4. For problematic soils, the testing shall be more rigorous. The characteristics with regard to permeability and consolidation shall also be determined for these soils. The frequency of sampling and testing of these soils shall be finalized in consultation with the NHAI officers after the problematic soil types are identified along the road sections.

5. The laboratory for testing of material should be got approved from NHAI before start of work.

4.11.4 Investigations for Bridges and Structure

4.11.4.1 Inventory of Bridges, Culverts and Structures

The Consultants shall make an inventory of all the structures (bridges, viaducts, ROBs/RUB and other grade separated structures, culverts, etc.) along the road under the project. The inventory for the bridges, viaducts and ROBs shall include the parametres required as per the guidelines of IRC-SP:35. The inventory of culverts shall be presented in a tabular form covering relevant physical and hydraulic parametres.

4.11.4.2 Hydraulic and Hydrological Investigations

1. The hydrological and hydraulic studies shall be carried out in accordance with IRC Special Publication No. 13 (“Guidelines for the Design of Small Bridges and Culverts”) and IRC:5 (“Standard Specifications & Code of Practice for Road Bridges, Section I General Feature of Design”). These investigations shall be carried out for all existing drainage structures along the road sections under the study.

2. The consultant shall also collect information on observed maximum depth of scour.

3. In respect of major bridges, history of hydraulic functioning of existing bridge, if any, under flood situation, general direction of river course through structure, afflux, extent and magnitude of flood, effect of backwater, if any, aggradation/degradation of bed, evidence of

scour etc. shall be used to augment the available hydrological data. The presence of flood control/ irrigation structures, if affecting the hydraulic characteristics like causing obliquity, concentration of flow, scour, silting of bed, change in flow levels, bed levels etc. shall be studied and considered in design of bridges. The details of any future planned work that may affect the river hydraulics shall be studied and considered.

4. The Consultants shall make a desk study of available data on topography (topographic maps, stereoscopic aerial photography), storm duration, rainfall statistics, top soil characteristics, vegetation cover etc. so as to assess the catchment areas and hydraulic parametres for all existing and proposed drainage provisions. The findings of the desk study would be further supplemented and augmented by a reconnaissance along the area. All-important hydrological features shall be noted during this field reconnaissance.

5. The Consultants shall collect information on high flood level (HFL), low water levels (LWL), high tide level (HTL), low tide level (LTL) where applicable, discharge velocity etc. from available past records, local inquiries and visible signs, if any, on the structural components and embankments. Local inquiries shall also be made with regard to the road sections getting overtopped during heavy rains.

6. Conducting Model studies for bridges is not covered in the scope of consultancy services. If Model study is envisaged for any bridge, requirement of the same shall be spelt out in the RPF documents separately indicating scope and time frame of such study. Salient features of the scope of services to be included for model study are given in the supplement- II Terms of Reference.

4.11.4.3 Condition Surveys for Bridges, Culverts and Structures

1. The Consultants shall thoroughly inspect the existing structures and shall prepare a report about their condition including all the parametres given in the Inspection pro-forma of IRC-SP:35. The condition and structural assessment survey of the bridges / culverts / structures shall be carried out by senior experts of the Consultants.

3. For the bridges identified to be in a distressed condition based upon the visual condition survey, supplementary testing shall be carried out as per IRC-SP:35 and IRC-SP:40. Selection of tests may be made based on the specific requirement of the structure.

3. The assessment of the load carrying capacity or rating of existing bridges shall be carried out under one or more of the following scenarios:

   i. when the design live load is less than that of the statutory commercial vehicle plying or likely to ply on bridge;

   ii. if during the condition assessment survey and supplementary testing the bridge is found to indicate distress of serious nature leading to doubt about structural and / or functional adequacy, and

   iii. Design live load is not known nor are the records and drawings available.

4. The evaluation of the load carrying capacity of the bridge shall be carried out as per IRC-SP:37 ("Guidelines for Evaluation of Load Carrying Capacity of Bridges"). The analytical and correlation method shall be used for the evaluation of the load carrying capacity as far as possible. When it is not possible to determine the load carrying capacity of the bridge using analytical and correlation method, the same shall be carried out using load testing. The consultant has to exhaust all other methods of evaluation of strength of bridges before recommending to take up load testing of bridges. Road closure for testing if unavoidable shall be arranged by NHAI for limited duration say 12 hours or so.

5. Consultant shall carryout necessary surveys and investigations to establish the remaining service life of each retainable bridge or structure with and without the proposed strengthening

and rehabilitation according to acceptable international practice in this regard.

4.11.4.4 Geo-technical Investigations and Sub-Soil Exploration

1. The Consultants shall carry out geo-technical investigations and sub-surface explorations for the proposed Bridges / Road over bridges/ tunnels/ viaducts/ interchanges etc., along high embankments and any other location as necessary for proper design of the works and conduct all relevant laboratory and field tests on soil and rock samples. The minimum scope of geo-technical investigations for bridge and structures shall be as under:

S. No.	Description	Location of Boring
1	Overall length = 6 – 30 m	One abutment location and at least one intermediate location between abutments for structures having more than one span
2	Overall length = 30 – 60 m	One abutment location and at least one intermediate location between abutments for structures having more than one span.
3	Overall length >60 m	Each abutment and each pier locations.

2. The deviation(s), if any, by the Consultants from the scheme presented above should be approved by NHAI.

3. However, where a study of geo-technical reports and information available from adjacent crossings over the same waterway (existing highway and railway bridges) indicates that subsurface variability is such that boring at the suggested spacing will be insufficient to adequately define the conditions for design purposes, the Consultants shall review and finalize the bore hole locations in consultation with the NHAI officers.

4. Geotechnical Investigations and Sub soil Exploration shall be carried out to determine the nature and properties of existing strata in bed, banks and approaches with trial pits and bore hole sections showing the levels, nature and properties of various strata to a sufficient depth below the level suitable for foundations, safe intensity of pressure on the foundation strata, proneness of site to artesian conditions, seismic disturbance and other engineering properties of soil etc. Geotechnical investigation and Sub-soil Exploration will be done as per IRC 78.

5. The scheme for the borings locations and the depth of boring shall be prepared by the Consultants and submitted to NHAI for approval. These may be finalized in consultation with NHAI.

6. The sub-soil exploration and testing should be carried out through the Geotechnical Consultants empanelled by NHAI. The soil testing reports shall be in the format prescribed in relevant IRC Codes.

7. For the approach road pavement, bore holes at each major change in pavement condition or in deflection readings or at 2 km intervals whichever is less shall be carried out to a depth of at least 2 m below embankment base or to rock level and are to be fully logged. Appropriate tests to be carried out on samples collected from these bore holes to determine the suitability of various materials for use in widening of embankments or in parts of new pavement structure.

4.11.5. Material Investigations

1. The Consultants shall identify sources (including use of fly-ash/ slag), quarry sites and borrow areas, undertake field and laboratory testing of the materials to determine their suitability for various components of the work and establish quality and quantity of various construction materials and recommend their use on the basis of techno-economic principles. The Consultants shall prepare mass haul diagram for haulage purposes giving quarry charts

indicating the location of selected borrow areas, quarries and the respective estimated quantities.

"Environment friendly materials"

"As per MORTH circular No. RW /NH-33044/53/2013-S&R(R) dated 20th November, 2013, alternative pavement materials and technologies for road construction shall be assessed and compared in the design stage. The alternative resulting in substantial reduction in GHG emission and with least life cycle cost shall be recommended for implementation.

Technical and economic feasibility of using industrial byproducts, recyclable and waste materials shall be assessed depending on their availability in the concerned region.

2. It is to be ensured that no material shall be used from the right-of-way except by way of leveling the ground as required from the construction point of view, or for landscaping and planting of trees etc. or from the cutting of existing ground for obtaining the required formation levels.

3. Environmental restrictions, if any, and feasibility of availability of these sites to prospective civil works contractors, should be duly taken into account while selecting new quarry locations.

4. The Consultants shall make suitable recommendations regarding making the borrow and quarry areas after the exploitation of materials for construction of works.

5. The Material Investigation aspect shall include preparation and testing of bituminous mixes for various layers and concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler etc.) as identified during Material Investigation to conform to latest MoRT&H specification.

4.12 Detailed Design of Road and Pavements, Bridges, Structures

4.12.1. General

1. The Consultants are to carryout detailed designs and prepare working drawings for the following:

   i. High speed highway with divided carriageway configuration complete in all respects with service roads at appropriate locations;

   ii. Design of pavement for the additional lanes and overlay for the existing road, paved shoulders, medians, verges;

   iii. Bridges, viaduct/subways and other grade separated structures including ROBs/RUBs etc.

   iv. At-grade and grade-separated intersections, interchanges (if required);

   v. ROB for railway crossings as per the requirement and the standards of the Indian Railways; and,

   vi. Prepare alignment plans, longitudinal sections and cross-sections@ 50mintervals;

   vii. Designs for road furniture and road safety/traffic control features;

   viii. Designs and drawings for service road/under passes/overpass / cattle passes tree planting/fencing at locations where necessary / required

   ix. Toll plazas and office-cum-residential complex for NHAI (one for each civil contract package)

   x. Short bypasses at congested locations

   xi. Drainage design showing location of turnouts, out falling structures, separate drawings sheet for each 5 km. stretch.

   xii. Bridges and structures rehabilitation plan with design and drawings

   xiii. Traffic amenities (Parking Areas, Weighing Station and Rest Areas, etc.).

xiv. Design of pavement for approach road

xv. Design of river bank protection / training works. Innovative type of structures with minimum joints, aesthetically, pleasing and appropriate to the topography of the region shall be designed wherever feasible.

4.12.2. Design Standards

1. The Consultants shall evolve Design Standards and material specifications for the Study primarily based on IRC publications, MoRT&H Circulars and relevant recommendations of the international standards for approval by NHAI.

2. The Design Standards evolved for the project shall cover all aspects of detailed design including the design of geometric elements, pavement design, bridges and structures, traffic safety and materials.

4.12.3. Geometric Design

1. The design of geometric elements shall, therefore, take into account the essential requirements of such facilities.

2. Based on the data collected from reconnaissance and topographic surveys, the sections with geometric deficiencies, if any, should be identified and suitable measures for improvement should be suggested for implementation.

3. The data on accident statistics should be compiled and reported showing accident type and frequency so that black spots are identified along the project road section. The possible causes (such as poor geometric features, pavement condition etc.) of accidents should be investigated into and suitable cost-effective remedial measures suggested for implementation.

4. The detailed design for geometric elements shall cover, but not be limited to the following major aspects:

   i. horizontal alignment;

   ii. longitudinal profile;

   iii. cross-sectional elements, including refuge lane (50m) at every 2kms.

   iv. junctions, intersections and interchanges;

   v. bypasses; and,

   vi. service roads as and when require i.e built up area.

5. The alignment design shall be verified for available sight distances as per the standard norms. The provision of appropriate markings and signs shall be made wherever the existing site conditions do not permit the adherence to the sight distance requirements as per the standard norms.

6. The consultants shall make detailed analysis of traffic flow and level of service for the existing road and workout the traffic flow capacity for the improved project road. The analysis should clearly establish the widening requirements with respect to the different horizon periods taking into account special problems such as road segments with isolated steep gradients.

7. In the case of closely spaced cross roads the Consultant shall examine different options such as, providing grade separated structure for some of them with a view to reduce number of at-grade crossings, services roads connecting the cross-roads and closing access from some of the intersections and prepare and furnish appropriate proposals for this purpose keeping in view the cost of improvement, impact on traffic movement and accessibility to cross roads. The detailed drawings and cost estimate should include the provisions for realignments of the existing cross roads to allow such arrangements.

8. The Consultant shall also prepare design of grade separated pedestrian crossings (viaducts) for large cross traffic of pedestrians and / or animals on the basis of passenger and animal cross traffic surveys conducted.

9. The Consultant shall also prepare details for at-grade junctions, which may be adopted as alternative to the grade separated structures. The geometric design of interchanges shall take into account the site conditions, turning movement characteristics, level of service, overall economy and operational safety.

10. The Consultants shall prepare design and other details in respect of the parallel service roads in urbanized locations and other locations to cater to the local traffic, their effect of the viability of the project on commercial basis if service roads are constructed as part of the project and the implications of not providing the service roads.

11. The consultant shall prepare complete road and pavement design including drainage for new bypass option identified around congested town en-route.

4.12.4. Pavement Design

1. The detailed design of pavement shall involve:

   i. strengthening of existing road pavement and design of the new pavement if any, if the findings of the traffic studies and life-cycle costing analysis confirm the requirement for widening of the road beyond 2lane undivided carriageway standard;;

   ii. pavement design for bypasses; and,

   iii. design of shoulders.

2. The design of pavement shall primarily be based on IRC publications.

3. The design of pavement shall be rigorous and shall make use of the latest Indian and International practices. The design alternatives shall include both rigid and flexible design options. The most appropriate design, option shall be established on life-cycle costing and techno-economic consideration.

4. For the design of pavement, each set of design input shall be decided on the basis of rigorous testing and evaluation of its suitability and relevance in respect of in-service performance of the pavement. The design methodology shall accompany the design proposals and shall clearly bring out the basic assumptions, values of the various design inputs, rationale behind the selection of the design inputs and the criteria for checking and control during the implementation of works. In other words, the design of pavement structure should take due account of the type, characteristics of materials used in the respective courses, variability of their properties and also the reliability of traffic predictions. Furthermore, the methodology adopted for the design of pavement shall be complete with flowcharts indicating the various steps in the design process, their interaction with one another and the input parametre required at each step.

5. For the design of overlays for the existing 2-lane pavement, the strengthening requirement shall duly take into account the strength of the existing pavement vis-à-vis the remaining life. The overlay thickness requirements shall be worked out for each road segment homogenous with respect to condition, strength and sub- grade characteristics. The rehabilitation provisions should also include the provision of regulating layer. For existing pavement with acceptable levels of cracking, provision of a crack inhibiting layer should also be included.

5 (a) For rehabilitation and strengthening, consultant shall consider the alternatives of rehabilitating the existing pavement, overlaying with the same or alternate pavement type (e.g. white/black topping) and also the option of removal and replacement of existing pavement layers and chose the best alternative basis lifecycle costing, and any local considerations such as material

availability, time available for construction etc.

6. Latest techniques of pavement strengthening like provision of geo-synthetics and cold/hot pavement recycling should be duly considered by the consultant for achieving economy. The use of technology particularly environment friendly technology viz. recycling of bituminous mixes, warm mixes and soil stabilization etc. should be adopted wherever feasible. Clause 519 of the "Specifications for Road and Bridge Works" (Fifth Revision) covers specifications for recycling of existing bituminous pavement materials to upgrade the pavements. These provisions notwithstanding, recycling of existing bituminous materials is yet to be implemented in most of the NHAI projects. The reclaiming and reprocessing of pavement materials involve both design (how the pavement should be designed using reclaimed materials with the given properties) and technology (the methods to reclaim and reprocess, equipment, knowhow and quality) issues. After addressing these issues, the recycling of pavements will be environmentally and economically better option for rehabilitation, repair or reconstruction compared to the use of fresh or virgin materials. Indian Road Congress has published IRC: 120-2015 on "recommended practice for recycling of bituminous pavements" giving a detailed procedure for its implementation

7. The paved shoulders shall be designed as integral part of the pavement for the main carriageway. The design requirements for the carriageway pavement shall, therefore, be applicable for the design of shoulder pavements. The design of granular shoulder should take into account the drainage considerations besides the structural requirements.

8. The pavement design task shall also cover working out the maintenance and strengthening requirements and periodicity and timing of such treatments.

4.12.5. Design of Embankments

1. The embankments design should provide for maximum utilization of locally available materials consistent with economy. Use of fly ash wherever available with in economical leads must be considered. In accordance with Government instructions, use of fly ash within 300 km from Thermal Power Stations is mandatory as per extra ordinary Gazette Notification No. S.O. 254 (E) Part Section – III – Sub Section (ii) dated 25th January, 2016 and subsequent amendment, if any of Ministry of Environment, Forest and Climate change, New Delhi.

2. The Consultants shall carry out detailed analysis and design for all embankments of height greater than 6 m based on relevant IRC publications.

3. The design of embankments should include the requirements for protection works and traffic safety features.

4.12.6. Design of Bridges and Structures

1. The data collected and investigation results shall be analyzed to determine the following:

   i. HFL

   ii. LWL

   iii. LBL

   iv. Erodibility of bed/scour level

   v. Design discharge

   vi. Linear waterway and effective linear waterway

   vii. Likely foundation depth

   viii. Safe bearing capacity

   ix. Engineering properties of sub soil

x. Artesian conditions

xi. Settlement characteristics

xii. Vertical clearance

xiii. Horizontal clearance

xiv. Free board for approach road

xv. Severity of environment with reference to corrosion

xvi. Data pertaining to seismic and wind load

xvii. Requirement of model study etc.

2. The Consultant shall prepare General Arrangement Drawing (GAD) and Alignment Plan showing the salient features of the bridges and structures proposed to be constructed / reconstructed along the road sections covered under the Study. These salient features such as alignment, overall length, span arrangement, cross section, deck level, founding level, type of bridge components(superstructure, substructure, foundations, bearings, expansion joint, return walls etc.) shall be finalized based upon hydraulic and geo-technical studies, cost effectiveness and ease of construction. The GAD shall be supplemented by Preliminary designs. In respect of span arrangement and type of bridge a few alternatives with cost-benefit implications should be submitted to enable NHAI to approve the best alternative. After approval of alignment and GAD the Consultant shall prepare detailed design as per IRC codes /guidelines and working drawings for all components of bridges and structures.

3. The location of all at-grade level crossings shall be identified falling across the existing level crossings for providing ROB at these locations. The Consultants shall prepare preliminary GAD for necessary construction separately to the Client. The Consultant shall pursue the Indian Railways Authorities or/and any statutory authority of State/Central Government for approval of the GAD from concerned Authorities.

4. GAD for bridges/structures across irrigation/water way channels shall be got approved from the concerned Irrigation/Water way Authorities. Subsequent to approval of GAD and alignment plan by NHAI, the Consultants shall prepare detailed design as per IRC codes/guidelines for all components of the bridges and structures.

5. Subsequent to the approval of the GAD and Alignment Plan by NHAI and Railways, the Consultant shall prepare detailed design as per IRC and Railways guidelines and working drawings for all components of the bridges and structures. The Consultant shall furnish the design and working drawings for suitable protection works and/or river training works wherever required.

6. Dismantling/ reconstruction of existing structures shall be avoided as far as possible except where considered essential in view of their poor structural conditions/ inadequacy of the provisions etc.

7. The existing structures having inadequate carriageway width shall be widened/reconstructed in part or fully as per the latest MoRT&H guidelines. The Consultant shall furnish the detailed design and working drawings for carrying out the above improvements.

8. Suitable repair / rehabilitation measures shall be suggested in respect of the existing structures as per IRC-SP:40 along with their specifications, drawings and cost estimate in the form of a report. The rehabilitation or reconstruction of the structures shall be suggested based on broad guidelines for rehabilitation and strengthening of existing bridges contained in IRC-SP:35 and IRC-SP:40.

9. Subsequent to the approval of the GAD and the alignment plan by NHAI, detailed design shall

also be carried out for the proposed underpasses, overpasses and interchanges.

10. The Consultants shall also carry out the design and make suitable recommendations for protection works for bridges and drainage structures.

11. In case land available is not adequate for embankment slope, suitable design for RCC retaining wall shall be furnished. However, RES wall may also be considered depending upon techno-economic suitability to be approved by NHAI.

12. All the bridge structures having a length of 100 m or less can be used for tapping of water for serving dual purpose i.e., to cross the water body or to store water, if technically feasible. Therefore, such structures shall be designed as bridge cum barrage structures (bridge cum bandhara). Ministry's guidelines in this regard issued vide letter no. RW/NH-34066/89/2015-S&R(B) dated 18.04.2017 may be referred.

4.12.7. Drainage System

1. The requirement of roadside drainage system and the integration of the same with proposed cross-drainage system shall be worked out for the entire length of the project road section.

2. In addition to the roadside drainage system, the Consultants shall design the special drainage provisions for sections with super-elevated carriageways, high embankments and for road segments passing through cuts. The drainage provisions shall also be worked out for road segments passing through urban areas.

3. The designed drainage system should show locations of turnouts/outfall points with details of outfall structures fitting into natural contours. A separate drawing sheet covering every 5 km. stretch of road shall be prepared.

4. The project highway shall be designed to have well designed efficient drainage system, which shall be subsurface, as far as possible. While constructing the underpasses, the finished road level shall be determined so as to ensure that the accumulation of rain water does not take place and run-off flows at the natural ground level. The drains, wherever constructed, shall be provided with proper gradient and connected to the existing outlets for final disposal.

5. The rain water harvesting requirements be assessed taking into consideration the Ministry of Environment & Forest Notification Dt. 14.01.1997 (as amended on 13.01.1998, 05.01.1999 & 06.11.2000). The construction of rainwater harvesting structure is mandatory in and around water scarce / crisis areas notified by the Central Ground Water Board. The provisions for rainwater harvesting be executed as per the requirements of IRC:SP:42-2014 (Guidelines for Road Drainage) and IRC:SP:50-2013 (Guidelines on Urban Drainage).

6. All the bridge structures having a length of 100m or less can be used for tapping of water for serving dual purpose i.e. to cross the water body and to store water, if technically feasible. Therefore, such structures should be designed as bridge cum barrage structures (bridge cum bandhara). Ministry's guidelines in this regard issued vide letter no. RW/NH-34066/59/2015-S&R(B) dated 18.04.2017 may be referred.

7. The locations of the culverts should be planned in such a way that the proposed culvert covers optimum catchment area & the location shall be decided on the basis of topographical survey, local rainfall data, gradient of natural ground and enquiry from the local habitants. All culverts should preferably be box culverts as pipe culverts get filled up with silt, which is rarely cleared.

4.12.8. Traffic Safety Features, Road Furniture and Road Markings

1. The Consultants shall design suitable traffic safety features and road furniture including traffic signals, signs, markings, overhead sign boards, crash barriers, delineators etc. The locations of these features shall be given in the reports and also shown in the drawings.

2. The Consultant should make the provisions for "the overhead (gantry-mounted) signs on roads with two or more lanes in the same direction" as per provisions of IRC-67. The minimum height of gantry mounted sign be 5.5 m above the highest point at the carriageway.

3. Road safety shall be the focus of design. The roads shall be forgiving, having self-explaining alignment, safe designed intersections / interchanges segregation and safe crossing facilities for VRUs with crash barriers at hazardous locations. The details of traffic signs and pavement markings with their locations, types and configuration shall be shown on the plan so that they are correctly provided.

4. DPR shall undergo the exercise of Road Safety Audit through the Road Safety Auditor (separate from design team) and recommendations mentioned be incorporated.

5. Road markings and proper signage constitute another important aspect of the Road safety. The DPR shall contain a detailed signage plan, indicating the places, directions, distances and other features, duly marked on the chainage plan. It shall specify the suitable places where FoBs are to be provided. Road marking and signage plan shall be included in DPR and shall be specifically approved by the NHAI.

6. Advanced Traffic Management System (ATMS) shall be in place for all 4/6 lane roads of NHAI being put to tolling. This would provide real time information, guidance and emergency assistance to users. ATMS would include outdoor equipment including emergency call boxes, variable message sign systems, meteorological data system, close circuit TV camera (CCTV) system in addition to any other equipment required to meet the objective. Indoor equipment would include large display board, central computer with Network Management System, CCTV monitor system and management of call boxes system with uninterrupted power supply, all housed in a central control centre. In this connection, NHAI's policy circular ~~no.11041/218/2007-Admn dated 15.09.2016~~ no. 11.53/2023 dated 10.10.2023 may be referred.

7. As availability of suitable sight distance has a large effect on road safety, the alignment of all the NHs should be finalized in such a way so as to have double the stopping sight distance available to the road users at all locations.

4.12.9. Arboriculture and Landscaping

The Consultants shall work out appropriate plan for planting of trees (specifying type of plantation), horticulture, floriculture on the surplus land of the right-of way with a view to beautify the highway and making the environment along the highway pleasing. These activities should be included in the TOR for contractor/concessionaire and the cost of these activities shall also be added to the total project cost for civil works. The existing trees / plants shall be retained to the extent possible. The Transplantation of trees shall also be proposed wherever feasible.

4.12.10. Toll Plaza

1. The Consultants shall identify the possible toll plaza location(s) based on the data and information derived from the traffic studies and a study of the existing physical features including the availability of land. The location of the plaza should keep in view that the project road is to be developed as a partially access controlled highway facility and it is required to collect toll on rational basis from as much of the vehicular traffic as possible consistent with economy of collection and operations. The location of the toll plaza should be finalized in consultation with NHAI.

2. The minimum number of toll lanes at the toll plazas should be carefully designed taking into consideration the projected peak hour tollable traffic, permissible service time, adopted toll collection system and the capacity of service lanes. The number of lanes at any toll plaza would,

however, be not less than four times the number of lanes for which the highway has been designed. Eventually, all the lanes have to be designed / equipped with Electronic Toll Collection (ETC) systems and one lane at the extreme outer side for Over Dimensioned Vehicles (ODV) should be earmarked in each direction.

3. Car lanes and lanes for commercial vehicles shall be earmarked at the toll plaza with outer lanes earmarked for the commercial vehicles. At least 50% of the total lanes on each side shall be equipped with weigh-in-motion facility for dedicated use by commercial vehicles followed by a static weigh bridge on either side. Number of lanes with weigh-in-motion facility may be suitably increased depending on proportion of commercial vehicles in total traffic Provision should be kept for acquisition and earmarking of about one acre area for parking of the overloaded vehicles.

4. Toll Plaza shall be designed as per IRC 84.

4.12.11. Weighing Station, Parking Areas and Rest Areas

1. The consultant shall select suitable sites for weighing stations, parking areas and rest areas and prepare suitable separate designs in this regard. The common facilities like petrol pump, first-aid medical facilities, police office, restaurant, vehicle parking etc. should be included in the general layout for planning. For petrol pump, the guidelines issued by OISD of Ministry of Petroleum shall be followed. The facilities should be planned to be at approximately 50 km interval. At least each facility (1 no.) is foreseen to be provided for this project stretch. Weighing stations can be located near toll plazas so that overloaded vehicles can be easily identified and suitably penalized and unloaded before being allowed to proceed further. The type of weighing system suitable for the project shall be brought out in the report giving merits of each type of the state-of-the art and basis of recommendations for the chosen system.

2. The Consultant should take into consideration the provisions for persons with disabilities (PwD) in way side amenity centres / rest areas and provide ramp facilities, exit / entrance door with minimum clear opening of 900 mm and special toilet facilities for use of handicapped persons. The consultant shall also take into consideration, the provisions for Pedestrians facilities as per IRC-103.

4.12.12 Miscellaneous Works

1. The Consultants shall make suitable designs and layout for miscellaneous works including rest areas, bus bays, vehicle parking areas, telecommunication facilities etc. wherever appropriate.

2. The Consultants shall prepare the detailed scheme and lay out plan for the works mentioned in Para 1.

3. The Consultants shall prepare detailed plan for the traffic management and safety during the construction period.

4.13 Environment and Social Impact Assessment

The consultant shall under take the detailed environmental and social impact assessment in accordance with the standard set by the Government of India for projects proposed to be funded by MORT&H/NHAI. In respect of projects proposed to be funded by ADB loan assistance, Environmental Assessment Requirements, Environmental Guidelines for selected infrastructure projects, 1993 of Asian Development Bank shall be followed. Similarly, for projects proposed to be funded by World Bank loan assistance, World Bank Guidelines shall be followed.

4.13.1 Environmental Impact Assessment

Environment impact assessment or initial environment examination be carried out in accordance with ADB's Environmental Assessment Requirements of ADB 1998 guidelines for selected infrastructure projects 1993 as amended from time to time /World Bank Guidelines / Government of India Guidelines, as applicable

1. The consultant should carry out the preliminary environmental screening to assess the direct and induced impacts due to the project.
2. The consultant shall ensure to document baseline conditions relevant to the project with the objective to establish the benchmarks.
3. The consultant shall assess the potential significant impacts and identify the mitigation measures to address these impacts adequately.
4. The consultant shall do the analysis of alternatives incorporating environmental concerns. This should include with and without scenario and modification incorporated in the proposed project due to environment considerations.
5. The consultant shall give special attention to the environmental enhancement measures in the project for the following:
   (a) Cultural property enhancement along the highways
   (b) Bus bays and bus shelters including a review of their location,
   (c) Highway side landscape and enhancement of the road junctions,
   (d) Enhancement of highway side water bodies, and
   (e) Redevelopment of the borrow areas located on public land.
6. The consultant shall prepare the bill-of-quantities (BOQ) and technical specifications for all items of work in such a way that these may be readily integrated to the construction contracts.
7. The consultant shall establish a suitable monitoring network with regard to air, water and noise pollution. The consultant will also provide additional inputs in the areas of performance indicators and monitoring mechanisms for environmental components during construction and operational phase of the project.
8. The consultant shall provide the cost of mitigation measures and ensure that environmental related staffing, training and institutional requirements are budgeted in project cost.
9. The consultant shall prepare the application forms and obtain forestry and environmental clearances from the respective authorities including the SPCBs and the MOEF on behalf of NHAI. The consultants will make presentation, if required, in defending the project to the MOEF Infrastructure Committee. Further, for Environmental & Wildlife Clearances the firm should have been accredited by National Accreditation Board for Education and Training (NABET) for EIA. In case NABET accreditation is not available, the DPR consultant should have at least 1 retired or Ex Indian Forest Service officer and 2 retired or Ex State Forest Service officers on regular payroll each with over 15 years of service in Forest & Wildlife Department.
10. The consultant shall identify and plan for plantation and Transplantation of the suitable trees along the existing highway in accordance with IRC guidelines.
11. The consultant shall assist in providing appropriate input in preparation of relevant environment and social sections of BPIP.

12 Provision should be made for Noise Barriers wherever (especially where project highway passes through dense habitation) required as a mitigation measure against noise pollution and nuisance. Their location, dimension, type, material and shapes should be determined and defined in environment impact assessment studies forming part of DPR.

4.13.2 Social Assessment

1 The consultant would conduct base line socio-economic and census survey to assess the impacts on the people, properties and loss of livelihood. The socioeconomic survey will establish the benchmark for monitoring of R&R activities. A social assessment is conducted for the entire project to identify mechanisms to improve project designs to meet the needs of different stakeholders. A summary of stakeholder discussions, issue raised and how the project design was developed to meet stakeholders need would be prepared.

2 The consultant shall prepare Land Acquisition Plan and assist NHAI in acquisition of land under various Acts.

4.13.3 The consultant would prepare Resettlement and Rehabilitation Plan and assess feasibility and effectiveness of income restoration strategies and suitability and availability to relocation sites. The resettlement plan which accounts for land acquisition and resettlement impacts would be based on a 25% socio-economic survey and 100 % census survey of project affected people which provides the complete assessment of the number of affected households and persons, including common property resources. All untitled occupants are recorded at the initial stages and identify cards will be issued to ensure there is no further influx of people in to the project area. All consultations with affected persons (to include list of participants) should be fully documented and records made available to NHAI.

- Assessment on the impact of the project on the poor and vulnerable groups along the project road corridor.
- Based on the identified impacts, developing entitlement matrix for the project affected people.
- Assessment on social issues such as indigenous people, gender, HIV/AIDS, labourers including child labour.
- Implementation budgets, sources and timing of funding and schedule of tasks.
- Responsibility of tasks, institutional arrangements and personnel for delivering entitlement and plans to build institutional capacity.
- Internal and external monitoring plans, key monitoring indicators and grievance redress mechanism.
- Incorporating any other suggestions of the ADB/ World Bank/ NHAI, till the acceptance of the reports by the ADB/ World Bank/ NHAI

4.13.4 Reporting Requirements of EIA

- The consultant would prepare the stand-alone reports as per the requirement of the ADB/World Bank /NHAI, as applicable, with contents as per the following:
- Executive Summary
- Description of the Project
- Environmental setting of the project.
- Identification and categorization of the potential impacts (during pre- construction,

construction and operation periods).

- Analysis of alternatives (this would include correlation amongst the finally selected alternative alignment/routing and designs with the avoidance and environmental management solutions).
- The public consultation process.
- Policy, legal and administrative framework. This would include mechanisms at the states and national level for operational policies. This would also include a description of the organizational and implementation mechanism recommended for this project.
- Typical plan or specific designs for all additional environmental items as described in the scope of work.
- Incorporating any other as per the suggestions of the ADB/ World Bank / NHAI, till the acceptance of the reports by the ADB/ World Bank/ NHAI , as applicable.
- EMP Reports for Contract Package based on uniform methodology and processes. The consultant will also ensure that the EMP has all the elements for it to be a legal document. The EMP reports would include the following:
- Brief description of the project, purpose of the EMP, commitments on incorporating environmental considerations in the design, construction and operations phases of the project and institutional arrangements for implementing the EMP.
- A detailed EMP for construction and operational phases with recourse to the mitigation measures for all adverse impacts.
- Detailed plans for highway-side tree plantation (as part of the compensatory afforestation component).
- Environmental enhancement measure would be incorporated.
- Enhancement measures would include items described in the scope of work and shall be complete with plans, designs, BOQ and technical specifications.
- Environmental monitoring plans during and after construction including scaling and measurement techniques for the performance indicators selected for monitoring.
- The EMP should be amendable to be included in the contract documents for the works.
- Incorporating any other as per the suggestions of the ADB/ World Bank/ NHAI, till the acceptance of the reports by the ADB/ World Bank /NHAI as applicable.

4.13.5 Reporting requirements of RAP

Analysis on the resettlement plan be conducted based on ADBs Hand Book on Resettlement, A Guide to Good practice 1998 as amended time to time/ World Bank Guidelines / Government of India Guidelines, as applicable.

- Executive summary
- Description of project
- Objectives of the project.
- The need for Resettlement in the Project and evaluation of measures to minimize resettlement.
- Description and results of public consultation and plans for continued participation of PAPs.

- Definition of PAPs and the eligibility criteria.
- Census and survey results-number affected, how are they affected and what impacts will they experience.
- Legal and entitlement policy framework-support principles for different categories of impact.
- Arrangements for monitoring and evaluation (internal and external)
- Implementation schedule for resettlement which is linked to the civil works contract
- A matrix of scheduled activities linked to land acquisition procedures to indicate clearly what steps and actions will be taken at different stages and the time frame
- The payment of compensation and resettlement during the acquisition process
- An itemized budget (replacement value for all assets) and unit costs for different assets

5.1 Land Acquisition

5.1.1 Overall program management of all activities pertaining to Land Acquisition

5.1.1.1 Coordinate all activities necessary for accurate and timely publication of notifications as per NH Act including but not limited to

i. Identify all land parcels that need to be acquired as part of project highway

ii. Conduct Joint Measurement Survey in conjunction with CALA, NHAI and state revenue department to verify land records

iii. Conduct valuation of land and associated assets (structures, trees, crops etc.) and liaison with authorities of State Government for authentication of the valuation

5.1.1.2 Liaison with relevant state departments throughout land acquisition process

i. Liaison with State Government departments including but not limited to Land Revenue Office (or Tehsil), Sub - Registrar office, Directorate of Surveys and with other State departments (like Public works department, horticulture department etc.) to expedite the land acquisition process

ii. Co-ordinate collection of all the necessary land record documents and information required to support CALA/CALA staff during the LA process

5.1.1.3 Facilitate communication between NHAI (PIU) and CALA throughout land acquisition process

i. Ensure prompt official communication (including delivery of documents and notifications) between the office of Competent Authority for Land Acquisition (CALA) and NHAI

5.1.1.4 Support CALA and PIU with manpower and resources CALA throughout land acquisition process

i. Ensure presence of adequate manpower like surveyors, revenue inspectors, assistants, peons, computer operators as required to support CALA, PIU, RO in the LA process corresponding to respective project

ii. Ensure comprehensive quality checks (4 Eye Checks) for all the notifications prepared before submission in the Bhoomi Rashi portal

5.1.2 Assist CALA and NHAI (PIU) in the publication of notifications

5.1.2.1 Provide copy of following documents to PIU - 1 soft copy (less than 3MB combined) + 1 hard copy, on finalization of alignment and approval of the alignment from the competent authority

i. Index Map: Document showing alignment of proposed highway overlaid on a detailed political map of the region

ii. Alignment plan: Engineering plan detailing relative position of Proposed Right of Way to existing road, bypasses, realignments significant structures, affected villages and chainage

iii. NHAI project sanction document detailing chainage, length, scheme code and land acquisition requirements (Total Land Required, Land available, land to be acquired etc.)

5.1.2.2 Conduct enquiry at Village Administrative Office along approved alignment to ensure inclusion of all villages

5.1.2.3 Ensure correct spelling of taluks and villages according to local revenue records (Jamabandi) or State Government land record website. The same should be done for English and Hindi

5.1.2.4 Obtain approval of taluk names, village names and other details mentioned in 3a from CALA office

5.1.2.5 Co-ordinate with PIU and District Collector/State Government in obtaining appointment order for CALA

5.1.2.6 Co-ordinate with NIC to ensure correct village names and spelling are included in Bhoomi Rashi portal

5.1.2.7 Assist PIU in creating 3a notification and preamble on Bhoomi Rashi along with all supporting documents in format prescribed to be sent for approval to NHAI HQ

5.1.3 Assist CALA and NHAI (PIU) in the publication of 3A notification

5.1.3.1 Co-ordinate collection of all village maps from state land revenue department

i. Ensure all village maps are collected from the Taluk Office/Regional Deputy Director of Survey and Land Records and bear a saleable copy mark.

5.1.3.2 Co-ordinate collection of all survey maps for all the affected survey numbers in the proposed right of way from state land revenue department

i. Ensure collection of digitized survey maps from the state revenue department prepared using CollabLand software of NIC for the purposes of land acquisition activities, wherever available

ii. Ensure all survey maps collected are scaled to 1:500, 1:1000 or 1:2000

iii. Ensure survey maps contain all necessary information including boundary dimensions, ladder diagrams, topographical details, sub division details and adjoining survey numbers as available, in line with the norms of the State Government

iv. Verify the level of accuracy in the maps and their suitability for the purposes of supporting the land acquisition effort for the project road in terms of both dimensional accuracy and details available

v. Ensure consistency between the revenue maps and other land records (Record of Rights, Tenancy and Crops /A-Register etc.) and correct the maps/records in case of inconsistency. Ensure, the corrected maps are vetted by the Village Administrative Officer

5.1.3.3 Ensure collection of geo referenced control points capable of being imported into appropriate GIS system

i. Conduct an alignment walk-through and ensure details of the ground control points include village stones, suitable land details and permanent geographical features are collected

ii. Ensure a minimum of 10 control points are identified and geo-referenced for every 1 km

iii. Ensure the Geo-location information from the control points are imported into the GIS system, to aid in superimposition of alignment map and the digitized village map. Suitable land details and features should also be added to the GIS system to enable review of individual land parcels.

5.1.3.4 Ensure accurate digitization and projection of village maps on GIS system

i. Consultant should ensure complete digitization of the area containing the Proposed Right of Way

ii. Where digitized revenue maps are unavailable or are deemed to be insufficient for the purposes of this project, the consultant shall digitize the survey maps of the area falling in and surrounding the existing and PROW, keeping the following in mind:

1. Create digitized maps of individual survey numbers using the procedure used by the land revenue department to recreate revenue maps such as using ladder diagrams, grid dimensions etc., using CollabLand software, wherever possible

2. Input numerical measurements mentioned in the ladder diagram/grid dimensions/survey boundaries in CollabLand or similar software to ensure accuracy of digital map

3. Stitch the digitized survey maps to recreate a scaled and digitized village map depicting all the survey numbers affected by the proposed right of way

iii. Ensure that the digitized map exactly matches the original map like a contact print and contain all information contained in the original survey map

iv. Ensure an accuracy of 1mm or higher in a 1:1000 scale, as this translates into an accuracy of 1 m or higher on ground

v. In digitization and feature addition, the consultant shall endeavor to follow any standards, requirements and formats laid down by the relevant state/ central government agency for land ownership and revenue management or that set by the authority involved in digitization of land records

1. Where applicable, the consultant shall share back the digitized cadastral maps in both soft and hard copy with the relevant local agency or state government

5.1.3.5 Ensure accurate projection of survey revenue maps on Google Earth or similar GIS software necessarily having the following layers

i. Alignment Map

ii. Digitized Village Map

iii. Topographical details as collected during topographical survey using LiDAR/Drone Imaging

iv. Geo-referenced control points imported into GIS software

5.1.3.6 Ensure proper superimposition of the alignment map, digitized village map by accurately matching the topographical details and geo-referenced ground control points on both the layers.

i. Divide the village maps at every 500 meters (in case of the same village) to ensure proper projection of the planar map on Google Earth or equivalent

ii. Adjust the digitized map to exactly match the ground situation using the geo-referenced ground control points identified

5.1.3.7 Accurately identify extent of area encroached by alignment in survey numbers/sub division numbers using appropriate software (ArcGIS/AutoCAD, etc) based on the superimposition of the alignment map on the digitized village map

5.1.3.8 Co-ordinate collection all the relevant revenue records from state revenue department required to ascertain type and nature of land

i. Collect the updated land revenue records with details on survey numbers, sub-division, land type, land nature and owner from the Taluk office

5.1.3.9 Prepare and submit 3A draft and LA plan in the format prescribed by NHAI

5.1.3.10 Co-ordinate submission of copies of LA plan and Alignment map to CALA offices through PIU required for verification of 3A draft in the format prescribed by the CALA Office

5.1.3.11 Facilitate CALA staff in verification of the draft 3A document

5.1.3.12 Assist CALA staff in preparation of 3A notification, preamble and forwarding letter to be forwarded to PIU

5.1.3.13 Assist PIU in uploading 3A notification (as declared by CALA) along with preamble on Bhoomi Rashi

i. Provide computer operators to upload 3A notification on Bhoomi Rashi

ii. Ensure the 3A submitted on Bhoomi Rashi matches the signed copy verbatim and no changes are made

5.1.3.14 Provide copy of 3A Gazette notification to the office of the CALA on publication in the Gazette

5.1.3.15 Prepare 3A notification in vernacular language to be sent to newspaper for 3A(3) notification

i. Ensure the translated 3A sent to the newspaper matches the 3A Gazette copy verbatim and no changes are made

5.1.3.16 Co-ordinate with the CALA to get a signed copy of the press ready version along with the file reference number needed for future reference at the CALA office

5.1.3.17 Assist PIU in coordinating with newspaper agency to ensure publication of 3A notification in 2 newspapers: 1 Vernacular + 1 Other

5.1.3.18 Provide copies of newspaper publication of 3A notification to the CALA and PIU

5.1.3.19 Ensure all activities are planned and adequate manpower is made available to ensure the prescribed timelines are adhered to

i. Ensure submission of 3A to the PIU in prescribed format within 30 days of 3a publication

ii. Ensure publishing of 3A in Gazette by pursuing the same with relevant stakeholder within 14 days of submission of final 3A to the PIU

iii. Provide adequate manpower including but not limited to AutoCAD draftsmen, liaison officers, computer operators, retired tahsildars, etc. to ensure mandated timelines are met

iv. Ensure adequate resources including but not limited to computers, software licenses, scanner, printer etc. are deployed to ensure mandated timelines are met

5.1.4 Assist CALA and NHAI (PIU) in conduction of 3C enquiry and compilation of final orders

5.1.4.1 Co-ordinate with CALA for scheduling public hearings as necessitated by section 3C of NH Act 1956

5.1.4.2 Assist CALA staff in sending notices to petitioners on respective hearing dates either through newspaper notifications to be published in 2 newspapers: 1 Vernacular + 1 other or through respective village administrative offices

5.1.4.3 Provide copies of newspaper publication/ notices of 3C notification to the office of the CALA

5.1.4.4 Assist CALA staff in receiving and compiling of objections

5.1.4.5 Assist CALA during objection hearings, recording of hearings, ensuring compliance of corresponding orders and notification of final CALA order to petitioners

5.1.4.6 Assist CALA staff in dispatching and ensuring delivery of final 3C orders to petitioners in a timely manner and obtain acknowledgement of receipt of 3C orders from the aggrieved parties

5.1.5 Assist CALA and NHAI (PIU) in conducting Joint Measurement Survey

5.1.5.1 Co-ordinate with the CALA office and state government departments and obtain all permissions necessary to conduct JMS and center line marking

5.1.5.2 Ensure laying of boundary pillars in an accurate and expedited manner

i. Ensure use of Differential GPS or Total Station systems to conduct center line marking

ii. Ensure placing of boundary pillars (left and right) and the center line peg (in case of brownfield sections), center line pillar (in case of greenfield sections) at 50-meter intervals, clearly demarcating the Proposed Right of Way.

iii. Ensure all boundary pillars are provided and planted as per IRC:25:1967

iv. Ensure that the boundary stones are secured at location

v. Provide daily reports to PIU and CALA office by mail indicating progress of boundary stone marking in terms of length and chainage covered

vi. Retain a Total Station system, controller and a prism holder for the entire duration of the JMS to ensure prompt assistance to the survey team

5.1.5.3 Ensure accurate and timely conduction of JMS for the complete length of the project

i. Provide scaled revenue maps, latest ownership records, village map and other revenue documents necessary for conducting JMS

ii. Arrange retired revenue sub inspectors of survey and chainmen to conduct Joint Measurement Survey at the consultant's cost

iii. Ensure accurate measurement of revenue survey plots with respect to PROW of project, by identifying physical features present on the ground & the survey sketches, measuring the distance of the PROW stone from the physical features and marking the distance on the survey sketch

iv. Ensure marking of PROW on scaled revenue maps indicating extent of encroachment into survey numbers/sub division numbers

v. Ensure surveyors collect details of structures and trees present in sub-divisions during JMS

vi. Ensure accurate calculation of area affected in each sub-division

vii. Ensure sub-division records are prepared as per the guidelines of the state revenue surveyor clearly indicating the name of the land owner as per latest ownership record

viii. Ensure sub-division records divide affected sub-divisions clearly indicating portion of land vested with the owner and portion of land acquired by NHAI

ix. Ensure submission of JMS records in format expected by the CALA office along with all supporting documents

x. Co-ordinate with local land revenue office in updating of all land records as per sub-division records submitted to CALA office, including vesting of acquired land in the name of Government of India, post publication of the 3D notification

xi. Provide daily reports to PIU and CALA office by mail indicating progress of JMS in terms of length, villages and number survey numbers covered

5.1.5.4 Assist land revenue department in conducting pre-scrutiny

i. Ensure all records are submitted at Taluk office in the correct format

ii. Facilitate creation of new sub-divisions based on the sub division records submitted by the survey team, including vesting of acquired land in the name of Government of India, post publication of the 3D notification

iii. Provide daily reports to PIU and CALA office by mail indicating progress of pre-scrutiny in terms of number of villages covered

5.1.5.5 Co-ordinate with CALA team and PIU to facilitate site inspection

5.1.6 Assist CALA and NHAI (PIU) in the publication of 3D notification

5.1.6.1 Prepare 3D draft based on 3A notification and scrutinized JMS statements in the format prescribed by NHAI

5.1.6.2 Co-ordinate submission of copies of 3D draft and scrutinized JMS Statements to the office of the CALA for verification

5.1.6.3 Facilitate CALA staff in verification of the draft 3D version

i. Ensure presence of surveyors to clarify/rectify any issue that may arise during verification, both during on-ground inspection as well as during the document verification

5.1.6.4 Assist CALA staff in preparation of 3D notification, preamble and forwarding letter to be forwarded to PIU

5.1.6.5 Assist PIU in uploading 3D notification (as declared by CALA) along with preamble on Bhoomirashi

i. Provide computer operators to upload 3D notification on Bhoomirashi

ii. Ensure the 3D submitted on Bhoomirashi matches the signed copy verbatim and no changes are made

5.1.6.6 Provide copy of 3D Gazette notification to the office of the CALA on publication in the Gazette

5.1.6.7 Prepare 3D notification in vernacular language to be sent to newspaper

i. Ensure the translated 3D sent to the newspaper matches the 3D Gazette copy verbatim and no changes are made

5.1.6.8 Co-ordinate with the CALA to get a signed copy of the press ready version along with the file reference number needed for future reference at the CALA office

5.1.6.9 Assist PIU in coordinating with newspaper agency to ensure publication of 3A notification in 2 newspapers: 1 Vernacular + 1 Other

5.1.6.10 Provide copies of newspaper publication of 3D notification to the CALA and PIU

5.1.6.11 Ensure all activities are planned and adequate manpower is made available to ensure the prescribed timelines are adhered to

i. Ensure submission of 3D statement along with sub-division records to the PIU in prescribed format within 45 days of 3A publication

ii. Ensure publishing of 3D in Gazette by pursuing the same with relevant stakeholder within 15 days of submission of final 3D to the PIU

iii. Provide adequate manpower including but not limited to surveyors, revenue inspectors, chain-men, liaison officers, computer operators, central line marking teams, helpers, etc. to ensure mandated timelines are met

iv. Ensure adequate resources including but not limited to computers, boundary pillars, Total Station/DGPS systems, vehicles etc. are deployed to ensure mandated timelines are met

5.1.7 Assist the CALA in the declaration of award (3G)

5.1.7.1 Assist CALA in drafting public notice inviting claims (under sub-section 3 of section 3G) from all persons interested in the land to be acquired and 3D notification to be published in 2 local newspaper - 1 vernacular and 1 other.

5.1.7.2 Co-ordinate with NHAI /CALA on publishing of claim invitation notification in 2 local newspapers - 1 vernacular and 1 other. The public notice inviting claims (under sub-section 3 of section 3G)

from all persons interested in the land to be acquired can be issued along with the newspaper publication of 3D notification

5.1.7.3 Provide 1 copy of newspaper notification of 3D and claim invitation to CALA, Ward, Panchayat, Circle office, police station and Collector office.

5.1.7.4 Assist CALA during claim hearings, record hearings and compliance of corresponding orders

i. Collate ownership claims and the documents received during the claim hearings

ii. Assist the office of the CALA in verifying the claims and in finalizing the land owners

5.1.7.5 Assist CALA office in collection of sales statistics and market value (Guideline value/ Collector rates) from the relevant State Government department

i. Collect the sales statistics for 3 years prior to the date of the 3A notification from the Sub-Registrar's Office

ii. Assess the sales statistics to evaluate the nature of land for all the sale deeds based on the land records available with the State Government (Chitta/ A- Register, etc.)

iii. Compute the average of the top 50% of the sales statistics after eliminating the outliers, with proper justification

iv. Collect the Guideline Value/ Prevalent market rates, as issued by the order of the Competent Authority of the State Government for all the relevant villages

v. Collect the details of the sales of land for public purpose through private negotiation in the recent past for similar type of land

5.1.7.6 Compute land valuation for the all the affected survey numbers in line with RFCTLARR Act and the guidelines issued by MoRTH

5.1.7.7 Conduct valuation of land related assets (Structures, trees, crops etc.) and liaison with respective State authority including but not limited to State Public Works Department, Agriculture, Horticulture, Forest Department, etc. for authentication of the valuation.

5.1.7.8 Assist CALA in 3G award preparation and in drafting 3G award documents along with the required annexures including but not limited to preparation of field book which contains award by each beneficiary, list of sales statistics considered for finalizing the market value, etc.

5.1.8 Assist NHAI in obtaining possession of land

5.1.8.1 Co-ordinate delivery of confirmation letter of deposit from PIU to CALA

5.1.8.2 Assist CALA staff in drafting notification for beneficiaries for award collection and vacating the land within 60 days (under section 3E)

5.1.8.3 Co-ordinate serving of notice to all beneficiaries for collection of award and to vacate the land within 60 days (under section 3E)

5.1.8.4 Co-ordinate collection of certificate of possession from CALA

5.1.9 Publication of Gazette Notifications relating to Land Acquisition:

5.1.9.1 Cost for publication of Gazette Notifications relating to land acquisition in Newspapers shall be borne by the NHAI.

5.2 Utility shifting proposal and estimates

5.2.1 Identify type and location of all existing utilities within the proposed ROW

1. Consultant will review information available with all utilities agencies in the region, consult maps/plans available with NHAI, MoRTH and state road agencies, consult with locals and municipal bodies to ascertain the presence and location of utilities , including but not limited

to water-mains, gas, telephone, electricity and fiber-optic installations in and around the project road

2. Deploy ground penetrating radar, inductor locators or better technology to accurately map the location, type and size of utilities in the ROW of the project road as required in the section of this TOR

3. Develop a detailed strip plan and digitized maps showing:

   i. type, size and current location of all the utilities identified

   ii. relative offset from the centerline

   iii. existing right of way

5.2.2 Plan for utilities in future road design

1. Consultants need to identify utilities that will require shifting to enable construction of the proposed project road

2. Incorporate space required for elevated and under-ground utilities corridors and utilities crossings as required for existing and future utilities in consultation with user departments

5.2.3 Develop a utilities relocation plan

1. Consultants need to develop and submit a utilities relocation plan in consultation with NHAI and user departments clearly identifying current utilities and suggested relocations along with crossings as required

2. Plan and conduct discussions, consultations and joint site visits required for the planning of utilities shifting and the development of required drawings and proposals

3. Prepare necessary details, documents and suggested relocation plan to be submitted to user department

4. Develop initial cost estimates based on suggested relocation plan and the latest available schedule of rates for inclusion in the cost of the project at the time of approval

5.2.4 Estimates and approvals

1. Consultants need to obtain draft utilities shifting proposal from user departments for all utilities identified for shifting along project road

2. Prepare utility shifting cost estimates using latest schedule of rates and obtain approval from user departments

3. Review final designs submitted, cost estimates, complete checklist, obtain required declarations and submit to NHAI for approval

4. Work with user department, NHAI as required to incorporate any changes requested in shifting proposal and cost estimate

5. Obtain all required utilities shifting proposal estimates and required approvals from both user departments and NHAI within the time stipulated in DPR contract

5.3 Estimation of Quantities and Project Costs

1. The Consultants shall prepare detailed estimates for quantities (considering designs and mass haul diagram) and project cost for the entire project (civil packages wise), including the cost of environmental and social safeguards proposed based on MoRT&H's Standard Data Book and market rate for the inputs. The estimation of quantities shall be based on detailed design of various components of the projects. The estimation of quantities and costs would

have to be worked out separately for civil work Package as defined in this TOR.

2. The Consultants shall make detailed analysis for computing the unit rates for the different items of works. The unit rate analysis shall duly take into account the various inputs and their basic rates, suggested location of plants and respective lead distances for mechanized construction. The unit rate for each item of works shall be worked out in terms of manpower, machinery and materials.

3. The project cost estimates so prepared for NHAI/ADB/WB projects are to be checked against rates for similar on-going works in India under NHAI/World Bank/ ADB financed road sector projects.

4. The Consultant should work out the quantity of Bitumen, Steel and Cement likely to be used in the project and indicate in the summary sheet.

6. Viability and Financing Options and Bidding process

1. The Project Road should be divided into the traffic homogenous links based on the findings of the traffic studies. The homogenous links of the Project Road should be further subdivided into sections based on physical features of road and pavement, sub-grade and drainage characteristics etc. The economic and commercial analysis shall be carried out separately for each traffic homogenous link as well as for the Project Road.

2. The values of input parametres and the rationale for their selection for the economic and commercial analyses shall be clearly brought out and got approved by NHAI.

3. For models to be used for the economic and the commercial analyses, the calibration methodology and the basic parametres adapted to the local conditions shall be clearly brought out and got approved by NHAI.

4. The economic and commercial analyses should bring out the priority of the different homogenous links in terms of project implementation.

6.1. Economic Analysis

1. The Consultants shall carry out economic analysis for the project. The analysis should be for each of the sections covered under this TOR. The benefit and cost streams should be worked out for the project using HDM-IV or other internationally recognized life-cycle costing model.

2. The economic analysis shall cover but be not limited to be following aspects:

   i. assess the capacity of existing roads and the effects of capacity constraints on vehicle operating costs (VOC);

   ii. calculate VOCs for the existing road situation and those for the project;

   iii. quantify all economic benefits, including those from reduced congestion, travel distance, road maintenance cost savings and reduced incidence of road accidents; and,

   iv. estimate the economic internal rate of return (EIRR) for the project over a 30-year period. In calculating the EIRRs, identify the tradable and non- tradable components of projects costs and the border price value of the tradable components.

   v. Saving in time value.

3. Economic Internal Rate of Return (EIRR) and Net Present Value (NPV), "with "and "without time and accident savings" should be worked out based on these cost-benefit stream. Furthermore, sensitivity of EIRR and NPV worked out forth different scenarios as given under:

   Scenario – I Base Costs and Base Benefits

   Scenario - II Base Costs plus 15% and Base Benefits

Scenario - III Base Costs and Base Benefits minus 15%

Scenario – IV Base Costs plus 15% and Base Benefits minus 15%

The sensitivity scenarios given above are only indicative. The Consultants shall select the sensitivity scenarios taking into account possible construction delays, construction costs overrun, traffic volume, revenue shortfalls, operating costs, exchange rate variations, convertibility of foreign exchange, interest rate volatility, non-compliance or default by contractors, political risks and force majeure.

4. The economic analysis shall take into account all on-going and future road and transport infrastructure projects and future development plans in the project area.

6.2 Financial Analysis

6.2.1 Need for financial analysis

1. It is envisaged that project stretches should be implemented in a commercial, PPP funded format
2. Therefore, the Consultant will need to study the financial viability of the project under various available commercial formats and suggest a mode of funding and execution that is most likely to be successful
3. The consultant shall study the financial viability of the project under several different traffic volume, user fee scenarios and funding options to arrive at the optimal execution mode and funding modalities

6.2.2 Financial analysis of the project

1. The Consultants shall in consultation with NHAI finalize the format for the analysis and the primary parameters and scenarios that should be taken into account while carrying out the commercial analysis
2. The Financial analysis for the project should cover financial internal rate of return, projected income statements, balance sheets and fund flow statements and should bring out all relevant assumptions.
3. The financial analysis should cover identification, assessment, and mitigating measures for all risks associated with the project. The analysis shall cover, but be not limited to, risks related to construction delays, construction costs overrun, traffic volume, revenue shortfalls, operating costs, exchange rate variations, convertibility of foreign exchange, interest rate volatility, non-compliance or default by contractors, political risks and force majeure.
4. The sensitivity analysis should be carried out for a number of probabilistic scenarios.

6.2.3 Outputs from financial analysis

1. The financial model so developed shall be handed over to and be the property of NHAI.
2. The consultant shall also suggest positive ways of enhancing the project viability and furnish different financial models for implementing on BOT format

6.3 Bidding process

6.3.1 Consultant shall assist the authority in preparing the required bid documents and support the authority through the bidding process

6.3.2 Preparation of documents

1. The consultant shall prepare all required bid documents and technical schedules required for the bidding of the project

2. The Consultants shall prepare separate documents for each type of contract (EPC/PPP) for each package of the DPR assignment

3. The consultant shall assist authority in reviewing bid documents and in making any changes required basis their findings or the and finalising bid documents

4. The consultant shall assist the authority in collecting and providing all required supporting documents for initiating bid as defined by the SOP for contracting

5. The DPR consultant may be required to prepare the Bid Documents, based on the feasibility report, due to exigency of the project for execution if desired by NHAI.

    a. To enable this, consultant should study the financial viability and financial options for the project for modes such as BOT Toll/ Annuity during the feasibility stage.

6. Provide any and all clarifications required by the authority or other functionaries such as the financial consultant and legal advisor as required for the financial appraisal and legal scrutiny of the Project Highway and Bid Documents.

7. The consultant shall be guided in its assignment by the Model Concession/ Contract Agreements for PPP/ EPC projects, as applicable and the Manual of Specifications and Standards for two/ four/ six laning of highways published by IRC (IRC:SP:73 or IRC:SP:84 or IRC:SP:87, as applicable) along with relevant IRC codes for design of long bridges.

    a. It is suggested that consultant should go through the EPC/ PPP documents of ministry before bidding the project.

6.3.3 Support during the bidding process

1. Consultant shall support NHAI through the entire bid process and shall be responsible for sharing the findings from the preparation stages during the bid process

2. The consultant shall ensure participation of senior team members of the consultant during all interaction with potential bidders including pre-bid conference, meetings, site visits etc.

3. During the bid process for a project, the consultant shall support the authority in:

    a. Responding to all pre-bid technical queries

    b. Preparation of detailed responses to the written queries raised by the bidders

4. The consultant shall assist NHAI and its functionaries as needed in the evaluation of technical bids

7. Time period for the service

1. Time period envisaged for the study of the project is indicated in **Annex-I to LOI.** The final reports, drawings and documentation shall be completed within this time schedule.

2. NHAI shall arrange to give approval on all sketches, drawings, reports and recommendations and other matters and proposals submitted for decision by the Consultant in such reasonable time so as not to delay or disrupt the performance of the Consultant's services.

8. Project Team and Project Office of the Consultant

1. The Consultants shall be required to form a multi-disciplinary team for this assignment. The consultants' team shall be manned by adequate number of experts with relevant experience in the execution of similar detailed design assignments.

2. List of suggested key personnel to be fielded by the consultant with appropriate man-month of consultancy services is given in Enclosure-I as per client's assessment.

3. A Manning Schedule for key personnel mentioned above is enclosed as Enclosure-I along with broad job- description and qualification as Enclosure-II. The information furnished in Enclosures-I & II are to assist the Consultants to understand the client's perception about these requirements and shall be taken by the Consultants for the purpose of Financial Proposal and deployment schedule etc. in technical proposal to be submitted by them. Any deviation proposed may be recorded in the comments on TOR. All the key personnel mentioned will be evaluated at the time of evaluation of technical proposal. Consultants are advised in their own interest to frame the technical proposal in an objective manner as far as possible so that these could be properly assessed in respect of points to be given as part of evaluation criteria as mentioned in Data sheet. The bio-data of the key personnel should be signed on every sheet by the personnel concerned and the last sheet of each bio-data should also be signed by the authorized signatory of the Consultants.

4. The Consultants shall establish an office at the project site manned by senior personnel during the course of the surveys and investigations. All the project related office work shall be carried out by the consultant in their site office unless there are special reasons for carrying out part of the office work elsewhere for which prior approval of NHAI shall be obtained. The address of the site office including the personnel manning it including their Telephone and FAX numbers will be intimated by the Consultant to NHAI before commencement of the services.

5. All key personnel and sub professional staff of the DPR Consultants shall use the fingerprint based (biometric) attendance system for marking their daily attendance. Attendance shall be marked at least once a day and anytime during the day. Biometric Attendance System shall be installed by the DPR Consultants at its own cost at the site office and design office in order to facilitate the attendance marking. A copy of attendance records shall be attached at the time of submission of their bills to the NHAI from time to time. Proper justification shall be provided for cases of absence of key personnel/ sub-professional staff which do not have prior approval from Project Director of Concerned stretch. If NHAI so desires, it shall facilitate electronic linking of the attendance system with the Central Monitoring System of NHAI.

9. Reports to be submitted by the Consultant to NHAI

9.1 All reports, documents and drawings are to be submitted separately for each of the traffic homogenous link of the Project Road. The analysis of data and the design proposals shall be based on the data derived from the primary surveys and investigations carried out during the period of assignment. The sources of data and model relationships used in the reports shall be indicated with complete details for easy reference.

9.2 Project preparation activities will be split into eight stages as brought out below.

No	Stage	Key activities	Report/deliverable submitted
1	Inception	Project planning and mobilization	Inception Report and QAP
2	Feasibility	Alignment finalization, preliminary surveys	Alignment Options Report and Feasibility Report
3	LA and Clearances I	LA, utilities identification; creation of draft notifications and proposals	Strip Plan, LA Report (3a, 3A), Clearances and Utility Shifting proposals
4	DPR	Detailed design of highway, preparation of detailed project	Draft DPR Report, Final DPR Report, documents and drawings

No	Stage	Key activities	Report/deliverable submitted
		report with drawings	
5	Technical Schedules	Preparation of bid documents and technical schedules	Civil Works Contract Agreement and Schedules
6	(i) LA II (ii) Project Clearances	*Land acquisition process, obtaining final utilities estimates and required clearances*	JMS and *3D Report, Final Project Clearances and Utilities Report*
7	LA III- Award Determination	Land acquisition award determination	*3G Report*
8	LA IV- Possession	*Obtaining possession of land*	*Land Possession Report*

Preliminary design work should commence without waiting for feasibility study to be completed. Stage 3, 5 and 6 shall run in parallel with Stage 2 and 4

For stages 7 and 8 consultant will be required to submit a report at the completion of 90% of the activities for that stage. In addition, an updated report will need to be submitted at the completion of all land acquisition activities covering receipt of 100% of the land possession certificates for the land parcels pertaining to the project road.

9.3 Timelines for the submission of reports and documents

Consultant shall be required to complete, to the satisfaction of the client, all the different stages of study within the time frame indicated in the schedule of submission in para 10 pertaining to Reports and Documents for becoming eligible for payment for any part of the next stage.

10 Reports and Documents to be submitted by the Consultant to NHAI

1. The Consultant shall submit to the client the reports and documents in bound volumes (and not spiral binding form) after completion of each stage of work as per the schedule and in the number of copies as given in Enclosure-III. Further, the reports shall also be submitted in floppy diskettes / CD's in addition to the hardcopies as mentioned in Enclosure-III. Consultant shall submit all other reports mentioned specifically in the preceding paras of the TOR.

2. The time schedule for various submissions prescribed at Sl. No.1 above shall be strictly adhered to. No time overrun in respect of these submissions will normally be permitted. Consultant is advised to go through the entire terms of reference carefully and plan his work method in such a manner that various activities followed by respective submissions as brought out at Sl.No.1 above are completed as stipulated. Consultant is, therefore, advised to deploy sufficient number of supporting personnel, both technical and administrative, to undertake the project preparation activities in construction package (Section) simultaneously. As far as possible, the proposal should include complete information such as number of such persons, name, position, period of engagement, remuneration rate etc. The Consultant is also advised to start necessary survey works from the beginning so as to gain time in respect of various other activities in that stage.

3. DPR Deliverables in each stage of project

1. The key stages, activities and deliverables for the detailed project report are as described in these documents
2. The following section describes the detailed requirements for each report that needs to be submitted
3. Consultants are also advised to refer to **Error! Reference source not found.** to understand any additional format and content requirements
4. All reports must be submitted along with the relevant checklist form completed and signed off by the consultant

STAGE 1

10.1 Quality Assurance Plan (QAP) Document

1. Immediately upon the award, the Consultants shall submit four copies of the QAP document covering all aspects of field studies, investigations design and economic financial analysis. The quality assurance plans/procedures for different field studies, engineering surveys and investigation, design and documentation activities should be presented as separate sections like engineering surveys and investigations, traffic surveys, material geo-technical and sub-soil investigations, road and pavement investigations, investigation and design of bridges &structures, environment and R&R assessment, economic & financial analysis, drawings and documentation; preparation, checking, approval and filing of calculations, identification and traceability of project documents etc. Further, additional information as per format shall be furnished regarding the details of personnel who shall be responsible for carrying out/preparing and checking/verifying various activities forming part of feasibility study and project preparation, since inception to the completion of work. The field and design activities shall start after the QAP is approved by NHAI.
2. Data formats for report and investigation result submission
    i. Required data formats for some reports, investigations and documents are discussed in **Error! Reference source not found.**.
    ii. The consultants will need to propose data formats for use in all other field studies and investigations not covered in enclosure IV.
    iii. The proposed data forms will need to be submitted for the approval of NHAI after the commencement of services.

10.2 Inception Report (IR)

1. The report shall cover the following major aspects:
    i. Project appreciation;
    ii. Detailed methodology to meet the requirements of the TOR finalized in consultation with the NHAI officers; including scheduling of various sub activities to be carried out for completion of various stages of the work; stating out clearly their approach & methodology for project preparation after due inspection of the entire project stretch and collection/ collation of necessary information;
    iii. Task Assignment and Manning Schedule;
    iv. Work programme;
    v. Proforma for data collection;
    vi. Design standards and proposed cross-sections;
    vii. Key plan and Linear Plan;
    viii. Development plans being implemented and / or proposed for implementation in the near

future by the local bodies and the possible impact of such development plans on the overall scheme for field work and design for the study;

ix. Quality Assurance Plan (QAP) finalized in consultation with NHAI;

x. Draft design standards; and

2. The requirements, if any, for the construction of bypasses should be identified on the basis of data derived from reconnaissance and traffic studies. The available alignment options should be worked out on the basis of available maps. The most appropriate alignment option for bypasses should be identified on the basis of site conditions and techno-economic considerations. Inception Report should include the details regarding these aspects concerning the construction of bypasses for approval by NHAI.

i. Bypasses should be identified on the basis of data derived from reconnaissance and initial traffic information/traffic studies

ii. The available alignment options should be worked out on the basis of available topographic maps, publicly available mapping services or remote sensing based topography and land use maps

iii. The most appropriate alignment option for bypasses should be identified on the basis of site conditions and techno-economic considerations

10.3 Alignment options report

1. Basis review of the existing project road, local traffic patterns and initial reconnaissance surveys, the consultant shall present possible alignment alternatives for the project road

2. Alignment options should include but not be limited to:

   (i) Greenfield sections of the road

   (ii) New alignments due to lack of RoW, opportunity to shorten road etc.

   (iii) New/Re-alignment to cater to local traffic and o-d points

   (iv) Re-alignment due to changes in local network and/or surrounding road network

   (v) Bypasses as suggested and approved in alignment report

   (vi) Re-alignment due to need to improve road geometry

   (vii) Provision of ROBs, flyovers and other structures

3. The alignment report shall contain:

   i. Drivers for re-alignment of road and re-alignment needed as discussed in para 2 above

   ii. Alignment alternatives for each section where re-alignment of road is needed

   iii. Analysis of alignment alternatives bringing out the pros and cons of each alternative including, but not limited to: new construction required, land acquisition requirements, environmental impact, utilities and structures affected, cost of construction, road geometry and road safety aspects, input from local consultation, NHAI views

   iv. For optimization and planning of Projects the DPR consultant shall follow the process flow stipulated in NHAI policy circular no. 7.1.78/2023 dated 03.11.2023 without any additional cost to Authority.

   v. Recommendations from among the alignment options presented for the authority to consider

      a. Consultant will enable authority to visualize and compare alignment options by providing alignment options in a GIS environment that should include, but not be limited to:

         i. Road alignment alternative centerlines

         ii. Digital elevation model of the region

         iii. Land use / land cover information

         iv. Hydrology information

         v. Surrounding road network including key NH, SH, MDR and ODRs

         vi. Key O/D points and urban settlements

         vii. High resolution satellite/airborne imagery of the region

10.4 Feasibility Report

1. The consultant shall commence the Feasibility Study of the project in accordance with the accepted IR and the report shall contain the following:

   i. Executive summary

   ii. Overview of NHAI organization and activities, and project financing and cost recovery mechanisms

   iii. Project description including possible alternative alignments/bypasses and technical/engineering alternatives

iv. Methodology adopted for the feasibility study

v. Socioeconomic profile of the project areas

vi. Indicative design standards, methodologies and specifications

vii. Traffic surveys and analysis

viii. Environmental screening and preliminary environmental assessment

ix. Initial social assessment and preliminary land acquisition/resettlement plan

x. Cost estimates based on preliminary rate analysis and bill of quantities,

xi. Cost analysis of all alternate identified alignments

xii. Economic and financial analysis

xiii. Conclusions and recommendations

2. In view of para 1 above the consultant has to submit the following documents in six sets:

i. **Technical Specifications:** The MORT&H's Technical Specifications for Road and Bridge works shall be followed for this study. However, Volume-IV: Technical Specifications shall contain the special technical specifications which are not covered by MORT&H Specifications for Roads and Bridges (latest edition / revision)and also specific quality control norms for the construction of works.

ii. **Rate Analysis:** This volume will present the analysis of rates for all items of works. The details of unit rate of materials at source, carriage charges, any other applicable charges, labour rates, and machine charges as considered in arriving at unit rates will be included in this volume.

iii. **Cost Estimates:** This volume will present the each item of work as well as a summary of total cost.

iv. **Bill of Quantities:** This volume shall contain the detailed Bill of Quantities for all items of works

3. The basic data obtained from the field studies and investigations shall be submitted in a separate volume as an Appendix to Feasibility Report.

4. The Final Feasibility Study Report incorporating comments, revisions and modifications suggested by NHAI shall be submitted within 15 days of receipt of comments from NHAI on draft feasibility study report.

STAGE 3:

10.5 Strip Plan and Clearances

1. The Consultants shall submit the following documents:

   i. Details of the center line of the proposed widened NH along with the existing and proposed right-of-way limits to appreciate the requirements of land acquisition;

   ii. The information concerning the area including ownership of land to be acquired for the implementation of the project shall be collected from the revenue and other concerned authorities and presented along with the strip plans;

   iii. Strip plans showing the position of existing utilities and services indicating clearly the position of their relocation;

   iv. Details for various clearances such as environment and forest clearances;

   v. Separate strip plan showing shifting / relocation of each utility services in consultation with the concerned local authorities;

   vi. The utility relocation plans should clearly show existing right-of-way and pertinent topographic details including buildings, major trees, fences and other installations such as water-mains, telephone, telegraph and electricity poles, and suggest relocation of the services along with their crossings the highway at designated locations as required and prepare necessary details for submission to the Service Departments;

   vii. Detail schedules for acquisition of additional land and additional properties in consultation with the revenue authorities; and

   viii. Land Acquisition Plan shall be prepared after digitization of cadastral / land revenue maps. The digitized map shall exactly match the original map, like a contact print, since the dimensions and area of plots, or the whole village is to be extracted from the map itself. An accuracy of 1mm or higher in a 1:1000 scale map shall be ensured, as this translates into an accuracy of 1 m or higher on ground.

2. The strip plans and land acquisition plan shall be prepared on the basis of data from reconnaissance and detailed topographic surveys.

3. The Report accompanying the strip plans should cover the essential aspects as given under:

   i. Kilometre-wise Land Acquisition Plan (LAP) and schedule of ownership thereof and Costs as per Revenue Authorities and also based on realistic rates.

   ii. Details of properties, such as buildings and structures falling within the right-of way and costs of acquisition based on realistic rates.

   iii. Kilometre-wise Utility Relocation Plan (URP) and costs for relocation per civil construction package as per concerned authorities.

   iv. Kilometre-wise account in regard to felling of trees of different type and girth and value estimate of such trees based on realistic rates obtainable from concerned District forest office.

4. The strip plans shall clearly indicate the scheme for widening. The views and suggestions of the concerned State PWDs should be duly taken into account while working out the widening scheme (left, right or symmetrical). The widening scheme shall be finalized in consultation with NHAI.

5. Kilometre-wise Strip Plans for section (Package) shall be prepared separately for each concerned agency and suggested by NHAI.

10.6 Land Acquisition Report

1. Consultant shall submit a detailed land acquisition plan that provides details on kilometre-wise land acquisition requirements, all required details and draft notifications made.

2. The Land acquisition plan and report shall be prepared and submitted for each section (package). Details shall also be submitted in land acquisition proforma to be supplied by NHAI, in both Hindi and English languages.

3. The Land Acquisition Plan shall be prepared after digitization of cadastral/land revenue maps as per clause of this TOR

    i. Land parcels identification should be verified by superimposing the proposed road corridor RoW on the geo-located cadastral map to ensure all affected land parcels have been accounted for and land area to be acquired is accurately determined

4. The land acquisition plan shall present details concerning the land area to be acquired in conjunction with the strip plan:

    i. Kilometer-wise existing and proposed RoW on either side of the proposed centreline

    ii. Detail schedules of additional land to be acquired, land ownership and other required details as per revenue records

    iii. Details of properties, such as buildings and structures falling within the right-of way

    iv. Costs of acquisition as per revenue authorities and also based on realistic market derived rates

    v. Detail schedules for acquisition of additional land and additional properties in consultation with the revenue authorities;

5. The land acquisition plan shall report the progress of the land acquisition process under the NH Land Acquisition act

    i. All required details on land parcels to be acquired

    ii. Copies draft 3a and 3A notifications and approvals from NHAI

    iii. Copies of published notifications, communication with CALAs and current status land acquisition process

    iv. Village, district and CALA wise summary of land to be acquired, current status of process and notifications published

6. The estimated cost of land acquisition shall invariably be worked out realistically for all projects before finalization of 3(D) notifications for publication so as enable taking a conscious decision regarding the feasibility of acquiring the land or exploring of other alternatives (such as following alternative alignments, etc.).

7. The land acquisition report should be prepared in consultation with affected persons, non-governmental organisations and concerned government agencies and should cover land acquisition and resettlement plan and estimated costs of resettlement and rehabilitation of affected persons.

10.7 Utility relocation plan

1. The consultant shall prepare a kilometre-wise Utility Relocation Plan (URP) and costs for relocation per civil construction package as per estimates from concerned authorities

2. The utility relocation shall contain details regarding:

    i. All utilities identified in the existing and proposed road RoW such as water-mains, telephone, telegraph and electricity poles

    ii. Those utilities that will require shifting to enable construction of the project road

iii. All necessary details required for submission of utilities shifting proposals to the concerned user agencies

iv. Copies of utilities shifting proposals made to the concerned user agencies along with suggested relocation of services along with their crossings across the project road at designated locations as required

v. Details of consultations made with local people and user agencies

vi. Preliminary scheme for shifting and cost estimates for shifting as per the concerned authorities

vii. Separate strip plan showing shifting/relocation of each utility services prepared in consultation with the concerned local authorities

viii. Draft map and plans showing road centerline, existing right of way, proposed right of way, pertinent topographic details and existing and proposed location of utilities

10.8 Clearances report

1. The consultant shall prepare a report regarding all other clearances required to enable the construction of the project road such as environment, forest, tree cutting and railways clearances

2. The clearances report shall include kilometre-wise requirement of all clearances required presented along with the strip plan including, but not limited to:

   i. Requirements for environmental clearances along the project corridor

   ii. Requirements for forest clearances including type of forest affected, extent of land area needing diversion

   iii. Account of required felling of trees of different type and girth and value estimate of such trees based on realistic rates obtainable from concerned District forest office

   iv. Plan of compensating afforestation, its land requirement with specific locations and cost involved for undertaking all activities in this regard.

   v. Requirements for wildlife clearances

   vi. Requirements for CRZ clearances

   vii. ROB/RUBs along the project corridor to be constructed, widened or modified in any form requiring clearances from the railways

   viii. Clearances from Irrigation Authorities regarding Irrigation structures, etc.

3. The clearances report shall also include:

   i. Details of proposals made to concerned agencies and departments

   ii. Date of submission of clearances proposals, Environmental impact assessment report to the competent authority

   iii. Copies of all actual clearance proposals made or drafts of proposals yet to be submitted

   iv. Information regarding points of contact, current status of proposals made, key issues raised and clear next steps to obtaining clearances

4. The consultant shall also assist in attending to queries raised/ furnishing of clarifications towards securing applicable clearances.

5. Further, for Environmental & Wildlife Clearances the firm should have been accredited by National Accreditation Board for Education and Training (NABET) for EIA. In case NABET accreditation is not available, the DPR consultant should have at least 1 retired or Ex Indian Forest Service officer and 2 retired or Ex State Forest Service officers on regular payroll each with over 15 years of service in Forest & Wildlife Department.

STAGE: 4

10.9 Draft Detailed Project Report (DPR)

1. The draft DPR Submission shall consist of construction package-wise Main Report, Design Report, Materials Report, Engineering Report, Drainage Design Report, Economic and Financial Analysis Report, Environmental Assessment Report including Resettlement Action Plan (RAP), Package-wise bid Documents and Drawings.

2. The Report volumes shall be submitted as tabulated in para 10 above.

3. The Documents and Drawings shall be submitted for the Package and shall be in the following format:

Reports

i. **Volume-I, Main Report:** This report will present the project background, social analysis of the project, details of surveys and investigations carried out, analysis and interpretation of survey and investigation data, traffic studies and demand forecasts designs, cost estimation, environmental aspects, economic and commercial analyses and conclusions. The report shall include Executive Summary giving brief accounts of the findings of the study and recommendations. A sample executive summary has been enclosed in Appendix VIII.

The Report shall also include maps, charts and diagrams showing locations and details of existing features and the essential features of improvement and upgrading. The Environmental Impact Assessment (EIA) Report for contract package shall be submitted as a part of the main report.

The basic data obtained from the field studies and investigations and input data used for the preliminary design shall be submitted in a separate volume as an Appendix to Main Report.

ii. **Volume - II, Design Report:** This volume shall contain design calculations, supported by computer printout of calculations wherever applicable. The Report shall clearly bring out the various features of design standards adopted for the study. The design report will be in two parts. Part-I shall primarily deal with the design of road features and pavement composition while Part-II shall deal with the design of bridges, tunnels and cross-drainage structures. The sub-soil exploration report including the complete details of boring done, analyses and interpretation of data and the selection of design parametres shall be included as an Appendix to the Design Report.

The detailed design for all features should be carried out as per the requirements of the Design Standards for the project. However, there may be situations wherein it has not been possible to strictly adhere to the design standards due to the existing site conditions, restrictions and other considerations. The report should clearly bring out the details of these aspect and the standards adopted.

iii. **Volume - III, Materials Report:** The Materials Report shall contain details concerning the proposed borrow areas and quarries for construction materials and possible sources of water for construction purposes. The report shall include details on locations of borrow areas and quarries shown on maps and charts and also the estimated quantities with mass haul diagram including possible end use with leads involved, the details of sampling and testing carried out and results in the form of important index values with possible end use thereof.

The materials Report shall also include details of sampling, testing and test results obtained in respect physical properties of subgrade soils. The information shall be

presented in tabular as well as in graphical representations and schematic diagrams. The Report shall present soil profiles along the alignment.

The material Report should also clearly indicate the locations of areas with problematic soils. Recommendations concerning the improvement of such soils for use in the proposed construction works, such as stabilization (cement, lime, mechanical) should be included in the Report.

iv. Volume - IV, Environmental Assessment Report including Environmental Management Plan (EMP) & Resettlement Action Plan (RAP): The Report shall be prepared conforming to the Guidelines of the Government of India, State Government and World Bank / ADB as appropriate for construction package.

v. Volume-V, Technical Specifications: The MORT&H's Technical Specifications for Road and Bridge works shall be followed for this study. However, Volume IV: Technical Specifications shall contain the special technical specifications which are not covered by MOST Specifications for Roads and Bridges (latest edition / revision) and also specific quality control norms for the construction of works.

vi. Volume - VI, Rate Analysis: This volume will present the analysis of rates for all items of works. The details of unit rate of materials at source, carriage charges, any other applicable charges, labour rates, machine charges as considered in arriving at unit rates will be included in this volume.

vii. Volume - VII, Cost Estimates: This volume will present the contract package wise cost of each item of work as well as a summary of total cost.

viii. Volume - VIII, Bill of Quantities: This volume shall contain the package-wise detailed Bill of Quantities for all items of works.

ix. Volume - IX, Drawing Volume: All drawings forming part of this volume shall be 'good for construction' drawings. All plan and profile drawings will be prepared in scale 1:250V and 1:2500H scale to cover one km in one sheet. In addition this volume will contain 'good for construction' drawings for the following:

- Horizontal Alignment and Longitudinal Profile.
- Cross-section @ 50m interval along the alignment within ROW
- Typical Cross-Sections with details of pavement structure.
- Detailed Working Drawings for individual Culverts and Cross Drainage Structures.
- Detailed Working Drawings for individual Bridges, tunnels and Structures.
- Detailed Drawings for Improvement of At-Grade and Grade-Separated
- Intersections and Interchanges.
- Drawings for Road Sign, Markings, Toll Plazas, and other Facilities.
- Schematic Diagrams (linear chart) indicating but be not limited to be following:
- Widening scheme;
- Locations of median openings, intersections, interchanges, underpasses, overpasses, bypasses;
- Locations of service roads;
- Location of traffic signals, traffic signs, road markings, safety features; and,
- Locations of toll plaza, parking areas, weighing stations, bus bays, rest areas, if any.
- Drawings for toll plaza, Bus Bays, Parking areas, Rest areas, weighing stations etc. All

drawings will be prepared in A2 size sheets. The format for plan, cross section and profile drawings shall be finalized in consultation with the concerned NHAI officers. The drawings shall also include details of all BM and reference pillars, HIP and VIP. The co-ordinates of all points should be referenced to a common datum, preferably GTS referencing system. The drawings shall also include the locations of all traffic safety features including traffic signals, signs, markings, crash barriers, delineators and rest areas, busbays, parking areas etc.

- The typical cross-section drawings should indicate the scheme for future widening of the carriageway. The proposed cross-sections of road segment passing through urban areas should indicate the provisions for pedestrian movements and suitable measures for surface and sub-surface drainage and lighting, as required.
- Digital drawings of proposed highway and features

x. **Volume X:Drainage Plan**

a. DPRs should be submitted for Main and drainage plan separately. The DPR should have proper drainage plan prepared on basis of contours of the area, outlet availability and discharge requirements including discharge at the outfall from drains of local bodies.

b. Preferably underground drains with well sized and well-spaced manholes any be provided to take care of cleaning. Wherever possible self-clearing cross-section of drains may be adopted.

c. Drainage Plan in DPR will go through Peer Review of Drainage Experts of Regional Officer. The Drainage plan will also be vetted by one Traffic Expert so that these drains do not hinder free flow of traffic.

d. Drainage Plan in DPR will be checked through a joint inspection with the engineers of local body/ Development Authority etc. so that Drainage Plan is totally integrated with the local body Drainage Plan.

e. The drain covers should be strong enough to withstand the weight of Light commercial vehicles, wherever required.

f. Stretch of the NH passing through a town can have multiple drainage plans/ sub plans due to different contours or due to having different outlets.

g. the cross- sections of drains being shown presently in Schedule-B (typical Cross Sections) & details of drains being mentioned in Schedule-C (length & type of drains) shall not be mentioned in future as it will vary from location to location based on drainage plan. The scope of drains in the project shall be on the basis of drainage plan drawn at each location and such Drainage Plan shall be made part of Scope of Project.

For the purpose above, NHAI policy guideline no. 18.48 dated 08.07.2020 may be taken into account.

a. The consultant shall deliver the final road alignment geometry, proposed road way model and all proposed structures in a 3D engineered model with all the required features as proposed in Enclosure IV

b. The consultant shall also provide digital versions of all drawings stated in para 1 above in the format proposed in Enclosure IV

6. The draft Detailed Project report of specialized projects will be scrutinized by the Peer Review consultant appointed by NHAI. The peer Review Consultant will be retired professional in the field, drawn from the various Central/State Highway/Road Work departments having adequate knowledge in the field. One professional will be earmarked from the standing panel of Peer

Review consultant approved by NHAI for each DPR. The Peer Review consultant will scrutinize the draft DPR within 15 days of submission and the observations will be complied with and incorporated in the final DPR.

10.10 Final Detailed Project Report, Documents and Drawings (6 Sets)

1. The Final package-wise DPR consisting of Main Report, Design Report, Drainage Design Report and Materials Report, incorporating all revisions deemed relevant following receipt of the comments from NHAI on the draft DPR shall be submitted as per the schedule given in Enclosure-III.

STAGE: 5

10.11 Bid documents and Technical Schedules

1. *Bid documents*

a. The consultant shall prepare bid documents for EPC, PPP or other modes of contracting as suggested by NHAI

b. Individual bid documents will be submitted for each mode suggested and for each individual package or section identified for execution

c. Consultant shall assemble and provide all supporting documents from the DPR assignment that will be required for the bid, in the format required by the contracting SOP in force at the time of bidding or as maybe required by the authority

2. *Technical Schedules*

a. The consultant shall submit a Draft Contract/Concession Agreement derived from the Master Contract/Concession Agreement maintained by the authority with all required modifications and inclusions made with reference to the

b. The agreement submitted shall contain all required technical schedules updated with the pertinent project details and data required

c. Draft agreement and schedules shall be finalised in consultation with the authority and submitted for further processing and use with the contractor/concessionaire awarded the bid packages

STAGE: 6

10.12 LA & Clearances II Report

Land acquisition report II

1. The consultant shall prepare and submit a second report on Land Acquisition providing details of further land acquisition activity, relevant documentation and notifications until 3D and report the outcomes of the joint measurement survey

2. The land acquisition report shall contain:

   i. Current status of land acquisition at a village, district and CALA level

   ii. Dates and details of all land acquisition related notifications published, proceedings/hearings held and objections raised

   iii. Draft, final (as declared by CALA where applicable) and published 3a, 3A and 3D notifications

   iv. Date of joint measurement survey by village, key proceedings and outcomes

   v. Detailed schedule of information regarding land to be acquired with information on land area, land type, nature of land use, ownership status, and area to be acquired by survey number and list of structures by plot

   vi. The report shall also contain updated sketches of alignment, updated land parcels to be acquired

   vii. All relevant information in this report shall be verified by the consultant with the land revenue department, and CALA office

Clearances Report II

1. The consultant shall obtain all the necessary project related clearances such as environment, forest and wildlife clearance from MOEF, Railways in respect of ROB/

RUBs, Irrigation Deptt, CRZ clearances from concerned authorities, and any other concerned agencies by the end of this stage

2. The final approvals shall be obtained and submitted to NHAI so that project implementation can begin straight away

3. The accompanying report on clearances shall include:

   i. An updated list of all clearances required, current status, expected completion date in case the clearance is pending, key issues and suggested next steps

   ii. Details of all public hearings, consultations and meetings conducted in the process of obtaining the required clearances

   iii. Date/details of proposals submitted and estimated date for issue of clearances

   iv. Date and details of all joint measurement and site inspection surveys completed

   v. Date of final approval of clearances if any

   vi. Copies of all clearances obtained

Utilities Report II

1. Consultant shall obtain final utility clearances from the relevant user agencies to enable shifting of the utilities from project road

2. A report shall be submitted on the final completion status and costs of utilities shifting along with other final clearances and land acquisition II report

3. The final utilities clearances report shall contain a summary view of utilities shifting: type and extent of utility, length of road affected, chainage, user agency, point of contact and approver at agency, date of approval at agency and NHAI, shifting estimate, agency/super vision fees, executing agency – user agency or NHAI

4. In addition, for each utility to be shifted, the report shall contain:

   i. Copies of actual approvals granted at user agency and NHAI

   ii. Cost estimates and shifting plans approved, demand note from agency

   iii. Approved utilities shifting proposal including strip plan showing scheme of shifting

   iv. Map and design/engineering drawings of existing utility and shifting to be executed

   v. Details of approved contractors, schedule of rates for state and bank account/deposit details for agency

   vi. Finance pro-forma, utilities checklist, no upgradation certificate and other documentation as maybe required by NHAI at the time of approval

Stage 7: Award Determination

10.13 Submission of Award Determination Report

a. Consultant shall submit a a report on status of award upon approval by NHAI of award declared for 90% of area as per LA plan or as per the timeline as given in Enclosure III, whichever is earlier

b. The Consultant shall also submit an updated report containing all required details upon approval of award by NHAI of 100% of land required to be acquired

c. The Land award report shall contain details of:

   i. Summary of compensation award status by village including:

      1. total private and public land being acquired for the project (sq. m) - by village
      2. date of 3A& 3D, final award by CALA, approval by NHAI by village
      3. variation of land area and nature of land use against that notified in 3D with reasons
      4. Total award declared by village, claims made by beneficiaries and status of disbursement

   ii. In detail for each village:

      1. Updated land acquisition tracker containing parcel-wise status of each notification, award and disbursement
      2. Method used by CALA for arrival on market value
      3. Valuation report and details of Award calculation
      4. Claims report (received under sub-section 3 of 3G)
      5. Copies of notifications published, certificates received
      6. Deviations in area according to CALA from provisions under sec. 26-30

   iii. Key issues being faced in completing land acquisition and tentative timeline for completion

   iv. A GIS map containing digitised details of land parcels shall be updated with all relevant land possession details and supplied in the agreed digital format

Stage 8: Land Possession

10.14 Submission of land possession report

a) The consultant shall submit a report on status of land possession upon receiving land possession certificates for 90% of area as per LA plan or as per the timeline as given in Enclosure III, whichever is earlier

b) The Consultant shall also submit an updated report containing all required details upon completion of 100% of land possession certificates

c) The land possession report shall contain

i. Summary of land possession status by village including:

- total private and public land being acquired for the project (sq. m) - by village
- date of final award by CALA, approval by NHAI, notification (3E) to owners and receipt of land possession certificates from CALA by village
- Status of disbursement on the date of receipt of land possession certificate

ii. Key issues being faced in completing land acquisition and tentative timeline for completion

iii. Land possession certificates as received from CALA by village

iv. Updated land acquisition tracker containing parcel-wise status of each notification and disbursement status

v. A GIS map containing digitised details of land parcels shall be updated with all relevant land possession details and supplied in the agreed digital format

11. Interaction with NHAI

1. During entire period of services, the Consultant shall interact continuously with NHAI and provide any clarification as regards methods being followed and carryout modification as suggested by NHAI. A programme of various activities shall be provided to NHAI and prior intimation shall be given to NHAI regarding start of key activities such as boring, survey etc. so that inspections of NHAI officials could be arranged in time.

2. The NHAI officers and other Government officers may visit the site at any time, individually or collectively to acquaint/ supervise the field investigation and survey works. NHAI may also appoint a Proof Consultant to supervise the work of the DPR consultant including inter-alia field investigation, survey work, Design work and preconstruction activities

3. The consultant shall be required to send 3 copies of concise monthly Progress Report by the 5th day of the following month to the designated officer at his Head Quarter so that progress could be monitored by the NHAI. These reports will indicate the dates of induction and de-induction of various key personnel and the activities performed by them. Frequent meetings with the consultant at site office or in Delhi are foreseen during the currency of project preparation.

4. All equipment, software and books etc. required for satisfactory services for this project shall be obtained by the Consultant at their own cost and shall be their property.

12. Payment Schedule

1. The Consultant will be paid consultancy fee as a percentage of the contract values as per the schedule given in the Draft Contract Agreement.

13. Data and Software

1. a. Consultants shall also deliver to NHAI all basic as well as the processed data from all field studies and investigations, report, appendices, annexure, documents and drawings in a digital format as described in Enclosure IV over the course of this assignment and at the submission of the final report in the form of a removable storage device (CD or USB pen drive) and hosted in a secure online file hosting platform

   b. If required by NHAI the consultant shall arrange at their own cost necessary software for viewing and measurement of imagery/ point cloud data.

      i. **Engineering Investigations and Traffic Studies:** Road Inventory, Condition, Roughness, Test Pit (Pavement composition), Falling Weight Deflectometer (FWD) Material Investigation including test results for subgrade soils, Traffic Studies(traffic surveys), axle load surveys, Sub-soil Exploration, Drainage Inventory, Inventory data for bridge and culverts indicating rehabilitation, new construction requirement etc. in MS EXCEL or any other format which could be imported to widely used utility packages.

      ii. **Topographic Surveys and Drawings:** All topographic data would be supplied in (x, y, z) format along with complete reference so that the data could be imported into any standard highway design software. The drawing files would be submitted in dxf or dwg format.

      iii. **Rate Analysis:** The Consultant shall submit the rate analysis for various works items including the data developed on computer in this relation so that it could be used by the Authority later for the purpose of updating the cost of the project.

      iv. **Economic and Financial Analysis**

2. **Software**: The Consultant shall also hand-over to NHAI floppies/CD's containing any general software including the financial model which has been specifically developed for the project.

3. The floppy diskettes/CD's should be properly indexed and a catalogue giving contents of all floppies/CD's and print-outs of the contents (data from field studies topographic data and drawings) should be handed over to NHAI at the time of submission of the Final Report.

4. Consultant shall include editable soft copies of the final versions of all documents, including but not limited to the strip plan, plan & profile drawings, cross sections of right of way and details of structures as well as any cost workings.

SUPPLEMENT-I

ADDITIONAL POINTS TO BE CONSIDERED FOR HILL ROADS IN ADDITION TO POINTS COVERED IN MAIN TOR

At feasibility stage –

-Geological map study (GSI map) & remote sensing images to identify geological features , fault lines other weakness,

-Also study contour map to identify vulnerable slopes etc

-Topography survey using Lidar of alternative alignments .

To capture geological & engineering property of slope bed soil/ rock

- visit of geologist & geotech specialist in all alignments under consideration & Accordingly do requisite test to capture engineering properties of soil/ rock (idea is to estimate cost intensive slope protection requirement or vulnerabilty maping of alternative alignments to arrive it cost effective sustainable alignment.

Sr. No.	Clause No. of TOR	Additional points
1.	2.2	a) Provisions of tunnels if required.
2.	2.3	a) Design of tunnels, if required b) Design of protective works, drainage works in hilly terrain, reinforced soil slopes/walls in hilly terrain, hill slope stabilization measures, erosion control measures, land slide control/protection measures snow drift control/snow clearance measures, avalanche protection measures, if required
3.	3	Feasibility study and preparation of detailed project report for hill roads shall be done in accordance with "IRC:SP:48 Hill Road Manual" and the best international practices and wherever practicable/feasible steep gradients and hair pin bends may be avoided by realignments by provision of structures and provision of tunnels if required. Proposal for Instrumentation and monitoring for detecting signs of impending instability and post-slide movements shall be included.
4.	4.1	a) Inventory and condition survey for tunnels, if required. b) Identification of faults in rock strata and impact of faults in design of tunnels, if required c) Detailed design of road considering and incorporating specific aspects related to hill region like terrain, topographic conditions, drainage issues,

Sr. No.	Clause No. of TOR	Additional points
		reinforced soil slopes and walls, slope stability and landslides, protective & erosion control, snow clearance and avalanche treatment, ecology and environment extreme weather conditions, altitude effects etc. d) Design of protective works, drainage works, reinforced soil slopes/walls, slope stabilization measures, erosion control measures, land slide control/protection measures, snow drift control/snow clearance measures, avalanche protection measures, if required e) Design of scenic overlooks/watering points etc.
5.	4.5 (1)	All activities related to field studies, design and documentation shall be done as per the latest guidelines/circulars of MORT&H and relevant publications of the Indian Roads Congress (IRC)/Bureau of Indian Standards (BIS) for hill roads including tunnels. For aspects not covered by IRC and BIS, international standard practices, such as, British and American Standards may be adopted.
6.	4.7	Review of data and documents pertaining to a) Terrain and soil/rock conditions b) Condition of tunnels, if required. c) Sub-surface and geo-technical data for existing tunnels, if required. d) Drawing and details of existing tunnels, if required. e) Existing protective works, reinforced soil structures, drainage works, erosion control and land slide control/protection works, slope stabilization measures, snow drift control measures, avalanche protection measures f) Existing land slide and snow clearance facilities g) Geological details of rock strata in the area in case of tunnels h) Past history of slope failure and land slides i) Existing approach paths/roads
7.	4.11.1(1)	The Consultant should make an in depth study of available geological and Meteorological maps of the area.
8.	4.11.1(2)	The primary tasks to be accomplished during the reconnaissance survey shall also include: a) details of terrain (steep or mountainous), cliffs and gorges, general elevation of the road including maximum heights negotiated by main ascents and descents, total number of ascents and descents, hair pin bends, vegetation etc. b) Climatic conditions i.e. temperature, rainfall data, snowfall data, fog conditions, unusual weather conditions etc. c) Realignment requirements including provision of tunnels, if required. d) Inventory of tunnels and geologically sensitive areas like slip prone areas, areas subject to landslides, rockfall, snow drifts, erosion, avalanche activity etc.

Sr. No.	Clause No. of TOR	Additional points
9.	4.11.2.1 (3.ii)	Cross sections shall be taken at every 25 m interval in case of hill roads which shall be reduced to 10m interval on sharp bends and at points of appreciable changes in soil & geological conditions. While taking cross sections, soil/geological conditions shall also be recorded.
10.	4.11.3.1 (1)	The inventory data shall also include: a) General elevation of road indicating maximum & minimum heights negotiated by main ascents & descents and total no. of ascents & descents. b) Details of road gradients, lengths of gentle & steep slopes, lengths & location of stretches in unstable areas, areas with cliffs, areas with loose rocks, land slide prone areas, snow drift prone areas, no. & location of hairpin bends etc. c) Details of tunnels d) Details & types of protective structures, erosion & land slide control/protection measures, snow drift control measures, avalanche protection/control measures etc. e) Details of existing drainage facilities and reinforced soil structures
11.	4.11.3.2 (2)	Pavement: a) Location of crust failures along with their causes b) Conditions of camber/cross falls/super elevations etc., whether affected by subsidence Embankment: Extent of slope erosion on hill and valley side
12.	--	Condition Surveys & Investigation for Slope Stabilization, Erosion Control, Landslide Correction/Protection & Avalanche Protection Measures: a) Inventory & Condition Surveys of Existing Protective/Control Measures including Condition surveys for existing drainage and reinforced soils structures: The consultant shall make an inventory of all the structures related to Slope Stabilization, Erosion Control, Landslide Control/protection, Avalanche Protection etc. This shall include details of effectiveness of control measures already done and condition of protective/control structures including existing drainage and reinforced soils structures. b) Landslide Investigation This shall be carried out to identify landslide prone areas, to suggest preventive measures or alternate routes that are less susceptible to landslide hazard. Further in existing slide areas this shall help to identify factors responsible for instability and to determine appropriate control measures needed to prevent or minimize recurring of instability problems. Initial preliminary studies shall be carried out using available contour maps, topographical maps, geological/geo-morphological maps, aerial photographs etc. for general understanding of existing slide area and to identify potential slide areas. This shall be followed by further investigations

Sr. No.	Clause No. of TOR	Additional points
		like geological/geotechnical/hydrological investigation to determine specific site conditions prevailing in the slide area as per relevant IRC specifications/publications, MORT&H circulars and relevant recommendations of the international standards for hill roads. The result of the investigations shall provide basis for engineering analysis and the design of protection/remedial measures.
13.	4.11.4.4	a) For tunnels if required, geotechnical and subsurface investigation shall be done as per IRC:SP:91. b) Geotechnical and subsurface investigation and testing for tunnels shall be carried out through the geotechnical Consultants who have the experience of geotechnical and subsurface investigation in similar project.
14.	4.12.1 (1)	The Consultant shall also carry out detailed designs and prepare working designs for the following: a) cross sections at every 25 m intervals which shall be reduced to 10m on sharp curves and locations with rapidly changing soil/geological conditions. b) Slope stabilization and erosion control measures c) Design of protection/control structures in areas subject to subsidence, landslides, rock fall, rock slide, snow drifts, icing, scour, avalanche activity etc. d) Design of protective structures in slip prone and unstable areas e) Design of scenic overlooks, watering points etc. f) Safety features specific to hill roads g) Drainage facilities specific to hill roads h) Reinforced soil slopes and walls specific to hill roads Note: While finalising investigations and mitigation measures for landslide prone areas in Hilly Regions DPR consultants shall use the guidelines/methodologies detailed in report of Expert Committee on Cost Effective Long-Term remedial Measures for landslide Prone areas in Hilly Regions circulated vide MoRTH Office Memorandum dated 28.11.2024.
15.	4.12.2 (1) 4.12.2 (2)	The Consultant shall evolve Design Standards and material specifications for the Study primarily based on IRC publications, MORT&H Circulars and relevant recommendations of the international standards for hill roads for approval by NHAI. The Design Standards evolved for the project shall cover all aspects of detailed design including the design of geometric elements, pavement design, bridges and structures, tunnels if required, traffic safety and materials.
16.	4.12.3	Wherever practicable/feasible hairpin bends and steep gradients shall be avoided by realignments, provision of structures or any other suitable provisions.
17.	4.12.4	While designing pavement for hill roads specific aspects relevant to hill

Sr. No.	Clause No. of TOR	Additional points
		regions like terrain & topographic conditions, weather conditions, altitude effects etc. shall be duly considered and suitably incorporated in design so that pavement is able to perform well for the design traffic and service life. Effects of factors like heavy rainfall, frost action, intensive snow and avalanche activity, thermal stresses due to temperature difference in day and night, damage by tracked vehicles during snow clearance operations etc. must also be considered along with traffic intensity, its growth, axle loads and design life.
18.	4.12.5(3)	The design of embankments should include the requirements for protection works, provision for drainage and traffic safety features including features specific to hill roads.
19.	4.12.6	Design and Drawing of Tunnels: The Consultant shall prepare design and drawings for tunnels, if required as per the results of feasibility study, as per the relevant specifications of IRC:SP:91/MORT&H and other international specifications.
20.	4.12.7	a) Topography of hills generates numerous water courses and this coupled with continuous gradients of roads in hills and high intensity of rainfall calls for effective drainage of roads. The drainage system shall be designed to ensure that the water flowing towards the road surface may be diverted and guided to follow a definite path by suitable provision of road side drains, catch water drains, interceptors etc. and flow on valley side is controlled so that stability is not affected. b) Further, adequate provision shall be made for sub-surface/subgrade drainage to take care of seepage through the adjacent hill face of the road & underground water flows.
21.	4.12.8	The Consultant shall design suitable traffic safety features and road furniture including traffic signals, signs, markings, overhead sign boards, crash barriers, delineators etc. including any feature specific to hill roads. The locations of these features shall be given in the reports and also shown in the drawings.
22.	4.12.11	The Consultant shall make suitable designs and layout for miscellaneous works including rest areas, bus bays, vehicle parking areas, telecommunication facilities, scenic overlooks, watering points etc. wherever appropriate.
23.	10.9.3	Volume II: Design Report: a) Inventory of protection measures and other structures b) Inventory of tunnels, if required. b) Proposed preliminary designs for tunnels, if required. c) Drainage facilities and reinforced soil structures specific to hilly region Volume III: Drawings a) Drawings for protection/control measures and other structures b) Drawings for tunnels, if required.

Sr. No.	Clause No. of TOR	Additional points
		c) Drawings for drainage and reinforced soil structures specific to hilly terrain
24.	10.9.3	Volume II: Design Report (Part II) Part II of Design Report shall also deal with design of tunnels, if required and design of other protection/control structures, drainage works and reinforced soil structures specific to hilly terrain. Volume IX: Drawing Volume This shall also include: a) Detailed working drawings for tunnels, if required. b) Detailed working drawings for protection/control structures c) Detailed working drawings for drainage works and reinforced soil structures specific to hilly terrain.

SUPPLEMENT-II

ADDITIONAL REQUIREMENTS FOR BRIDGES

Sr. No.	Clause No. of TOR	*Additional points*
1	4.1	For standalone bridge projects the scope of work shall include detailed design of approach road extending at least up to 2 km on either side of the bridge
1.	4.11.4.2(6)	Model Studies for Bridges 1. Objective Physical/ Mathematical Model study for detailed Hydraulic / Hydrologic investigations regarding the proposed bridge for hydraulic design of the bridge and assessment and hydraulic design of required river training works. 2. Methodology Physical/Mathematical Model study shall be carried out at a reputed/recognized institution. The consultant will be responsible for identifying the institution, supplying Information /Documents /Data required for modal studies as indicated in para 4 below and coordinating the model study with the institution concerned 3. Scope of Work 3.1 Physical Model study Physical modeling with appropriate model scale for Hydraulic and Hydrologic Investigations to: i) Finalize span arrangement causing uniformity in flow distribution, and work out the alignment and orientation of river training works and bridge axis. ii) Provide information on estimated/observed maximum depth of scour. iii) Provide information on required river training works for proposed bridge iv) Provide hydraulic design for the bridge and the required river training works. v) Quantify the general direction of river course through bridge, afflux, extent and magnitude of flood, effect of backwater, if any, aggradation/degradation of bed, evidence of scour etc. shall be used to augment the available hydrological data. The presence of flood control/irrigation structures, if affecting the hydraulic characteristics like causing obliquity, concentration of flow, scour, silting of bed, change in flow levels, bed levels etc. shall be studied and considered in Hydraulic design of proposed bridge. The details of any planned work in the immediate future that may affect the river hydraulics shall be studied and considered. vi) Analyze effects of Wind Load on the Structures.

Sr. No.	Clause No. of TOR	*Additional points*
		3.2 Mathematical Model study Mathematical modeling for detailed Hydraulic / Hydrologic investigations regarding the proposed new bridge to: i) Finalize the site/location of the proposed new bridge based on mathematical modeling. ii) Provide information on estimated/observed maximum depth of scour. iii) Provide information on required river training works for proposed bridge iv) Provide hydraulic design for the bridge and the required river training works. v) Quantify the general direction of river course through bridge, afflux, extent and magnitude of flood, effect of backwater, if any, aggradation/degradation of bed, evidence of scour etc. shall be used to augment the available hydrological data. The presence of flood control/irrigation structures, if affecting the hydraulic characteristics like causing obliquity, concentration of flow, scour, silting of bed, change in flow levels, bed levels etc. shall be studied and considered in Hydraulic design of proposed bridge. The details of any planned work in the immediate future that may affect the river hydraulics shall be studied and considered. vi) Analyze effects of Wind Load on the Structures 4. Information/Documents/Data required for Physical /Mathematical Model study i) Plan layouts showing the locations of the proposed bridge as well as the existing bridges /barrages etc., in the vicinity of the proposed bridge with the chainages with respect to a standard reference marked on it. ii) High flood discharges and corresponding flood levels at the locations of the existing bridges in the vicinity of the proposed bridge. iii) General arrangement drawing (GAD) of the existing bridges showing number of spans, pier and well dimensions, founding levels, maximum scour level, the design discharge and the HFL, guide bund details. On this, the plan form of the river course with the bridge alignment may also be shown as far as possible. iv) General arrangement drawing (GAD) of the proposed new bridge showing number of spans, pier and foundation dimensions. On this, the plan form of the river course with the bridge alignment may also be shown as for as possible. v) River cross sections at 500m longitudinal spacing (maximum) up to a distance of 2 times the bridge total length on the upstream side and up to a distance equal to the bridge total length on the downstream with right bank and left bank clearly marked on it. At least one cross section

Sr. No.	Clause No. of TOR	*Additional points*
		to be provided at the location of the proposed bridge. At each cross section, the bed levels to be taken at a maximum lateral distance of 8 m in flow section and at 25 m in non-flow section respectively. The abrupt variations in the bed levels to be captured by taking measurements at closer locations both in longitudinal as well as lateral directions. vi) The cross sections, as for as possible, from high bank to high bank. vii) The longitudinal profile of the river along the length of the proposed alignment. viii) Size distribution of the river bed material and the bore log data at different locations at the site of the proposed bridge. ix) The series of annual peak rainfall and flood of the river for at least 30 years period

SUPPLEMENT-III

ADDITIONAL REQUIREMENT FOR SAFETY AUDIT

The use of checklists is highly recommended as they provide a useful "aide memoire" for the audit team to check that no important safety aspects are being overlooked. They also give to the project manager and the design engineer a sense of understanding of the place of safety audit in the design process. The following lists have been drawn up based on the experience of undertaking systematic safety audit procedures overseas. This experience indicates that extensive lists of technical details has encouraged their use as "tick" sheets without sufficient thought being given to the processes behind the actions. Accordingly, the checklists provide guidelines on the principal issues that need to be examined during the course of the safety audits.

Stage F-During Feasibility Study

1. The audit team should review the proposed design from a road safety perspective and heck the following aspects

CONTENTS	ITEMS
Aspects to be checked	A. Safety and operational implications of proposed alignment and junction strategy with particular references to expected road users and vehicle types likely to use the road. B. Width options considered for various sections. C. Departures from standards and action taken. D. Provision of pedestrians, cyclists and intermediate transport E. Safety implications of the scheme beyond its physical limits i.e. how the scheme fits into its environs and road Hierarchy
A1 : General	□ Departures from standards □ Cross-sectional variation □ Drainage □ Climatic conditions □ Landscaping □ Services apparatus □ Lay-byes □ Footpath □ Pedestrian crossings □ Access (minimize number of private accesses) □ Emergency vehicles □ Public Transport □ Future widening □ Staging of contracts □ Adjacent development

CONTENTS	ITEMS
A2 : Local Alignment	? Visibility ? New/Existing road interface ? Safety Aids on steep hills
A3 : Junctions	? Minimise potential conflicts ? Layout ? Visibility
A4 : Non-Motorised road users Provision	? Adjacent land ? Pedestrians ? Cyclists ? Non-motorised vehicles
A5 : Signs and Lighting	? Lighting ? Signs/Markings
A6 : Construction and Operation	? Build ability ? Operational ? Network Management

Stage 1 – Completion of Preliminary Design

1. The audit team should review the proposed check the following aspects design from a road safety perspective and check the following aspects

CONTENTS	ITEMS
Aspects to be checked	A. Safety and operational implications of proposed alignment and junction strategy with particular references to expected road users and vehicle types likely to use the road. B. Width options considered for various sections. C. Departures from standards and action taken. D. Provision of pedestrians, cyclists and intermediate transport E. Safety implications of the scheme beyond its physical limits i.e. how the scheme fits into its environs and road hierarchy
B1 : General	? Departures from standards ? Cross-sectional variation ? Drainage ? Climatic conditions ? Landscaping ? Services apparatus ? Lay-byes ? Footpaths

	□ Pedestrian crossings □ Access (minimize number of private accesses) □ Emergency vehicles □ Public Transport □ Future widening □ Staging of contracts □ Adjacent development
B2 : Local Alignment	□ Visibility □ New/Existing road interface □ Safety Aids on steep hills
B3 : Junctions	□ Minimise potential conflicts □ Layout □ Visibility
B4 : Non-Motorised road users Provision	□ Adjacent land □ Pedestrians □ Cyclists □ Non-motorised vehicles
B5 : Signs and Lighting	□ Lighting □ Signs/Markings
B6: Construction and Operation	□ Build ability □ Operational □ Network Management

Stage 2 – Completion of Detailed Design

1. The audit team should satisfy itself that all issues raised at Stage 1 have been resolved. Items may require further consideration where significant design changes have occurred.

2. If a scheme has not been subject to a stage 1 audit, the items listed in Checklists B1 to B6 should be considered together with the items listed below.

CONTENTS	ITEMS
Aspects to be checked	A. Any design changes since Stage 1. B. The detailed design from a road safety viewpoint, including the road safety implications of future maintenance (speed limits; road signs and markings; visibility; maintenance of street lighting and central reserves).
C1 : General	□ Departures from standards □ Drainage □ Climatic conditions □ Landscaping □ Services apparatus □ Lay-byes □ Access □ Skid-resistance □ Agriculture □ Safety Fences □ Adjacent development
C2 : Local Alignment	□ Visibility □ New/Existing road interface
C3 : Junctions	□ Layout □ Visibility □ Signing □ Lighting □ Road Marking □ T,X,Y-junctions □ All roundabouts □ Traffic signals
C4 : Non-Motorised road users Provision	□ Adjacent land □ Pedestrians □ Cyclists □ Non-motorised vehicles
C5 : Signs and Lighting	□ Advanced direction signs

	□ Local traffic signs □ Variable message signs □ Other traffic signs □ Lighting Network Management