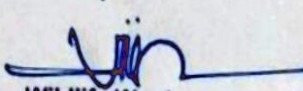
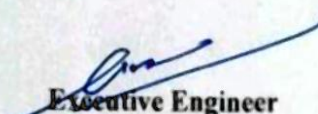


ECO-FRIENDLY MEASURES TO MITIGATE IMPACTS
OF
CONSTRUCTION OF ALTERNATIVE ALIGNMENT OF LAKHANPUR-THEIN
ROAD KM 11TH TO 12TH DUE TO SUBMERGENCES OF 2X39 MTRS, RCC T-
GIRDER BRIDGE ON NORA NALLAH (AT 410.0 MTR LEVEL)
PWD (R&B) DIVISION KATHUA.

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**ECO-FRIENDLY MEASURES TO MITIGATE IMPACTS OF
CONSTRUCTION OF ALTERNATIVE ALIGNMENT OF LAKHANPUR-THEIN ROAD
KM 11TH TO 12TH DUE TO SUBMERGENCES OF 2X39 MTRS, RCC T-GIRDER
BRIDGE ON NORA NALLAH (AT 410.0 MTR LEVEL)**

1. Introduction to the Project:

- The Sub project, Lakhanpur-Thein Road happens to be the lifeline of vast population which connects remote Tehsils of District Kathua viz Basohli, Billawar, Bani & Mahanpur with National Highway NH-44. This road joins Lakhanpur on NH-44 with Dhar Udampur road at Thein. The existing road is of single lane specification and has become insufficient for increased traffic intensity on the road.
- This road when improved shall not only give impetus to the market accessibility of the remote area but also provide better riding quality for the thousands of vehicles. This road is also significant from the defense point of view as it serves as an alternative for NH-44 in case of exigencies.

Objectives of Animal Passage Plan Study:

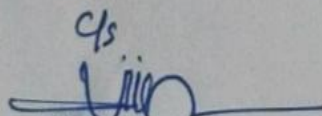
The objectives of animal passage plan are:

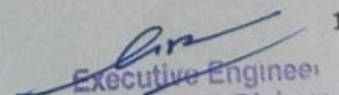
- To incorporate the needs of wildlife into transportation projects.
- To maintain the habitat connectivity
- To aid in the reduction of human wildlife conflict, improving awareness, safety and reducing collisions.

Achieving these goals will include restoring connections where they have been removed and ensuring that existing connections remain as the project road expands.

2. Project Location & Technical details of the Project Proposed.

Project:	Construction of alternative alignment of Lakhanpur-Thein road km 11 th to 12 th due to submergences of 2x39 mtrs, RCC T-girder bridge on Nora nallah (at 410.0 mtr level)
Project Proponent:	Executive Engineer PWD (R&B) Division Kathua
Details of PAinvolved.	Thein Wild Life Conservation Reserve


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Project Cost	1728.80 Lakh.
Project Area inside PA	2.84 Ha.
Forest land inside PA	2.84 Ha.
Non-Forest Land inside PA	Nil

3. Justification for proposed route & alternative examined.

Lakhanpur-Thein Road connects 4 Tehsils of District Kathua with NH-44 at Lakhanpur. Due to submergence of existing 2x39 mtr RCC-T-Girder-Bridge on Nora nallah alongwith 100mtr length of this road in Shahpur Kandi Dam Project. Alternative alignment of this road of 480m length and construction of 191 mtr long bridge alongwith Improvement/Widening of road from RD 9/600 to RD 12/700 has been proposed. So, this alignment is only viable option and there is no alternative to the proposed alignment and the forest/Wildlife area involved is unavoidable.

Separate proposed has been submitted for this project on PARIVESH portal being a separate project from the proposal submitted earlier vide proposal No FP/JK/ROAD/143592/2021 for improvement/widening of Lakhanpur-Thein road RD 12/700 to 17/100. Further more, this project has a seperate Administrative approval as well as technical sanction and has a different source of funding. As the alignment for the instant proposal was not finalized while applying for proposal No FP/JK/ROAD/143592/2021. AA/TS was also not granted till that time being a separate project.

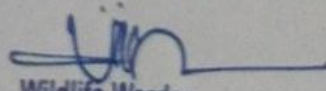
In the present project, the left-over portion i.e between RD 9/600 to RD 12/700 has been taken up for Wildlife clearance as well as forest clearance.

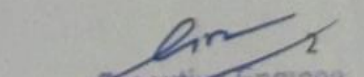
4. Area details falling in Thein Wildlife Conservation Reserve.

Total Length of Road = 3.10 Km.

Width of Road = 10.5 meter

Total project area= 2.84 Ha.

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Area of Forest land within protected area (Marked A)= 2.84 Ha.

Calculation Sheet for the Construction of alternative alignment of Lakhanpur-
Thein road km 11th to 12th due to submergences of 2x39 mtrs, RCC T-girder
bridge on Nora nallah (at 410.0 mtr level)

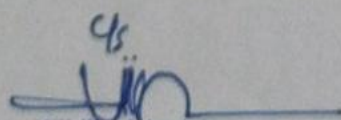
S.No	Location		Area (Sqm)		
			Length (in mtrs)	Width (in mtrs)	Area (Sqm)
1.	RD 9/600	RD 9/820	220	8.35	1837
2.	RD 9/820	RD 10/235	415	12	4980
3	RD 10/235	RD 10/260	25	15	375
4	RD 10/260	RD 10/451	191	12	2292
5	RD 10/451	RD 10/491	40	12	480
6	RD 10/491	RD 10/700	2209	8.35	18445
			3100		28409

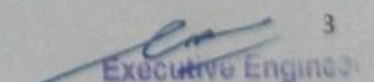
Total Project Area = 28409 Sqm = 2.84 Hectare

S No	Total Project Area	Project area under protected area	Project area under non - protected area	Forest Area involved in project within protected area	Non Forest Area involved in project within protected area
1	2.84 ha	2.84 ha	Nil	2.84 ha	Nil

5. Major Activities involved in the execution of Project.

1.	Construction of 2.0 M Span RCC Culvert
2.	Construction of 3.0 M Span RCC Culvert
3.	R/Wall Ht. 4.00 M


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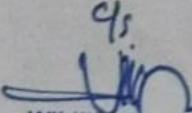
3

4.	B/Wall Ht. 1.5 m
5.	Parapet
6.	Pucca Drain
7.	P/L WBM-2 & WBM-3
8.	OGPC
9.	Citizen & Main Information Board
10.	Logo Board
11.	Road Sign Boards
12.	KM Stones
13.	200 M Stones
14.	Earthen Shoulders

6. Likely impact of the Project on Protected Area of Their Wildlife Conservation Reserve.

Current Status of Wildlife: - The Their Conservation Reserve is situated on the right bank of river Ravi, district Kathua, in the UT of Jammu and Kashmir. Different landmarks from the natural boundaries of Their Conservation Reserve. To the southeast lies river Ravi, northeast lies Badiari Ki-Dhar, SukalKhad to the southwest and Tikkar Nallah to the northwest. Their Conservation reserve covers an area of 18.90 km² and is located at latitudes 32°28.1' N to 32°24.6'N and longitudes 75°40.3'E to 75°44.7E.

- **Flora:** The weather is dry sub-humid type. The summer season begins in April and lasts until mid- July. Winters season is from November to February. Spring is from mid-February to mid-April. Rainfall varies spatially, however most of the rainfall is received during monsoons. The flora comprises of broad-leaved associates, namely *Lanneacoromandelic*, *Dendrocalamusstrictus*, *Acacia catechu*, *A. arabica*, *Dalbergia sissoo*, *Bombax ceiba*, *Ficus religiosa*, *Ziziphus jujuba*, etc. along with shrubs like *Justicia adhatoda*, *Murrayakoenigii*, *Lantana camara*, *Parthenium*

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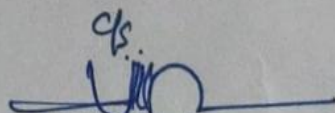
hysterophorus, *Calotropis procera*, etc. Chir pine (*Pinus roxburghii*) and *Euphorbia* spp. Are the predominant vegetation found on hill tops.

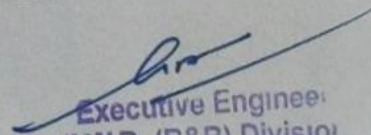
- **Fauna:** The protected area has potential for supporting Himalayan Grey Goral (*Nemorhaedus bedfordi*) populations owing to its rugged terrain. Other ungulates such as Nilgai (*Boselaphu stragocamelus*), barking deer (*Muntiacus muntjak*), Chital (*Axis axis*) and wild pig (*Sus scrofa*). Other faunal species include Mongoose (*Herpestes edwardsii*), Porcupine (*Hystrix indica*), Chital (*Axis axis*), Rhesus monkey, (*Macaca mullata*), Jackal (*Canis aureus*) and Hare (*Lepus nigricollis*). About 14 bird species are recorded from the area.
- **Mammals:** - it includes Common Leopards (*Panthera pardus*) Barking deer (*Muntiacus muntjak*), Nilgai (*Boselaphu stragocamelus*), Goral (*Nemorhaedus goral*), Wild Boar (*Sus scrofa*), Jackal (*Canis aureus*), Hare (*Lepus nigricollis*), Jungle Cat (*Felis chaus*), Porcupine (*Hystrix indica*), Mongoose (*Herpestes edwardsii*) etc.
- No significant negative impact of the current proposal on Thein Wildlife Conservation Reserve is likely to occur in terms of section 29 of the Wildlife Protection Act, 1972, thus there is no significant impact on the corridor of the Wildlife. Forest/Wildlife area cannot be avoided as the alignment proposed is the only feasible alignment providing vital connectivity to the hamlets.

6.1 Adverse effect associated with Linear Project vis-à-vis present project

The linear projects passing through wildlife protected areas are associated with:

- Loss of habitat resulting reduced carrying capacity.
- Fragmentation of habitat into spatially isolated parts.


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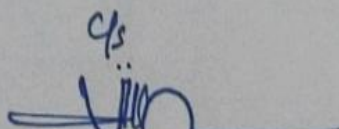
- Injury/mortality to animals.
- Presence of construction camps.
- Deprive animals from using their entire habitat.
- Increased human wildlife conflict.
- Pollution due to liquid or solid waste.

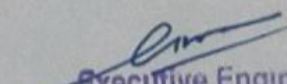
a. Habitat Loss and Fragmentation: Generally, linear Projects like Roads are known to affect many different animal groups, predominantly mammals. These impacts are largely associated with fragmentation & degradation of wildlife habitats along the Project corridor. The Project might impact the habitat and movement of others arboreal species like monkey, primates etc.

b. Induced Impact on Wildlife from Construction workers:

Construction manpower will be required for execution of the project and makeshift construction camps and will be set up as per site requirement. Generally, for construction works, local manpower/workers will be engaged. The induced impact on the wildlife of Thein Conservation Reserve from such construction workers is the likelihood of involvement in hunting/trafficking of wild animals and other unlawful activity during the execution of the project.

In case of The Improvement/Widening of Lakhanpur Thein Road, no labour camp will be established in Sanctuary area. It shall be ensured that that no activity is carried out after sunset within the sanctuary area. Awareness-raising will be done to mitigate this risk. The contractor and his workers must be informed on the Forest and Nature Conservation Act, Rules and Regulations and copies of these shall be made available to them. Workers shall be made aware of the fines and penalties as well as the risk of job loss for poaching/hunting to avoid such illegal activities.


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7. Safeguard for Animal/Wildlife Passage.

Necessity of Passage Plan: Animals move between habitats in order to survive by finding food, mates and areas of refuge. As rural areas continue to expand and road network and traffic increase there is a threat to animals while crossing the roads. All proposals for roads, railway tracks, canals and power lines will now have to include a plan to provide for safe movement of wildlife and allocate budget for animal passages as per NBWL proceedings dated 25th January 2018.

Adverse effect associated with Linear Project vis-à-vis present project

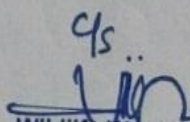
The linear projects passing through wildlife protected areas are associated with:

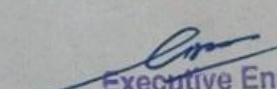
- Loss of habitat resulting reduced carrying capacity.
- Fragmentation of habitat into spatially isolated parts.
- Injury/mortality to animals.
- Presence of construction camps.
- Deprive animals from using their entire habitat.
- Increased human wildlife conflict.
- Pollution due to liquid or solid waste.

Project Corridor

The present project under discussion, through a linear project has very negligible or null ill effect to the project. On critical analysis/ observation of this project is seen that:

- The project length of alternate alignment of Lakhanpur -Thein Road km 11th to 12th due to submergence of 2x39 mtr RCC T-Girder Bridge on Nora nallah is 3.1 Kms which is passing through Thein Wild Life Conservation Reserve.
- The land required for this project is 2.84 Ha in protected area.


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- The project road is a major District Road and is in proposal to come within protected area.
- The problem of human wildlife conflict, depriving free flow of habitats will be avoided by the provision of under passages in the form of RCC Culverts.

Passage to the wildlife habitats will be provided in the form of under passages by means of RCC Culverts already proposed in the DPR. 10 No. RCC culverts i.e. 1 No 3 Mtr span and, 9 No 2.0 M Span are proposed in the road. The locations of animal passage are also shown in the GPS Map attached below.

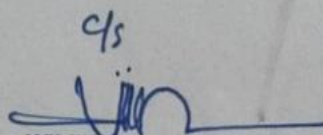
Table Showing Location of RCC Culverts

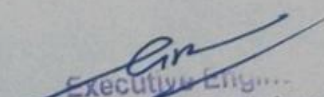
S. No	Location of Culvert	Span
1	RD 9/890	2M
2	RD 9/970	3M
3	RD 10/25	2M
4	RD 10/215	2M
5	RD 10/745	2M
6	RD 10/850	2 M
7	RD 11/290	2 M
8.	RD 11/330	2 M
9.	RD 12/120	2 M
10	RD 10/620	2 M

The land use of the project area and the adjacent lands will play a large role in determining the type and extent of mitigation required. As the area surrounding the project is slated for high density residential/commercial development, the facilitating wildlife movement through this area is likely not feasible or desired. As per observation made in the site visits and during different survey proceedings, no wildlife crossings were found in the project stretch.

Common land uses in the project road include the following:

- Residential


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- Agricultural
- Natural Area
- Drainage Channels

It is important to not only consider present development, but also consider future development. The present road is in hilly terrain. So, the land use pattern is mostly open section with few stretches of built-up section and semi-built up sections. Farming is found in many stretches. Few stretches come under forest region.

7.3 Conflict with Habitats

Generally, there may be conflicts between local wildlife and the transportation projects. But as per observations and information collected from the forest department, no passage of land animals is seen to cross the project road as the project corridor is full with patches of built-up sections and human interference.

The project has low traffic volume and/or speed or large vehicles. Different species will be less affected by the traffic volume and /or speed in different ways depending on their mobility. But as mentioned above, there is no crossing across the project road.

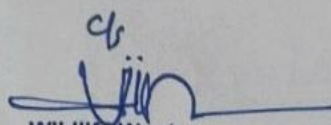
7.4 Conflict with road characteristics

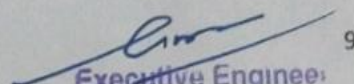
Traffic volume and speed play an important role in determining whether a road will impact wildlife movement. Because vehicle traffic behaves as a filter to movement rather than a absolute barrier, the number of species both attempting and successfully crossing the road will be reduced at greater traffic volume and speeds. The majority of wildlife-vehicle collisions occur on the roads with immediate traffic volume while low traffic volume roads have essentially no incidents.

7.5 Conflicts with Existing Infrastructure

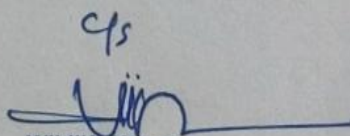
Many existing structures are not designed for wildlife and were installed with human function as the major goal. In order to avoid hindrance for wildlife, the followings are need to be kept in mind:

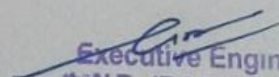
- Removal of physical barriers
- Structures that incorporate both pedestrian and wildlife into the same structures


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- No perched culverts
- Structures with insufficient water depth for aquatic passage
- Structures with excessive water velocities
- During the construction phase, the excavated pits shall be properly barricaded and fenced so as to prevent accidental falling of mammals in the vicinity of the construction sites.
- Noise levels during the construction phase shall be monitored properly to avoid disturbance, if any to the animals.
- No construction activity shall be undertaken after sunset and during the night.
- No harm to wildlife habitat including fauna and flora of the sanctuary shall be ensured.
- The WLS area shall not be used for any other work other than the work permitted.
- No establishment of any temporary or permanent labour camp inside the sanctuary area.
- Alternate Fuel (LPG) shall be provided to Laborer's for cooking purpose.
- No vehicular movement inside sanctuary area shall be allowed from sunset to sunrise except emergency vehicle.
- Awareness-raising will be done to mitigate this risk. The contractor and his workers shall be informed on the Forest and Nature Conservation Act, Rules and Regulations and copies of these shall be made available to them. Workers shall be made aware of the fines and penalties as well as the risk of job loss for poaching/hunting to avoid such illegal activities.
- In addition to above mitigation measures, any other measures as envisaged by the CWLW/State Board of Wildlife/National Board of Wildlife and as per provisions of The Wildlife(Protection) Act, 1972 shall be implemented by the company during execution of the project.


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7.6 Design Guidelines

The design of the roadway can help to reduce the effects of transportation infrastructure on wildlife. Some simple principles that should be considered in the road design include:

- Consider the slope of the roadside
- Consider potential/known areas of higher wildlife activity
- Consider impact of drainage ditches
- Consider the implications of the roadway design for emergency response access and maintenance access.

7.7 Identify Ecological Design Group

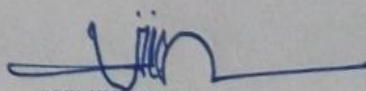
The vast biodiversity in nature provides a challenge when attempting to maintain connectivity and reduce genetic isolation. Each species within an area will have slightly different habitat requirements and behavior making it difficult to design a corridor that will satisfy the requirements of all the species. In addition, there is insufficient data for many species which provides a challenge when attempting to understand their life history strategy and to design a corridor that will satisfy the requirements.

The category of species which special attention are as follows:

- Species that require dispersal for survival
- Species that are integral to ecological processes
- Species that are dominant but could become less important if connectivity is lost
- Species that need connectivity to prevent genetic divergence
- Species experiencing high vehicle associated mortality in or near the study area
- Rare, endangered or vulnerable species

7.8 Identify Mitigation

Mitigation for the purpose of this passage plan, is intended to be site specific and practical. The details of the crossings provided are as under:

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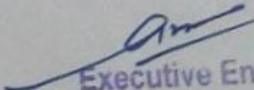
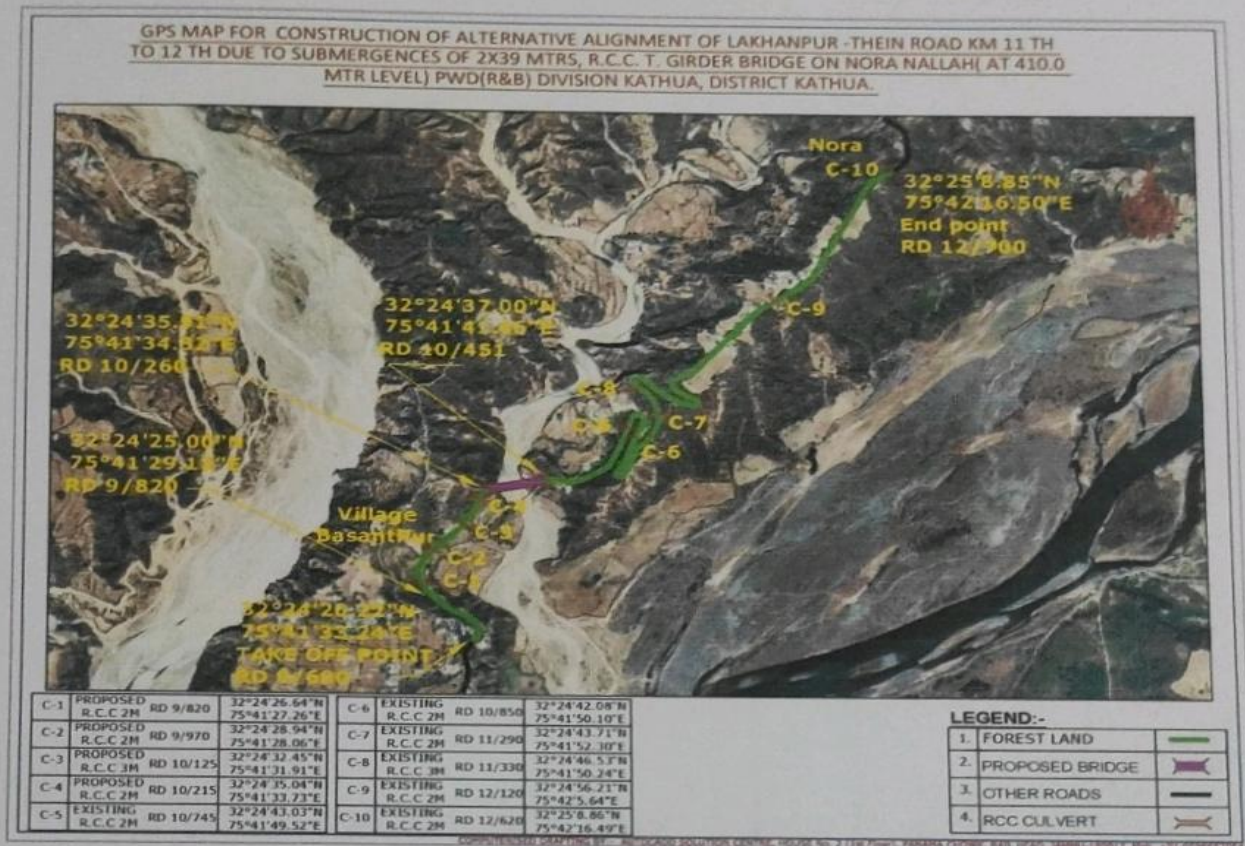
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Fig.1: Showing Locations of Animal Crossing



7.9 Calculation of Openness Ratio

- **Openness Ratio = $\frac{\text{height of the opening} \times \text{width of th structure}}{\text{length of the underpass}}$**

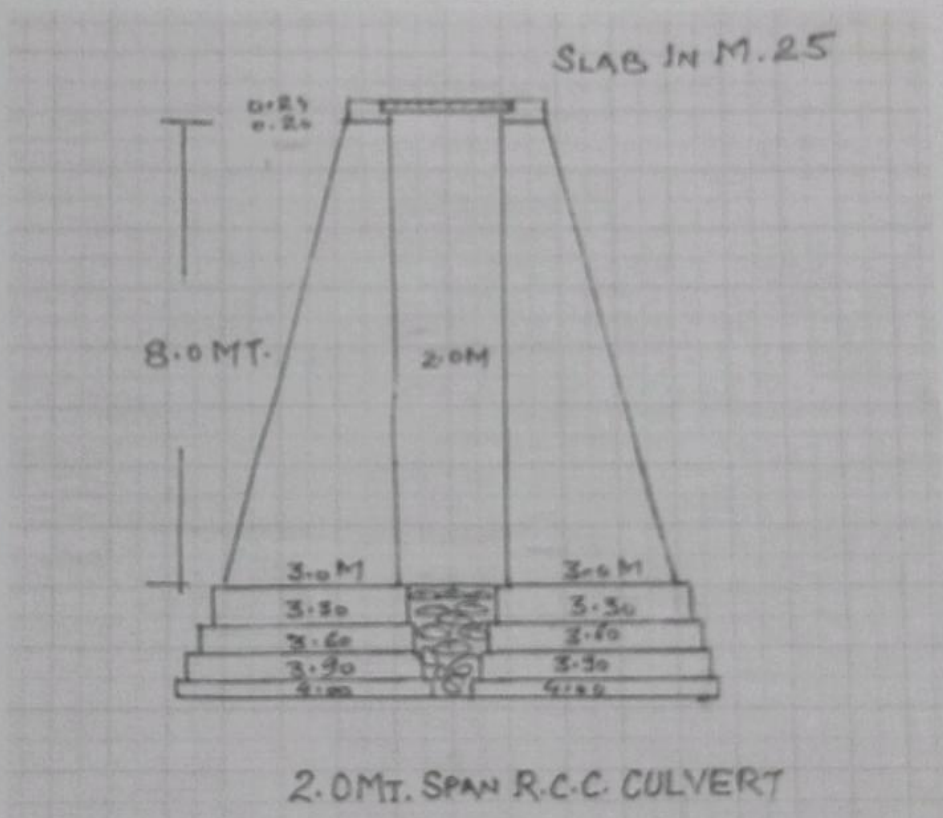
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Fig.2 : Dimensions of an underpass determining its openness ratio



Fig.3: Specifications of 6 m Span RCC Culvert



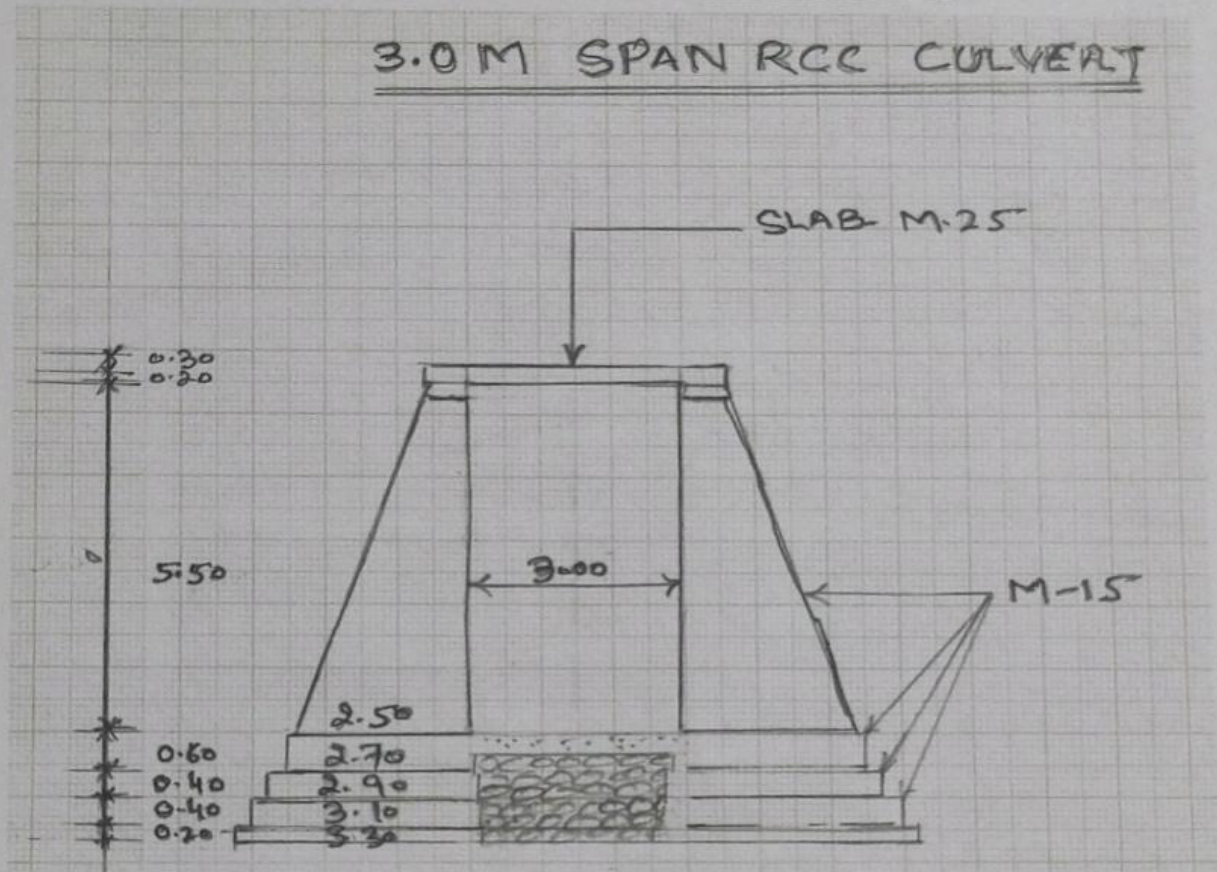
- Length = 10.50 m
- Width = 2.00 m

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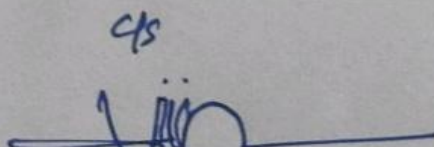
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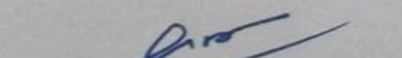
- Height = 8.00 m
- Openness Ratio = $\frac{2.00 \times 8.00}{10.50} = 1.52$

Fig.4: Specifications of 3 m Span RCC Culvert



- Length = 10.50 m
- Width = 3.00 m
- Height = 5.70 m
- Openness Ratio = $\frac{3.00 \times 5.70}{10.50} = 1.63$


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**Table Showing Openness Ratio Value of RCC Culverts
to be used as Underpass**

S.No	Location of Culvert	Span	Openness Ratio
1	RD 9/890	2M	1.52
2	RD 9/970	3M	1.63
3	RD 10/25	2M	1.52
4	RD 10/215	2M	1.52
5	RD 10/745	2M	1.52
6	RD 10/850	2 M	1.52
7	RD 11/290	2 M	1.52
8	RD 11/330	2 M	1.52
9	RD 12/120	2 M	1.52
10	RD 12/620	2 M	1.52

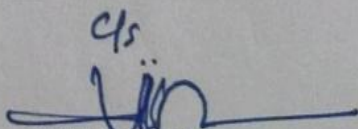
7.10 Provision of Safety Features

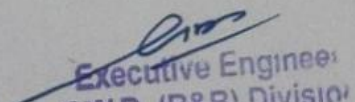
- Cautionary / Warning Sign Boards will be provided at the start and at the end of each stretch of forest land. Fig. below showing board to be used:



Table Showing location of Animal Crossing Boards

S No	RD	Board Count
1	RD 9/600	01
2	RD 10/300	01
3	RD 10/700	01
4	RD 11/100	01
5	RD 11/900	01
6	RD 12/400	01
	Total	06


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