



भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन एवं राजमार्ग मंत्रालय)
National Highways Authority of India
(Ministry of Road Transport & Highways)

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परियोजना क्रियान्वयन इकाई छिन्दवाड़ा / Project Implementation Unit Chhindwara

एच.नं. 84, पॉलीथिन फैक्ट्री के बाजू में, स्वर्ण जयन्ती नगर, खजरी रोड, फ्रेंड्स कॉलोनी, छिन्दवाड़ा म.प्र. 480001

H.No. 84, Beside Polythene Factory, Swarna Jayanti Nagar, Khajri Road, Near Friends Colony, Chhindwra (M.P.) 480001

CHW/15010/9/FP 33615/ Harda -Betul Section/2018/ 2564

Date the 26th June, 2020

To,

The Divisional Forest Officer (General)

West Betul,

Betul, Madhya Pradesh.

Sub: 4-laning of Harda – Betul Section of National Highway (NH-47) from Temagav km30+000 to Chicholi km. 81+000 (length- 51 km) of total length under BHARATMALA Pariyojana Economic Corridor (Phase-I) in three district of Harda, Hoshangabad and Betul the State of Madhya Pradesh on Hybrid Annuity Mode - **Submission of Wildlife mitigation measures plan.**

Ref: Your office letter No. Kramank\Ma.Chi\2019\1783 dated 11.09.2019

Sir,

This has in reference to your office letter dated 11.09.2019 vide which it is intimated to incorporate the Mitigation Measures for wildlife due to falling the compartments of Satpuda-Melghat Corridor in 4 laning of Harda-Betul section of NH 47.

The DPR Consultant M/s LASA has prepared the Mitigation Measures provisions in the forest diversion proposal as per Policy Guideline for Wild Life Mitigation Measures in compliance to your letter dated 11.09.2019.

Therefore, the wildlife mitigation measures plan is attached for further processing of forest diversion proposal along with the FRA certificate received from Collector Betul (M.P.).

In view of above it is requested to process the Forest diversion proposal of land 37.399 Hec. under DFO, West Betul (General) division, Betul for the approval at the earliest, so that the 4 lanign work of the subjected project can be taken up.

Encl: as above.

Yours faithfully,
[Signature]
26/6/2020
(B. P. Gupta)
Project Director.

Copy to :

- (i) The General Manager (T)-MP, NHAI HQ New Delhi for information please.
- (ii) The Regional Officer, RO Bhopal, for information please.
- (iii) The Collector Betul, for kind information and with request for further needful action please.
- (iv) The CCF, Betul, for kind information and with request for further needful action please.
- (v) Team Leader, LEA Associates New Delhi, for information & necessary action.

**NATIONAL HIGHWAYS AUTHORITY OF
INDIA**

**Ministry of Road Transport & Highways,
Government of India**

(PIU-NHAI, H.No. 84, Beside Polythene Factory. Swarna
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Madhya Pradesh)

**MITIGATION
FOR
FRAGMENTATION OF WILDLIFE ANIMAL**

(SATPURA – MELGHAT TIGER CORRIDOR)

**HARDA – BETUL, NH-47
(PACKAGE -2)**



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1. Introduction

National Highways Authority of India entrusted to optimise the efficiency of freight and passenger movements by bridging critical infrastructure gaps through development of economic corridor, inter-corridor and feeder route, National Corridor efficiency movements, Border & international connectivity roads, coastal and port connectivity roads and Green – field expressway under Bharatmala Priyोजना. The construction of 24800km was being taken up in the phase – 1.

In this connection, the NHAI proposed for 4-laning of NH-47 from Harda to Betul.

The entire project corridor is divided into three packages.

The package -1 starts from Harda and ends at Temagaon.

The package-2 starts Km 30.00 from Temagaon village of Harda town which ends at interchange of Bhopal & Nagpur, Km 81.00 at Chicholi close to Betul traversing through three districts named as Harda, Hoshangabad and Betul of Madhya Pradesh. Package -3 starts from Chicholi which ends at Betul. Package 1 & 3 is proposed for 4-laning by expanding the old road from single carriageway to a four – lane configuration.

However, the majority of section of package - 2 is passing through the forested area of Satpura – Melghat corridor; therefore, it has been proposed to build two-lane configurations separate from the current alignment. As road route of package-2 notified under the tiger corridor, therefore detail study for defragmentation of wildlife animal by providing adequate mitigation measures to prevent road kills are conducted.

The entire length of package-2 covers 50.00km. The project road falls under three different forest divisions. The project length from km 30+000 to 43+095 falls under the Harda Forest Division, the project road from Km 34+095 to 41+750 comes under Hoshangabad Forest Division and the last from Km 41+750 to 81+00 lies under West Betul Forest Division. We conducted a site survey of the road with the objective of proposing mitigation measures of wildlife crossing based on *"Eco- friendly measures to mitigate impacts of linear infrastructure on wildlife"*. In detail study techno feasible cost effective & environmentally sound alignments was proposed justifying conservation practice of reserve & protected forest as to minimize forest diversion for non forest – use and to prevent animal kills by taking due diligence at sensitive locations incorporation natural crossing in design as to provide mitigation along the Satpura – Melghat Corridor for the safe passage of wildlife animal.

In report behaviour of wild-life, types of species and mitigation to minimize impacts on animal along the forest in project route are studied in details. In the finding on field study in forest along road route where deterrents or barriers for movement / cross of road due to associated traffic on proposed economic corridor was taken into considerations for defragmentation of wildlife along the project road.

1.2 Eco-sensitive Area

The present study is related to eco-sensitive area along project road.

Roads and associated traffics act as deterrents or barriers to movement between habitats of many terrestrial wildlife species. When wildlife crosses roads, they are at risk of getting killed by vehicles and these collisions can be a safety issue for people too. Mortality of wildlife due to vehicle collisions can reduce its populations and exacerbate the threat of extinction for

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rare animal of wildlife. The package - 2 of proposed economic corridor, Harda to Betul traverses through the reserve & protected forest crossing the three different districts of forest divisions in its road route. All those forest divisions connect the Satpura Tiger reserve with the Melghat Tiger reserve which forms the Satpura – Melghat Corridor. The Satpura Tiger reserve is located in Hoshangabad Districts of Madhya Pradesh while the Melghat Tiger Reserve is located in Amravati & Bulghana district of Maharashtra. The Satpura – Melghat Tiger Corridor is required protection, restoration and mitigation measures to maintain the connectivity for multiple species of wildlife animal.

The National Tiger Conservation Authority in collaboration with the Wildlife Institute of India has mapped-out 32 major corridors across the country. The **Satpura - Melghat** tiger corridor is one among them which lies in Gawasen & Sawanligarh village as Least Cost Path from km 59+300 to km 60+850 under forest compartment **369 and 1420** in package -2 of project road, NH-47. The management and mitigation through a Tiger Conservation Plan is mandatory under section 38.0.1.g of the Wildlife (Protection) Act, 1972. This corridor is mostly through forested landscape of Hoshangabad, Betul and East Nimar and currently has low intensity agriculture and human density. It would be timely to safeguard this corridor and further development projects within this region should only be permitted with appropriate safeguards so as to maintain the functionality of the habitat as a viable corridor permitting gene flow of wild species between Satpura and Melghat.

It is important as tiger and other species of wild life animals are more likely to use the entire corridor and not just the Least Cost Path travel. In ground reality, individual tiger will almost never end –up using the exact path of the Least Cost Path, rather, they will end-up using the multiple alternative connectivity or combination of the multiple connectivity as predicted by the resistance based circuits-cape models. A wildlife mapping of the corridor are out-lined after the field study of animal sign survey conducted by the Wildlife Conservation Trust in association with LEA Associated Private Limited to which are compared with All India Estimation Exercise of wildlife survey report as shown in Fig –1,2,3,4 and 5 below indicate that almost entire area of the Satpura – Melghat Corridor have high potential for tiger movements. This is applying for other co-predator and small mammal. The another issues on the Least Cost Path as defined by Qureshi et al, 2015 is that the LCP is passing through West Betul is the fringe of forest and mostly through agriculture & revenue land. Therefore, the LCP passing through the Gawasen Range of West Betul is end of forested area from where habitations are started. The mitigation measures only in that compartment of 369 & 1420 based on LCP will be ineffective & detrimental to wild life animal.

Therefore, a detail study has been conducted taking entire section of forested area under the package -2 of the project road from Temagoan to Chicholito verify the eco-sensitive sites related to tiger movements, other wildlife animal and reserve & protected forest for development of mitigation to minimize impacts of flora & fauna and to propose adequacy of wildlife crossing to prevent fragmentation of wildlife and animal kills by road traffics. The study area has been undertaken therefore limited to 1.0 km either side of reserve forest as wildlife protection measures and provisions of underpass as a natural cave for crossing of animal and avoid reaching directly on road and particularly at the Satpura - Melghat tiger corridor as to mitigate the road barrier for protection of animal life & environment.

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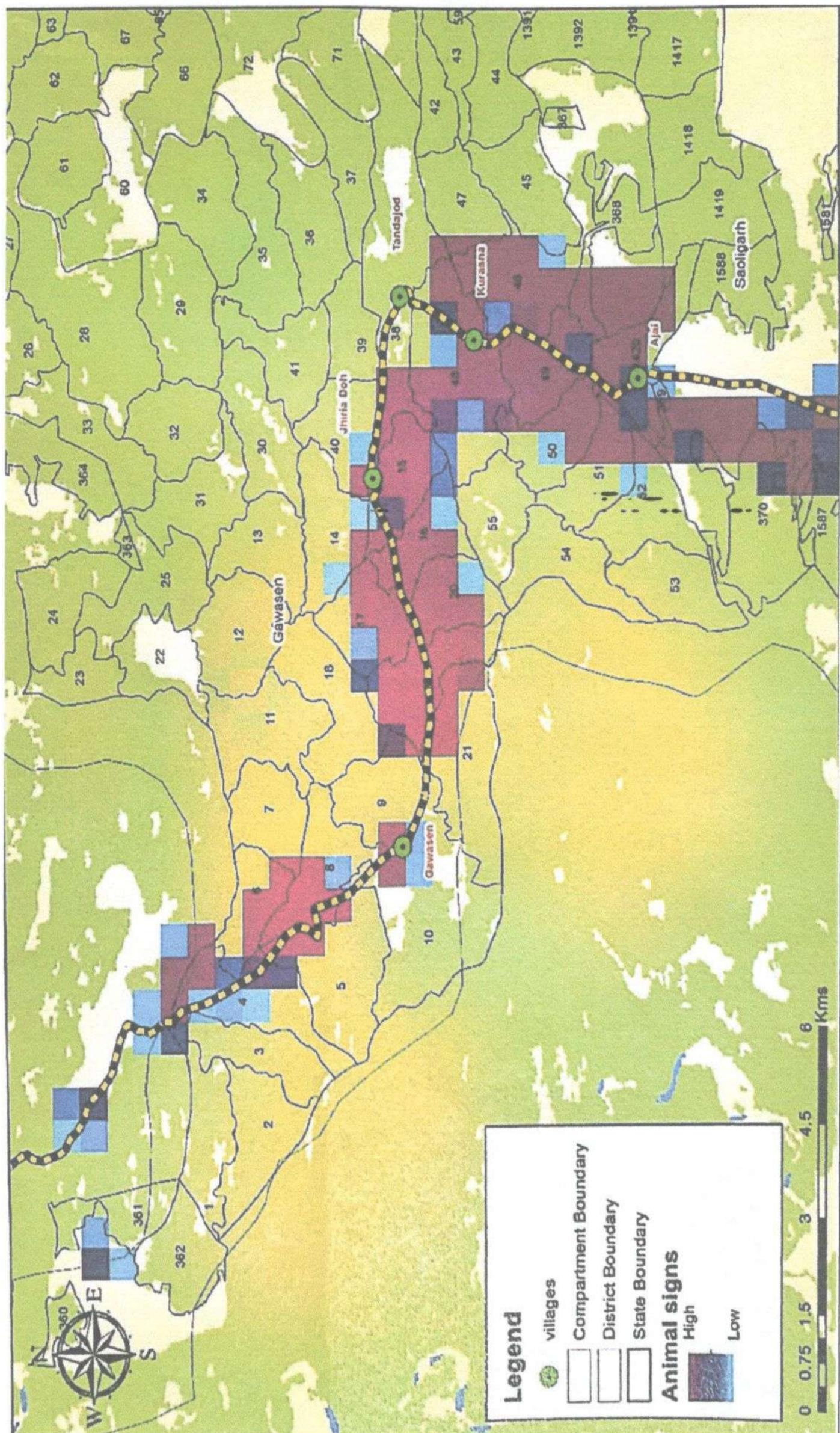


FIG : 1; INTENSITY OF WILD ANIMAL ALONG THE PROJECT CORRIDOR AS PER ANIMAL SIGN SURVEY

Source : Field Study, the W.C.T & LEA Associates from : 05th Dec. 2019 to 50th Dec. 2019.


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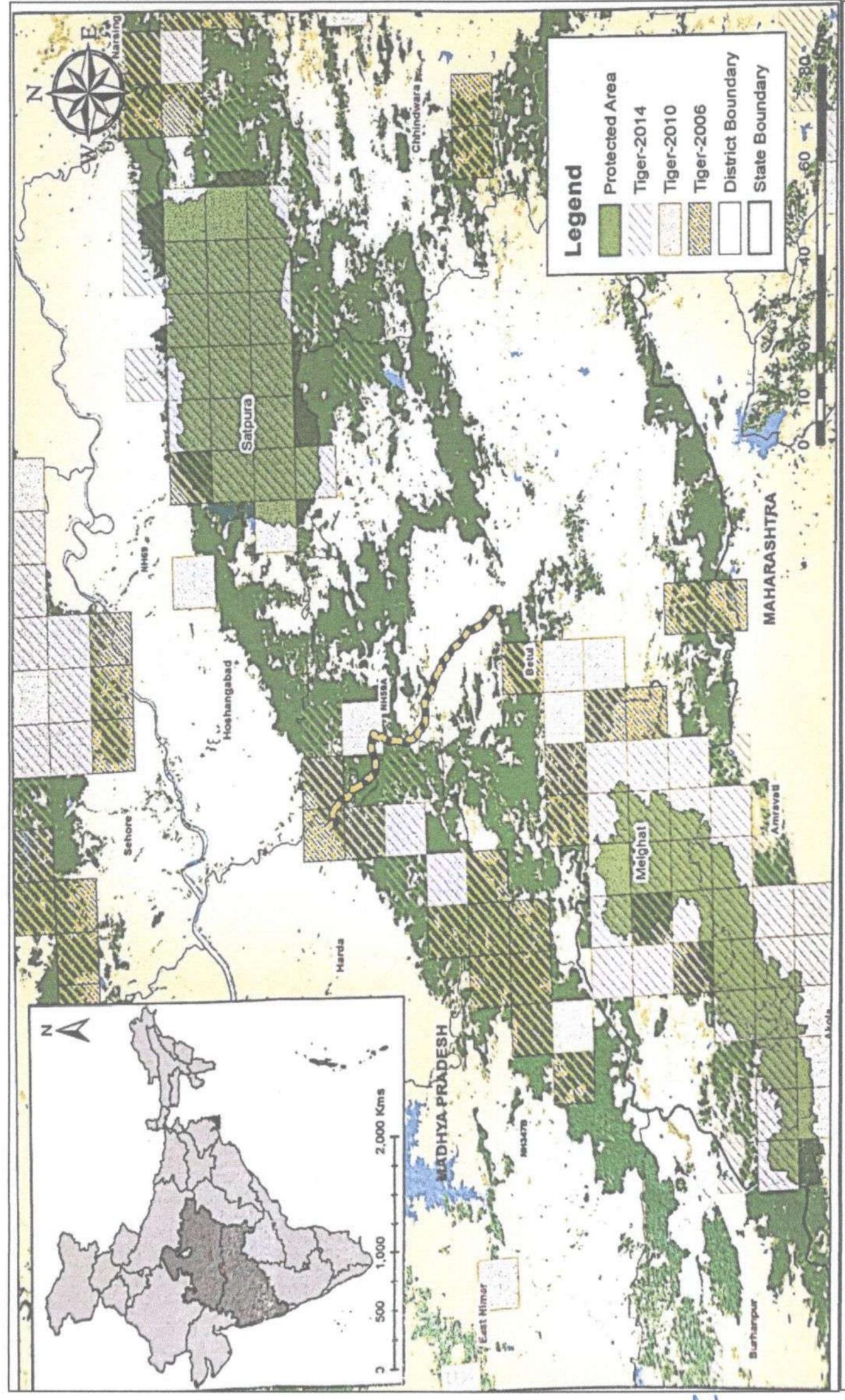


FIG: 2; PRESENCE OF TIGER IN THE SATPURA – MELGHAT CORRIDOR

Source: NTCA's All India Estimation Exercise (2006, 2010, 2014).

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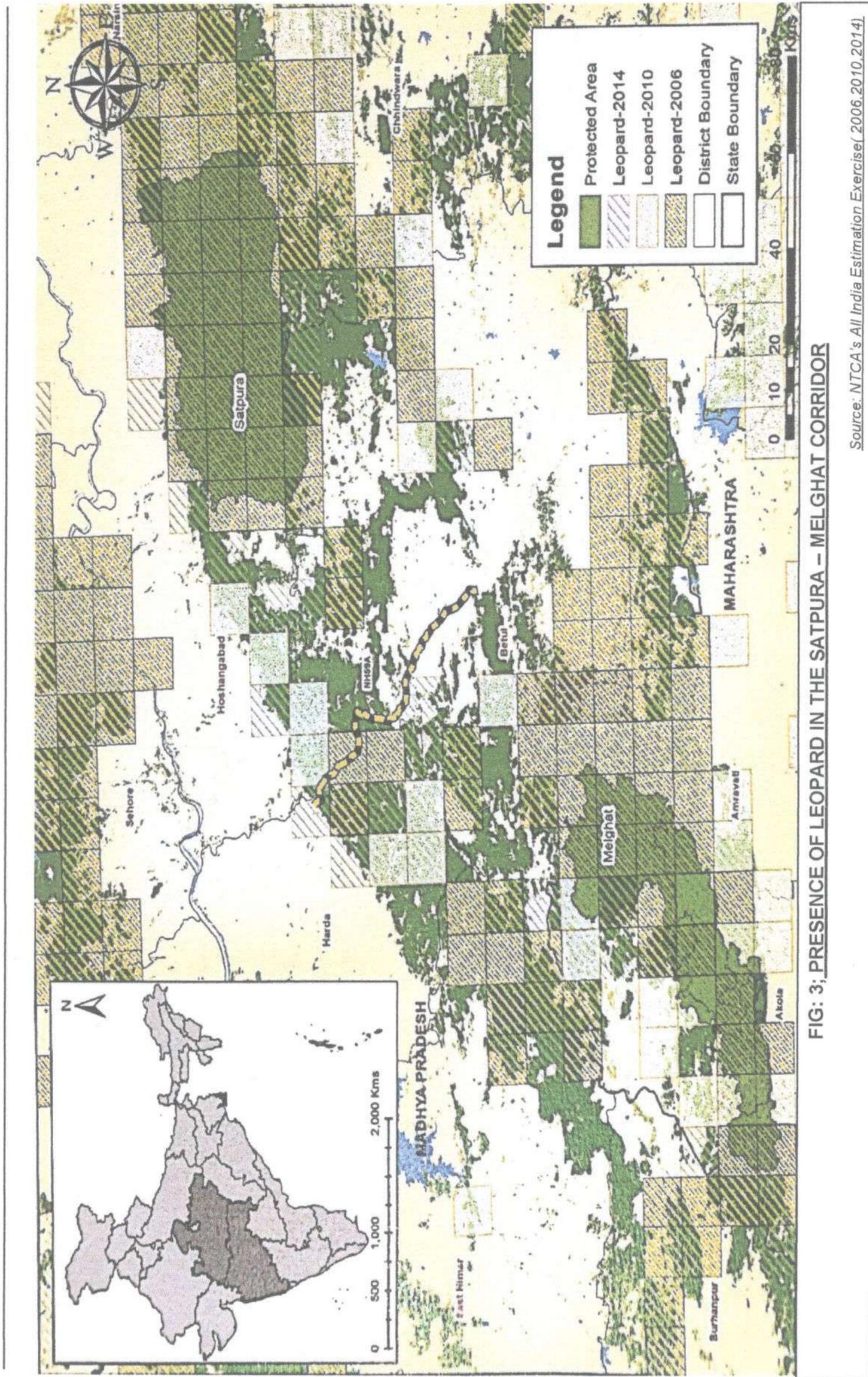


FIG: 3; PRESENCE OF LEOPARD IN THE SATPURA – MELGHAT CORRIDOR

Source: NTCA's All India Estimation Exercise (2006, 2010, 2014).


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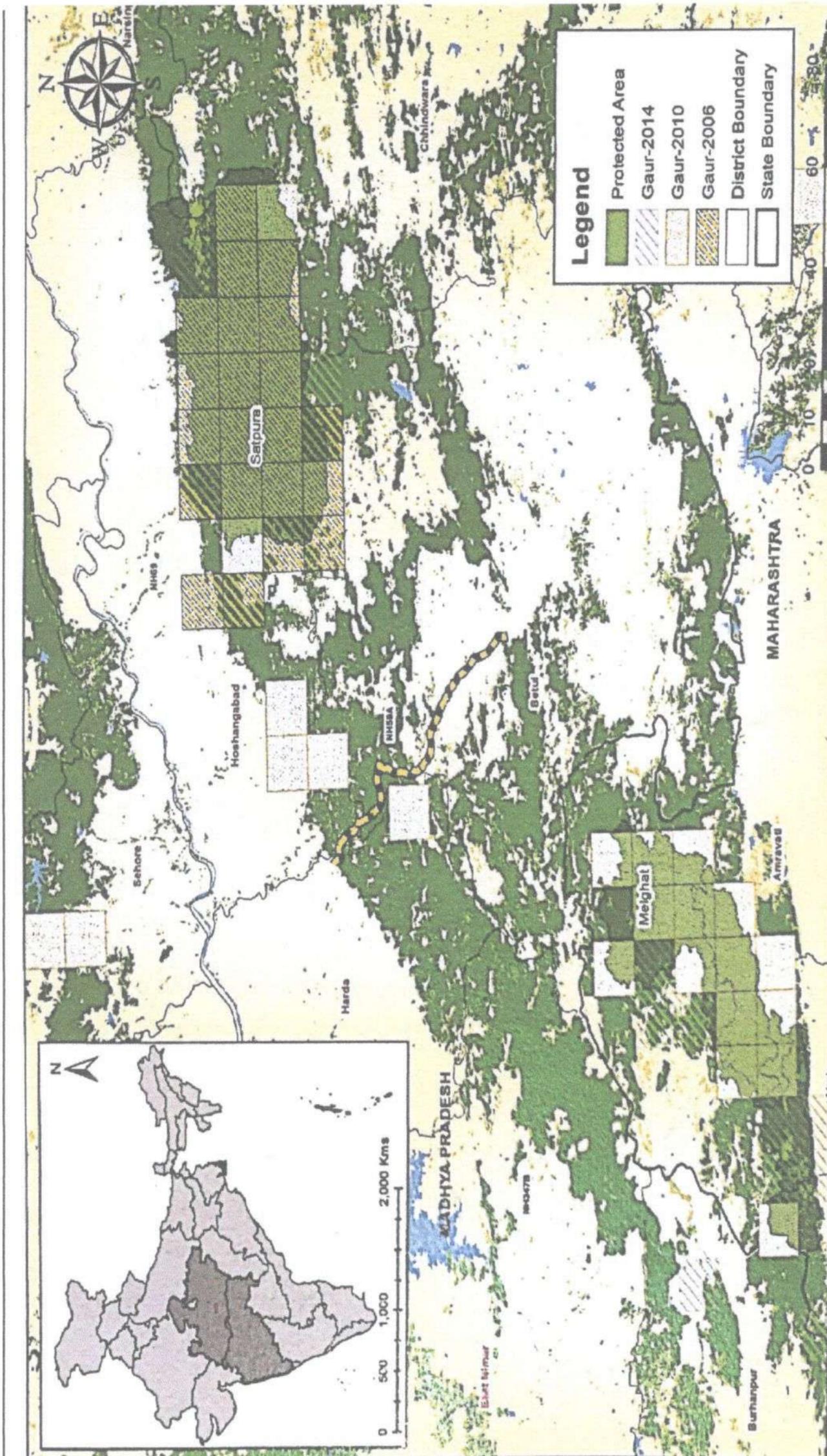


FIG: 4; PRESENCE OF GAUR IN THE SATPURA – MELGHAT CORRIDOR

Source: NTCA's All India Estimation Exercise (2006, 2010, 2014)

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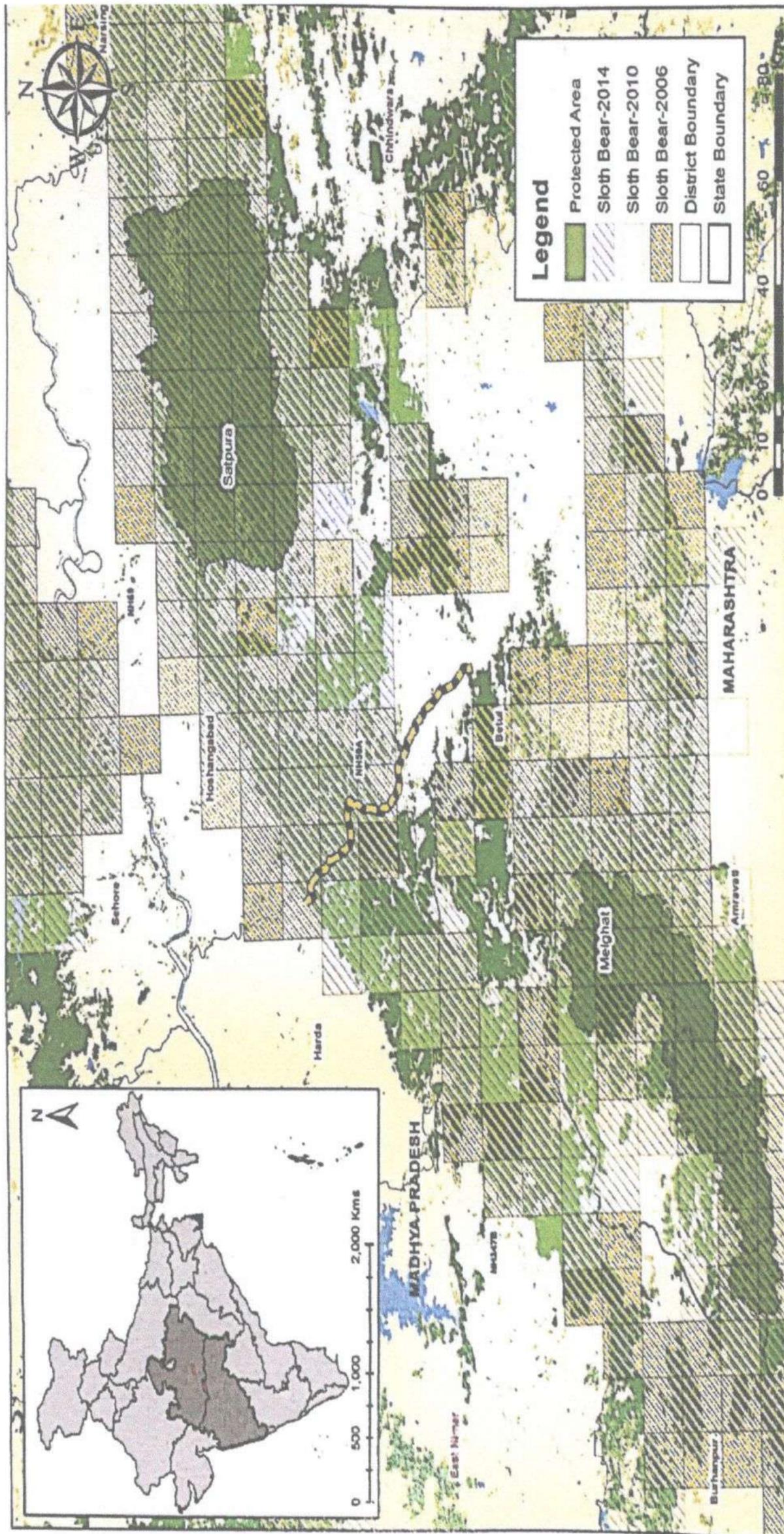


FIG: 5; PRESENCE OF SLOTH BEAR IN THE SATPURA – MELGHAT CORRIDOR

Source: NTCA's All India Estimation Exercise(2006, 2010, 2014)


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Forest along the project road is given in table below:

Table No : 1.0 Forest Location Along Project Road

HARDA TO BETUL, NH47							
Sl. No	Chainage		Total Length			Nature of Land	Forest Division
	From	To	RF	PF	Private Land		
1.	30+000	34+095	4.095			Jawardha RF	Harda
2.	34+095	41+750	7.655			Jawardha RF	Hoshangabad
3.	41+750	45+000	3.250			Khokrakheda RF	West Betul
4.	45+000	50+000	5.000			Sanvligarh RF	
5.	50+000	55+000	5.000			Sanvligarh RF	
6.	55+000	60+850	5.850			Gawasen RF	
7.	60+850	65+700			4.850	Private Land	
8.	65+700	65+800	0.100			RF	
9.	65+800	70+000			4.200	Private Land	
10.	70+000	75+000			5.000	Private Land	
11.	75+000	77+100			2.100	Private Land	
12.	77+100	77+450		0.350		PF	
13.	77+450	79+000			1.550	Private Land	
14.	79+000	79+750	0.750			PF	
15.	79+750	80+000			0.250	Private Land	
16.	80+000	81.000			1.000	Private Land	

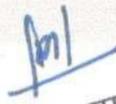
Source: Field Study & Forest Department

Forest patch along the project road shown in Topo Map 1:50000 scale in Fig 1.0

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FIGURE 1.0 : RF & PF (FOREST PATCH) ALONG THE PROJECT ROAD IN TOPO MAP 1:50000 SCALE.

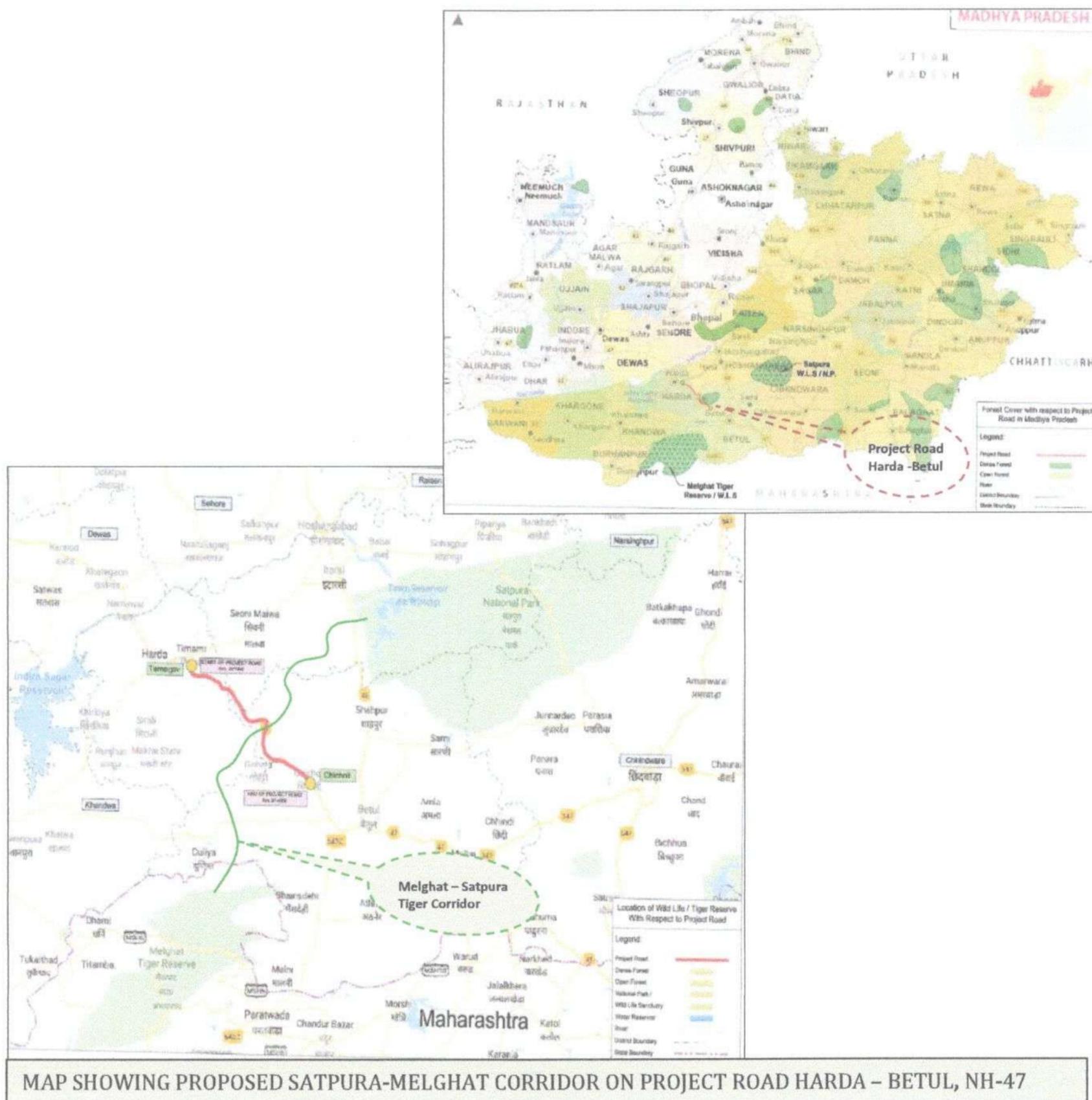

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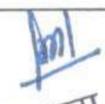
Animal crossing on road through Satpura-Melghat corridor is given in table : 2.0 below :

TABLE- 2.0 : SATPURA-MELGHAT CORRIDOR

Chainage		Nature of Forest	Village	Forest Division
From	To			
59+300	60+850	Gawasen RF	Amapura	West Betul

Source : West Betul Forest Division




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For the study of eco-sensitive sites following acts are considered:

- I. **Wild Life Protection Act, 1972** – relates to protection of wild life in sanctuaries and National Park. This act is applicable as it notified to us by the West Betul forest division that the **Satpura - Melghat tiger** corridor has a future plan which lies in road route under the forest compartment **369 and 1420** along the project road, NH-47.
- II. **Forest (Conservation) Act, 1980** – relates to diversion of forestland for non-forest use. The act is applicable as lowest minimum of 56.513 Haland are proposed for diversion of land for non – forest use.

Therefore, for the study of cumulative impacts on wildlife in RF & PF along project road is essentially required to formulate adequate mitigation plan for terrestrial animal crossing and finding suitable points on road in the forest compartment at Satpura-Melghat tiger corridor in order to provide animal underpass as natural cave in design to prevent directly reaching the animal on road and occurrence of road kills as to protect wildlife and fragmentation of species.

1.3 Traffic Condition of the Study Area

The important factor of project is construction of economic corridor to optimise the efficiency of freight and passenger movements by bridging critical infrastructure gaps. The widening of existing road shall have high vehicular movements due to improved facilities for commercial as well as public transport. Therefore, widening of road and increase of traffics are the two factors which will create direct impact on local flora and fauna. In the process of widening of project in the forest area will create temporary impacts on wildlife during the pre-construction & construction activities. To assess the potential impact on the wildlife and its movement, existing and projected traffic pattern is very important.

To understand traffic pattern, the baseline & projected traffic volume count in forest location passing along the project from Km 30.00 to Km 81.00 has been taken into account.

The traffic survey was carried out in the year of 2017. The figures for traffic data have been projected by considering Traffic Growth Rates which has been arrived using standard procedure and other relevant factors to get the best projected value for the assessment of mitigation measures from road kills and fragmentation of species.

The traffic projection for the 3 scenarios is presented in table below.

Table - 3.0 : Projected Traffic In Wildlife Area of Project Road

Year	Most Likely Scenario	Optimistic Scenario	Pessimistic Scenario
	Km 211.900 PCUs	Km 211.900 PCUs	Km 211.900 PCUs
2017	2678	2678	2678
2018	2844	2867	2811
2019	3021	3071	2952
2020	3209	3290	3100
2021	3393	3506	3255
2022	3589	3736	3417
2023	3796	3982	3588


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Year	Most Likely Scenario	Optimistic Scenario	Pessimistic Scenario
	Km 211.900 PCUs	Km 211.900 PCUs	Km 211.900 PCUs
2024	4016	4245	3768
2025	4248	4525	3956
2026	4464	4785	4154
2027	4690	5060	4361
2028	4929	5352	4579
2029	5180	5660	4808
2030	5444	5986	5049
2031	5708	6313	5301
2032	5985	6657	5566
2033	6276	7021	5845
2034	6581	7405	6137
2035	6901	7810	6444
2036	7237	8238	6766
2037	7590	8690	7104
2038	7960	9166	7459
2039	8348	9670	7832
2040	8756	10201	8224
2041	9184	10762	8635
2042	9633	11354	9067
2043	10105	11979	9520
2044	10600	12639	9996
2045	11120	13335	10496
2046	11666	14071	11021
2047	12239	14848	11572
2048	12841	15668	12151
2049	13472	16534	12758


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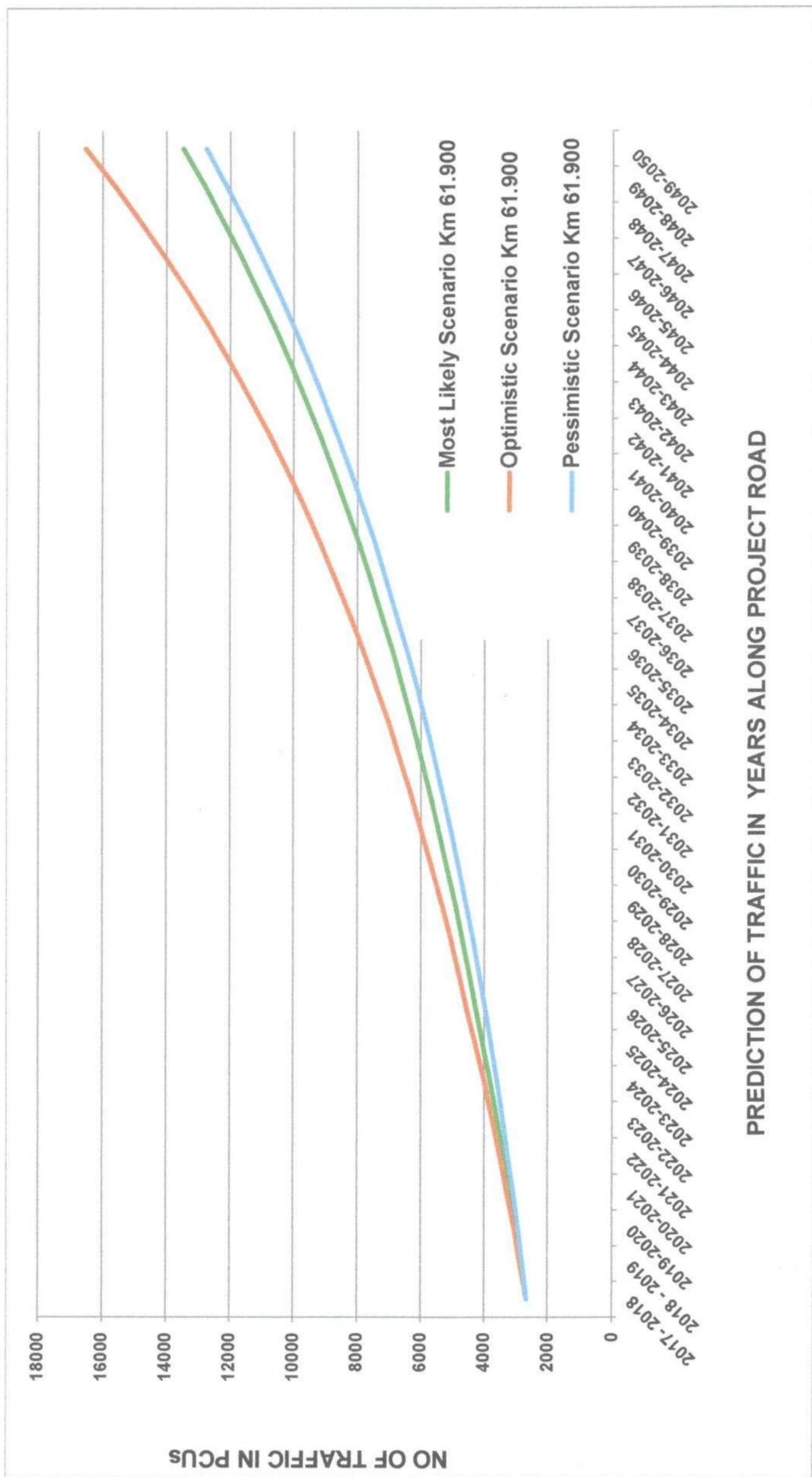


Fig : 3.0 TRAFFICS IN VARIOUS POSSIBLE PREDICTION ALONG THE WILDLIFE CORRIDOR

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1.4 Prediction of Impacts

Keeping in view the above prediction of road traffics scenarios in 30 years durations the projected traffic volume shall be one & half time in year 2027 two & half time in year 2037 and almost increase by four times in year 2019 as compare to the current traffic volume. The speed of traffics shall also be increased due to improved in riding quality after road construction. It is quite evident that the increased of traffics numbers and the speed of traffics shall create more impacts on wildlife animal and its natural movements along forest reach than the present time.

1.5 Project Features – Existing & Proposed

- The project road starts from Km 30.000 and traversing through villages Ajai, Alamgarh, Chirapatla, Bela, Tadhar, Pathakheda, Godhna, Uskali, and Alampuretc and terminate at Chicholi village at km 81.000. The proposed alignment is designated as economic corridor, with total design length of 51.000 km.
- The existing carriageway width is 7.50 m throughout the corridor with the flexible pavements. The proposed right of way (ROW) was kept 18.00m length in forest area from km 30+600 to 81+000. The ROW is 30.00 m was proposed in non- forest from km 30.00 to 30+600 only. The proposed road is a new alignment passing through the reserve & protected forest existing along the road.
- The project road section is 2-lane without paved shoulders while 2-lane with paved shoulder proposed.
- The 7- Typical cross section is proposed for the entire road. In this section 3 cross sections are proposed for the 4-lanes which are planned in non- forest area. In the section of reserve forest only two lanes with 1.5m paved and 2.00m earthen shoulders are proposed with 4- typical cross – sections.
- In improvements proposal flexible pavements are proposed along the entire section of road.
- The proposed project will involve construction of 1.0 major bridge, 21 – minor bridge and 101 culverts. Further, proposed road has 42 nos bus - shelters along the project highways with the one toll plaza. As the project road is passing through the Satpura – Melghat tiger corridor, therefore, the animal underpass at 6-specific points are proposed with wild- life fencing to funnel the animal crossing to the passage structure.
- The proposed road is improvements of alignments for safety of road-users and provision of various facilities to prevent fragmentation of wildlife and road kills by proposing animal underpass, wildlife signboards, trench along the project road for mitigation of impacts of wildlife.
- There are no major junctions along the road rout; but there are number of side roads along the project road leading to village, agriculture land, school.
- The design speed of project road is proposed minimum 80 km and maximum 100 km in plain and rolling terrain. And minimum 40 km and maximum 60 km per hour is proposed in wildlife and hilly & steep slope.


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1.6 CLIMATOLOGICAL TREND IN PROJECT DISTRICTS

The entire project length is lies in three districts. In Harda district project start from km 30.00 and end at km 35.00 covering total 5km in length. After that the project road enters into the Hoshangabad district which end km 41+750 covering 6.750 km length. Third & last section is 39.250 km length ends at Chainage km 81.00 in Betul district.

All three districts are touches with inter-district boundary of each consecutive district in rout of road whereserve forest laid either side of road. Therefore, total 30.00 Km out of 51 km of project road comes under direct coverage of Reserve & Protected forest comprising under the district Harda, Hoshangabad and part of West Betul forest division.

All three districts lies in the southern region of Madhya Pradesh, therefore climatic-conditions of this region shall directly influence the flora & fauna consequently create impacts on wildlife movements, fragmentation of terrestrial animal and road kills due to road traffics when animal became more active during on-set of monsoon. All three district experiences sub-tropical climate with dry summer from April –June followed by monsoon from July – September and cool & relatively dry winter. Entire section of project road falls in Satpura ranges which in plain to hilly range from Harda to Betul. Average rain fall along project road is lies between 180mm to 270 mm from June to September. Only the year 2019, unexpected rainfall is appeared which gone up-to 800mm in July. The dust storms and heat waves are common along the project road passing through the districts from April and May. The temperature begins to rise towards the end of March till the end of May, which is hottest month of the year. The temperature range along the project road varies in district between 17°C and 41°C from January to June. The hottest month is June. And the December is the coldest month with mean daily maximum and minimum temperatures being 4.0°C to 1.5°C respectively. In the month of June the temperature goes up-to 41°C. Relative humidity varies from 82% in summer to lowest 14% in month of March whereas 36% in winter throughout project passing along the districts. Based on the IMD Rainfall data (2015-2018) it observed that all three districts receive maximum downpour between July-August.

Therefore, wildlife along the forest are more vulnerable during this period where appropriate measures are required to prevent the animal directly reaching on road by providing appropriate crossing in road design by provision of amphibian / reptile tunnel in forest area and the wildlife crossing as a mitigation of fragmentation of wildlife terrestrial animal as like deer, wild boar, hyena etc. Furthermore the project route is identified the tiger movements which is linked the Satpura to Melghat tiger corridor in route. Therefore, animal underpass has been proposed at specific locations with the fencing along the ROW to fennel the wildlife to the passage structure as to prevent them from the road kills.

Rainfall distribution of the project districts is depicted in figure : 4.0 below.

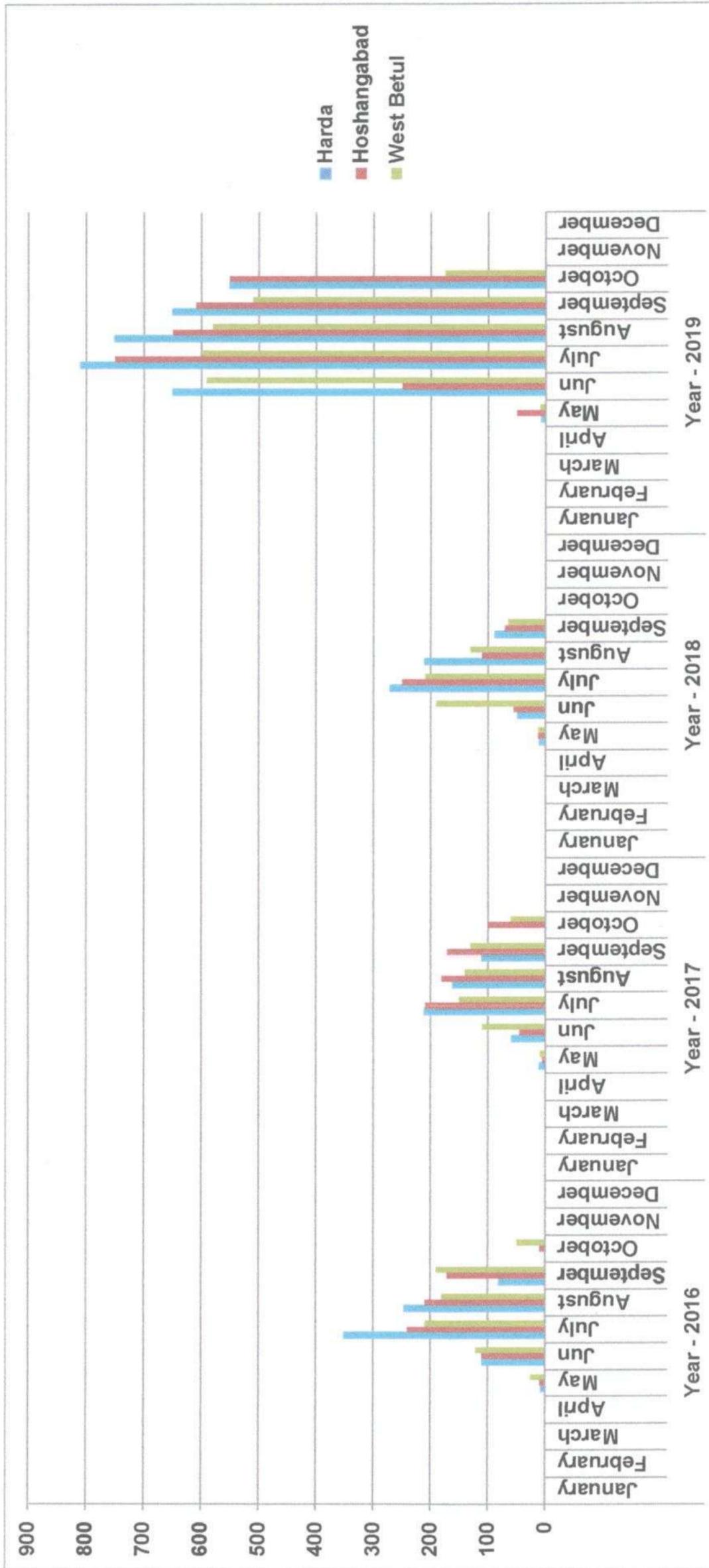


Fig 4.0 GRAPHICAL REPRESENTATION OF RAINFALL ALL DISTRICTS ALONG PROJECT ROAD

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2. SITE STUDY FOR WILDLIFE MITIGATION

As per the study of rainfall in project area it shows that during the monsoon in June receives less rainfall comparatively in July. The monsoon starts picking up after middle of July. This draws attention of animal as like deer, antelopes & wildboar which in turn draws the predators also.

The project area falling in reserve forest is nesting & breeding period for various ground dwelling birds, terrestrial animal, amphibian & reptiles and other forest dwellers during the period from June-August. As per secondary information, the large terrestrial mammal inside the forest sub-division Harda, Hoshangabad and west Betul are became more active and remain in courtship period in this time as like Jackal wild dog andhyaena. The lesser cats are also supposed to breed during this period. In the event of rains various amphibians & reptiles come-out on open land due to submergence of its burrow by rain water. It is also best time to track butterflies and dragonflies which proves health of biodiversity in area.

The project road is within the reserve forest in Harda, Hoshangabad and part of west Betul forest division; therefore ground dwelling species shall have more chance to get affected on road kills, fragmentation and biodiversity due to widening of road. In this case the mitigation plan for wildlife crossing is essential to protect animals from road kills by providing suitable passes & crossing of road to maintain species biodiversity of the RF & PF along either side of project road. Furthermore, along the project road a tiger corridor is also planned to connect Melghat to Satpura wildlife sanctuaries in order to maintain biodiversity by facilitate free movements of wildlife in forest region.

2.1 Study Area

The project road is broadly divided into three forest divisions.

The study area is the section of reserve forest & protected forest of project road. Therefore, wildlife movement are studied within the section only.

First part is under the RF of Harda Forest Division from km 30+0000 to km 43+095 in.

The Second Part RF is under Hoshangabad FD from 34+095 to 41+750. And the last third one from Km 41+750 to 60+850 in West Betul forest division.

Project road from Km 60+850 to 80+000 is not the part study for mitigation of wildlife movements as private land are falling either side of project road or protected forest are distinct away the proposed widening of project road. In this section, therefore, wherever the patch of RF & PF is closely associated with project road generic consideration for mitigation for wildlife crossing are considered by construction of additional structure of culvert guiding with trench for the amphibian & reptiles followed by adequate cleaning in the monsoon.

2.2 Methodology

The widening of project road is linear development. Therefore, it bisects the forest region in to two sections. For the study of wildlife movements rapid field study has been conducted for assessment of probable movements of wildlife animals.

In this procedure, each 5.00 km interval is randomly selected at six locations in 30 km forested area for onsite field study where standard line transects method was adopted. In this method transect line were drawn perpendicular with road axis. The length & location of transect line depend on habitat & terrain extending maximum 1.00km either side of the road.


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We laid five lines parallel to road at 0-10 m, 250 m, 500 m 750 m and 1000m at both sides of road. A team of wildlife expert from M/S WCT and team of M/S Lea associated who expertise to classify animal signs assisted by a conservation trained sniffer dogs of Belgium Malinois and Weimaraner breeds who able to detect animal signs by scent was deployed to walk each line from 05th Dec, 2019 to 25th Dec, 2019. The wildlife team covers about 50-100 meter wide area along the line. Any water bodies, stream and animal traces perpendicular to the line were noted & evaluated. The finding of animal signs and direct sightings of wildlife animal identified by its call was recorded. As the project road is forested area of Satpura & Melghat wildlife sanctuary & tiger reserve which is associated with notified area of tiger corridor. As the animal crossing is also determined by the adjoining terrain, therefore, finding of tiger movements besides the notified area of tiger corridor, which is hilly was also studied for the finding of animal sign-survey, hoof marks etc as to determine animal underpass at suitable locations besides the critical area of the tiger corridor. In this case, we also compare the data from the NTCA up-to last three years 'All India Estimation Exercise' from 2006, 2010 & 2014.

Furthermore, the small species as like ground dwelling birds, amphibian & reptiles and other forest dwellers as like rabbit etc. are more vulnerable. In this view, the existing culverts are also examined to understand the probable movements of wild fauna and their path for foraging. In field studies of regular 15 days stays various marks of wildlife existence are observed due to presence of foot/pug/hoof/ take-off skin of snake etc.. In the rapid study, movements of wildlife crossing through culverts and other cross structure etc. as like reptiles & rabbit etc are not come to the notice due to dry land in month of Dec, 2019 and siltation in culvert. Therefore, besides the field study consultation with stakeholders was also conducted, as secondary information to understand possible movements of wildlife fauna. In this process consultation with local public, experts from forest & wildlife was made for information of wildlife animal in project road. The Forest - ranger & Field officers were also consulted. For which following documents were taken from the forest departments.

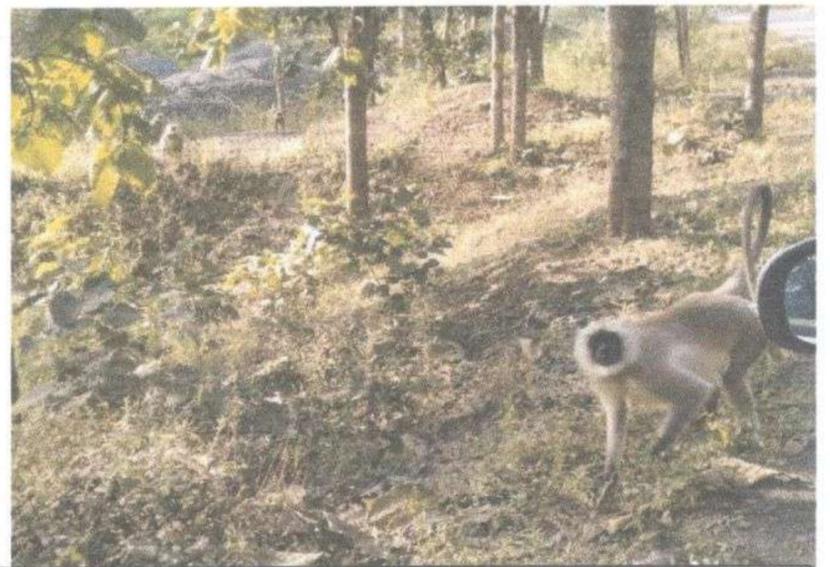
- Checklists of Flora & Fauna in the project area
- Man Animal Conflict & Road kill records.
- Information on Wild life movement.
- Cropping pattern.



WILDLIFE TEAM (M/S WCT) EXERCISE ANIMAL SIGN SURVEY BY SNIFFER DOG
FOREST RANGE – HARDA – BETUL, NH - 47



TEAM MEMBER (M/S WCT) RECORDING ANIMAL SIGNS
FOREST RANGE – HARDA – BETUL, NH - 47



RHESUS MACAQUE (*Macaca mulatta*) & COMMON LANGUR (*Simnopithecus entellus*)
CROSSING THE ROAD THROUGHOUT FORESTED AREA HARDA – BETUL, NH47

2.3 Findings of Studies

The entire section of project road falls in Satpura ranges which in plain to hilly terrain from Harda to Betul. All three district experiences sub-tropical climate with dry summer from April –June followed by monsoon from July – September and cool & relatively dry winter.

The study area received low rain fall and the rock face is highly exposed. The study area has flowing land-use sections, the first one is forest and rest part is hill section towards West Betul partly intercepted with water bodies/river.

The Major habitat along the project area is as follows :

- 1) Forest Land : The forest along the project road is Jawardha RF, Khokrakheda RF, Sanvligarh RF and Gawasen RF. The vegetation type of reserve forest is partly moist deciduous and partly dry deciduous. The unique ecological phenomenon of the reserve forest is the occurrence of Sal with predominant teak bearing area.
- 2) Arable land
- 3) Seasonal Stream/ River/ Ponds

2.3.1 Flora

The reserve forest and protected forest are lies along either side of the project road. Further the almost full alignment of project road under the package -2 of Harda – Betul , NH-47 is framed a new alignment by the diversion of forest through 56.515 ha land and acquisition of 65.47 ha from the private land. Hence, the project section is a part of Satpura Tiger reserve which has reach in flora comprising majority of teak, Saal, tendu, mahua (Indian butter-tree), bel (stone-apple), bamboos, grasses etc. The project road has more than 62 trees species, 30 small tree species, 58 shrubs species, 32 climber species and almost 64 grass species with important medicinal plants and endemic rare herbs.

The Tectona, Shorea robusta, mahogany is most prominent flora along project road. The other plant species under shrubs/herbs are noted as Melastoma Malabthricum, Murraya paniculata, Holmskioldia senguines, Blumea Lanceolaria, Sophora interrupta. As the study of the project road is widely taken on mitigation of wildlife movements and defragmentation animal in road construction, therefore, finding of wildlife animal along the study area are focused in great extent for development of mitigation plan to prevent animal from traffics kills.

2.3.2 Fauna

The field study of animal sign survey, secondary information of field data for last twenty years and public consultation with local people and the forest officers, it has been found- out that the project road, NH-47 from Harda to Betul is rich in biodiversity. The key species of fine scale distribution in the area are carnivore guild consisting of the tiger (*Panthera tigris*), sloth bear (*Melursus ursinus*), dhole (*Cuon alpinus*), striped hyena (*Hyaena hyaena*), Jackal (*Canis aureus*), Wolf (*Canis lupus*), Jungle cat (*Felis chaus*), Wild cat (*Felis silvestris*), Indian grey mongoose (*Herpestes edwardsii*), Common Palm Civet (*Paradoxurus hermaphrodites*). While the ungulate guild is comprised of Gaur (*Bos gaurus*), Nilgai (*Boselaphus tragocamelus*), Sambar (*Rusa unicolor*), Chital (*Axis axis*), Barking deer (*Muntiacus muntjak*), Blackbuck (*Antelope cervicapra*), Four Horned Antelope (*Tetracerus quadricornis*), Chinkara (*Gazella bennettii*), and hardground Barasingha (*Rucervus duvaucelii branderi*). Furthermore, the Satpura tiger reserve exist in one side and the melghat tiger reserve in another side along the


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project road. The secondary information on availability of tiger along the project road are marked for which details studies was carried -out for possible tiger crossing along the project road. Those routes for movements of tiger which linked the Melghat with the Satpura tiger reserve was pointed out to propose animal underpass by proving the fencing along road to funnel wildlife to the passage structure.

Furthermore, in field study numbers of avian faunal are reported. They are mostly ground dwelling and nesting on ground. Key species of dominance are given in table below Table -6.

In accordance to the Wildlife (Protection) Act, 1972, the wild animals are kept in different schedule keeping in view the degree of protection as like schedule I, II, III and IV. Accordingly to this category the species which are critically endangered are kept under the **Schedule I & II** which requires more attention and more conservation practices for their existence. The species which endangered are kept under the **Schedule III & IV** which requires lower degree of protection. The wild life animal which believes to be harmful to crops, farm animals which carry disease treated as vermin kept in the **Schedule: V** are rodents and might be hunted. And the last is **Schedule VI** which has floral species is prohibited from planting & cultivation. It is to be pointed -out that only few mammalian species were sighted on project site in the transect studies. The most common mammalian and other species located during the diurnal survey are listed in table no 4.0 below:

Table : .4.0 Schedule-I : Wildlife In Project Area

Sl. No.	Scientific Name	Common Name	Class	Source	Status & Sightings
1.	Black Buck	<i>Antelope cervicapra</i>	Mammal	Primary	Uncommon
2.	Sloth bear	<i>Melursus ursinus</i>	Mammal	Secondary	-
3.	Tiger	<i>Panthera tigris</i>	Mammal	Secondary	-
4.	Leopard	<i>Neofelis nebulosa</i>	Mammal	Secondary	-
5.	Eurasian Spoonbill	<i>Platalea leucorodia</i>	Aves	Primary	Uncommon
6.	Indian Peafowl	<i>Pavo cristatus</i>	Aves	Primary	Uncommon
7.	Great Indian Hornbill	<i>Buceros bicornis</i>	Aves	Primary	Uncommon
8.	Bengal Monitor Lizard	<i>Varanus Bengalensis</i>	Reptilia	Primary	Common
9.	Crimson Rose Butterfly	<i>Pachliopta hector</i>	Insecta	Primary	Common

Source: Field Study

Table : 5.0 Schedule II & III Wildlife in Project Area

Sl. No	Common Name	Scientific Name	Schedule	Class	Source	Status & Sightings
1.	Common Langur	<i>Semnopithecus entellus</i>	II	Mammal	Primary	Common
2.	Hyena	<i>Hyaena hyaena</i>	III	Mammal	Animal Sign	Uncommon
3.	Wild Dog/ Dhole	<i>Cuon alpines</i>	II	Mammal	Animal Sign	Uncommon
4.	Jungle Cat	<i>Felis chaus</i>	II	Mammal	Primary	Common
5.	Common Palm	<i>Viverricula indica</i>	II	Mammal	Secondary	Uncommon

	Civet					
6.	Chameleon	<i>Chamaeleo zeylanicus</i>	II	Reptiles	Primary	Common
7.	Russell's Viper	<i>Vipera russelli</i>	II	Reptiles	Primary	Uncommon
8.	Indian Cobra	<i>Ophiophagus hannah</i>	II	Reptiles	Primary	Common
9.	Mongoose	<i>Herpestes edwardsii</i>	II	Mammal	Primary	Common
10.	Barking deer	<i>Muntiacus muntjak</i>	III	Mammal	Primary	Uncommon
11.	Chital	<i>Axis axis</i>	III	Mammal	Primary	Common
12.	Nilgai	<i>Boselaphus tragocamelus</i>	III	Mammal	Secondary	Uncommon
13.	Sambar	<i>Rusa unicolor</i>	III	Mammal	Animal Sign	Uncommon
14.	Four horned antelope	<i>Tetracerus quadricornis</i>	III	Mammal	Secondary	Uncommon
15.	Chinkara	<i>Gazella bennettii</i>	III	Mammal	Primary	Uncommon
16.	Hard ground barasingha	<i>Rucervus duvaucelii branderi</i>	III	Mammal	Secondary	Uncommon
17.	Wild Pig	<i>Sus scrofa</i>	III	Mammal	Secondary	Uncommon

Source: Field Study

Table -6.0 : Ground Dwelling and Ground Nesting Birds in Project Area

Sl. No	Common Name	Scientific Name	Schedule	Class	Source	Status & Sightings
1.	Five-striped plam squirrel	<i>Funambulus pennanti</i>	IV	Mammal	Primary	Common
2.	White-browed Bulbul	<i>Pycnonotus luteolus</i>	IV	Aves	Primary	Common
3.	White necked stork	<i>Ciconia episcopus</i>	IV	Aves	Secondary	Uncommon
4.	Kingfisher	<i>Alcedo bengalensis</i>	IV	Aves	Primary	Uncommon
5.	Grey Francolin	<i>Francolinus pondicerianus</i>	IV	Aves	Primary	Common
6.	Red Wattled Lapwing	<i>Vanellus indicus</i>	IV	Aves	Primary	Common
7.	River Lapwing	<i>Vanellus duvaucelii</i>	IV	Aves	Secondary	Uncommon
8.	River Tern	<i>Sterna aurantia</i>	IV	Aves	Secondary	Uncommon
9.	Orange Headed Ground Thrush	<i>Zoothera citrina</i>	IV	Aves	Primary	Uncommon
10.	Little Ring Plover	<i>Charadrius dubius</i>	IV	Aves	Secondary	Common
11.	Ashy Crowned Sparrow Lark	<i>Eremopterix griseus</i>		Aves	Primary	Common
12.	Indian Bush Lark	<i>Mirafra erythroptera</i>	IV	Aves	Primary	Common
13.	Woolly-necked Stork	<i>Ciconia episcopus</i>	IV	Aves	Secondary	Uncommon
14.	Pied Kingfisher	<i>Alcedo rudis</i>	IV	Aves	Primary	Uncommon
15.	Ringed Plover	<i>Charadrius hiaticula</i>	IV	Aves	Primary	Uncommon
16.	White-browed Bulbul				Primary	Common

Sl. No	Common Name	Scientific Name	Schedule	Class	Source	Status & Sightings
17.	Black-crested Bulbul	<i>Pycnonotus melanicterus</i>	IV	Aves	Primary	Common
18.	Malabar Pied Hornbill		IV	Aves	Primary	Uncommon
19.	Indian Pitta	<i>Pitta brachyura</i>	IV	Aves	Secondary	Uncommon
20.	Indian Courser	<i>Cursorius coromandelius</i>	IV	Aves	Primary	Uncommon
21.	Malabar Whistling Thrush	<i>Myophonus horsfieldii</i>	IV	Aves	Primary	Uncommon

Source: Field Study

There are many more faunaspecies of wildlife observed during transact walk in project area. Among all the faunal species coming under the schedule1, II, III and IV of Wildlife Protection Act, 1972 are listed in the above table.

2.3.3 Road Crossings

There are various faunal species spotted crossing the road during field study. In spite of this forest division and the consultation with local people was made for gathering information of animal crossing along project road. The probablelists of wildlife along project road are given in table below. However, it does not limit the wildlife animal along the road.

Many more wildlife existeither side of the reserve forest are given in Table : 7.0 below

Table - 7.0 : Wildlife Animal Road Crossing

Sl. No.	Common Name	Scientific Name	Class	Schedule	Severity / Remarks
1.	Black Buck	<i>Antelope cervicapra</i>	Mammalia	I	Gawasen F
2.	Russell's Viper	<i>Vipera russeii</i>	Reptilia	II	Gawasen F
3.	Tiger	<i>Panthera tigris</i>	Mammalia	I	Gawasen F
4.	Grey Mongoose	<i>Vipera russeii</i>	Mammalia	II	Gawasen F
5.	King cobra	<i>Ophiophagus hannah</i>	Reptilia	II	Gawasen F
6.	Common Vine Snake	<i>Ahaetulla nasuta</i>	Reptilia	IV	Gawasen F
7.	Garden Lizards	<i>Calotes versicolor</i>	Reptilia	IV	Korkrakheda
8.	Indian Peafowl	<i>Pavo cristatus</i>	Aves	IV	Sanvligarh F
9.	Wild Boar	<i>Sus scrofa</i>	Mammalia	IV	Sanvligarh F
10.	Five-striped Palm Squirrel	<i>Paradoxurus hemaphroditus</i>	Mammalia	IV	Sanvligarh F
11.	Common Langur	<i>Semnopithecus entellus</i>	Mammalia	II	Entire Project Corridor
12.	Rhesus macaque	(<i>Macaca mulatta</i>)	Mammalia	II	Entire Project Corridor
13.	Hyena	<i>Hyena hyena</i>	Mammalia	III	Gawasen F
14.	Wild Dog or Dhole	<i>Cuon alpinus</i>	Mammalia	II	Gawasen F

2.3.4 Road Kills

In the field study few faunal species are recorded in road kills. Furthermore, the faunal species recorded in road kills by the forest division are also taken to which are given in table 8.0 below:

Table no - 8.0 : Wildlife Animal in Road Kills

Sl. No.	Common Name	Scientific Name	Schedule	Date & Time	Location
In Direct Sighting during Survey					
1.	Common Langur	<i>Semnopithecus entellus</i>	II	28.12.2019	Sanvligarh
2.	Rhesus macaque	<i>Macaca mulatta</i>	II	26.12.2019	Sanvligarh
Road Kills on Stakeholders' Consultations i.e Forest Division & Local people					
3.	Wild Boar	<i>Sus scrofa</i>	IV	04.09.2019	Sanvligarh
4.	Hyena	Hyena hyena	III	01.01.2013	Sanvligarh
5.	Sambar deer	<i>Rusa unicolor</i>		27.01.2013	Sanvligarh
6.	Spectacled Cobra	<i>Ophiophagus hannah</i>		In monsoon	Gawasen
7.	Frog		-	In Monsoon	Gawasen

3. IMPACT ASSESSMENT & MITIGATION PROPOSED

3.1 Forest Areas

The widening of proposed road from Harda-Betul sections shall have an impact on forest areas as diversions of forest land are required for the road construction. However, it is proposed to minimize diversion of land for road –use. The total area for diversion of forest land is estimated to be 56.515 Ha. In Harda district 5.336 ha, Hoshangabad has 13.78 ha and the West Betul district is estimated to be 37.399 ha.

3.1.1 Flora

In the construction of road removal of green-cover from forest is required for road works. Therefore, minimum loss & damage is to be carried out to avoid overcutting of trees.

In diversion of forest land felling of trees should be minimized.

The predominant most common trees species along the project road either side of the forest are Sal, teak, mahogany, bamboo. The best effort shall be given to reduce the number of felling to the maximum extent possible. The cutting is limited width along the project road therefore impacts on endangered of endemic species are not envisaged

3.1.2 Fauna

Proposed road lies inside the reserve forest; therefore, consistent damage of biodiversity shall occur due to proposed alignment of project road. Further, it shall create considerable damage to wildlife.


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In road crossing wild animal shall also be effected due to fragmentation of species. In study of wildlife, it come to notice that various wildlife animal residing in forest with presence of schedule animal as per the Wild Life Protection Act where few of them are found dead on road kills. Presently, there are low traffics densities but as per site study and local people consultation the road kills rate increases with increase in traffics during the monsoon. In spite of this the project road is considered improvements of alignment which is partly exist a new section and partly on existing road throughout the length which proposed to be constructed by diversion of forest land. Therefore, to minimize the biodiversity loss adequate mitigation to be developed for defragmentation and prevent road kills.

3.2 Proposed Mitigation

As per site study and keeping in view the section of road partially on existing and the new which proposed to be developed on the diversion of lands following mitigation being proposed.

- Provide trench on both the side of 1.4 m width at Top, 0.6 m width at bottom with a depth of 0.8 m all along 26 Km of project road section (Km 31+400 to Km 57+400) to create a barrier as well as to channelize wild life animal movement towards nearest Cross Drainage structure. The detail drawing is provided in Drawing No. **73579\LASA\HIGHWAYS\DPR\TCS-02**
- The RCC Box culverts (2.00 to 6.00m wide and 2.0~6.0m height) at specific locations so that wildlife of forest may freely move to other side of the road as well work as drainage of surface run-off during the monsoon.
- In the entire section, there shall not be any pipe culverts.
- In the project route a notified area of tiger corridor existed from km 59+370 to 60+ 870 which connects Satpura tiger reserve to Melghat wildlife sanctuaries. In field study of tiger movements **other specific locations** are also indentified after the animal sign – survey besides the notified area of tiger – corridor in Gawasen RF where need to construct the animal underpass. The detail location of animal underpass is given in Table – 11.
- Provide the sign-boards notifying the wild life along project for the safety of animal in forest moving freely along either side of the project road. Also require sign-boards of forest divisions along with the mobile number of the concern forest officers in cases of emergency. The type of signage is given in drawings No. **73579\LASA\HIGHWAYS\DPR\TCS-01**
- Total 30 km out of 51 Km of project length is falling under the reserve & protected forest in three different forest divisions namely as Harda, Hoshangabad and Betul Forest Division. This section the traffic speed should be regulated a limit up-to maximum 45 km/hr. Therefore, traffic speed along the project road from km 30.00 to 60.000 need to be controlled with putting-up movable barriers and speed limit boards at interval of specific distance in day & night hrs for the safety of wildlife. Furthermore, this section is a green-belts and the wildlife will became active at night, therefore these section should be declared as silence zone in this consequences no traffics horn should be allowed at night hrs. The speed limit boards and horns prohibited sign boards should also be installed at regular interval for the awareness of road-users. The drawing of signboards are given in drawing no : **73579\LASA\HIGHWAYS\DPR\TCS-01.**

- In the construction period no work to be allowed at night from 18.00 hrs in summer and 17.30 hr in winter particularly in the road section from km 30.00 to 60.00.
- Road construction work to be carried out 5.00 km maximum in length at a time. No new section to be opened unless and until the top layer of road works is completed. The construction site should be adequately barricaded with rigid barriers to minimize animal human conflicts and its free movements during the construction. Further, no borrows shall be opened inside the forest area.
- The workers & local populace to be made aware through workshops about the Satpura – Melghat tiger corridor passing along the project corridor and to take precautionary measures for safeguarding the predominant wildlife species in the forest area during the construction period.

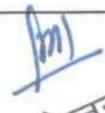
3.2.1 Box – Culvert :

Along the project road, there are deficient of appropriate requirements of cross drainage structure. Therefore, details studies have been carried- out for identifying the correct location to facilitate crossing of wildlife as like amphibians & reptiles and small mammal like rabbit etc. to prevent the road kills. There are total 93 box – culverts are proposed for surface run –off . Keeping in view the animal signs and requirements of road crossing the height and width of culvert are modified for clear movements during road crossing. The list of locations identified for crossing of wildlife through box –culverts are given below in table no 9 .

Table – 9 : New Culvert Along the Project Road

Sl. No.	Type	Design Chainage (m)	Proposed Span Arrangement (no. x length x height)	Mitigation Animal Crossing Box – culvert
1	RCC Box	31617	1 x 3 x 1.8	1 x 3 x 1.8
2	RCC Box	32165	1 x 5 x 1.8	1 x 5 x 1.8
3	RCC Box	32700	1 x 3 x 1.8	1 x 3 x 1.8
4	RCC Box	35530	1 x 2 x 1.8	1 x 2 x 2.5
5	RCC Box	36978	1 x 2 x 1.8	1 x 2 x 1.8
6	RCC Box	37400	1 x 2 x 1.8	1 x 2 x 1.8
7	RCC Box	38400	1 x 2 x 1.8	1 x 2 x 1.8
8	RCC Box	38650	1 x 2 x 1.8	1 x 2 x 1.8
9	RCC Box	39012	1 x 2 x 1.8	1 x 2 x 1.8
10	RCC Box	40460	1 x 6 x 1.8	1 x 6 x 1.8
11	RCC Box	41565	1 x 2 x 1.8	1 x 2 x 1.8
12	RCC Box	43145	1 x 4 x 1.8	1 x 4 x 1.8
13	RCC Box	43213	1 x 2 x 1.8	1 x 2 x 1.8
14	RCC Box	43605	1 x 6 x 1.8	1 x 6 x 1.8
15	RCC Box	44370	1 x 2 x 1.8	1 x 2 x 2.5
16	RCC Box	46040	1 x 2 x 1.8	1 x 2 x 2.5
17	RCC Box	46545	1 x 2 x 1.8	1 x 2 x 3.0
18	RCC Box	47840	1 x 2 x 1.8	1 x 2 x 3.0
19	RCC Box	48339	1 x 2 x 1.8	1 x 2 x 3.0
20	RCC Box	48560	1 x 2 x 1.8	1 x 2 x 3.0

Sl. No.	Type	Design Chainage (m)	Proposed Span Arrangement (no. x length x height)	Mitigation Animal Crossing Box – culvert
21	RCC Box	48694	1 x 2 x 1.8	1 x 2 x 2.5
22	RCC Box	49050	1 x 2 x 1.8	1 x 2 x 2.5
23	RCC Box	49480	1 x 2 x 1.8	1 x 2 x 3.0
24	RCC Box	49570	1 x 2 x 1.8	1 x 2 x 3.0
25	RCC Box	50440	1 x 2 x 1.8	1 x 2 x 3.0
26	RCC Box	50968	1 x 2 x 1.8	1 x 2 x 2.0
27	RCC Box	51390	1 x 2 x 1.8	1 x 2 x 3.0
28	RCC Box	51640	1 x 2 x 1.8	1 x 2 x 3.0
29	RCC Box	51722	1 x 2 x 1.8	1 x 2 x 3.0
30	RCC Box	52050	1 x 2 x 1.8	1 x 2 x 2.0
31	RCC Box	52223	1 x 2 x 1.8	1 x 2 x 3.0
32	RCC Box	52460	1 x 2 x 1.8	1 x 2 x 3.0
33	RCC Box	52630	1 x 5 x 1.8	1 x 5 x 3.0
34	RCC Box	52765	1 x 2 x 1.8	1 x 2 x 3.0
35	RCC Box	53015	1 x 2 x 1.8	1 x 2 x 3.0
36	RCC Box	53165	1 x 2 x 1.8	1 x 2 x 3.0
37	RCC Box	53320	1 x 2 x 1.8	1 x 2 x 3.0
38	RCC Box	53510	1 x 2 x 1.8	1 x 2 x 2.0
39	RCC Box	53945	1 x 2 x 1.8	1 x 2 x 3.0
40	RCC Box	54290	1 x 2 x 1.8	1 x 2 x 3.0
41	RCC Box	54415	1 x 2 x 1.8	1 x 2 x 3.0
42	RCC Box	54660	1 x 4 x 1.8	1 x 4 x 3.0
43	RCC Box	55000	1 x 2 x 1.8	1 x 2 x 3.0
44	RCC Box	55106	1 x 2 x 1.8	1 x 2 x 3.0
45	RCC Box	55735	1 x 2 x 1.8	1 x 2 x 3.0
46	RCC Box	56195	1 x 2 x 1.8	1 x 2 x 3.0
47	RCC Box	56255	1 x 2 x 1.8	1 x 2 x 3.0
48	RCC Box	56660	1 x 2 x 1.8	1 x 2 x 3.0
49	RCC Box	57143	1 x 6 x 1.8	1 x 6 x 3.0
50	RCC Box	57505	1 x 2 x 1.8	1 x 2 x 2.0
51	RCC Box	57910	1 x 2 x 1.8	1 x 2 x 3.0
52	RCC Box	57960	1 x 2 x 1.8	1 x 2 x 3.0
53	RCC Box	58140	1 x 3 x 1.8	1 x 3 x 3.0
54	RCC Box	58320	1 x 2 x 1.8	1 x 2 x 3.0
55	RCC Box	58430	1 x 2 x 1.8	1 x 2 x 3.0
56	RCC Box	58935	1 x 2 x 1.8	1 x 2 x 2.0
57	RCC Box	59120	1 x 2 x 1.8	1 x 2 x 3.0
58	RCC Box	59208	1 x 2 x 1.8	1 x 2 x 3.0
59	RCC Box	59308	1 x 6 x 1.8	1 x 6 x 3.0
60	RCC Box	59675	1 x 2 x 1.8	1 x 2 x 2.0
61	RCC Box	59790	1 x 2 x 1.8	1 x 2 x 3.0
62	RCC Box	60040	1 x 2 x 1.8	1 x 2 x 2.0
63	RCC Box	61125	1 x 5 x 1.8	1 x 5 x 3.0
64	RCC Box	61507	1 x 2 x 1.8	1 x 2 x 3.0
65	RCC Box	61941	1 x 2 x 1.8	1 x 2 x 3.0
66	RCC Box	62155	1 x 2 x 1.8	1 x 2 x 3.0


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Sl. No.	Type	Design Chainage (m)	Proposed Span Arrangement (no. x length x height)	Mitigation Animal Crossing Box – culvert
67	RCC Box	62340	1 x 5 x 1.8	1 x 5 x 3.0
68	RCC Box	62522	1 x 2 x 1.8	1 x 2 x 3.0
69	RCC Box	62995	1 x 5 x 1.8	1 x 5 x 3.0
70	RCC Box	63315	1 x 2 x 1.8	1 x 2 x 2.0
71	RCC Box	63696	1 x 2 x 1.8	1 x 2 x 3.0
72	RCC Box	64856	1 x 2 x 1.8	1 x 2 x 3.0
73	RCC Box	65210	1 x 2 x 1.8	1 x 2 x 3.0
74	RCC Box	65400	1 x 2 x 1.8	1 x 2 x 3.0
75	RCC Box	65608	1 x 2 x 1.8	1 x 2 x 3.0
76	RCC Box	66320	1 x 2 x 1.8	1 x 2 x 3.0
77	RCC Box	67380	1 x 6 x 1.8	1 x 6 x 2.0
78	RCC Box	67692	1 x 2 x 1.8	1 x 2 x 3.0
79	RCC Box	68400	1 x 2 x 1.8	1 x 2 x 3.0
80	RCC Box	69178	1 x 2 x 1.8	1 x 2 x 3.0
81	RCC Box	69600	1 x 2 x 1.8	1 x 2 x 3.0
82	RCC Box	69858	1 x 2 x 1.8	1 x 2 x 3.0
83	RCC Box	70596	1 x 6 x 1.8	1 x 6 x 3.0
84	RCC Box	71938	1 x 2 x 1.8	1 x 2 x 3.0
85	RCC Box	73600	1 x 2 x 1.8	1 x 2 x 3.0
86	RCC Box	74291	1 x 2 x 1.8	1 x 2 x 3.0
87	RCC Box	74490	1 x 2 x 1.8	1 x 2 x 3.0
88	RCC Box	75146	1 x 4 x 1.8	1 x 4 x 3.0
89	RCC Box	75700	1 x 2 x 1.8	1 x 2 x 3.0
90	RCC Box	75860	1 x 2 x 1.8	1 x 2 x 3.0
91	RCC Box	77209	1 x 3 x 1.8	1 x 3 x 3.0
92	RCC Box	77565	1 x 2 x 1.8	1 x 2 x 3.0
93	RCC Box	78256	1x 2 x 1.8	1x 2 x 3.0

3.2.2 Minor Bridge :

Minor bridges are provided where there is water way across the project road. Keeping in view the animal sign survey the height & width of minor bridge are modified as mitigation for the wildlife crossing to reach other side of road and to prevent animal fragmentation. There are total 21 minor bridge is planned. For the mitigation of wildlife animal, modified height & width of minor bridge as wildlife animal freely cross the road are given below in table : 10.

Table – 10 : Minor Bridge - Harda – Betul

Sl. No	Design Chainage (m.)	Span Arrangement	Type of Super-structure	Proposal	Mitigation for Wildlife Crossing	
					span	Height
1	39717	3X15	RCC Box	New Construction	3X15	5.1
2	40922	2X10	RCC Box	New	2X10	3.8


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Sl. No	Design Chainage (m.)	Span Arrangement	Type of Super-structure	Proposal	Mitigation for Wildlife Crossing	
					span	Height
				Construction		
3	41700	4X10	RCC Box	New Construction	4X10	8.0
4	44640	2X10	RCC Box	New Construction	7X10	11.2
5	45120	2X10	RCC Box	New Construction	2X10	5.0
6	45620	2X15	RCC Box	New Construction	5X15	3.0
7	47050	1X15	RCC Box	New Construction	1X15	3.0
8	48130	1X15	RCC Box	New Construction	4X15	5.5
9	50190	1X10	RCC Box	New Construction	1X10	9.5
10	54948	1X10	RCC Box	New Construction	1X10	4.5
11	56910	2X10	RCC Box	New Construction	2X10	4.5
12	59348	1X8	RCC Box	New Construction	1X8	3.5
13	59930	1X8	RCC Box	New Construction	1X8	5.0
14	63970	2X10	RCC Box	New Construction	2X10	6.0
15	64600	2X10	RCC Box	New Construction	2X10	4.0
16	65978	1X8	RCC Box	New Construction	1X8	3.5
17	66848	2X15	RCC Box	New Construction	2X15	6.0
18	70460	1X10	RCC Box	New Construction	1X10	4.5
19	71080	2X10	RCC Box	New Construction	2X10	5.5
20	72900	2X10	RCC Box	New Construction	2X10	6.5
21	77741	2X10	RCC Box	New Construction	2X10	6.5

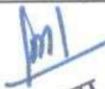
3.2.3 Animal Underpass :

In the project tiger corridor existed which linked the Satpura tiger reserve to Melghat wildlife sanctuaries. In field study of tiger movements, following **specific locations** are identified to provide animal underpass with height of 5m for wildlife crossing


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Table -11: Animal Underpasses on the Tiger Corridor

	Chainage	PROPOSED LOCATION (KM)			TYPE OF STRUCTURE
		Span	Height	Length	
1.	36+630	16.8 x3	5.0	50.4	Animal Underpasses
2.	38+580	16.8 x3	5.0	50.4	Animal Underpasses
3.	39+870	16.8 x3	5.0	50.4	Animal Underpasses
4.	41+600	16.8 x3	5.0	50.4	Animal Underpasses
5.	43+100	16.8 x3	5.0	50.4	Animal Underpasses
6.	49+800	16.8 x3	5.0	50.4	Animal Underpasses
7.	52+380	16.8 x3	5.0	50.4	Animal Underpasses
8.	53+720	16.8 x3	5.0	50.4	Animal Underpasses
9.	54+740	16.8 x3	5.0	50.4	Animal Underpasses
10.	55+160	16.8 x3	5.0	50.4	Animal Underpasses
11.	57+070	16.8 x3	5.0	50.4	Animal Underpasses
12.	58+280	16.8 x3	5.0	50.4	Animal Underpasses
13.	59+160	16.8 x3	5.0	50.4	Animal Underpasses
14.	59+870	16.8 x3	5.0	50.4	Animal Underpasses
15.	60+870	16.8 x3	5.0	50.4	Animal Underpasses


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4.0 WILDLIFE MANAGEMENT PLAN

Sl. No.	Environmental Issue	Location/sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
Pre-Construction Phase					
	Biodiversity & Design Proposal	Study Area	<ul style="list-style-type: none"> To provide adequate number of animal underpasses as per site survey of tiger movements for safe crossing of wildlife from the road to prevent defragmentation of species. Make a provision of trench line along road leading to the cross drainage structure as channelize amphibian & reptiles to passage structure to limit access to highways to prevent mortality from road traffics. To conduct Trees enumeration with adequacy as per actual requirements to prevent overcutting in road construction. Toll Plaza (if any) should be restricted in road section under the reserve forest & protected forest from km 30.00 to 62.00 of project road. Needs to be planned and designed meticulously in consultation with the environmental expert so that it does not harm to animal movements and fragmentofwildlife habitat. The labour/ construction camp should be prohibited in forest from km30.00 - 60.00 along either side of the road. It should be kept minimum 1 km away from habitat area. 	Supervision Consultant/ WL Consultant/ Concessionaire/Contractor	CSC and NHAI
	Planning for Traffic Diversions & Detours	Project road section		Concessionaire/ Contractor	CSC and NHAI
	Labour Camp & Construction Camp	Either side of Road.		Concessionaire/ Contractor	CSC and NHAI


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Sl. No.	Environmental Issue	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
Construction Phase					
Site Clearance					
	Clearing & Grubbing	ROW	<ul style="list-style-type: none"> Cleaning & grubbing of land for road construction should be carried – out limited to the right of way only. Removal of land vegetation in reserve & protected forest should be planned in consultation with environmental expert of CSC to minimize loss of forest ecosystem. 	Concessionaire/ Contractor	CSC and NHAI
	Disposal of Debris		<ul style="list-style-type: none"> Any concrete residues/extraneous wastes/ construction wastes etc. should be disposed away the forest reach. Forest reach from km 30.00 to 60.00 should be kept clean from any unsuitable materials/debris as it does not affect the forest ecosystem. The construction wastes if generated should be collected as soon as possible and disposed of in safe manner under consultation with Environmental Expert of the CSC. 	Concessionaire/ Contractor	CSC and NHAI
	Heavy equipments and construction machineries parking & storage	Camps & ROW	<ul style="list-style-type: none"> The construction machineries and heavy equipments should not be allowed to park /store inside the forest from km 30.00 to km 60.00. Parking of heavy machineries to be carried – out at a proper area which are defined & fixed. 	Concessionaire/ Contractor	
	Top management soil	ROW of Forest Area, Camp site and Borrowers.	<ul style="list-style-type: none"> Earth after stripping of top layers from ROW must be stock piled in order to utilize at suitable place and restore forest ecosystem soon in future. 	Concessionaire/ Contractor	CSC and NHAI


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Sl. No.	Environmental Issue	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
	Wildlife Protection	Reserve & Protected Forest	<ul style="list-style-type: none"> In the case of road kill of wildlife animal reporting should be made to the CSC immediately and latest by 24.00 hrs. 	Concessionaire/ Contractor	CSC and NHAI
	Habitat Fragmentation & Impact on Biodiversity	Project Road	<ul style="list-style-type: none"> Periodical impact assessment should be carried out to review of wildlife fragmentation by the environmental expert of CSC. In the entire period of construction of road works mitigation strategy should be examined accordingly addendum should be made in the wildlife management plan. Animal underpass should be constructed at designated locations as per approved drawing & design and to funnel wildlife to the passage structure standard wildlife fencing to be erected at height of 8 foot with 12.5 gauge fence fabric strung of 10 foot posts spaced 20 feet apart and metal line posts in concrete spaced no more than 120 feet along both side of the project road. 	CSC/ Concessionaire/ Contractor	CSC and NHAI
	Workshop & Training	Project Site	<ul style="list-style-type: none"> Periodic awareness workshops & training programme should be conducted at the project site to understand the value of wildlife habitat. The training programme should be planned minimum two (2) times in a year. 	CSC/ Concessionaire/ Contractor	CSC and NHAI
Procurement of Construction Material					
	Borrow Areas	Borrow materials for the road works	<ul style="list-style-type: none"> Borrow should not be taken out from forest area. And No earth should be collected which identified as tiger corridor and wildlife movements from km 30.00 to 60.00. The borrow approval must be obtained from Environmental Expert of CSC prior to sending the sample for testing in lab. The selection of borrow site should be made in consultation with 	CSC/ Concessionaire/ Contractor	CSC and NHAI


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Sl. No.	Environmental Issue	Location/sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
			<p>Environmental Expert of CSC.</p> <ul style="list-style-type: none"> The haul roads should be rerouted to avoid forest area and tiger corridor which should be planned through the existing access from the village wherever it is available. The haul road should be repaired as soon as damage and restore after the end of borrowing with attending environmental requirements by proper grading & levelling of ground. 		
Working Period during Construction Material					
	Wildlife Movement		<ul style="list-style-type: none"> The road construction work to be carried –out in a phase manner by interval of 5.00 km length at a time. No new site should be opened in forest area unless & until top layers of road are completed in forest section. The entire section of road works in forest reach must be barricaded with rigid barrier to confine the construction for the safety of wildlife. In construction period no work to be allowed at night from 18.00 hrs in summer and 17.30 hr in winter particularly along road length from km 30.00 to 60.00. Any construction activity should not be undertaken before the on-set of monsoon and till the end of monsoon season (start of June to mid of August approx.) in the forest reach from km 30.00 to km 60.00. Provide the Posters & information boards notifying the wildlife for awareness to public passing through 	Concessionaire/ Contractor	CSC and NHAI
	Installation of Information			Concessionaire/ Contractor	CSC and NHAI


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Sl. No.	Environmental Issue	Location/ sources	Mitigation Measures	Implementing Agency	Supervising & Monitoring Agency
	Signboards		the forest corridor for their awareness and safety of animal. • Also erect the signboards notifying the area of forest divisions falling under the project road along with the mobile number of the concern forest officers.		
Operation Stage					
	Wildlife road kill	Forest Area along Project Road	The reporting of wildlife should be made to the CSC on occurrence of incidents of wildlife – vehicle collisions immediately or within 24 hrs after the sighting.	Concessionaire/ Contractor	CSC and NHAI
	Clearing & Maintenance of Cross drainage structure and Animal underpass		All box culverts/ animal underpass should be appropriately examined periodically at the interval of each month for any blockage with unwanted materials to clear the wildlife passage.	Concessionaire/ Contractor	CSC and NHAI
	Maintenance of Information Signboards		Periodical cleaning and resurfacing & painting of wildlife information boards along the project road.	Concessionaire/ Contractor	CSC and NHAI


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5. COST OF MITIGATION MEASURES

The cost for provision of mitigation measures is given table :11 below :

Table – 11: Cost of Mitigation Measures

Sl. No.	Particular		Unit	Quantity	Rate (INR)	Total INR	
						Lakh)	Crore
1.	Box-culverts as RCC Box Culverts.		No	93	-	3440.00	34.40
2.	Minor Bridge as RCC Box Culverts.		No	21	-	3865.00	38.65
3.	Trench including cost for turfing & jute protection.		Running meter	35000.00	250.00	87.5	0.875
4.	Signage – Information (size 900 x 1800 mm) including lettering as per IRC code.	Animal Underpass	No	12	27000.00	3.24	0.0324
		Road Kills	No	6	27000.00	1.62	0.0162
5.	Signage – Information (size 1200 x 600 mm) including lettering as per IRC code.		No	20	20000.00	4.0	0.04
6.	Cautionary/ Warning signs (730 x 730x 900 mm) Isosceles triangle) as per IRC code.	Animal Cross	No	20	9000.00	1.8	0.018
		Biodiversity Reach	No	14	9000.00	1.26	0.0126
7.	Mandatory / Regulatory sign (60 cm circular) as per IRC code.		No	20	6000.00	1.2	0.012
8.	New Animal Underpass.		No	15.00	-	4082.00	40.82
9.	Noise Barriers (100 m along the underpass both side road and 2.0m height) Poly carbonated Sheet		Square Meter (m ²)	6000.00	11000	660.00	6.6
Total Cost						12147.62	121.47

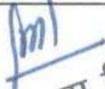
6. Conclusion :

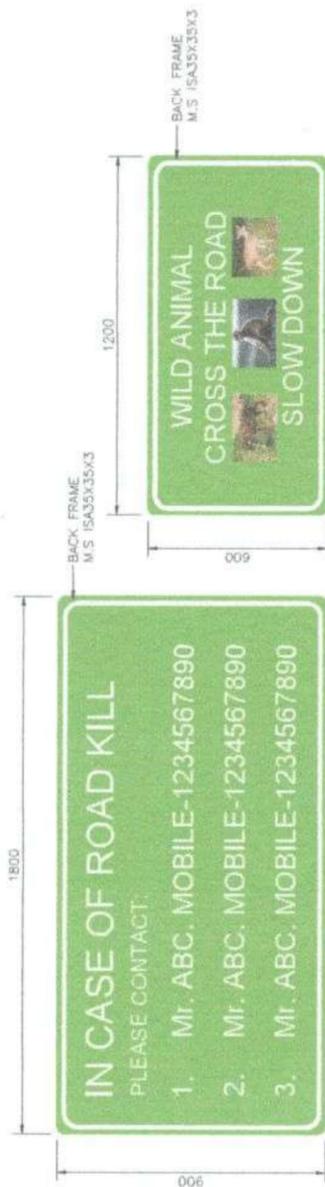
The project road from Harda to Betul from km 30.00 to 81.00 is a new alignment which is passing through the reserve & protected forest and part of private land. The major section is passing through forest which existed in route of Melghat – Satpura tiger corridor. Hence, the project area is reach in biodiversity with numerous flora and wildlife animal. Furthermore, after improvements of road number of traffics hall increase many folds which affect free movements of wildlife animal resulting increase in fatality or road kills due to traffic collisions.

Therefore, wildlife mitigation measures are essentially required to prevent road kills and fragmentation of wildlife animal living inside the forest to minimize habitat loss. If adequate mitigations measures will be taken following provision of trenches, animal underpass, regulation of traffic by various regulatory & informatory signboards in wildlife area and noise barriers etc. as proposed in wildlife mitigation strategy then the impacts on wildlife animal shall be minimized and there should not be any difficulties to the wild life after road construction.


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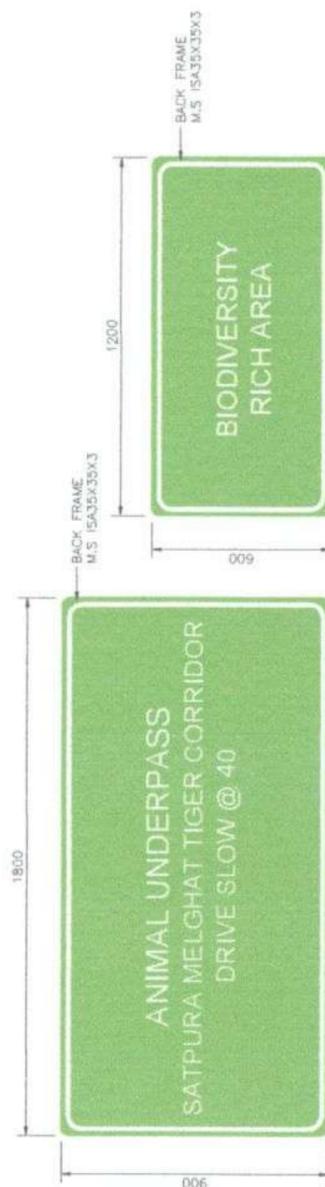
Annexure


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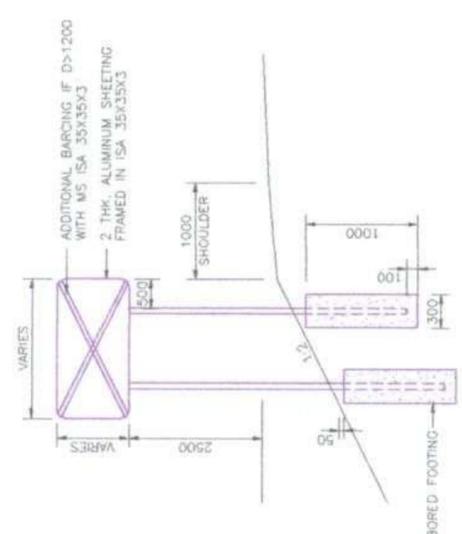
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PLACE IDENTIFICATION SIGN 02

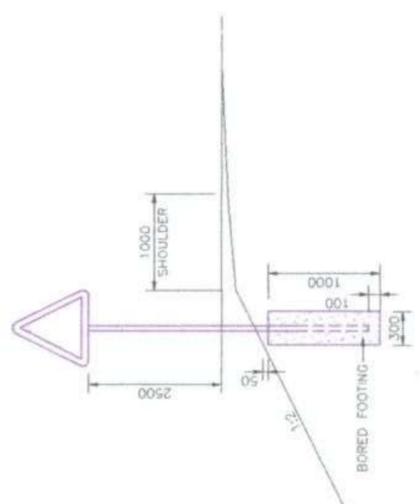


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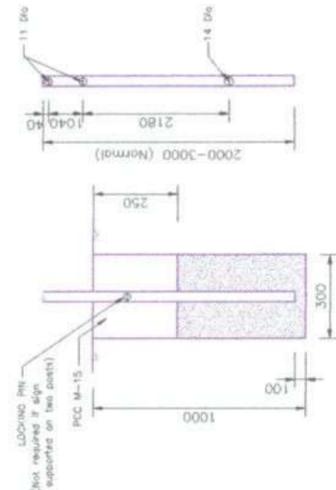
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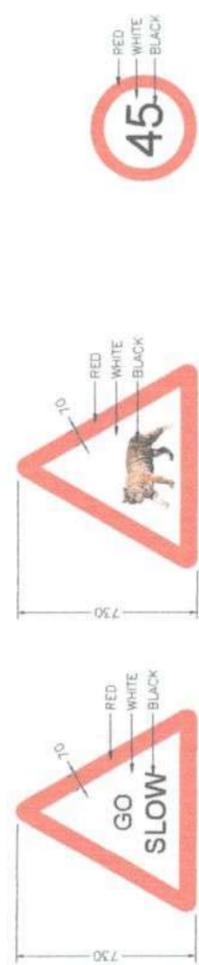
DIRECTIONAL SIGN (WITH BORED FOOTING)



SINGLE LEAF SIGN



FOOTING DETAILS FOR SINGLE SIGN SUPPORT



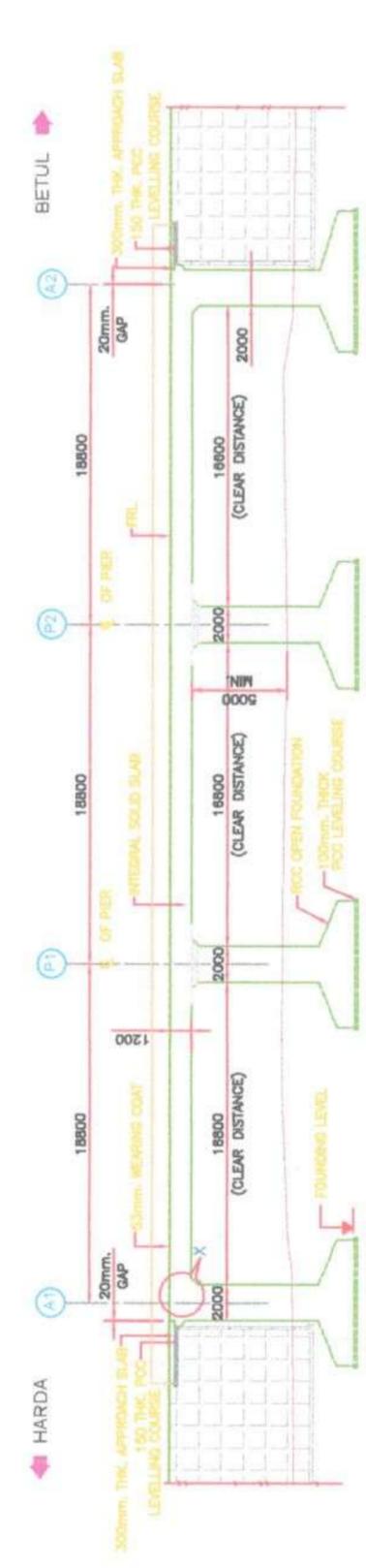
GO SLOW

WILD ANIMAL

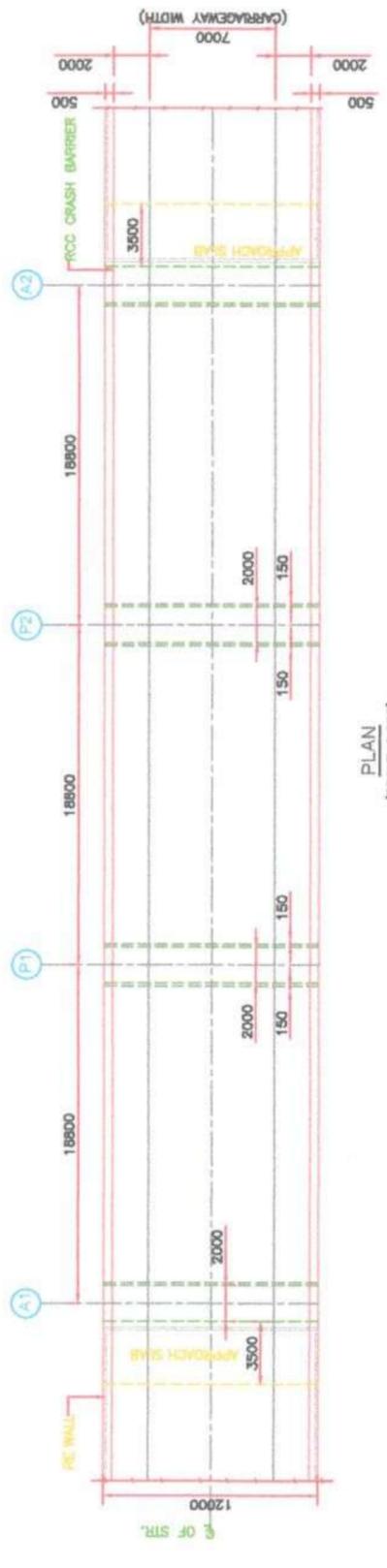
MAXIMUM SPEED LIMIT

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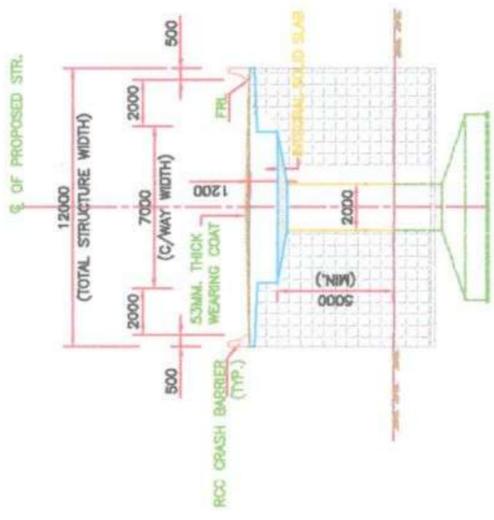
DESIGN CONSULTANT		SCALE		CLIENT		DRAWING TITLE		DRG. NO.		REV.	
LEA ASSOCIATES SOUTH ASIA PVT. LTD., B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 INDIA		NOT TO SCALE		NATIONAL HIGHWAYS AUTHORITY OF INDIA (Ministry of Road Transport & Highways) Government of India		TYPICAL DETAIL OF ROAD SIGNS (Part 1 of 5)		735791ASAHIGHWAYSIDPRWISGRS-01		0	
DATE: February 2020		DESIGNED: Anand Riaz		CHECKED: Supriy Shaha		DRAWN: Praveen		APPROVED: J.K.Das		SHEET SIZE A2	
PREPARATION OF DETAILED PROJECT REPORT FOR DEVELOPMENT OF ECONOMIC CORRIDORS, INTER-CORRIDORS, FEEDER ROUTES AND COASTAL ROAD PRIMARILY TO IMPROVE THE FREIGHT MOVEMENT IN THE COUNTRY (LOT-1/MADHYA PRADESH/PACKAGE-1).											



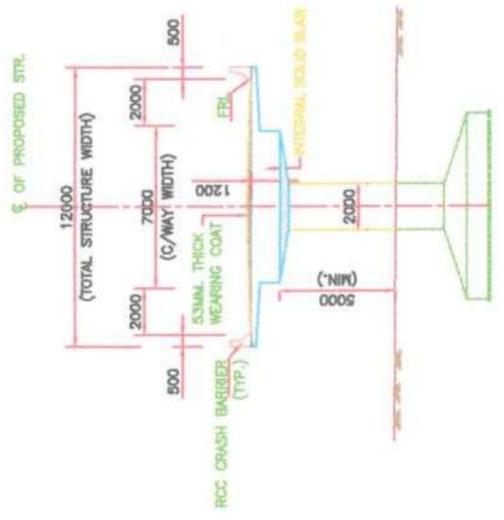
ELEVATION
(SCALE 1:250)



PLAN
(SCALE 1:250)



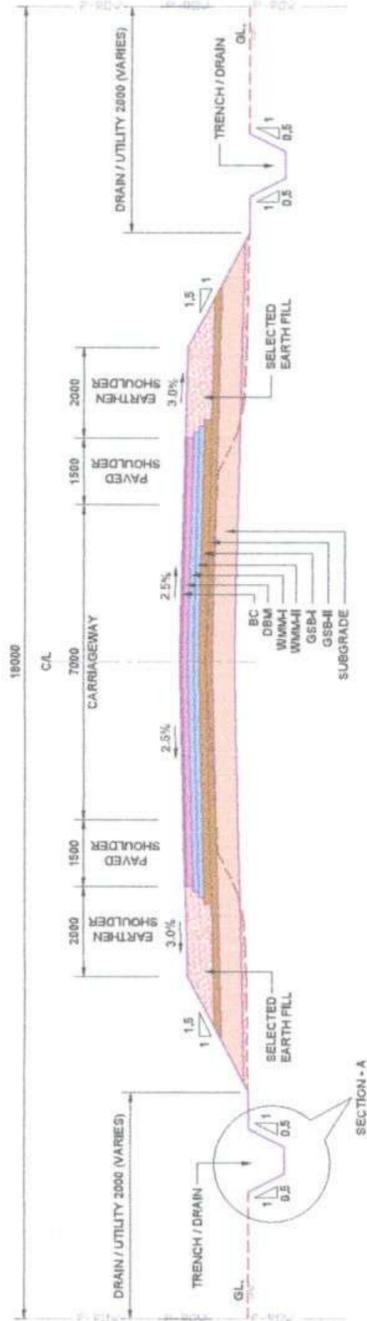
SECTION AT ABUTMENT LOCATION
(SCALE 1:200)



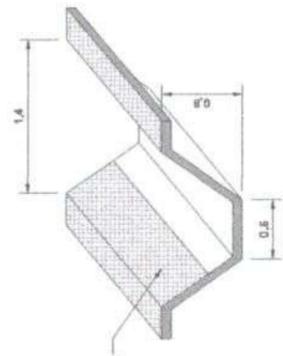
SECTION AT PIER LOCATION
(SCALE 1:200)

- NOTES :-**
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE. DIMENSIONS ARE NOT TO BE SCALD.
 2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
 3. THE DRAWING SHALL BE READ IN PARALLEL WITH PAP OF THE STRUCTURE LOCATION. THE FORMATION LEVEL MENTIONED IN P&P DRAWING IS FINAL.
 4. THE CLEAR HEIGHT MENTIONED IS 5.0M MINIMUM.
 5. THE FOUNDATION LEVEL SHALL BE DECIDED BASED ON THE FINAL BORE HOLE DETAIL. MINIMUM DEPTH OF FOUNDATION SHALL BE AT LEAST 2.0M BELOW THE NON-SUBGRADLE BED LEVEL.
 6. THIS STRUCTURE IS DESIGNED FOR AN SAFE BEARING CAPACITY OF 4000K/M².
 7. THE CLEAR WIDTH MENTIONED IN THE DRAWING IS MINIMUM.

Am
परियोजना निदेशक
Project Director
भा.रा.प्र.परि.इकाई-छिन्दवाडा(म.प्र.)
NHAI, PIU-Chhindwara (M.P.)



TYPE - E
TYPICAL CROSS SECTION - 2 LANE NEW CONSTRUCTION
WILDLIFE AREA / VILLAGE AREA

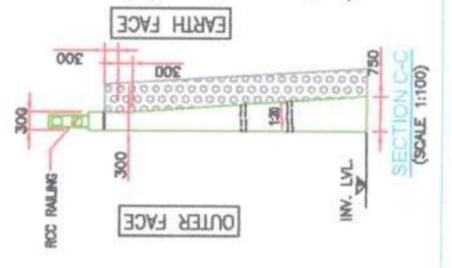
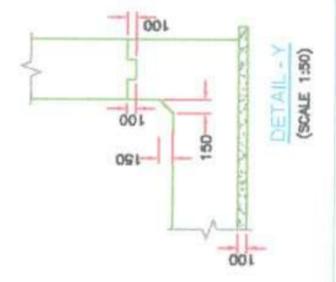
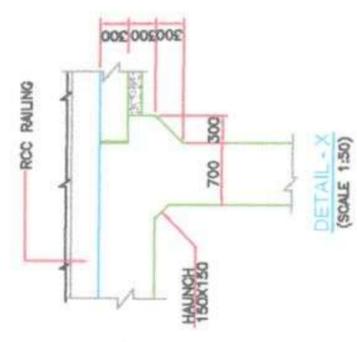
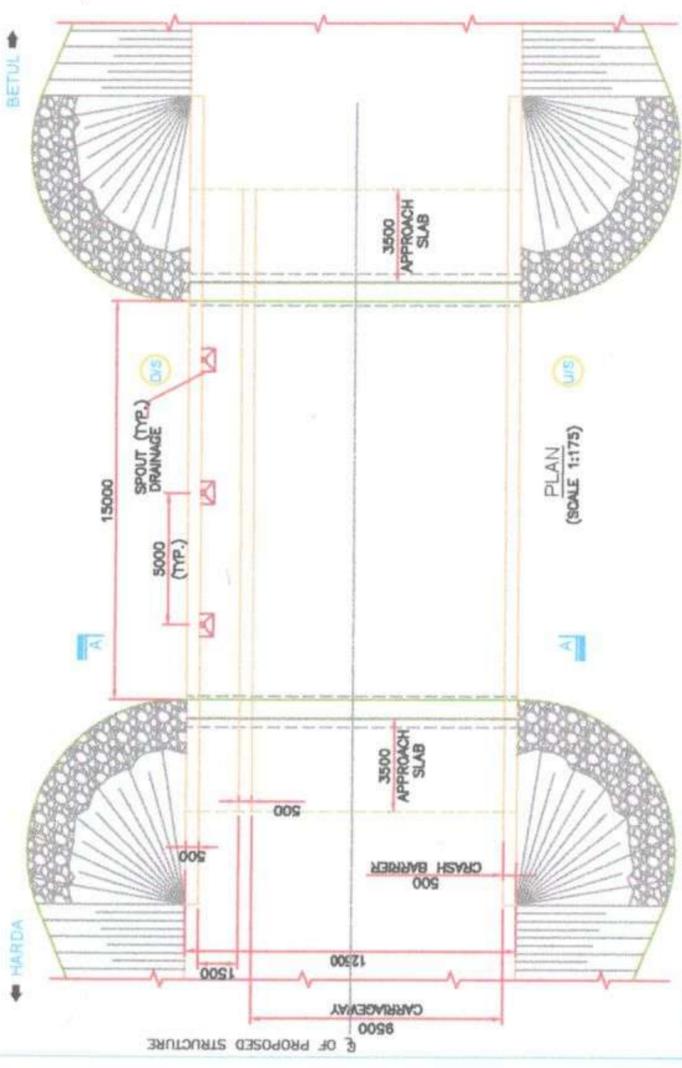
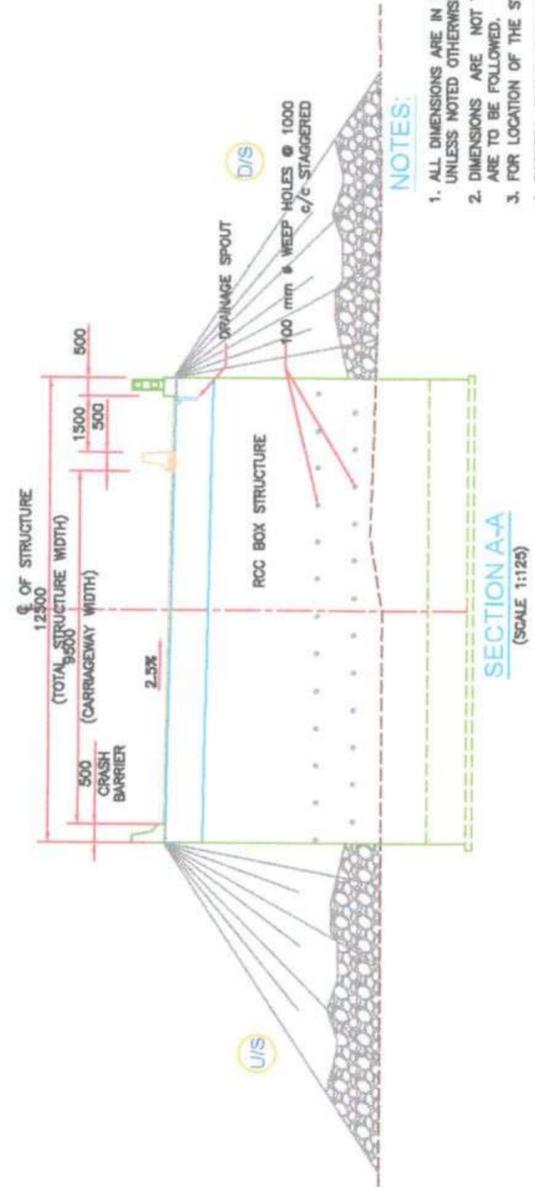
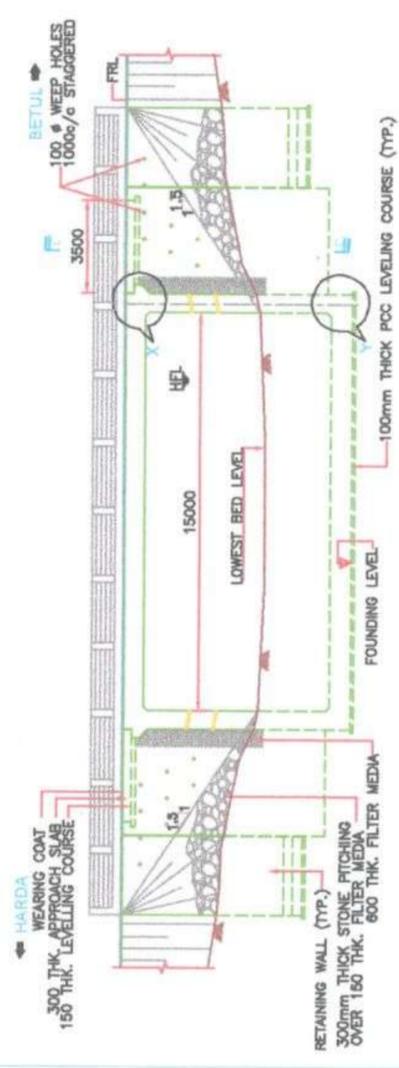


SECTION - A DETAIL

- NOTE:-**
1. ALL THE DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 2. DIMENSIONS ARE TO BE SCALED, ONLY THE FINISHED DIMENSIONS ARE TO BE FOLLOWED.
 3. THIS DRAWING SHALL BE PROVIDED IN CONJUNCTION WITH HIGHWAY ALIGNMENT DRAWING.

परियोजना निदेशक
Project Director
भा. रा. रा. प्रा. परि. इकाई - छिन्दवाडा (म.प्र.)
NHAI, PIU-Chhindwara (M.P.)

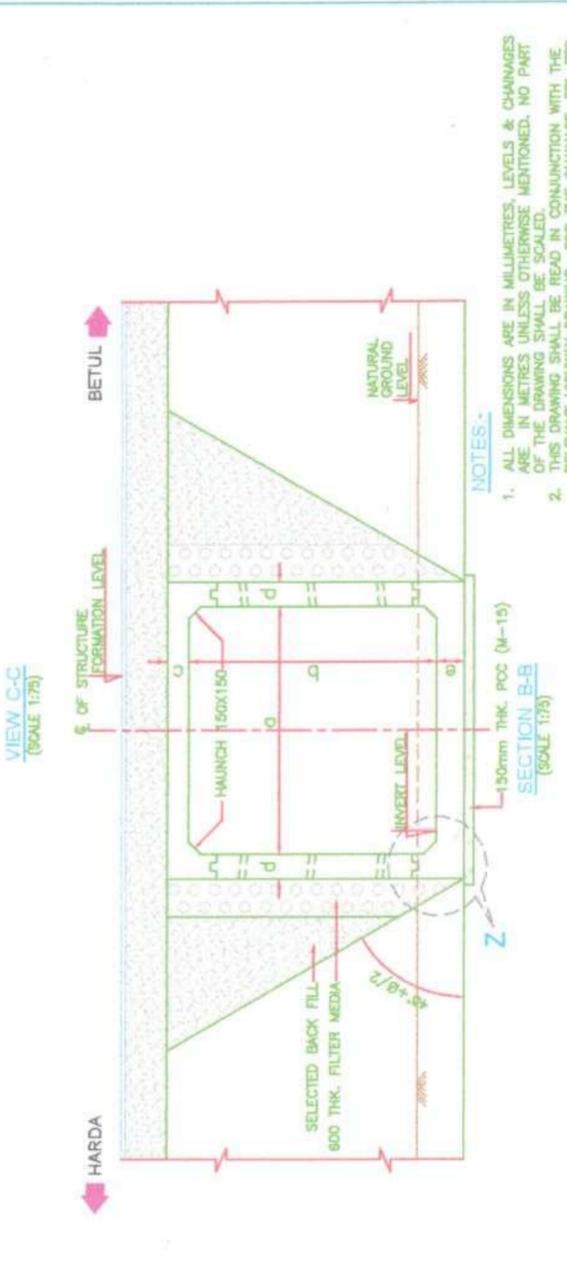
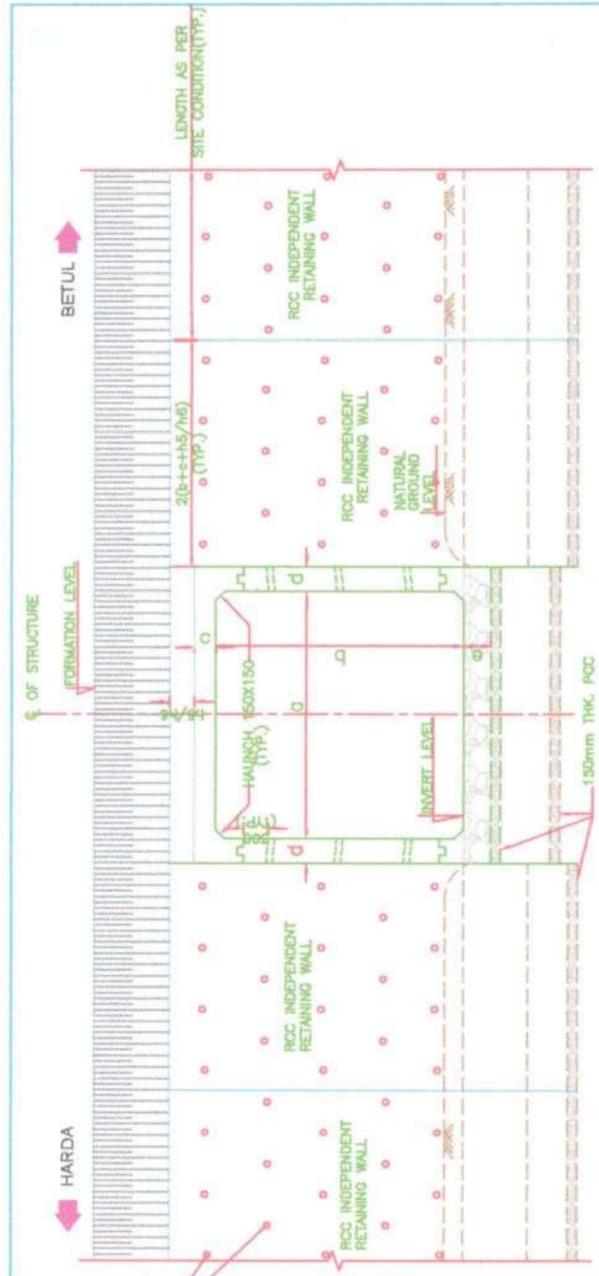
DESIGN CONSULTANT LEA ASSOCIATES SOUTH ASIA PVT. LTD. B-1, E-27, 1 st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTE E, MATHURA ROAD, NEW DELHI-110044 INDIA		CLIENT NATIONAL HIGHWAYS AUTHORITY OF INDIA (Ministry of Road Transport & Highways) Government of India	DRAWING TITLE TYPICAL CROSS SECTION WILDLIFE AREA / VILLAGE AREA	DRG. NO. 73579LASA/HIGHWAYS/SDP/RTCS-02	REV. 0
SCALE 1:100	PROJECT *PREPARATION OF DETAILED PROJECT REPORT FOR DEVELOPMENT OF ECONOMIC CORRIDORS, INTER-CORRIDORS, FEEDER ROUTES AND COASTAL ROAD PRIMARILY TO IMPROVE THE FREIGHT MOVEMENT IN THE COUNTRY (LOT-HIMADHYA, PRADESH/PACKAGE-I).	DATE: February 2020 DESIGNED: Abdul Rizq CHECKED: Sujoy Sinha DRAWN: J.K. Das PREPARED: APPROVED	SHEET SIZE A3		



NOTES:

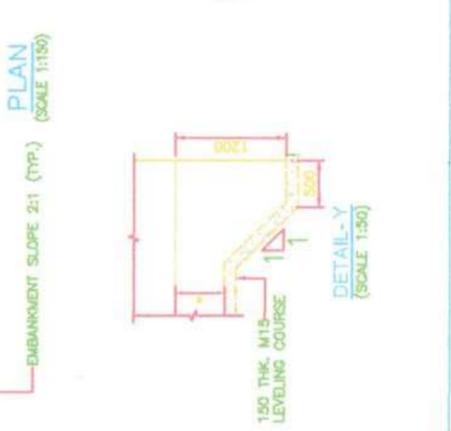
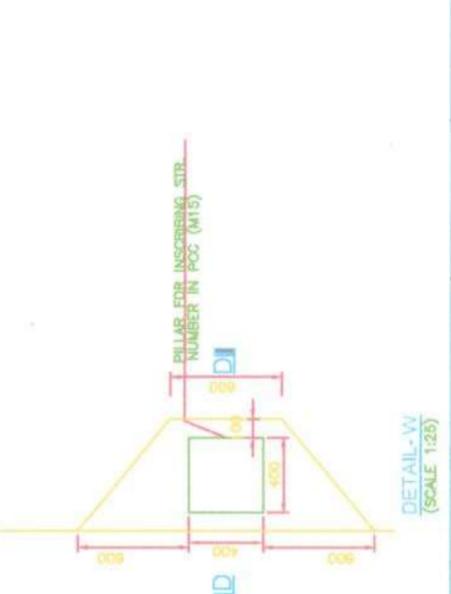
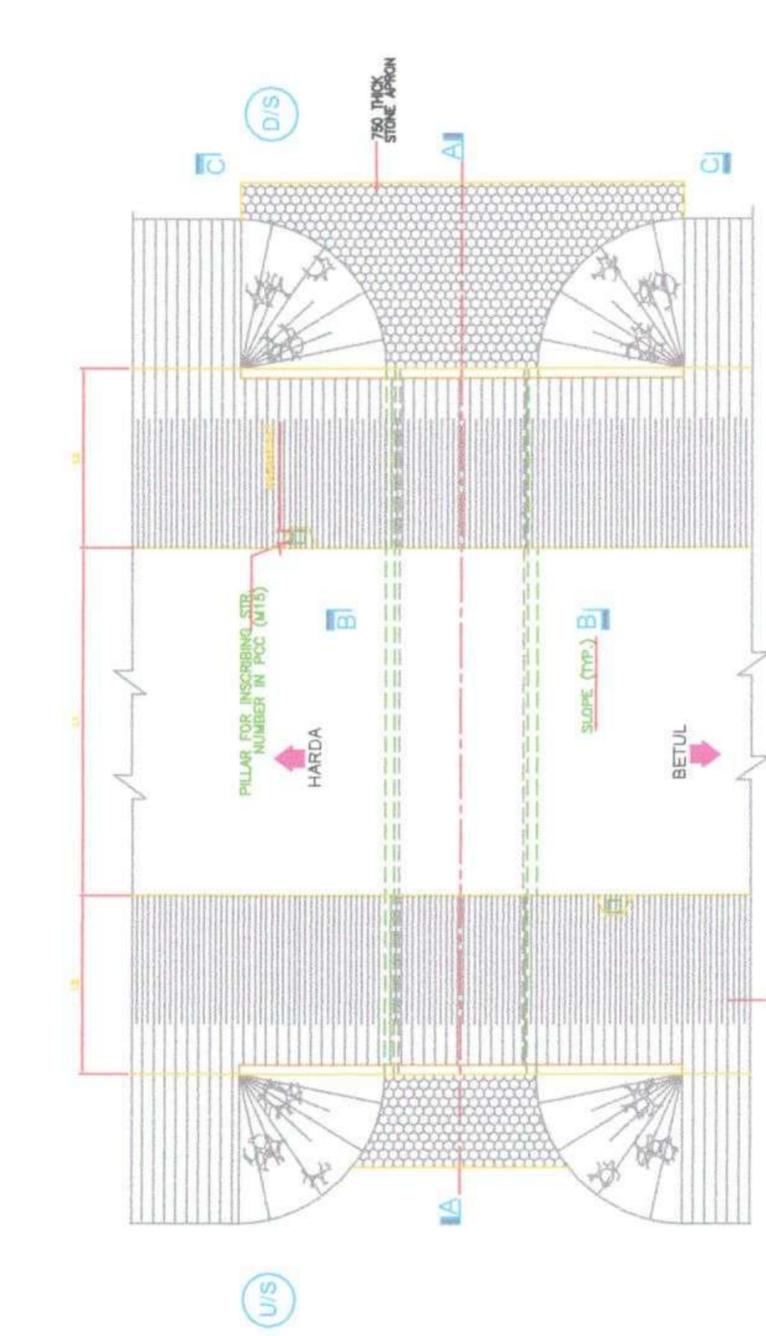
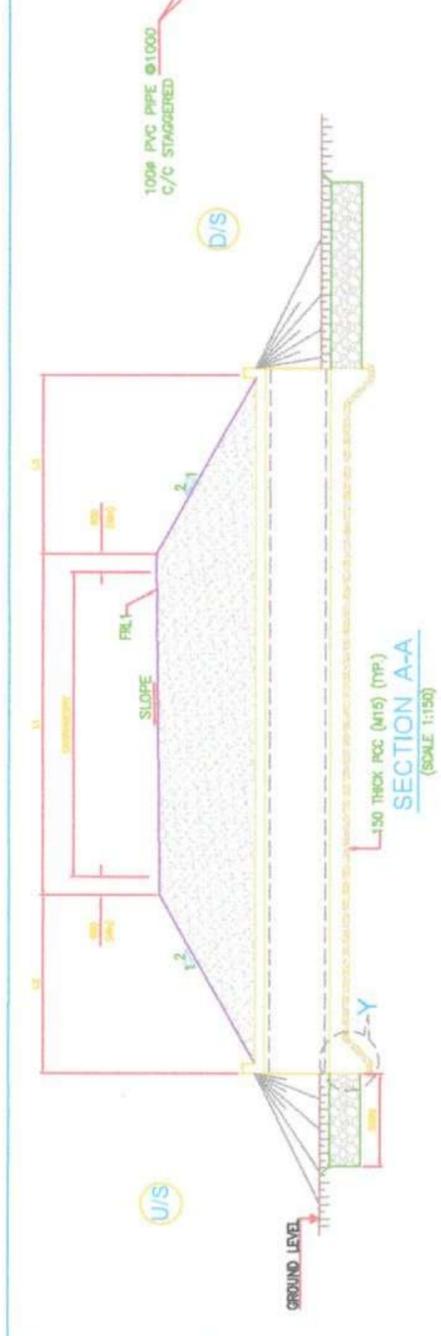
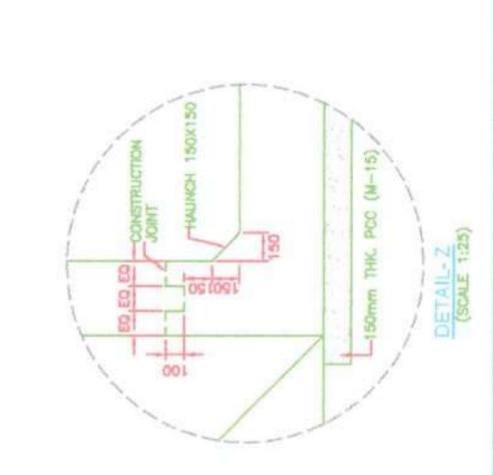
1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. FOR LOCATION OF THE STRUCTURE REFER RELEVANT HIGHWAY DRAWING.
4. BACKFILL GRANULAR SOIL MATERIAL BEHIND ABUTMENT/RETURN WALL SHALL HAVE THE FOLLOWING PROPERTIES $\phi=30^\circ$, $c=0$, $\gamma=2000\text{kg/m}^3$, 600mm THK. FILTER MATERIAL BEHIND ABUTMENT/RETURN WALL SHALL BE LAID AS PER IRC: 78-2014.
5. NET BEARING CAPACITY OF 12TON/m^2 OF THE SOIL SHALL BE ENSURED BEFORE CONSTRUCTION THROUGH PROPER FIELD TEST.
6. SOFT & LOOSE PATCHES IN THE FOUNDING AREA ARE TO BE REPLACED BY COMPACTED GRANULAR FILLS WITH LAYERS NOT EXCEEDING 300mm .
7. THE STRUCTURE IS IN SEISMIC ZONE-II.
8. THE STRUCTURE SHALL BE DESIGNED WITH THE FOLLOWING LOADS:
 - (i) CLASS A- 1 LANE, 2 LANE, 3 LANE
 - (ii) CLASS 70R- 1 LANE
 - (iii) COMBINATION OF CLASS A & 70 R WHEEL LOAD
 - (iv) SPECIAL VEHICLE LOADING ONLY ON MAIN ROAD STRUCTURE FOR SERVICE ROAD BRIDGES, SV LOADING SHALL NOT BE CONSIDERED.
9. THE GRADE OF CONCRETE FOR DIFFERENT ITEMS SHALL BE AS FOLLOWS:
 - (i) PCC LEVELING COURSE M15
 - (ii) RCC APPROACH SLAB M30
 - (iii) RCC CRASH BARRIER M40
 - (iv) RCC RAILING M25
 - (v) RCC BOX M35
 - (vi) RCC DECK SLAB M40
10. THE GRADE OF STEEL SHALL BE FE500D CONFIRMING TO IS:1786-2008.
11. THE CLEAR COVER TO REINFORCEMENTS FOR EACH COMPONENT SHALL BE:
 - (i) TOP SLAB & PLANK 40mm
 - (ii) VERTICAL WALL EARTH FACE 75mm
 - (iii) VERTICAL WALL ALTERNATE WETTING AND DRYING 50mm
 - (iv) RCC FOUNDATION 75mm
 - (v) RCC APPROACH SLAB EARTH FACE 75mm
 - (vi) RCC APPROACH SLAB ROAD FACE 40mm
12. $\phi 1000\text{mm/c}$ HORIZONTALLY AND VERTICALLY IN STAGGERED MANNER.
13. IF THE ROCK TOP LEVEL ACTUALLY FOUND DURING EXCAVATION IS LOWER THAN AS SHOWN IN THE DRAWINGS, THEN THE MINIMUM EMBEDMENT DEPTH OF OPEN FOUNDATION SHALL BE 1.50M AND 0.60M RESPECTIVELY IN ORDINARY/SOFT ROCK AND HARD ROCK AS PER THE GUIDELINES OF CLAUSE NO. 705.2.2 OF IRC-78:2014.

परियोजना निदेशक
Project Director
भा. रा. रा. प्रा. परि. इकाई - छिन्दवाडा (म.प्र.)
NHAI, PIU-Chhindwara (M.P.)



- NOTES:-**
- ALL DIMENSIONS ARE IN MILLIMETRES. LEVELS & CHANGES ARE IN METRES UNLESS OTHERWISE MENTIONED. NO PART OF THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE RELEVANT HIGHWAY DRAWING FOR THE CHAINAGE, FRL, ETC. THE BACK FILLING ON BOTH SIDE OF THE STRUCTURES SHALL BE DONE SIMULTANEOUSLY. THE MATERIAL FOR BACK FILLING SHALL BE HAVING PROPERTIES C-0, B-30 & DENSITY=20 kN/m³.
 - CLEAR COVER FOR REINFORCEMENT SHALL BE AS PER FOLLOWS:
 - EARTH FACE = 75mm
 - INSIDE FACE = 40mm
 - THE GRADE OF CONCRETE FOR DIFFERENT COMPONENTS ARE AS FOLLOWS:
 - a. RETAIN WALL = M30
 - b. RCC BOX = M30
 - c. PCC LEVELLING COURSE = M15
 - d. ALL REINFORCEMENT SHALL BE OF GRADE F_y 500 OR F_y 5000 CONFORMING TO IS:1786.
 - e. S.B.C OF 10T/SQM HAS BEEN CONSIDERED IN THE DESIGN AND SAME SHALL BE VERIFIED AT SITE BEFORE CONSTRUCTION.
 - f. THE GROUND IMPROVEMENT REQUIRED IF ANY SHALL BE EXECUTED AS PER THE RELEVANT GEO-TECHNICAL REPORT. IN ORDER TO IMPROVE THE SAFE BEARING CAPACITY OF SOIL.
 - g. THE SUPER STRUCTURE IS DESIGNED FOR THREE LANE OF IRC CLASS A LOADING OR 1 LANE OF CLASS A LOADING OVER EACH SPAN WITH ONE LANE CLASS A LOADING IF THE HEIGHT OF FILL IS MORE THAN 600mm. THE APPROACH SLAB MAY NOT BE REQUIRED.
 - h. FOR PROTECTION WORK AND OTHER MISCELLANEOUS DETAILS REFER TO MISCELLANEOUS DRAWING.

- LEGENDS:-**
- CLEAR SPAN OF BOX
 - CLEAR HEIGHT OF BOX
 - TOP SLAB
 - SIDE WALL
 - BOTTOM SLAB
 - FINISHED ROAD LEVEL
 - DOWN STREAM
 - UP STREAM
 - SUPER ELEVATION



परियोजना निदेशक
 Project Director
 भा. रा. प्रा. परि. इकाई - छिन्दवाड़ा (म.प्र.)
 NHAI, PIU-Chhindwara (M.P.)



कार्यालय कलेक्टर (आदिम जाति कल्याण) बैतूल
E-Mail- actw.btl@mp.gov.in जिला बैतूल

'hone No. (O) (07141) 234343

क्रमांक—FRA/2019/13/ 5801
प्रति,

बैतूल, दिनांक 30 अगस्त, 2019

✓ परियोजना संचालक,
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण,
परियोजना क्रियान्वयन इकाई छिन्दवाडा.

विषय :- वन (संरक्षण) अधिनियम-1980 के अंतर्गत भारतीय राष्ट्रीय राजमार्ग एन.एच-47 हरदा से बैतूल खण्ड के चौड़ीकरण 4 लेन निर्माण के प्रस्ताव रकबा 37.399 हेक्टेयर के व्यपवर्तन (Diversion) प्रस्ताव के लिए वन अधिकार अधिनियम-2006 के तहत क्लीयरेंस प्रमाण-पत्र का प्रदाय करने बाबत ।

संदर्भ :- कार्यालय ऑनलाईन प्रस्ताव FP/MP/ROAD/33615/2018 दिनांक 10.05.2019

—00—

विषयांतर्गत संदर्भित प्रस्ताव के अनुसार वन (संरक्षण) अधिनियम-1980 के अंतर्गत भारतीय राष्ट्रीय राजमार्ग—एन.एच.-47 हरदा से बैतूल खण्ड के चौड़ीकरण 4 लेन निर्माण कार्य के प्रस्ताव रकबा 37.399 हेक्टेयर व्यपवर्तन (Diversion) हेतु वन अधिनियम-2006 के अंतर्गत क्लीयरेंस प्रमाण-पत्र कलेक्टर, बैतूल की ओर से हस्ताक्षरित पत्र के संलग्न भेजा जा रहा है ।

कृपया क्लीयरेंस प्रमाण-पत्र प्राप्त होने पर कार्यालय स्तर से अभिस्वीकृति भेजने का कष्ट करें ।

संलग्न :- क्लीयरेंस प्रमाण-पत्र, परिशिष्ट


सहायक आयुक्त,
आदिवासी विकास,
बैतूल.

बैतूल, दिनांक 30 अगस्त, 2019

पृ.क्रमांक—FRA/2019/13/5802
प्रतिलिपि :-

1. वन मंडलाधिकारी, वनमंडल पश्चिम (सामान्य) बैतूल
2. अनुविभागीय अधिकारी, (राजस्व) भैसदेही
3. जिला जनसंपर्क अधिकारी, बैतूल
की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु सम्प्रेषित


सहायक आयुक्त,
आदिवासी विकास,
बैतूल.

Annexure-I

FORM-I
(For linear projects)
Government of Madhya Pradesh
Office of the District Collector, Betul.



NO- FRA/2018/13/ 5801

Dated 30/8/2019

TO WHOSOEVER IT MAY CONCERN

In compliance of the Ministry of Environment and Forests (MoEF), Government of India's letter No.11- 9/98-FC (pt.) dated 3rd August 2009 wherein the MoEF issued guidelines on submission of evidences for having initiated and completed the process of settlement of rights under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Right) Act, 2006 ('FRA', for short) on the forest land proposed to be diverted for non-forest purposes read with MoEF's letter dated 5th February 2013 wherein MoEF issued certain relaxation in respect of linear projects, it is certified that 37.399 hectare of forest land proposed to be diverted in favour of PIU Chindwara, National Highway of Authority, Madhya Pradesh, Govt. of India for 4 laning of Harda -Betul Section of National Highway (NH-47) from Temagav km 30+000 to Chicholi km 81+000 (length-51.000 km) under BHARATMALA Pariyojana Economic Corridor (Phase- I) in three districts of Harda, Hoshangabad and Betul in the State of Madhya Pradesh on Hybrid Annuity Mode. in district of Betul falls within jurisdiction of Villages Driyaganj, Khokrakheda, Gawasen, Ajai, Chirapatla, Alampur, Alamgarh, Bela, PathaKheda, Dhaniyajam, Chunagosai, Godhana & Sitadongri in Chicholi tehsils .

It is further certified that:

- (a) The complete process for identification and settlement of rights under the FRA has been carried out for the entire 37.399 hectares of forest area proposed for diversion. A copy of records of all consultations and meetings of the Forest Rights Committee(s), Gram Sabha (s), Sub-Division Level Committee(s) and the District Level Committee are enclosed as annexure A to B annexure---
- (b) The proposal for such diversion (with full details of the project and its implications, in vernacular language) have been placed before each concerned Gram Sabha of Forest-dwellers, who are eligible under the FRA.
- (c) The each of concerned Gram Sabha(s) has certified that all formalities/ processes under the FRA have been carried out, and that they have given their consent to the proposed diversion and the compensation and ameliorative measures, if any, having understood the purpose and details of proposed diversion. A copy of certificate issued by the Gram Sabha of Villages Driyaganj, Khokrakheda, Gawasen, Ajai, Chirapatla, Alampur, Alamgarh, Bela, PathaKheda, Dhaniyajam, Chunagosai, Godhana & Sitadongri in Chicholi tehsils .
- (d) Driyaganj, Khokrakheda, Gawasen, Ajai, Chirapatla, Alampur, Alamgarh, Bela, PathaKheda, Dhaniyajam, Chunagosai, Godhana & Sitadongri Village(s) is enclosed as annexure A to annexure B.
- (e) The discussion and decision on such proposals has been taken place only when there was a quorum of minimum 50% of the members of Gram Sabha present.
- (f) the diversion of forest land for facilities managed by the Government as required under section 3 (2) of the FRA have been completed and the Grama Sabhas have given their consent to it;
- (g) the rights of Primitive Tribal Group and Pre-Agricultural Communities, where applicable have been specifically safeguarded as per section 3(1)(e) of the FRA

Encls.: As above.


(Full Name and Official seal of District Collector)