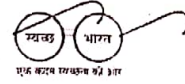


भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)
NATIONAL HIGHWAYS AUTHORITY OF INDIA
(Ministry of Road Transport and Highways, Government of India)

परियोजना कार्यान्वयन इकाई / Project Implementation Unit

ऑफिस: बड़बड़ नाका के पीछे, सैलाना रोड, रतलाम (म.प्र.)
Office: Behind Badbad Naka, Sailana Road, Ratlam (M.P.)
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भारतमाला
प्रगति के पथ पर अग्रसर
BHARATMALA
ROAD TO PROSPERITY

NHA/PIU/RATLAM/EC/2019/743

Dated: 15.07.2019

To,

The Director, IA-III (Infra-1)
Ministry of Environment Forest and Climate Change
Jorbagh Marg, New Delhi-110003

Sub: Construction of Eight lane road (New NH-148N) from village Kandwarwasa to KherKhunta, District Ratlam from Ch.150+000 to 181+000 (length 31km) in the state of Madhya Pradesh (sub package-2) under BharatmalaPariyojana (Lot-4/Package-5) by M/s National Highways Authority of India - **Environmental Clearance-reg.**

Ref: (i) [Proposal No. IA/MP/NCP/94029/2018] [F. No. 10-64/2018-IA.III] and
(ii) Agenda Item No.3.2 of 208th minutes of meeting of Expert Appraisal Committee for projects related to Infrastructure Development, Industrial estate/parks/complexes/areas, Export Processing Zones, Special Economic Zones, Biotech Parks, Leather Complexes and National Highways projects held on 19th - 20th February, 2019. – **ADS compliance.**
(iii) DFO Ratlam letter no. WL/2019/1977 dated 06.06.219
(iv) PCCF (WL) letter number 3969 dated 14.06.2019

Sir,

With reference to subject cited above, MoM of EAC (208th meeting dated 19 & 20 February, 2019) vide which MoEFC&C has requested NHAI to furnish the cumulative impacts of the project activities on the habitat of wildlife, such as Lesser Florian in Sailana Bird Sanctuary and the detailed conservation plan which is to be prepared in consultation with the State Chief Wild life warden with required budget provisions and year wise activities.

2. In this regard, the MoEFC&C empanelled consultant M/s Enviro Infra Solutions, Ghaziabad and M/s CPCPL, DPR consultants have prepared the report as per the recent MoEFC&C Mitigation measures guidelines for linear projects incorporating the comments of the DFO-Ratlam and PCCF-CWLW, Bhopal, Madhya Pradesh. (Enclosed Biodiversity and mitigation measures Study for Sailana WLS and DFO and PCCF letter as Annexure-5 & 6 respectively in report)

3. In view of above, it is requested to kindly grant the Environment Clearance to this project of Government of India.

Encl: Biodiversity and mitigation measures Study for SailanaKharmourWLS, Ratlam

Yours faithfully,

(K.P.S. Chauhan)
Project Director

Copy to:

- (i) The PCCF(WL)/CWLW, Bhopal (MP)
- (ii) The Regional Officer-MP NHAI, RO-Bhopal (MP)
- (iii) The General Manager (Env.), NHAI, HO-New Delhi
- (iv) The District Forest Officer, Forest Deptt., Ratlam (MP)

मुख्यालय: जी-5 व 6, सेक्टर 10, द्वारका, नई दिल्ली-110 075
Head Office: G-5 & 6, Sector 10, Dwarka, New Delhi-110 075



**Biodiversity and Mitigation
measures Study of Sailana
Kharmour Wildlife
Sanctuary, Ratlam, M.P.**

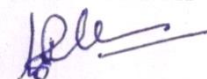

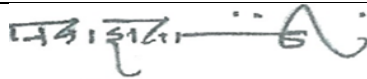

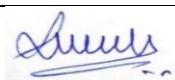
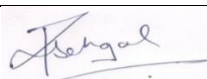
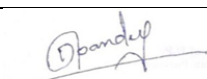
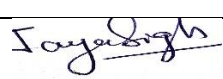
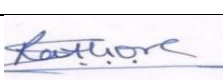
For

**Construction of 8 lane
expressway from
Kandarwasa village at design
Ch. 150+000 to Kajaliya
village at Ch. 181+000 (Total
length= 31 km) in Ratlam
district in the state of
Madhya Pradesh**

**Enviro Infra Solutions Pvt.
Ltd., Ghaziabad**

**DETAILS OF EXPERTS AND TEAM MEMBERS CONTRIBUTING TO THE BIODIVERSITY STUDY
REPORT OF SAILANA KHARMOUR WILDLIFE SANCTUARY**

The following personnel were involved in the preparation of the Biodiversity report. The team has a vast and varied experience in the fields of ecology, biodiversity, environment and sustainable development and engineering issues.

S. No.	Functional Areas	Name of the experts	Signature
1.	Ecology and Biodiversity	Dr. Niranjan Prakash Melkania	
2.	Air Pollution, Air Quality, Noise & Vibration	Sanjeev Sharma	
3.	Social expert	Nitin Shitole	
4.	Soil Conservation	Vijay Sharma	
Team Members EIS & CPCPL			
1.	Sharad Verma, Project Coordinator (Environment, Forest & Wildlife)		
2.	Rishabh Sehgal, Environment Engineer		
3.	Deepak Pandey, Environment Scientist		
4.	Jaya Singh, Environment Engineer		
5.	Shanu Rathore, Site Engineer		

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BIODIVERSITY STUDY OF SAILANA KHARMOUR WILDLIFE SANCTUARY

1.1 Brief about the project

The proposed road project is an access controlled expressway and is totally a Green field (new) alignment and proposed for eight lanes with capacity up gradation upto twelve lanes in future. The proposed expressway starts from Kandarwasa village at design Ch. 150+000 and terminates at Kajaliya village at Ch. 181+000 with a total length of 31 km in Ratlam district in the state of Madhya Pradesh. The proposed alignment does not pass through Sailana Kharmour Wildlife Sanctuary or its eco sensitive zone as per the draft MoEF&CC Notification No. 760 dated 29th March 2016, This has also been expressed by the D.F.O. Ratlam vide letter no. मा.चि./2019/476 dtd. 14/02/2019; however proposed alignment at Ch. 161+000 km near Dhamnod village is approximately 3.5 km away from the Sailana Kharmour Wildlife Sanctuary, which is the nearest point to the proposed expressway. The clearance from National/State Board of Wildlife would however be taken if applicable and the same is under process. Figure- 1 and 2 shows the distance of Sailana Wildlife Sanctuary from the proposed alignment on Google map and Sol toposheet map.

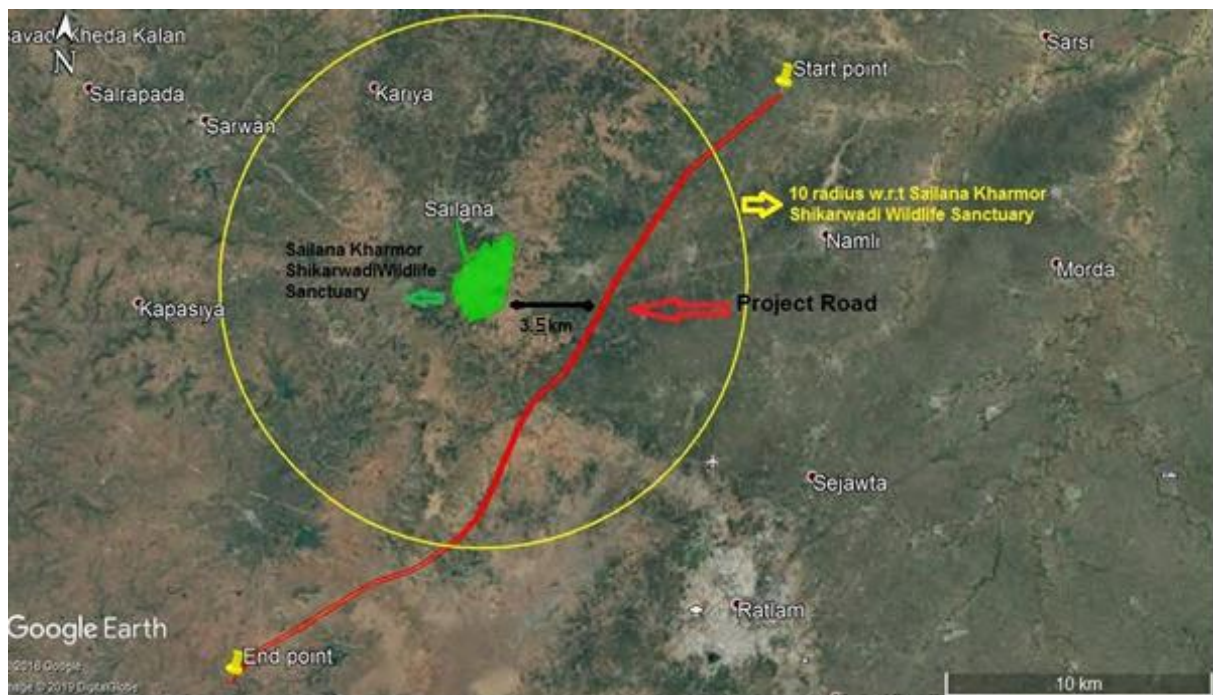


Figure-1 Sailana WLS and proposed alignment on Google map

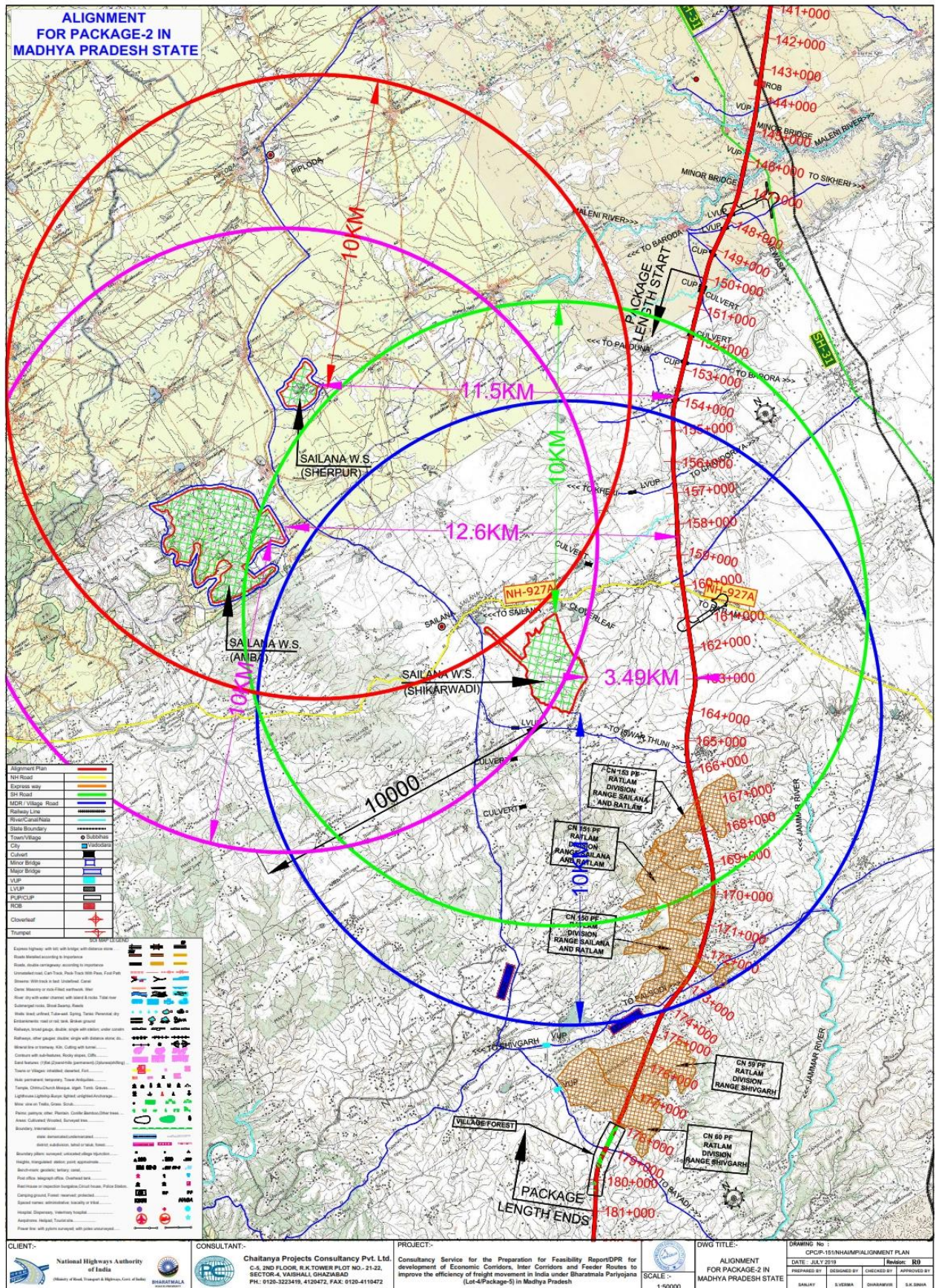
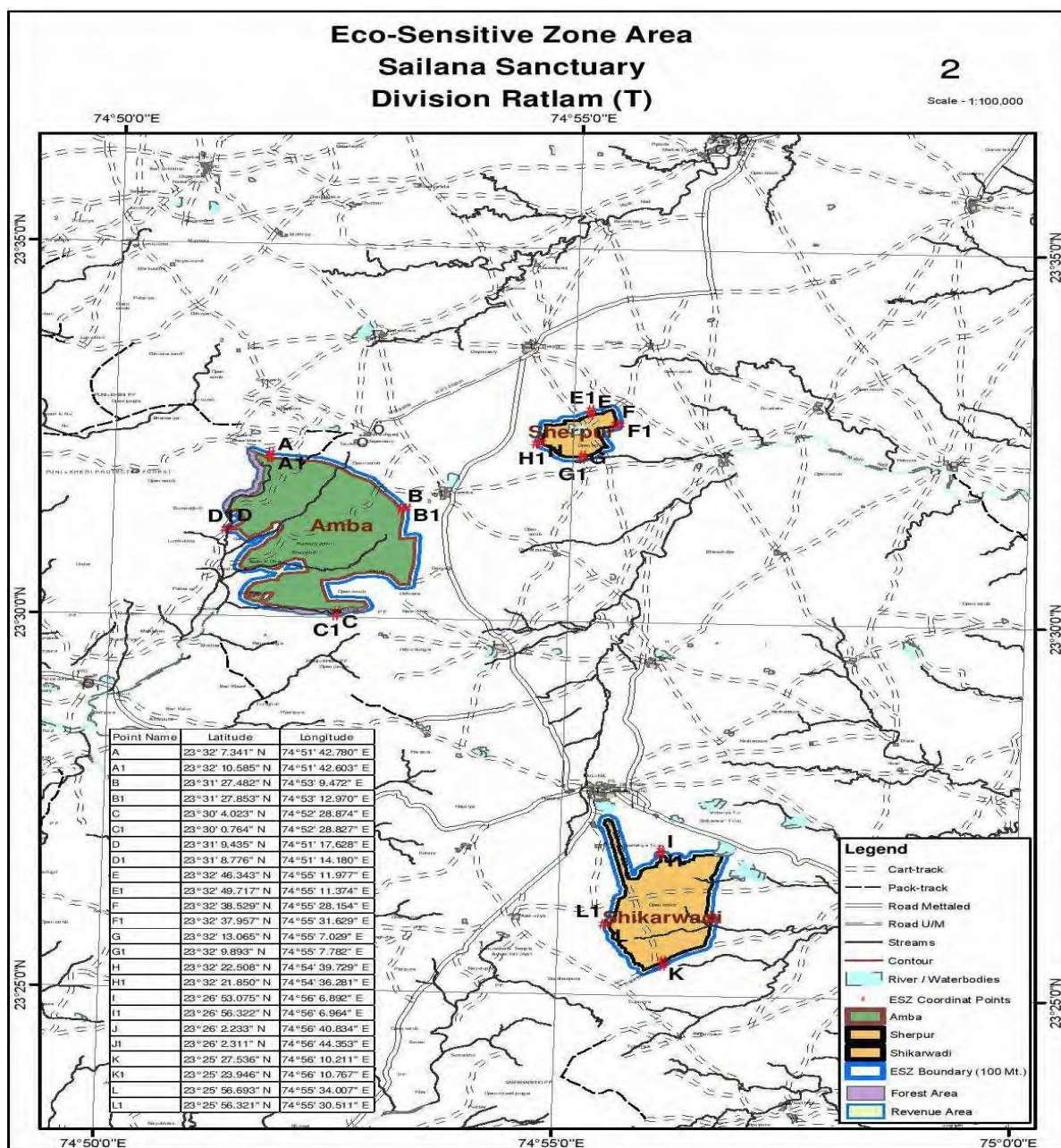


Figure-2 Sailana WLS and proposed alignment on Sol toposheet map

1.2 Brief about the Sailana Kharmour Wildlife Sanctuary

The Sailana Wildlife Sanctuary is located in Ratlam district in the state of Madhya Pradesh and is spread over an area of 12.96 square kilometers. The sanctuary comprises of three separate locations i.e. Amba (area 8.51 sq. km.), Sherpur (area 0.91 sq. km.) and Shikarwadi Private Agriculture and Grazing Land (area 3.54 sq. km.) as per the draft Gazette notification of the Sanctuary. Figure: 3 presented below shows the notified map of Sailana WLS and a detailed map showing the 10 km radius w.r.t these three areas, forest areas and the alignment are shown in SOI topo sheet map attached as Annexure 4.



Source: Gazette notification of Sailana Kharmour WLS (Draft)

Figure: 3- Notified map of Sailana WLS, Ratlam, Madhya Pradesh

Proposed alignment from CH. 151.800 to 174.000 falls within the 10 radius w.r.t Sailana Shikarwadi Sanctuary with total area of 222 ha. However, there is settlements, builtup area in between the proposed alignment and the boundary of protected area. (Refer Figure 2). This Sailana Shikarwadi Sanctuary (3.54 sq. km area) is not connected to any of the forest areas. However the following forest compartment nos. are falling with in the 10 km boundary of sanctuary and also along the alignment (compartment no. CN 153 PF, CN 151 PF and CN 150 PF). The Compartment no. 153 PF and 150 PF passes on both sides of the proposed alignment while the road passes on one side of the compartment no. 151 PF and 150 PF.

The compartment no 153 PF passes from CH.166.700 to 168.000 and is a broader patch while compartment no. 150 PF passes through a narrow patch from CH. 172.100 to CH. 172.400 on both sides of the road. Compartment no. 151 PF passes near CH. 170.000 on the left hand side of the proposed road as seen on map (Figure 2) and other side of the proposed road is builtup, settlement and agricultural fields.

The nearest forest patch comprising of compartment no. 153 PF is located at a distance of around 6 km from the boundary of Sailana Shikarwadi Sanctuary (3.54 sq. km area).

The three sanctuary areas of Sherpur, Amba and Shikarwadi are located at a distance of 11.50 km, 12.60 km and 3.50 km respectively from their nearest point to the proposed alignment. The three sanctuary areas are not connected by any forest areas, but are rather inter spread with various human settlements, villages, windmill power plants, agricultural fields, grass lands, etc. Many towns and villages in and around the sanctuaries and lying within the 10 km radii are Sailana town, villages Dhamnod, Gobardhanpura, Adwania, Asawari, Nawabganj, Sherpur, Bodina, Iswar Thuni, etc. to name a few. Hence it can be seen that the area are very much developed. Some villages are also coming between the proposed alignment and the sanctuary like Dhamnod, Palduna, Machun, Bhainsa Dabar, etc. Various existing roads like NH 927A (Sailana-Banswara), MDR 12A, other MDR and village roads are already present in the area.

It seems due to the existing built-up area, settlements and human activities like agriculture in between the proposed alignment and protected area the project may not create any further or additional impact either in construction phase or during operation phase.

1.3 Scope of the Study

The scope of the study is to prepare a cumulative impact of the project activities if any on the ecology and habitat of wildlife, specifically the Lesser florican bird and other wildlife species found in the area and suggest suitable mitigation measures and strategies to minimize the impact of project.

1.4 Methodology for the study

The methodology adopted for the study basically comprised of a primary survey - field visits, meeting local stakeholders, wild life Sanctuary officials, forest department officials and secondary survey with literature review, research papers, wild life management reports, web search, air, noise, light, impacts, etc. to prepare the said report.

1.5 Field Survey

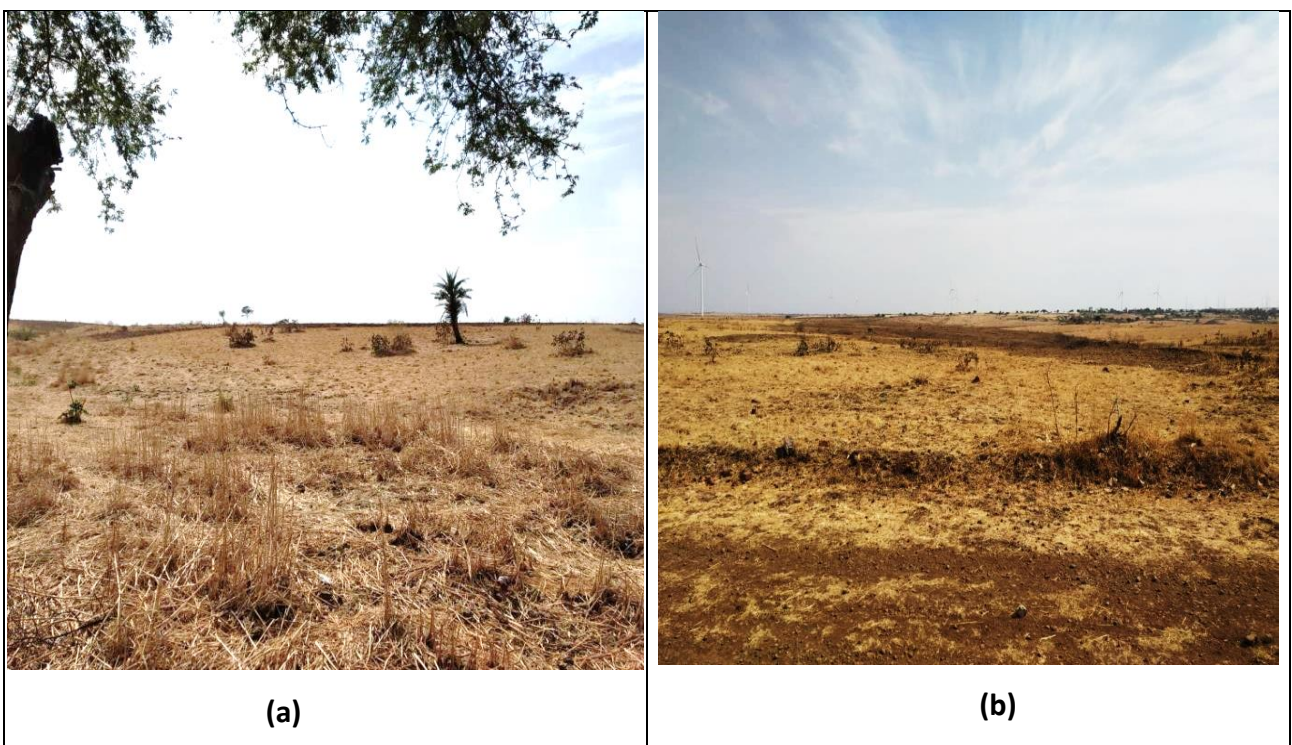
A site visit to the locations of Kharmour Wildlife Sanctuary by the team of Enviro Infra Solutions Pvt. Ltd. along with local project staff was undertaken on 16th March, 2019. A meeting was also undertaken with PCCF (WL) and CWLW, Mr. Shahbaaz Ahmed, IFS, M.P. forest department during the initial project alignment discussion on 15.06.2018 at Bhopal and his suggestion was to not go through the proposed draft ESZ boundary of the sanctuary (refer MoEF&CC Notification No. 760 dated 29th March 2016) and hence the alignment was proposed at around 3.5 kms away from its draft ESZ boundary. Some villages are also coming between the proposed alignment and the sanctuary like Dhamnod, Palduna, Machun, Bhainsa Dabar, etc. Field visits with the Forest Range Officer and Forest Guard (of Shikarwadi range of Tehsil Sailana, District Ratlam) also accompanied the survey team and the major findings recorded during the meeting and filed visit to the sanctuary are as following:

- i. Maximum land of Shikarwadi range belongs to the state Revenue Department and private landholders, comprising of agricultural fields, check dams.
- ii. The owners of the land have been practicing agriculture since decades in the region. Major crops grown are oilseed crop and pulses.
- iii. Kharmour bird visits the area during July to October, mostly in monsoon season.
- iv. During 2018 rainy season, only 02 pairs (04 birds) were spotted in the Shikarwadi range

and their numbers have been on decline year on year.

- v. Other animals and bird species commonly seen are Neelgai (Blue bulls), Owls, etc.
- vi. There are also a number of wind mills power generation projects in the vicinity of the Sanctuary near Tajpuriya and Panibad villages close to the sanctuary.
- vii. The Lesser Florican bird is categorized as an endangered species on the IUCN Red List (IUCN, 2009) and is protected under Schedule I of the Wildlife Protection Act (1972) of India.

The typical site features of the project area are illustrated in Figs. 4 & 5.



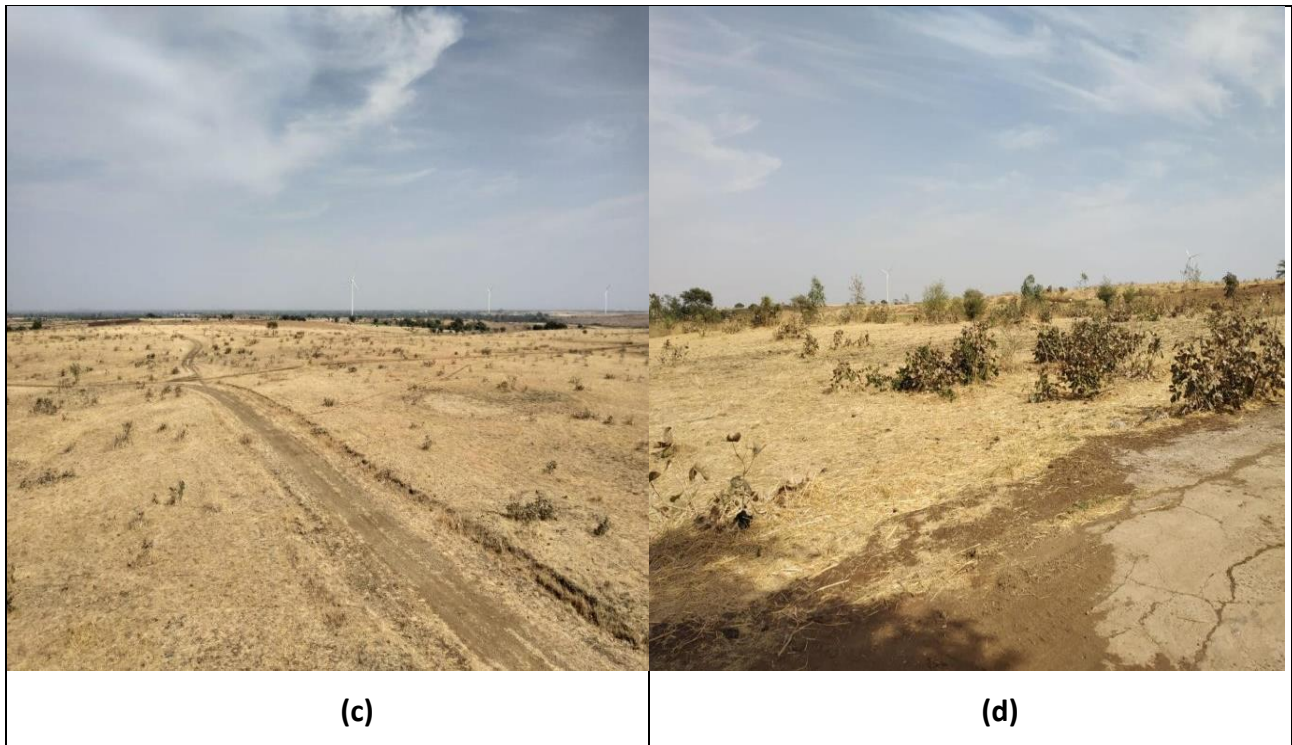


Figure: 4 - Sites in and around Sailana Kharmour Sanctuary (a) Grassland with tall grass species, (b) A mosaic of grassland and adjacent cropland, (c) *Grass bir* showing shrubby growth as an illustration of Savanna situation, windmills are also seen in the background area, (d) Grassy area with shrubby growth of *Butea monosperma* and *Tectona grandis* coppice shoots)

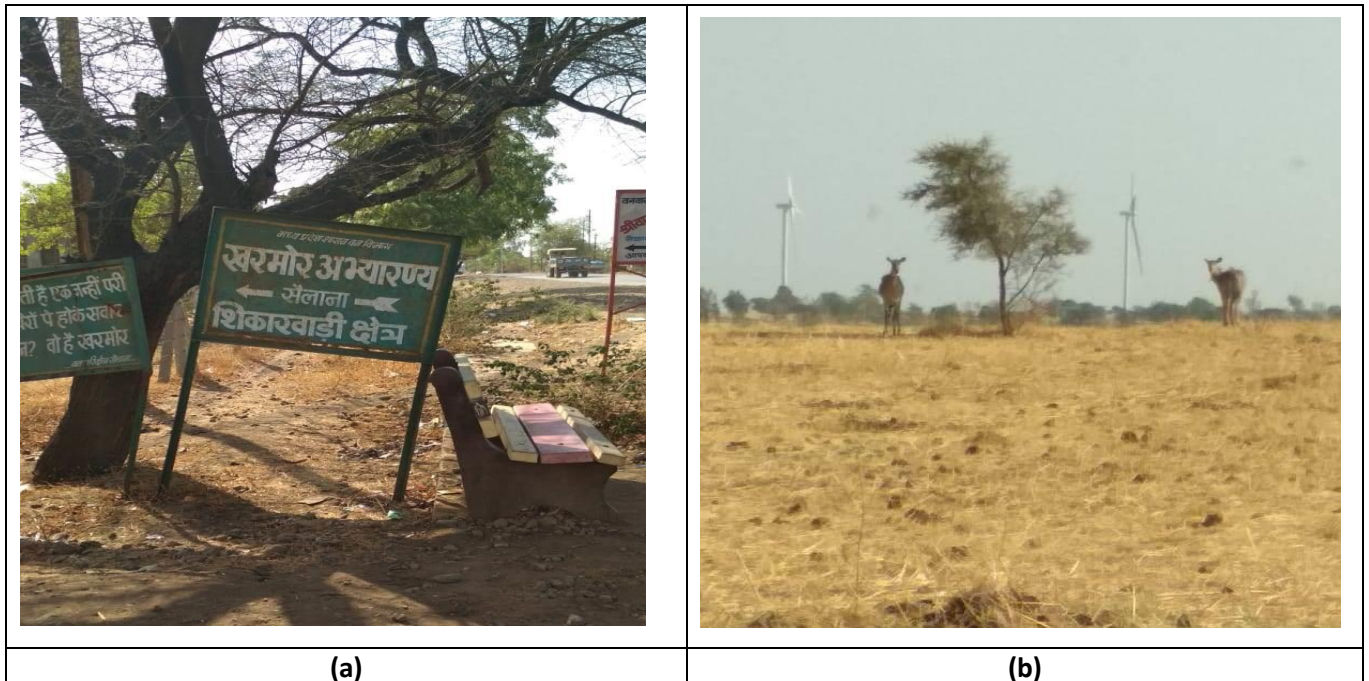




Fig. 5. A view of sites in the project area; (a). Indicating of the sanctuary; (b) Blue bull in the project site; (c) Lizards shelter holes; (d) Natural water resource in the project site; (e) Wind mills around the lesser florican habitat.

The proposed alignment is approximately 3.5 km away from the Sailana Kharmour Shikarwadi Wildlife Sanctuary (Fig – 6). This sanctuary is also known as Sailana Bird Sanctuary or Sailana Kharmour Bird Sanctuary. It is recognized as a part of the ecological region of Kathiawar- Gir dry deciduous forests (Champion and Seth 1968).

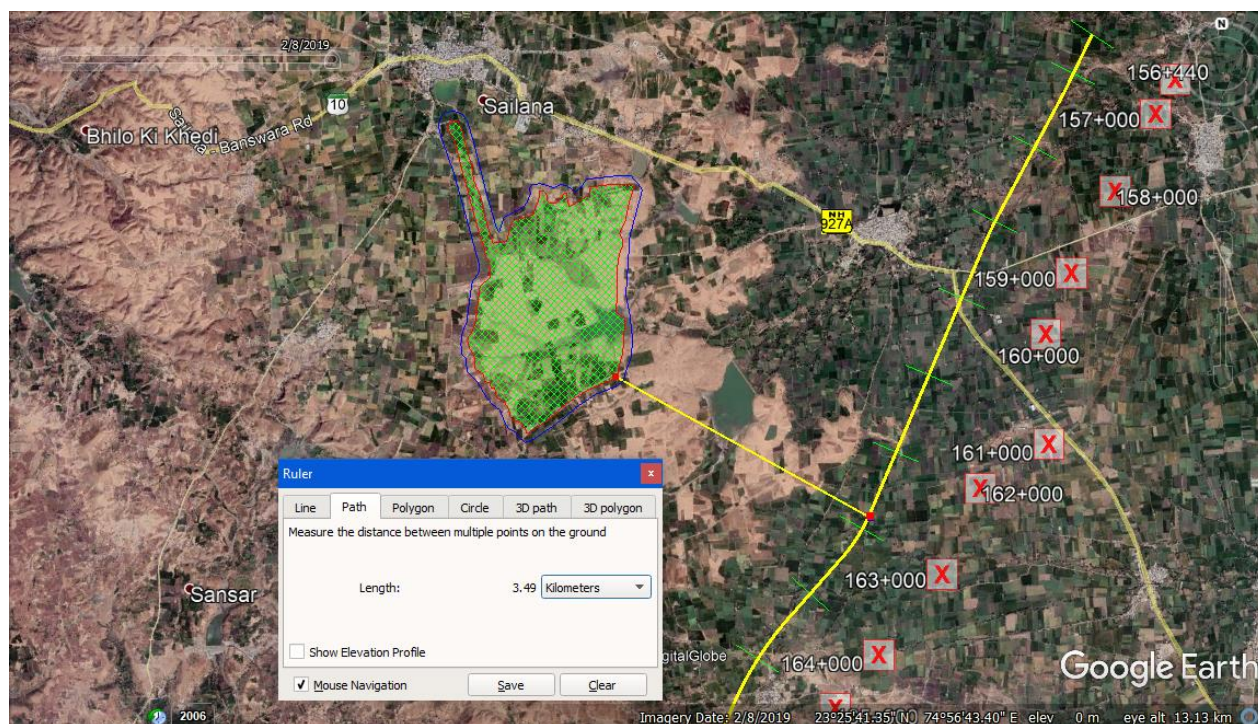


Fig. – 6 : Proposed Road and distance from Shikarwadi.

The sanctuary is home to and named after the “Kharmour Bird or Grass Peacock or Lesser Florican (*Sypheotides indicus*)”- the smallest in the bustard family and the only member of genus *sypheotides*, endemic (native and resident) to India.

Typically the size and shape of the bird is like a domestic hen, the male measures about 46 cm; and the female is slightly larger than the male and measures about 51 cm. Breeding male is black-and-white coloured with a tuft of narrow spatulate-ended up-curved black peculiar plumes projecting behind the head, three on either side. Non-breeding male is similar to female, but with much white colour on its wing. Colour of bare body parts is pale yellow or brownish fawn colour. The colour of upper mandible in the bill is horny brown, whereas lower one is yellowish flesh coloured.

The colour of the female is sandy buff, mottled and with blackish arrowhead marks on back. Two parallel blackish stripes down center of throat and fore-neck are also present. Forehead and crown is black in colour with a pale median stripe or ‘centre parting’. Head plumes are absent in female. The chick (in down) is of uniform dirty pale yellow colour, with some black stripes on the wing, back and sides and about the ears; with an unclosed ‘V’ on the crown of the head.

The sanctuary is also a major stop for species of other migratory birds. It was declared as

protected area in June 1983 to safeguard the Lesser florican. Villages Sailana, Adwanya and Gordhanpura bound the sanctuary, and the areas are owned by agriculturists. The grassland in sanctuary- Naulakha beed –occupy 200ha area (Shankaran 1990) and fall in Malwa Plateau. Once well wooded with teak (*Tectona grandis*) and Dhak (*Butea monosperma*), the area is now predominantly a grassland of *Sehima nervosum*- *Chrysopogon fulvus* type (Dabadghao and Shankarnarayana 1973). Highly scattered growth of woody species, viz., *Acacia catechu*, *Butea monosperma*, *Prosopis juliflora* and *Zizyphus jujuba* is evident in parts of the sanctuary.

Salim Ali, R. Sankaran, A. Ralimani (all from Bombay Natural History Society), P.M Lad (from State Forest Department of Madhya Pradesh) and Ajay Gadikar (from Nature Focus, Maharashtra) have studied bird fauna of the sanctuary extensively. The floral and faunal diversity of species found in the study area is listed in **Table 1, 2 and 3**. Selected bird species Lesser Florican normally found in the project site is illustrated in **Fig. 7**.

Table 1: Floral diversity recorded in the study area

Sr. No.	Scientific Name	Local/ English Name	Family	IUCN Category
Tree Species				
1.	<i>Acacia Catechu</i>	Khair	Mimosaceae	NA
2.	<i>A. nilotica</i>	Babul	Mimosaceae	NA
3.	<i>Aegle marmelos</i>	Bel	Rutaceae	NA
4.	<i>Albizia lebbek</i>	Kalasiris	Mimosaceae	NA
5.	<i>Boswellia serrata</i>	Salai	Sterculiaceae	NA
6.	<i>Bombax ceiba</i>	Semal	Malvaceae	NA
7.	<i>Butea monosperma</i>	Dhak	Papilionaceae	NA
8.	<i>Ficus religiosa</i>	Pipal	Moraceae	NA
9.	<i>Prosopis juliflora</i>	Prosopis	Fabaceae	NA
10.	<i>Tectona grandis</i>	Teak	Verbenaceae	NA
Shrub Species				
1.	<i>Adhatoda vasica</i>	Adusa	Acanthaceae	NA
2.	<i>Cassia tora</i>	Banar	Caesalpiniaceae	NA
3.	<i>Nyctanthes-arbor-tristis</i>	Parijat	Nyctaginaceae	NA

4.	<i>Zizyphus jujuba</i>	Ber	Rhamnaceae	NA
Herb Species				
1.	<i>Achyranthes aspera</i>	Latjeera	Amaranthaceae	NA
2.	<i>Ageratum conyzoides</i>	-	Asteraceae	NA
3.	<i>Desmodium sp.</i>	-	Fabaceae	NA
4.	<i>Oxalis corniculata</i>	-	Oxalidaceae	NA
5.	<i>Parthenium hysterophorus</i>	Gajarghas	Asteraceae	NA
6.	<i>Zornia diphylla</i>	-	Papilionaceae	NA
Grass Species				
1.	<i>Agrostis Spp</i>	-	Poaceae	NA
2.	<i>Apluda mutica</i>	Phuli	Poaceae	NA
3.	<i>Cenchrus ciliaris</i>	-	Poaceae	NA
4.	<i>C. setigerus</i>	-	Poaceae	NA
5.	<i>Chrysopogan fulvus</i>	Ghoriya	Poaceae	NA
6.	<i>Cynodon dactylon</i>	Doob	Poaceae	NA
7.	<i>Heteropogon contortus</i>	Kumasia	Poaceae	NA
8.	<i>Saccharum spontaneum</i>	Kans	Poaceae	NA
9.	<i>Themeda quadrivalvis</i>	-	Poaceae	NA

Source: Field Survey, NA= Not assessed

Table 2: Faunal diversity at the project site

Sr. No.	Scientific Name	Local/ English Name	WLA Schedule	IUCN Category
Insect Species				
1.	<i>Acrida sp.</i>	Grasshopper		NA
2.	<i>Apis dorsata</i>	Honeybee		NA
3.	<i>Camponatus sp.</i>	Ant		NA
4.	<i>Gastrimargles marmoratus</i>	Locust		NA
5.	<i>Typhlocactus mitchelli</i>	Scorpion		NA
Butterfly Species				
1.	<i>Atrophoneura aristolochea</i>	-		NA

2.	<i>Curtis theitis</i>	-		NF
3.	<i>Delias eucharis</i>	-		NA
4.	<i>Papilio demoleus</i>	-		NF
Amphibian Species				
1.	<i>Duttaphrynus melanostictus</i>	Toad	IV	LC
2.	<i>Rana caterbiana</i>	Frog	IV	LC
Reptile Species				
1.	<i>Naja naja</i>	Cobra	II	VU
2.	<i>Podaris muralis</i>	Lizard	IV	NA
3.	<i>Tiyas mucosus</i>	Dhaman	IV	NA
Mammal Species				
1.	<i>Muntiacus muntjac</i>	Bherki	III	NA/NF
2.	<i>Vulpus bengalemin</i>	Fox	II	NA
3.	<i>Crocuta crocuta</i>	Hyena	III	NA
4.	<i>Boselaphus tragocamelus</i>	Neelgai	III	NA
5.	<i>Lepus migricollis</i>	Rabbit		LC
6.	<i>Felis chaus</i>	Junglal Cat	II	NA
7.	<i>Hystrix indica</i>	Sehi	IV	NA
Fish Species				
1.	<i>Catla catla</i>	Catla		NA
2.	<i>Cirrhina mrigala</i>	Mrigal		NA
3.	<i>Labeo rohita</i>	Rohu		LC

Table 3. Avifaunal diversity at the project site

Sr. No.	Scientific Name	Local/ English Name	WLA Schedule	IUCN Category
1.	<i>Ardea cinerea</i>	Anjan		NF
2.	<i>Acridia cinerea</i>	Bagula	IV	NA
3.	<i>Milvus migrans</i>	Cheela	I	LC
4.	<i>Corvus splendens</i>	Crow	IV	NA
5.	<i>Eudynamis scolopacea</i>	Koyal	IV	NA

6.	<i>Acridotheres tritis</i>	Myna	IV	LC
7.	<i>Sypheotides indicus</i>	Lesser Florican	I	EN
8.	<i>Grus antigoni</i>	Saras Crane		VU
9.	<i>Dendrocygna javanica</i>	Lesser Whistling duck		VU
10.	<i>Passer domesticus</i>	Sparrow	IV	LC
11.	<i>Francolinus pondicerianus</i>	Titar	IV	NA

NA= Not assessed yet to be found in IUCN Red List; NF= Not Found in IUCN list; LC= Least Concerned, EN= Endangered; VU= Vulnerable

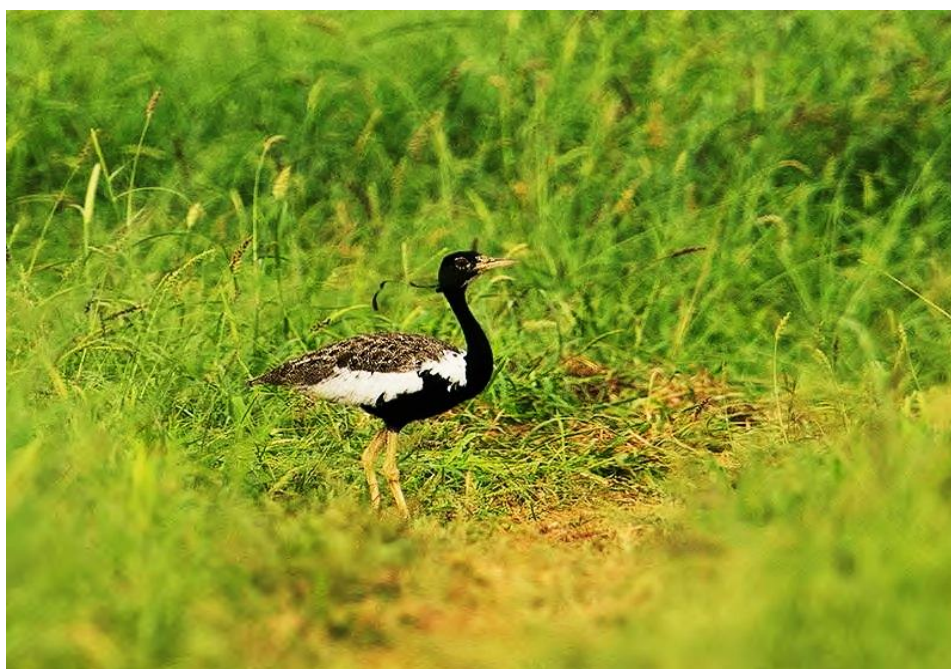


Figure 7. Lesser Florican bird species found in the study area (Illustrative)

1.6 Faunal Species found in the Sanctuary

a) Indian Cobra (*Naja naja*)

It inhabits wide range of habitats, such as, dense to open forests, plains, agricultural fields, rocky terrain and wetlands. It is often found in the vicinity of water and hiding locations like holes in embankments, tree hollows, termite mounds and rock files. It is a carnivorous reptile and prefers small snakes, frogs, lizards and insects as prey. Habitat destruction, change in land use, drying –up of water holes and illegal hunting for skin and catch for venom are some of the common threats to its survival. Promoting grassland development and recovery will facilitate its population growth due to development of food chain organisms. However no such threat is perceived due to the proposed expressway.

b) Jungle Cat or Swamp Cat (*Felis chaus*)

It inhabits preferably wetlands like swamps, littoral or riparian areas with dense vegetation, grasslands, shrubby areas and even agricultural fields. The tall grasses are typical of its habitat. It belongs to Least Concern (LC) category in IUCN Red species list. The cat is solitary in nature except the mating season. It is a carnivorous species and prefers small mammals and birds as its prey. The cat is diurnal and rests in burrows, grass thickets and scrub areas.

Habitat Loss - destruction of wetlands and swampy grass areas, water pollution, industrialization and urbanization and illegal hunting by humans for skin are the general threats faced by the cat. Prohibiting hunting and conserving grasslands and wetlands are the suitable measures for its conservation. However no perceived threats due to the road project is seen.

c) Indian Fox or Bengal Fox (*Vulpes bengalensis*)

The species is endemic to Indian sub-continent and categorized as Least Concern (LC) in IUCN Red list of species. The species is distributed throughout India except of the wet forests and extreme of arid zone. The preferred habitats are short open grasslands, scrub and thorn forests. This species avoids tall grasslands. It is considered to be a habitat generalist with preference for semi-arid short grassland habitats.

The species experiences threats as lack of habitat protection, hunting for skin and flesh (sometimes), conversion of grassland habitat to agricultural fields, industry and biofuel plantations. Conserving short grassland, recovery of degraded short grass area through protection and species enrichment and arresting conversion of grasslands are suitable measures for conserving this species. The project would not contribute to any such threat.

d) Cheel or Black Kite (*Milvus migrans*)

It is a diurnal raptor, vociferous and opportunistic hunter. The species is tropical resident and avoids heavy forested regions as its habitats. It is an omnivorous organism and prefers birds, bat, rodent, earthworm, lizards, mice and even garbage as food. Water pollution, extensive use of pesticides in agriculture, hunting and carcass poisoning are major threats to this species. The species can suitably be conserved by promoting food chain and regulating the use of pesticides and hunting, and by promoting organic agriculture. The road project would not pose any threat to the species.

e) Lesser Florican or Likher Kharmore (*Sypheotides indicus*)

This species is the smallest in the bustard family and the only member of genus *Sypheotides*. The species belongs to Schedule I of the Wildlife Protection Act, 1972 and Endangered category of the IUCN Red List Species. The species is endemic to India and found in tall grasslands. Geographically, this species is found in northwest and central India during summer and more widely distributed during winter season. This species prefers thick grasslands as its habitat but occurs sometime in agriculture fields or grasslands interspersed with croplands. The species feeds a wide varieties of small vertebrates and invertebrates-worms, centipedes, lizards, frogs and insects (preferably locusts, flying ants and hairy caterpillars). It also feeds on shoots, seeds, herbs and berries.

Habitat loss, hunting and more recently the establishment of wind mills in its habitat are major threats to this species. Conservation of tall and thick grasslands, restoration of degraded tall grasslands, promoting organic agriculture and grassland development vis-à-vis agriculture, control of hunting, and avoiding installation of wind mills in its habitat are suitable conservation measures for this species. However no perceived threats due to the road project is seen as the alignment is 3.5 to 12.5 km away from the sanctuary areas.

1.7 The Lesser Florican Bird in Kharmour Bird Sanctuary and overall population trends

The bird prefers tall grasslands devoid of tree but having shrub growth, as the habitat. **A mosaic of grasslands and agricultural fields is the ideal habitat for the bird.** In central India, the bird is found round the year. The breeding sites are now restricted to Gujarat and Western Madhya Pradesh. Sometimes the bird is reported from agricultural fields adjacent to grasslands. Malwa plateau in the western part of Madhya Pradesh, having prime grassland habitat with adjoining agricultural fields and water bodies attract the bird most suitably. The bird is globally a threatened species and recorded as “Endangered” (Birdlife International Fact Sheet 2019).

The bird is omnivorous and utilizes shoots, leaves, seeds and berries of plants and small vertebrates and invertebrates (such as worms, centipedes, lizards, frogs and insects (e.g. locust, flying ant and hairy caterpillars). July to October in the breeding period of the bird,

this duration is supported by growing grasses and juvenile growth of insects. Being an endangered species, the bird is given the highest degree of protection under Schedule I of Wildlife Protection Act 1972 even then its population has been estimated to be decreasing. The species' population was estimated at c.2,200 birds in the mid-1990s (Sankaran 1994b, 1995c), and based on this the number of mature individuals is put at c.1,500. (Source: IUCN Redlist). According to the data collected from different sanctuaries of the MP state, in 2014 only 11 Lesser Florican have migrated to state, as against 15 last year (Source: <http://wwfenvi.nic.in/ViewGeneralLatestNews.aspx?Id=4181&Year=2014>). Table-4 below gives a time series trend of the bird population in the three major states in the country where it is found. The overall trend of the bird in Madhya Pradesh is on the decreasing side. The bird is also included as a priority species for recovery in the Integrated Development of Wildlife Habitats in India by the MoEF&CC, Government of India.

State	District	1982	1989	1994	1999	2010	2014
Gujarat	Bhavnagar	0	2	35	19	27	26
	Amreli	0	NV	0	0	0	NV
	Junagarh	21	0	4	4	0	NV
	Jamnagar	34	NV	1	2	0	NV
	Rajkot	21	NV	27	42	0	NV
	Surendranagar	NV	NV	2	NV	NV	NV
	Kachchh	NV	8	36	67	22	1
	Punchmahal	NV	20	6	11	5	NV
Madhya Pradesh	Ratlam	36	28	25	55	8	7
	Jhabua	5	9	3	1	2	3
	Dhar	14	11	13	7	2	0
Rajasthan	Bhilwara	NV	NV	NV	3	5	0
	Tonk	NV	NV	NV	2	2	NV
	Ajmer	NV	NV	NV	4	3	40
	Pratapgarh	NV	NV	8	25	8	NV
	Total males seen	65	90	161	303	84	57
Estimated Number in Total		4374	1672	2206	3530	NC	NC

Source: 1982 to 2000 G.S. Bhardwaj (2011), WII progress 2014

Source: https://www.atree.org/sites/default/files/19_Grassland%20Habitat_2016_1.pdf

Table-4 Trend of the bird population in the three major states in the country

As per field visit in 2018 and 2019 to the Sanctuary the R.F.O has communicated that in 2018 only two pairs of Kharmour bird were sighted.

1.8 Impact on Flora, Fauna and Ecosystem due to the project

The cumulative impacts of the project activities on the habitat of wildlife, such as Lesser florican, Lesser Whistling duck, and Sarus crane and other fauna are as follows:

- Habitat:** No direct loss of habitat at intersection locations on account of damage to the existing vegetation due to construction activities and transport is envisaged as the highway is passing mostly through the buildup area, settlements, agricultural fields and protected forest in some patches. The construction and transportation activities will cause some degradation and loss of only agricultural fields at intersection locations such as 1 interchange at Ch. 161+345, 2 VUP's at Ch. 159+668 and Ch. 160+114, 3 LVUPs at Ch. 160+955, Ch. 169+340 and Ch. 170+599. The effects will be limited to accumulation of construction based debris, gaseous and particulate matter centric atmospheric pollution due to machine works and transportation, disintegration of soil alteration, damage and uprooting of natural flora and consequent changes in soil micro fauna and terrestrial micro and macro fauna only within the right of way. All these activities will be carried out by adopting mitigation plan to minimize the impact on surrounding buildup area, settlements, agricultural fields and protected forest in some patches. No habitat loss would be seen in the sanctuary area.
- Habitat quality:** No degradation in habitat quality due to construction activities and construction camps, and human use of water resources is envisaged in the sanctuary areas. Any alteration in soil structure, loss of soil moisture and organic matter, addition of harmful substances due to working of machines and use of transport, resultant loss of preferred flora and faunal species will be limited within RoW only. There will be no competition for space and possible pollution due to open defecation, sewage and sullage on account of temporary hutments and camps of labourers and other staff of the project as adequate EMP measures would be in place as per CPCB guidelines.
- Noise, Light and Air:** During construction as well as operation phase there may be some increase in noise and air pollution level. Interference of noise generated due to construction and vehicle transport to the communication systems of the wildlife would be very limited as the sanctuaries are located 3.5 to 12.60 km away from the alignment. The contributing aspects to this would be machine working and transportation vehicles. Proper noise mitigation measures like plantation of three rows of trees on road sides with increasing height towards outer side would further disperse the noise upwards. A 1.5 m wall on the RoW extremes would also

help to minimize noise pollution to a greater extent.

Analysis of noise pattern generation at site and impact at near the sanctuary is also undertaken as presented below, suitable model results have also been presented to shown the impact on the nearest sanctuary area.

Impact of Noise Levels:

The assessment of potential road noise impacts helps in understanding one of the most significant pollution, the noise pollution. Some salient features related to potential noise impact of a road development include: (i) the road noise impact is greatest where busy road passes through densely populated areas, townships and markets (ii) the range of noise level should be understood in relation to the habitation type also; for example, road noise in industrial area is not likely to be problematic but at sensitive location like schools and hospitals; its impact may be significant, (iii) mitigation of noise in urban areas is rather difficult, especially at the road intersections.

Environmental noise particularly highway traffic noise, is a complex phenomenon because its intensity and characteristics vary with time depending upon the frequency as well as type of vehicles on the road.

The impacts of noise due to the project will be of temporary significance locally during the construction phase and slight increase may occur during the operation stages. Table-5 below presents the source of noise pollution and the impact categorization.

Table 5: Source of the Noise pollution and its impact

Sr. No.	Phase	Source of Noise pollution	Impact categorization
1	Pre-construction	<ul style="list-style-type: none"> • Man, material & machinery movements • establishment of labor camps, onsite offices, stock yards and construction plants 	<ul style="list-style-type: none"> • all activities will last for a short duration and also shall be localized in nature
2	Construction Phase	<ul style="list-style-type: none"> • Plant Site stone crushing, asphalt production plant and batching plants, diesel 	<ul style="list-style-type: none"> • Plant Site: Impact will be significant within 500m. • Work zones: Such impacts again will be of temporary

Sr. No.	Phase	Source of Noise pollution	Impact categorization
		generators etc • Work zones Community residing near to the work zones	nature as the construction site will go on changing with the progress of the works.
3	Operation Phase	• due to increase in traffic (due to improved facility)	• Will be compensated with the uninterrupted movement of heavy and light vehicles.

Although the baseline day & night time noise levels monitored at various locations along the proposed project are within permissible limits specified by the MoEF&CC. The highest Leq noise levels was recorded at Dhamnod village which is 64.2 dB(A) during daytime and 53.6 dB(A) during night time. The Mathematical equation is used for noise prediction is $L_2 = L_1 - 20 \log D_2/D_1$.

Prediction of Noise Impact on Noise level

A noise propagation modeling study has been conducted to find out the impact from the noise generated because of the estimated total traffic flow as well as the significance of these impacts. The noise modeling has been done taking into account the design speed at various stretches and the stretches with restricted speeds have also been considered. DhvaniPRO is a computer program developed to undertake construction, industrial and traffic noise propagation studies for noise assessment.

Outcome of the Noise level Modelling:

The outcome of the noise modeling is as follows:

The predicted noise levels during both day and night time are within limit for all the land uses i.e., commercial, residential/rural and sensitive. The noise level at the boundary of Sailana Kharmour WLS is found to be less than 10 dB (A) and around 5dB at the farther end, which is very minimum as compared to 50-55 dB (A) at the highway site. There will be no additional impact of noise within protected area. The Contour map showing noise levels due to total traffic outcome at the homogenous intersections has been shown in Figure - 8.

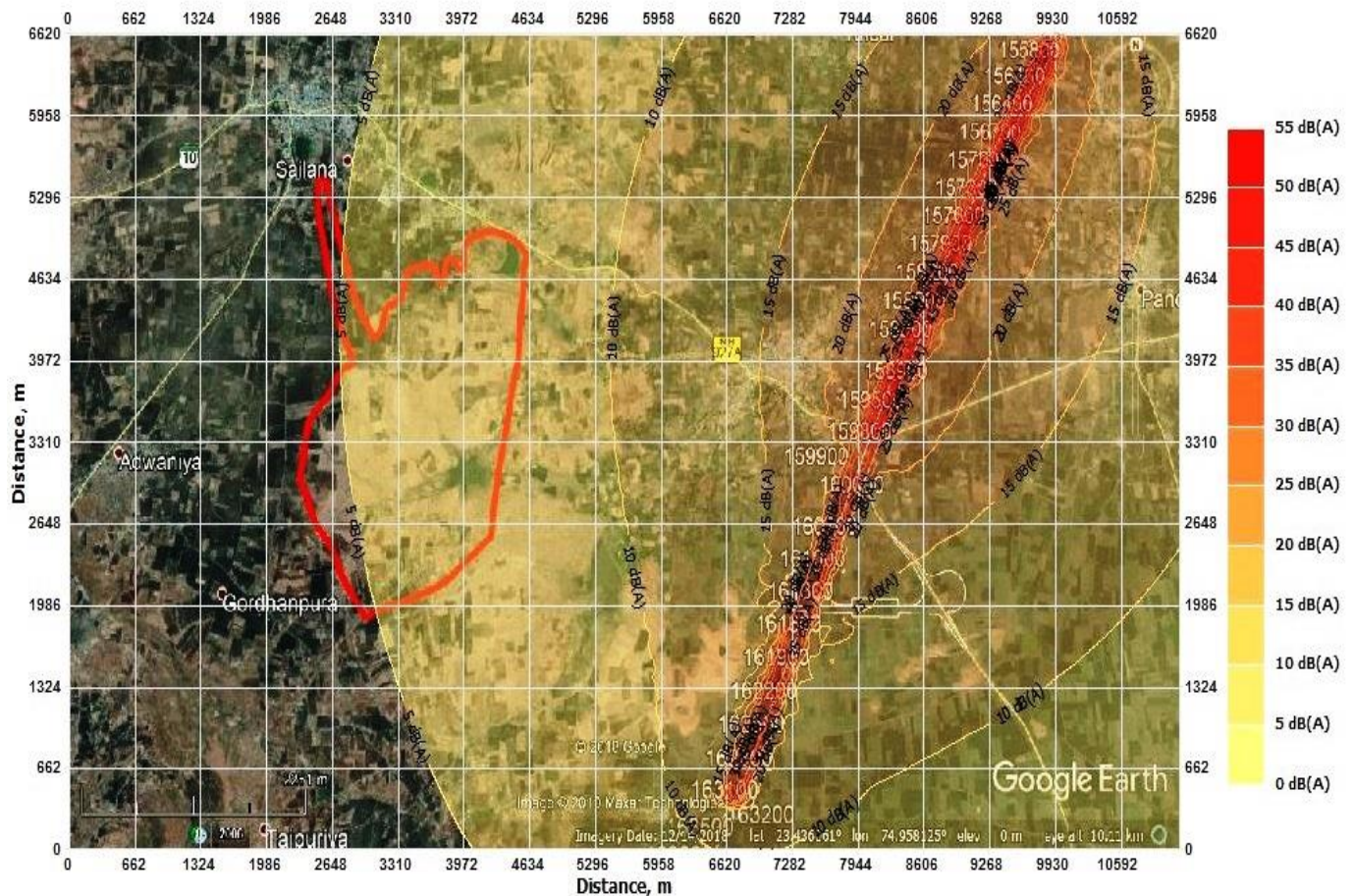


Figure 8: Contour map showing noise levels due to total traffic outcome at the homogenous intersections of 2018 year

Mitigation measures to reduce Noise levels

The following are the mitigation measures to reduce noise pollution:

- Noise standards will be strictly enforced for all vehicles, plants, equipment, and construction machinery. All construction equipment used for an 8-hour shift will conform to a standard of less than 90dB(A). If required, high noise producing generators such as concrete mixers, generators, graders, etc. will be provided with noise shields.
- Machinery and vehicles will be maintained regularly, with particular attention to silencers and mufflers, to keep construction noise levels to minimum.
- Workers in the vicinity of high noise levels will be provided earplugs, helmets and will be engaged in diversified activities to prevent prolonged exposure to noise levels of more than 90dB(A) per 8 hour shift.

- During construction vibratory compactors will be used sparingly within the urban areas. In case of complaints from roadside residents, the engineer will ask the site engineer to take suitable steps of restricting the work hours even further or use an alternative roller.
- Proposed tree and shrub plantations planned for avenue plantation especially close to settlements, sanctuary areas will also form an effective sound buffer during the operation stage.

Impact of Light

As the alignment is around 3.5 km away from the Sanctuary boundary and the road is mostly elevated by 3 to 3.5 m from the ground level and tree plantation in three rows on both sides of the proposed road edges is already planned in the construction cost. Hence light would mostly get diffused and a very less amount of glare is anticipated at the sanctuary area.

On the medians also small trees and hedging is proposed which would also to some extent reduce the glare. Additional measures if required would be undertaken to reduce the light glare near the sanctuary from CH. 159.500 to 165.000. This chainage is considered taking 1km additional length over and above the linear perpendicular distance from the far ends of the sanctuary boundary.

Impact on Air Environment

Change in Ambient air and GLC

The air pollution impact of excavation in ordinary earth and boulders and rock is directly dependent upon construction methodology, annual rate of excavation, mode of transport within the construction site, mode of screening and method of crushing. The air pollution sources at the proposed project site can be broadly classified into three categories, viz. area source, line source and instantaneous point source.

Excavation by various activities in project area is construed as an area source which includes excavation pit(s) and activities happening in the excavation area like digging, dozing, hauling and loading/unloading. The dust emission from these areas will be fugitive in nature. The excavator operations, loading/unloading operations will also cause dust emission though it will be confined to the area of operation of the

machinery. The gaseous emission from their operation shall be minimal and limited within the project.

Transportation of excavated material from the project site to dumping sites area categorized as line source. Since the dumper movement on haul road will be within the project area, no adverse impact shall be felt in the settlement and sanctuary area.

Dust Dispersion Modeling for Excavation Operation

In the present study, United States Environmental Protection Agency (USEPA-42 series) approved mathematical equations have been used to predict concentrations for different operations in project including the material transportation. To predict the particulate emissions, Envirotrans AERMODCloud. (Air Dispersion Modeling Software) an interface based on ISCST3 – was used to predict changes in air quality i.e., maximum ground level concentration (GLC's) of Particulate Matter. Short term model options were opted for uniform emissions rates. The concentration of other gaseous pollutants i.e. SO₂ and NO_x was found to be much lower than the threshold limit (80 µg/m³), the air modeling was restricted to determination of PM₁₀ and PM_{2.5} in the present case. The emission factors adopted for various project operations are mentioned below:

Emission Factor for Excavation and Material Loading/unloading

For excavation and material handling the emission factor for PM₁₀ has been adopted as per USEPA – 42 series.

For Dozing Operation:

$$EF_{PM10} \text{ (kg/hr)} = 0.34 \times S^{1.5}(\%) / M^{1.4}(\%)$$

Where,

EF_{PM10} (kg/hr) = emission factor in kg/hr

S = silt contents in percentage by weight

M = moisture content in percentage by weight

For Material Loading/unloading:

$$EF_{PM10} \text{ (kg/hr)} = 0.34 [0.119 / M^{0.9}]$$

Where,

EF_{PM10} (kg/hr) = emission factor in kg/ton

M = moisture content in percentage by weight.

Emission Factor for Material Haulage within Project:

The emission rate is dependent on several factors which include soil properties, climatic conditions, vehicular traffic, wind forces and machinery operation. The Empirical equation for calculation of emission rate is as under.

$$E = k \cdot (1.7)^s \cdot (s/12) \cdot (S/48) \cdot (W/2.7)^{0.7} \cdot (w/4)^{0.5} \cdot (365-p/365) \text{ g/VKT}$$

Where,

E=Emission Rate

K = Particle size multiplier

s=Silt Content of the Road surface material

S= Mean Vehicle Speed (km/hr)

W=Mean Vehicle Weight (tons)

w=Mean number of wheels

p= Number of days with at least 0.254mm of precipitation per year

Note: The emission factor for PM_{2.5} has been considered 60% of PM₁₀. The Isopleth developed for PM₁₀ and PM_{2.5} along the road alignment is shown in Figure 9 and 10 for PM₁₀ and PM_{2.5} respectively. The maximum GLC due to excavation, loading & unloading activities for PM₁₀ and PM_{2.5} were found to be 2.5 µg/m³ and 1.2 µg/m³ respectively at Dhamnod as shown in Table-6.

Table 6: Maximum Concentration at receptors

Location	Pollutants	N-Cord.	E-Cord.	GLC (µg/m ³)
Dhamnod	PM 10	23.442009°	74.979431°	2.5
Dhamnod	PM 2.5	23.442009°	74.979431°	1.2

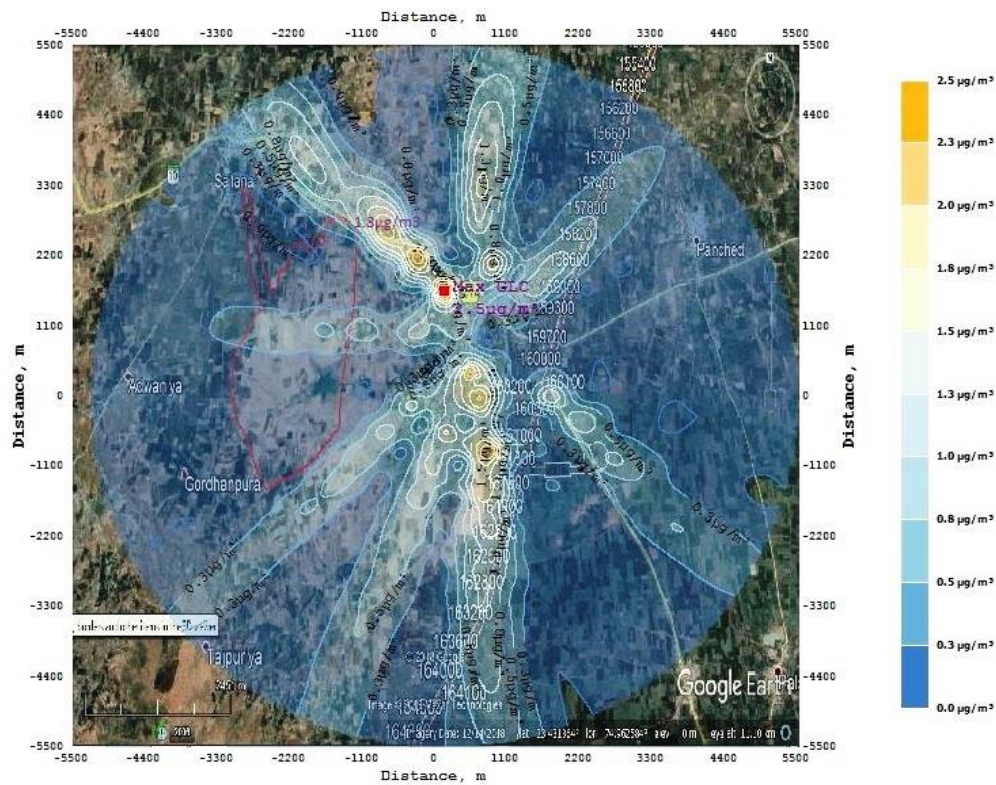


Figure 9: Isopleth of Maximum Predicted 24 hourly Ground – Level Concentrations for PM10

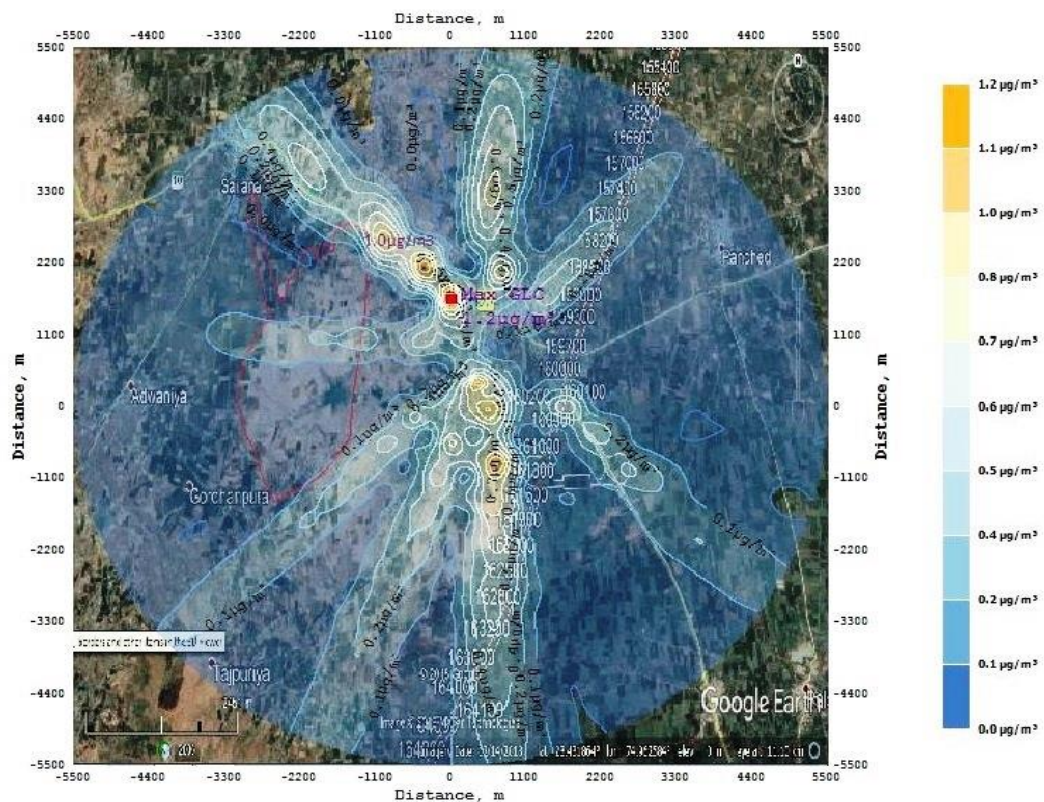


Figure 10: Isopleth of Max. Predicted 24 hourly Ground – Level Concentrations for PM 2.5

Resultant Impact

The resultant impact due to construction activities (excavation and crushing) on the ambient air quality for PM₁₀ and PM_{2.5} at monitoring station Dhamnod is presented in Table 7 which shows that, the resultant concentration level is within the NAAQS.

Table 7: Resultant levels due to excavation

Station Name	Distance of monitoring stn. from proposed alignment (km)	Pollutants	Sampling Station	Max. Conc. (µg/m ³)	Predicted GLC (µg/m ³)	Resultant concentration (µg/m ³)	NAAQS (µg/m ³)
Dhamnod	1.5	PM ₁₀	AAQ 2	96.5	2.5	99.0	100
Dhamnod	1.5	PM _{2.5}	AAQ 2	58.6	1.2	59.8	60

The predicted GLC at the boundary of Sailana Kharmour Wildlife Sanctuary is found to be 1.8 µg/m³ and 1.0 µg/m³ for PM₁₀ and PM_{2.5} respectively which is very minimum and which will have no significant impact during construction or operation phase. The value get further reduced after implementation of mitigation measures as suggested in EMP.

CALINE - 4 Model for CO emission and its impact

The air dispersion model used is **CL4 (A Graphical User Interface for CALINE4)** developed by the California Department of Transportation (Caltrans) for predicting air pollutant concentrations near roadways. CALINE4 is a simple line source Gaussian plume dispersion model.

CALINE4 is a model based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. The purpose of the model is to assess air quality impacts near transportation facilities. It also has special options for modeling air quality near intersections, street canyons and parking facilities.

CALINE4 divides individual highway sections into a series of elements from which incremental concentrations are computed and then summed to form a total concentration estimate for a particular receptor location. Downwind concentrations from the element are modelled using the crosswind FLS (Finite Line Source) Gaussian formulation, but σ_y and σ_z are modified to

consider the mechanical turbulence created by moving vehicles and the thermal turbulence created by hot vehicle exhaust in the region directly over the highway, region considered as a zone of uniform emissions and turbulence.

Input Data Requirement:

- **Emissions**

The emissions are provided by traffic volume (vehicles/h) and emission factor (g/mile/vehicle) for each section.

- **Meteorology**

Wind speed Wind direction Wind direction standard deviation Atmospheric stability Class Mixing Height Ambient Temperature.

The details of input parameters considered for the modeling exercises are presented in the following paragraphs.

- **Traffic Data**

The traffic surveys have been carried out along the corridor to establish base year traffic with reference to traffic movements. Average hourly traffic data has been considered for the present modeling exercises.

- **Meteorological Data**

“Worst case wind angle” run type was considered to predict the worst-case scenario. The met inputs entered were:

- Wind speed: 1.0m/s
- Stability Class: F
- Mixing Height: 50m
- Standard Deviation: 5°
- Ambient Air Temperature: 25°C

PRESENTATION OF RESULTS

For One-hour simulations, the concentrations were estimated around 3 receptors to obtain an optimum description of variations in concentrations over the distance of 30m, 50m & 100m downwind from the centerline for the worst angles as identified by the model. Based on the

observed traffic flows and reconnaissance surveys, the proposed project expressway has been divided into two homogenous traffic sections. The nearest receptor was considered to be at 30m from the centerline of Homogenous Sections. Air modeling results of all the two homogenous sections i.e Jojro ka Khera (NH 79) and Choundha (NH 3) have been presented in **Table 7 (a) to 7 (b)**.

Table 7 (a):- Air Modeling Result for Jojro ka Khera (NH 79), (Predicted Conc. of CO)

Predicted Maximum 1-hour Concentration of CO (ppm)					
Receptor Distance from Center Line	2018	2023	2028	2033	2038
at 30 m	0	0.1	0.2	0.3	0.6
at 50 m	0	0.1	0.1	0.3	0.5
at 100 m	0	0.1	0.1	0.2	0.4

Predicted Maximum 1-hour Concentration of CO ($\mu\text{g}/\text{m}^3$)					
Receptor Distance from Center Line	2018	2023	2028	2033	2038
at 30 m	0	115	229	344	687
at 50 m	0	115	115	344	573
at 100 m	0	115	115	229	458

Table 7 (b):- Air Modeling Result for Choundha (NH 3) (Predicted Conc. of CO)

Predicted Maximum 1-hour Concentration of CO (ppm)					
Receptor Distance from Center Line	2018	2023	2028	2033	2038
at 30 m	0	0.1	0.2	0.3	0.7
at 50 m	0	0.1	0.1	0.3	0.6
at 100 m	0	0.1	0.1	0.2	0.4

Predicted Maximum 1-hour Concentration of CO ($\mu\text{g}/\text{m}^3$)					
Receptor Distance from Center Line	2018	2023	2028	2033	2038

at 30 m	0	115	229	344	802
at 50 m	0	115	115	344	687
at 100 m	0	115	115	229	458

The predicted 1hr maximum concentration of CO after construction of the proposed project is found to be very low and within $4000 \mu\text{g}/\text{m}^3$ prescribed in National Ambient Air Quality Standards, 2009 for residential, rural and other areas.

Summary of impacts and Mitigation measures for air pollution

Table 8 presents the summary of impacts and mitigation measures with respect to the air pollution.

Table 8: Summary of impacts and mitigation measures

Environmental Issue/Component	Impact Description	Remedial Measure
Emission from construction vehicles and machinery	Effect on human health Dust settled on leaves may reduce growth rate of the plants Crowded market places and construction sites will have higher degree of emission.	All vehicles, equipment and machinery used for construction shall be regularly maintained to ensure that the pollution emissions levels are as per norms of SPCB Monitoring of suspended particulate matter to be conducted at least once a month at the sites where crushers are used. The human settlements should be at least 500 m downward wind direction of asphalt mixing plant.
Dust and its treatment	The impact of dust at construction sites is rather adverse, but localized in nature No serious health problem is likely to be caused	Precautions to reduce the level of dust emissions from the hot mix plants shall be taken. The hot-mix plants should be located at least 500 m from the nearest habitation. They should be fitted with dust extraction unit. Water would be sprayed in the line and earth mixing sites, asphalt mixing site and service roads. In filling subgrade, water spraying is needed to solidify the material. After the impacting, water would be sprayed regularly to prevent dust. Vehicles delivering material would be

		covered.
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- **Fragmentation in the grassland areas:** While the proposed highway is mostly passing through agricultural areas, one small stretch is passing through the forest areas from chainage 166.50 to 172.00. The following forest compartments namely CN 153 PF, CN 151 PF and CN 150PF are encountered. However as the birds prefer a grassland habitat having mosaic of tall grass species and agricultural fields. The grass land improvement programme has been recommended as a mitigation measure as per IGFR, Jhansi model.
- **Wildlife population, their flow and movement:** As already mentioned that the said highway will pass mainly through the agricultural fields and there are no threats to the local wildlife populations and adequate mitigation measures like culverts, underpasses, bridges over water bodies, streams are proposed at every location along the expressway. Proper animal movement measures would be undertaken at these places. A total of 31 major/minor bridges over rivers, streams, nallahs have been provided and over 25 RCC box culvers have also been provisioned in the alignment stretch of 31 kms. Tunnel effect would be minimized as these structures would be open to sky in the middle/median and around 10-20 m opening to sky is provisioned in the design.
- **Injury and accidents to animals:** This will be very minimal as the project has largely elevated tracks and embankment of upto 3.0 to 3.5 m is provided in design and as the highway is access controlled with a boundary wall of 1.5 m on both sides of the expressway including crash barriers on the road edges on both sides. The movement of the wild life would be only through the culverts, major & minor bridges over streams, water bodies provided for movement. Proper animal steering movement measures would be undertaken at these places.

1.9 General Threats to Lesser Florican in and around sanctuary

The general threats include Habitat (grasslands) degradation and loss due to diverse reasons and occasional hunting are the major threats to decline of Lesser Florican in the area. Based on field visits and secondary sources, the causes of its declining population are

as follows:

- Lack of understanding of grasslands as common resource at governmental level (as grasslands are classified under wastelands).
- Diversion of grassland area for purpose like expansion of agriculture, plantation of tree species, industrial development and development of alternative renewable energy resources like the wind mills for power generation and encroachment by local farmers.
- Invasion of alien undesirable species particularly *Prosopis juliflora* and *Parthenium hysterophorus* (around the agro- fields), and weedy species.
- Excessive grazing and tramping influences of domestic livestock and blue bulls.
- Excessive use of fertilizers and pesticides in agricultural crops (particularly soybean) leading to contamination of food of Lesser florican effecting its health and breeding potential, and longevity of the newly hatched chicks and juveniles.
- Predation of the bird by stray dogs is the new emerging threat in the recent years due to dumping of solid waste materials adjacent to grasslands and wastelands.

The proposed expressway will however not pose any of the threats as mentioned above as all adequate environment pollution control measures would be in place during the time of construction.

1.10 Environmental Management Plan for Conservation of Grassland Habitat and Lesser Florican and other avifauna

Though the bird has been given the highest degree of protection under Wildlife Protection Act 1972 but the reports (Sankaran and Rehmani 1990, Sanskaran 1991, P.M Lad 2002, etc.) reveal decline in its population due to abiotic (drought) and biotic factors, and also an account of Policy bottlenecks. The problem needs to be undertaken in a holistic manner following multi - dimensional strategy.

The measures that need to be considered for habitat conservation and conservation of Lesser florican are enumerated as follows:

- The governmental policy needs to recognize grasslands are resource for multiple use for the local people and habitat and breeding sites for

birds, hence need to be de-notified from wasteland category. Continuous monitoring of the grassland is wanted.

- The sanctuary grasslands need to be enriched by planting palatable species of grasses (*Sehima nervosum*, *Cenchrus ciliaris*, *C. setigerous*, *Chrysopogon fulvus* and *Themeda anathera*) and legumes (*Desmodium*, *Stylosanthes*, etc.) and other species (*Cassia tora*, *Adhatoda vasica* and *Zizyphus jujuba*).
- Habitats need to be managed as the treeless grasslands interspersed with croplands and small water holes.
- **Plantation of tree species in the grassland need to be completely discouraged as the bird does not prefer a tree dominated habitat.**
- Livestock grazing need to be minimized. Instead of continuous free range grazing, rotational grazing and deferred- cum-rotational grazing with low livestock density need to be encouraged.
- Efforts need to be made to regulate the livestock population to avoid competition for forage in the grassland that serve as habitat for Lesser Florican especially.
- Soil and water conservation measures such as contour trenches, small stone based check dams in the degraded sites of grassland to arrest soil erosion and improve fertility of soil need to be promoted.
- Eradication of invasive alien species like *Prosopis juliflora* and *Parthenium hysterophorus* from the grassy sites should be practiced **before the flowering stage.**
- Planting of tree species of top canopy, especially in breeding and nesting sites of Lesser florican need to be avoided completely.
- Promoting organic farming by the farmers especially around sanctuary and practicing integrated pest management (IPM) in farming practices.
- Complete ban on dumping of solid wastes around the sanctuary to avoid predation by stray dogs. **The organic waste may be used for compost production.**
- Promotion of awareness through informal and formal education and training activities among masses, media and policy makers about the

value of grasslands, importance of Lesser florican, value of grasslands for other bird species, danger of the use of pesticides and invasive alien species.

- Suitable reward and incentives to local people and NGOs promoting organic farming, IPM, reduced livestock population, regulated grazing, use and recycle of waste and conservation of Lesser florican.

1.11 Conservation and Mitigation Measures

This section is based on the actual field visits of the project site, discussion with local people and forest department field staff and published studies cited under “literature cited or references”. Assessment of habitat quality, extent and analysis of usage and problems are essential pre-requisite for Environmental Management Plan. Predicting barriers caused by local and state activities is critical. The following **measures** could be essentially practiced for the **environmental and biodiversity conservation** in the project area for the combined flora and fauna in the sanctuary:

1. **Monitoring:** Regular monitoring of the existing grasslands for aerial extent, species composition, biomass production and successional status is necessary besides monitoring of Lesser florican population.
2. **Management of Conservation Activities:** The conservation need be practiced **at landscape level following local people-centric decentralized participatory approach** where bottom up approach for generation of information and practices for conservation need be given priority. **A collaborative management approach** involving all stakeholders such as the Forest department, Wildlife wing, Park personnel, local people and knowledge partners-academia and research, and interface institutions like non-profit organizations and trusts would be appropriate for this purpose. Whenever possible, the Corporates may also be involved as stakeholder to perform their social responsibility in terms of their contribution as monetary support and technology for maintenance of wildlife habitat, habitat improvement and awareness generation. **The establishment of renewable energy**

(wind mill) project must be discouraged in those areas nearby to Park and eco-sensitive zone.

3. **Awareness Generation:** The knowledge and technical skills are pre-requisite for human capital to perform in a desired manner. It is, therefore, suggested that the information in regard to species of plants and animals existing in the project site, importance of these species for human beings and conservation of food chain organisms and ecological processes essential for ecological balance at the site, threats for their survival and suitable package of practices for conservation of biodiversity need be made available to the local people and other stakeholders **through print and electronic media, street plays (*nukkad natak*) and exhibitions. Local festivals and fairs (*mela*) can be better opportunities for awareness generation.**

Awareness generation with respect to the importance of Lesser florican, Sarus Crane, Whistling duck particularly, about religious taboos of local communities (e.g., presence of Lesser florican, Sarus Crane, Whistling duck in habitation and agricultural fields brings prosperity) and indigenous practices of biodiversity conservation **among youth** need to be promoted. **The youth and socially accepted persons may be utilized as guards against poaching and hunting.**

4. **Promotion of Eco-development and Ecotourism:** In order to reduce the dependency of local people on the forest, savanna, grassland and natural biodiversity for different socio-economic needs, such as, fire-wood, small timber, leaf fodder and medicinal species, etc., the eco-development program considering the cultural and socio-economic and environmental dimensions specific to the project site need be encouraged utilizing local population, indigenous knowledge and practices. Wherever necessary the technology developed through scientific experiments and field experiences in regard to sustainable utilization of natural resources and organic agriculture including agro-forestry for the grass needs be integrated with the traditional practices.

Eco-development is now seen as a site- specific conservation-friendly measure for environmentally-compatible economic development.

5. **Aquaculture for Fishery:** Fish provides meat of white category that does not lead to cardio-vascular diseases and high blood pressure. Additionally, fish is among the most potential source of animal protein and vitamin-A. Although the consumption of meat is not a common practice in and around the project site, it is, therefore, suggested that **fish farming** as an aquaculture practice need be popularized in the project area to meet the **twin objective of fish harvest and fish conservation** in natural water bodies and wetlands. The pond-based fishery may be promoted in the project area.

Suitable fish species such as *Cirrhinus mrigala*, *Catla catla* and *Labeo rohita* may get priority in this activity. Fishery Department of the Government of Madhya Pradesh should contribute as resource organization for fish seed and capacity building programmes.

6. **Promotion of Farm Forestry, Agro-Forestry and Silvo-pasture:** The multi- species landuses, such as, agro-forestry and farm forestry in the farm land, horti- pastoral and silvo-pastoral practices on the barren lands and wasteland need be given priority to achieve soil conservation and to obtain economic goods, such as, fire-wood, small timber, fodder and fruits simultaneously. For this purpose, locally-preferred species should be considered on priority.
7. **Promotion of Traditional Agriculture:** As the Lesser florican prefers a mosaic of grasslands and croplands with traditional crops, the cultivation of traditionally grown crops, such as, sorghum, pearl millet, sesame, gram, etc. should be promoted on private farmlands. As most of the area in the project site is owned privately under Revenue Department, cultivation of traditional crops on private land togetherwith grassland management will provide suitable habitats to the bird.
8. **Control of Illegal Harvest:** Recall that the poaching and killing of the

bird in the project area will increase due to influx of migratory and project related human forces, such activities need to be monitored regularly in the project area. **The labourers need to be educated about the significance of Lesser florican so that they develop a concern of care.** Wherever necessary, the poachers must be punished suitably following the legislative procedures.

9. **Habitat Management for Wildlife:** Both regulatory (for human actions) and habitat management practices including engineering devices need be utilized for managing and improving habitats for wildlife. The landscape approach following decentralized collaborative management need be adapted for this purpose.

The habitat management practices such as, road-side plantation, rain water harvesting, fencing along road-side, eradication of *Prosopis juliflora* are *Parthenium hysterophorus* and other weedy species, regulated grazing by domesticated livestock at selected site can be adopted.

For good governance in the interest of wildlife conservation and sustainable economic development, the following regulatory measures need be considered equitably in case of common citizens, authorities and very important persons.

- Wildlife (Protection) Act 1972 and amendments
- The Forest Conservation Act 1980
- The (Prevention and Control of Air Pollution) Act 1981
- The (Prevention and Control of Water Pollution) Act 1974
- The Environment (Protection) Act 1986
- The Biodiversity Act, 2002
- Discharge of effluents as per EPA, 1986
- Noise Pollution and Control Rules, 2000

- Construction and Demolition of Waste Management Rules, 2016
- Solid Waste Management Rules, 2016
- Plastic Waste Management Following Plastic Waste Management Rules, 2016

1.12 Plantation and Habitat Restoration

Green Belt Development

A green belt has been proposed along the boundary of the proposed expressway area. The area for green belt plantation consists of undisturbed soil; hence plantation can be made along the road sides. Green belt is erected not from biodiversity or conservation point of view only, but is basically developed as a screen to check the spread of dust/automobile pollution, reduce noise pollution, reduce light glaring in surrounding areas and improve the aesthetic and landscaping of the area.

Following procedure and precautions will be taken for this development:

- Seedlings of only native species, suitable for green belt plantation will be considered for road sides and suitable ornamental plants and hedges on median.
- All the representative plant species of the region are found to grow in and around the study site. Care would be taken against grazing, browsing and trampling of the plantations.
- Timely watering during the initial stages of survival and provisions for the allocation of funds are being made.
- Awareness will be created among villagers residing on the periphery of the project site regarding the judicious use of plantations.
- Plantations will be undertaken of indigenous non-edible species only, avoiding fodder and fruit bearing tree species which can also act as habitats for wild life so as to avoid animal fatalities.
- This tree cover would however be a place where some local fauna would develop and thrive overtime.

Plantation in the median zone

Trees are being planted in the median zone also, between the carriageway. This plantation is being done at selected places using local species of small trees, bushes, ornamental plants

and shrubs.

Water bodies

Water, particularly during drier seasons, becomes the most important factor to all types of wild animals including the mammals, birds and reptiles. If water is available safely, then all other factors become secondary for the presence and survival of the wild life in any forested and grassland area. Places suitable for mini ponds and water holes, watersheds would be identified in the vicinity of the project area to store rainwater. Further, to make water available at all the times, throughout the year, some of these water holes would be recharged through artificial means. Proper slope would be given to approach these water sources so that the wild animals would be able to drink water without any difficulty. Proper cover through vegetation would be developed near these water sources so that the prey species would be able to hide themselves from the predators, at the time of approaching the water sources. To attract the birds, plants yielding food to the birds would be planted on priority basis near water holes. If water and food are available to the birds without any anthropogenic disturbances, the area can also become an ideal place for bird watching and ecotourism.

1.13 Eco-friendly measures to mitigate Impacts of linear infrastructure on wildlife, MoEFCC, GoI Guidelines

The MoEF&CC has issued draft guidelines in 2016 for various Eco-Friendly Measures to Mitigate Impacts of Linear Infrastructure on Wildlife based upon the different types of fauna available. Based upon the Sailana WLS notification and field visits and discussions the following mitigations measures (Table- 9 & 10) are suggested to be followed during the construction period as to have a free movement for the wildlife in the project vicinity.

Table-9: Mitigation measures and details following guidelines

Sl.	Mitigation measure	Details as per Guidelines
1	Animal underpass (Ch 8, page 76)	If width of corridor is 3 km or more, 300 m underpass of size (span length -30 to 100 m, height - 5 m and width - 6 to 8 m) are suggested at every km of the road.
2	Pipe culvert (Hume Pipe), (Ch 6, Page 63 & Ch-8 page 76)	For maintaining connectivity for larger mammalian species, for amphibians or reptiles, pipe culverts (dia -1.2 to 1.5 m) single/multiple should be constructed in every 100 m stretch of road.

3	Steel wire fencing (Ch 9, Page 94)	As per mitigation measures fences should be at least 80 cm high above ground and 20 cm below ground for reptiles and amphibians, Fencing should ideally be located between two underpasses so as to guide animals to safe passage ways.
4	Steel road side railing	Railing on both sides of the road with 1m height to prevent animal crossing the road.
5	Culvert (Box Type), (Ch 6, Page 62)	Square/Rectangular box type culvert of size 3.0 m X 3.0 m
6	Noise/light mitigation through plantation of hedges/trees, Ch-11, pp113, 117	Natural soil berms, CC panels, Stones in zig-zag, (3-5m) hedging/tree plantations (around 60m width required) for 5-10 dB reduction.
7	Steel canopy bridge, Ch-6, p 61	This is a rope, or wooden ladder or walkway suspended either from vertical poles or trees. It should be taut and wide enough for animals to walk on. Size - 10.5m ht x 9m width.
8	Signages, Ch-10, p100	Reflective/non-reflective as per need, for speed regulation, caution, animal crossings, bird flight area and various information/directional signboards.
9	Tree bridges/canopy	Tree plantations on both sides and median of the road would deter birds to come to the road and would naturally fly from tree top on both sides.

Source: MoEFCC Guidelines for linear projects, 2016

Based upon the above list of mitigation measures, and as per the requirement and need for the project area, the following mitigation measures have been suggested and planned in the DPR of the project. The detailed List of structures proposed for local hydrogeology drainage and wildlife crossing is attached as **Annexure 2**.

Table 10: Eco-friendly measures to mitigate impacts of linear infrastructure on wildlife

S.No.	Mitigation measure*	No. or length (km)
1.	Animal underpasses of various spans (viaduct, deck slab bridge, RCC) over water bodies, Nallah, drains.	31 no.
2.	Culverts (Std. 3.0m x 3.0m)	25 no.
3.	Steel wire fencing (1.5 m -3.0m ht.) for steering animals towards underpasses, culverts and avoiding entering the embankment of road and median openings. i) 3.0 m ht. near outside embankments/openings ii) 1.50 m ht. at median openings, open to sky.	5 km 4km
4.	Boundary/shoulder road side wall BM/CC (1.50m ht.), entire length except openings for WL area.	40 km

5.	Noise/light mitigation through plantation of hedges/trees	62 km
6.	Signage's for entire length of 31 km	--

*These mitigation costs are already included in the construction cost in the DPR/Tender cost.
Reference: Mitigation measures for Linear projects, MoEFCC, GoI, 2016.

Most of the mitigation measures are inbuilt within the construction of the proposed highway, Additional cost on account of any new proposed mitigation measures as per the guidelines would be met as per the provisions/demand of the NBWL clearance that would be under taken for the project.

1.14 Additional Budget for Wildlife Conservation and Management

In order to further strengthen the wildlife conservation efforts the following activities have been considered:

- a. Grassland improvement (provision of seeds of palatable grass to the respective range offices and farmers associations in the buffer zone).
- b. Maintenance and gap filling (Provision of plantation to fill the void by plantation suitable local species).
- c. Promotion of organic farming, IPM, rotational grazing, etc. (Help will be given to the farmers and horticulturalist to get certified their products form MP State Organic Food Certification Agency).
- d. Development of water holes for birds and Soil & Water conservation measures.
- e. Eradication of invasive alien flora species.
- f. Compensation (for supporting conservation initiatives) to local people.
- g. Awareness programmes and capacity building activities for Self Health Group farmer association, Yuvak Mangal Dal, Mahila Mangal Dal and other Community based organisation.
- h. Reward for conservation efforts (anti-poaching) and organic farming to the NGOs and local people.
- i. Increasing the monetary compensation/incentive to the farmers in whose field the birds are sighted from existing Rs.5000/yr. to 10000/yr.
- j. Equipment's for ecology and habitat management is suggested below in Table-11 and budgeted in the mitigation cost.

Needless to say that these conservation efforts have to be taken up on priority and in a sustained manner over a long period of time, with the involvement of all the concerned stakeholders.

Further the detail budget for Wildlife Conservation and Management is given in Table 12 below. The budget would be spread over a period of three to five years and will be implemented in close co-ordination and association with the forest, fisheries and agriculture departments of Govt. of M.P.

Table-11: Suggestive list of equipment to be required for conservation and enrichment of flora and fauna

S.No.	Equipment
1.	Camera with accessories
2.	Binocular
3.	Equipment for plantlet generation (Tissue culture)
4.	Oven
5.	Refrigerator
6.	Desiccator
7.	Hot plate
8.	Net house
9.	Captive breeding cages
10.	Earthen pots
11.	Poly sheets of different thickness
12.	Plant raising bags
13.	Hyco-trays
14.	Glass wares, such as Petri-dishes, Flask, Beaker, Glass bottle, etc.
15.	Plastic wares like containers, trays, etc
16.	Seeds of different species of grasses, herbs, shrubs and trees indicated in the conservation plan
17.	Nursery implements-Kudal, Khurpi, spade, rake, sickle, saw, grass cutter, knife, scissor, etc

18.	Herbarium Almira, sheet and related items
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Table 12: Five year Budget (Rs.) for conservation and management (in Rupees)

Sl.	Activity	Year 1	Year 2	Year 3	Year 4	Year 5	Total
(A) OPERATIONAL COMPONENT[#]							
1	Grassland improvement activities (Approx. 50 ha. of the Sanctuary grassland as a gap filling). @ 0.25 lac/ha.^ (IGFRI Jhansi)	500000	400000	350000			1250000
2	Monitoring, maintenance and gap filling of approx. 50 ha of protected area.	200000	200000	200000	200000	200000	1000000
3	Eradication of weeds and invasive alien species, such as, <i>Prosopis juliflora</i> , etc.	200000	200000	200000	200000	200000	1000000
4	Development of water holes/water bodies (natural and artificial, solar pumps) and Soil & Water conservation measures	1000000	300000	200000	-	-	1500000
5	Awareness programmes and sensitization activities along with forest dept.	200000	200000	200000	200000	200000	1000000
	Sub-total (A)	2100000	1300000	1150000	600000	600000	5750000
(B) Expenditure for linear infrastructure* (Eco-friendly Measures to Mitigate the Impacts of Linear Infrastructure on Wildlife, MoEFCC circular no. F.No 6-111/2019 WL dated July 02, 2019)							
1	Animal underpasses of various spans (viaduct, deck slab bridge, RCC) over water bodies,	2378200000	2378200000				475,64,00,000

	Nallah, drains.						
2	Culverts as per DPR (Std. 3.0m x 3.0m)	65100000	65100000				13,02,00,000
3	Steel wire fencing (1.5 m -3.0m ht.) for steering animals towards underpasses, culverts and avoiding entering the embankment of road and median openings.	5750000	5750000				1,15,00,000
4	Boundary/shoulder road side wall BM/CC (1.50m ht.), entire length except openings for WL area.	76850000	76850000				15,37,00,000
5	Noise/light mitigation through plantation of hedges/trees	31000000	31000000				6,20,00,000
6	Signage's for entire length of 31 km	7500000	7500000				1,50,00,000
	Sub-total (B)	2564400000	2564400000				512,88,00,000
(C) INFRASTRUCTURE[#] (As proposed by CWLW vide letter no. 3969 dated June 14, 2019)							
1	Building for office, training-cum- meeting/ interaction hall, store, sanitation facilities and patrolling camp. (three buildings)	2500000					2500000
2	One Patrolling vehicle	1000000	-	-	-	-	1800000
	Patrolling expense	160000	160000	160000	160000	160000	
3	Watch tower (04)	1000000					1000000
4	Bridle path	800000					800000
5	Office-cum-training etc. related items, such as, furniture, fixtures, computer and accessories, and	1000000					1000000

	miscellaneous items						
6	Equipment's required for the conservation and enrichment of flora and fauna.	3000000					3000000
	Sub-Total (C)	9460000	160000	160000	160000	160000	10100000
	Grand-Total (A+B+C)	2575960000	2565860000	1310000	760000	760000	5144650000
	Grand-Total (A+C)[#]	11560000	1460000	1310000	760000	760000	15850000
	Grand-total	Rupees One crore fifty eight lakh and fifty thousand only					

[^] Source: <http://www.igfri.res.in/CMS/News/IGFRI%20technologies.pdf>

* The cost for these structures is already included in the construction cost in the Detailed Project Report for the proposed project. These structures and cost will be in the scope of the contractor with financial implication as per tender documents.

The suggestions given by CWLW vide his letter no. 3969 dated 14.06.2019 have been incorporated and this budget amount would be paid by NHAI as per the mandate of the SBWL/NBWL committee's project clearance letter that would form around 2% of the project cost. The project cost for the road stretch passing within the 10 km ESZ boundary of Sailana Shikarwadi Sanctuary will be around 650 crores and the 2% amount of the same would be more judicious than what has been proposed.

A total amount of Rs.1.585 crores (Rupees One crore fifty eight lakh and fifty thousand only) is proposed for the proper biodiversity protection and mitigation measures in the project area. This budget for the mitigation activities would be implemented from the budgetary provisions (approximately 2% of the project cost) that would be applicable as per the NBWL/SBWL clearance for the project passing through the wildlife sanctuary.

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- x. Shankaran, R. 1994. Red Data Bird: Lesser Florican. *Newsletter for Birdwatchers* 34(1) Cover.
- xi. <http://wwfenviis.nic.in/ViewGeneralLatestNews.aspx?Id=4181&Year=2014>
- xii. http://www.wiienviis.nic.in/KidsCentre/EndangeredSpecies_8095.aspx
- xiii. <http://www.igfri.res.in/Proven%20Technologies8.aspx> (Technology- VIII: Community pastureland development)
- xiv. <https://www.icar.org.in/files/forage-and-grasses.pdf>
- xv. http://planningcommission.gov.in/aboutus/committee/wrkgrp12/enf/wg_subfooder.pdf

Annexure 1 - Experience of Dr. N.P.Melkania, Consultant Biological Environment component (biodiversity aspect) of the EIA report

Dr. N.P. Melkania is a resident of Haldwani (Distt. Nainital) of Uttarakhand. He is a QCI-NABET accredited consultant for Ecology and Biodiversity Functional Area for Category A projects. Dr. Melkania has served as faculty in the Department of Environmental Science, G.B. Pant University of Agriculture & Technology, Pantnagar; also as an Environment Analyst at the same Department for MoEF&CC; Professor of MoEF&CC institution - Indian Institute of Forest Management, Bhopal; Professor of Forestry and Dean - Sponsored Research and Industrial Consultancy at MHRD Institution – North Eastern Regional Institute of S&T, Itanagar, Arunachal Pradesh; Project Coordinator (Forage crops) and Director of ICAR Institute – Indian Grassland and Fodder Research Institute, Jhansi; and Executive Director of Uttarakhand Open University's School of Sciences, and School of Agriculture Sciences, Haldwani.

Dr. Melkania has contributed as a Principle Investigator (Ecology Component) for Joint Forest Management project sponsored by Ford Foundation to the IIFM, Bhopal; Consultant for World Bank Project – Valuation of timber and non-timber forest products in M.P.; Narmada Valley Development Authority project (Sponsored to Friends of Nature Society, Bhopal) on Preparation of Wildlife Retrieval Plan; FRI Dehradun European Union Project on Ecological Goods & Services in Forestry working plan in Uttarakhand and Haryana, to cite the notable ones.

To illustrate contribution in the developmental Projects of India, Dr. Melkania has contributed as Consultant (Accredited as Functional Area Expert for Ecology and Biodiversity by QCI- NABET) for High Speed Rail Project - Mumbai to Ahmedabad; Thermal power projects in U.P.; Hydro Projects for Badaun (U.P.), Panna (M.P.), Datia (M.P.), Dhamtari (Chhatisgarh), Jamui (Bihar); and Construction of Expressway Projects - Ahmedabad and Bhavnagar District, Gujarat; and Ratlam (M.P.).

Annexure-2: List of bridges to be used for wildlife crossing along the alignment

S.No.	Description	Chainage	Span Arrangement	Width	Length of Structure	Type of Superstructure
1.	Minor Bridge	150+262	1 x 25.0	2 x 21.25	25	RCC T-Beam
2.	Minor Bridge	151+723	2 x 6.0	2 x 21.25	12	RCC Box
3.	Minor Bridge	153+735	1 x 16.0	2 x 21.25	16	RCC T-Beam
4.	Minor Bridge	156+27	1 x 20.0	2 x 21.25	20	RCC T-Beam
5.	Minor Bridge	157+477	1 x 35.0	2 x 21.25	35	PSC I-Beam
6.	Minor Bridge	158+181	2 x 16.0	2 x 21.25	32	RCC T-Beam
7.	Minor Bridge	158+365	1 x 6.0	2 x 21.25	6	RCC Box
8.	Minor Bridge	158+909	1 x 25.0	2 x 21.25	25	RCC T-Beam
9.	Minor Bridge	164+928	2 x 25.0	2 x 21.25	50	RCC T-Beam
10.	Minor Bridge	165+503	1 x 25.0	2 x 21.25	25	RCC T-Beam
11.	Major Bridge	167+780	13 x 35.0	2 x 21.25	455	PSC I-Beam
12.	Minor Bridge	168+725	2 x 25.0	2 x 21.25	50	RCC T-Beam
13.	Minor Bridge	169+57	1 x 25.0	2 x 21.25	25	RCC T-Beam
14.	Minor Bridge	170+515	1 x 18.0	2 x 21.25	18	RCC T-Beam
15.	Minor Bridge	171+02	2 x 6.0	2 x 21.25	12	RCC Box
16.	Minor Bridge	171+462	1 x 20.0	2 x 21.25	20	RCC T-Beam
17.	Minor Bridge	171+8	2 x 6.0	2 x 21.25	12	RCC Box
18.	Minor Bridge	172+625	1 x 35.0	2 x 21.25	35	PSC I-Beam
19.	ROB	173+661	123.0 + 230.0 + 123.0+ 3x35.0	2 x 21.25	581	Cable Stayed + PSC I-Beam
20.	Major Bridge	174+198	9 x 35.0	2 x 21.25	315	PSC I-Beam
21.	Minor Bridge	174+876	3 x 6.0	2 x 21.25	18	RCC Box
22.	Major Bridge	175+220	7 x 35.0	2 x 21.25	245	PSC I-Beam

23.	Major Bridge	175+865	2 x 35.0	2 x 21.25	70	PSC I-Beam
24.	Minor Bridge	176+008	1 x 35.0	2 x 21.25	35	PSC I-Beam
25.	Minor Bridge	176+545	2 x 16.0	2 x 21.25	32	RCC T-Beam
26.	Minor Bridge	176+765	1 x 16.0	2 x 21.25	16	RCC T-Beam
27.	Minor Bridge	177+010	1 x 16.0	2 x 21.25	16	RCC T-Beam
28.	Major Bridge	178+555	26 x 35.0	2 x 21.25	910	PSC I-Beam
29.	Minor Bridge	180+100	1 x 25.0	2 x 21.25	25	RCC T-Beam
30.	Minor Bridge	180+635	2 x 6.0	2 x 21.25	12	RCC Box
31.	Minor Bridge	180+970	1 x 25.0	2 x 21.25	25	RCC T-Beam

List of culverts to be used for wildlife crossing

S. No.	Design	Span Arrangement	Structure Type
1	150+371	1 x 3.0 x 3.0	RCC Box
2	154+800	1 x 2.0 x 2.0	RCC Box
3	155+160	1 x 3.0 x 3.0	RCC Box
4	155+488	1 x 2.0 x 2.0	RCC Box
5	156+458	1 x 3.0 x 3.0	RCC Box
6	156+845	1 x 3.0 x 3.0	RCC Box
7	157+043	1 x 3.0 x 3.0	RCC Box
8	157+955	1 x 2.0 x 2.0	RCC Box
9	160+700	1 x 2.0 x 2.0	RCC Box
10	161+450	1 x 5.0 x 3.0	RCC Box
11	162+066	1 x 5.0 x 3.0	RCC Box
12	163+344	1 x 5.0 x 3.0	RCC Box
13	170+284	1 x 3.0 x 3.0	RCC Box
14	170+350	1 x 3.0 x 3.0	RCC Box
15	174+722	1 x 3.0 x 3.0	RCC Box
16	173+661	1 x 3.0 x 2.0	RCC Box
17		1 x 3.0 x 2.0	RCC Box
18	176+108	1 x 3.0 x 3.0	RCC Box
19	176+390	1 x 3.0 x 3.0	RCC Box
20	176+473	1 x 5.0 x 3.0	RCC Box
21	177+400	1 x 3.0 x 3.0	RCC Box
22	179+877	1 x 3.0 x 3.0	RCC Box
23	180+290	1 x 3.0 x 3.0	RCC Box
24	180+830	1 x 3.0 x 3.0	RCC Box
25	181+000	1 x 2.0 x 2.0	RCC Box

Annexure-3: QCI and NABET Accreditation

NATIONAL ACCREDITATION BOARD FOR EDUCATION & TRAINING
QUALITY COUNCIL OF INDIA

QCI Office, 6th Floor, ITPI Building, Ring Road, I.P. Estate, New Delhi

Scheme for Accreditation of EIA Consultant Organizations

Accreditation Committee Meeting for Initial Accreditation held on

December 16, 2016

The following were present during the meeting.

- | | |
|----------------------------|-----------------|
| 1. Prof. B. B. Dhar | - Alt. Chairman |
| 2. Dr. S P Chakrabarti | - Member |
| 3. Dr. G K Pandey | - Member |
| 4. Prof. C.P. Kaushik | - Member |
| 5. Prof. Umesh Kulshrestha | - Member |

Earlier Dr. S R Wate, Dr. Nalini Bhat and Prof. G. J. Chakrapani expressed their inability to attend the meeting.

NABET Secretariat was represented by:

Mr. A. K. Ghose- Principal Advisor, Mr. A.K. Jha- Senior Director, Dr. Pawan Kumar Singh- Assistant Director and Ms. Kritika Sharma- Executive Officer.

Following cases were discussed and decisions taken thereof are:

1.0 Cases of Initial Accreditation

1.1 Enviro Infra Solutions Pvt. Ltd., Ghaziabad

Enviro Infra Solutions Pvt. Ltd., Ghaziabad has been assessed as per Version 3 of the Scheme. Result of the Initial Accreditation (IA) assessment is given below-

1.1.1 Category of Approval:

The organization has scored more than 60% marks therefore, accredited with Cat. A.

1.1.2 Scope of Accreditation

Sl. No.	NABET Scheme Sectors	Sector Description	Cat.	Sector Number (MoEFCC Notification dt. Sep. 14,2006 & Amendments)
1.	1	Mining of Minerals (opencast only)	B	1 (a)(i)
2.	2	Offshore and onshore oil and gas exploration, development & production	A	1 (b)
3.	3	River Valley projects	A	1 (c)
4.	4	Thermal power plants	A	1 (d)

5.	8	Metallurgical industries (for ferrous only)	B	3 (a)
		Metallurgical industries (for non ferrous only)	A	
6.	9	Cement plants	B	3 (b)
7.	21	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	A	5 (f)
8.	22	Distilleries	A	5 (g)
9.	27	Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks/ sanctuaries/coral reefs / ecologically sensitive areas including LNG terminal	A	6 (a)
10.	28	Isolated storage & handling of Hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	A	6 (b)
11.	33	Ports, harbours, break waters and dredging	B	7 (e)
12.	34	Highways	A	7 (f)
13.	38	Building and construction projects	B	8 (a)
14.	39	Townships and Area development projects	B	8 (b)

1.1.3 EIA Coordinator (ECs)

Sl. No	Name	Sectors			Cat.	Remarks
		Applied	Recommended	Approved		
In-house						
1	Yashpal Jain	8*	Yes	Yes	B	* Ferrous only
		9	Yes	Yes	B	
		22	Yes	Yes	A	
		38	Yes	Yes	B	
		39	Yes	Yes	B	
2	Anoop Misra Kishore	8*	Yes	Yes	A	*Non- ferrous only
		21	Yes	Yes	A	
		28	Yes	Yes	A	
3	Vijay Sharma	38	Yes	Yes	B	None
Empanelled						
4	Sanjeev Sharma	1*	Yes	Yes	B	*Opencast Only
		3	Yes	Yes	A	
		4	Yes	Yes	A	
		33	Yes	Yes	B	
		34	Yes	Yes	A	
5	B. M. Sinha	2	Yes	Yes	A	None
		27	Yes	Yes	A	

1.1.4 Functional Area Experts (FAEs)

Sl. No	Name	Functional Areas (FA)			Cat.	Remarks
		Applied	Recommended	Approved		

Sl. No	Name	Functional Areas (FA)			Cat.	Remarks
		Applied	Recommended	Approved		
In-house						
1	Yashpal Jain	WP	Yes	Yes	A	None
		AP	Yes	Yes	B	
		SHW	Yes	Yes	B	
2	Yasir Ahmad	LU	Yes	Yes	B	*Candidature withdrawn for SHW.
		SHW*	-	-	-	
3	Anoop Kishore Misra	RH	Yes	Yes	A	*ISW& HW only
		SHW*	Yes	Yes	A	
		WP	Yes	Yes	A	
4	Vijay Sharma	AP	Yes	Yes	B	None
		SC	Yes	Yes	B	
5	M.L. Sharma	SC	Yes	Yes	A	None
6	Abhay Bahuguna	EB	Yes	Yes	A	None
		SE	Yes	Yes	B	
7	Ishan Jain	HG	Yes	Yes	B	*Candidature withdrawn for SC
		SC*	-	-		
Empanelled						
8	N.P. Melkania	EB	Yes	Yes	A	None
9	Nitin Shitole	SE	Yes	Yes	A	None
10	Sanjeev Sharma	AP	Yes	Yes	A	None
		AQ	Yes	Yes	A	
		NV	Yes	Yes	A	
		SHW	Yes	Yes	A	
11	B.M. Sinha	Geo	Yes	Yes	A	None

1.1.5 Functional Area Associate (FAA)

Sl. No	Name	Functional Area Applied	Functional Area Approved	Cat	Name of senior expert	Remarks
1	Rishabh Sehgal	AP	Yes	B	Yashpal Jain	None
		NV	Yes	B	Sanjeev Sharma	

Note: Details of the balance candidates and assessment findings shall be communicated to the ACO by NABET.

1.2 TEAM Institute of Science & Technology Pvt Ltd, Jaipur

The case of TEAM Institute of Science & Technology Pvt Ltd, Jaipur could not be completed due to paucity of time. The same shall be taken up in the AC next meeting.

The meeting concluded with a vote of thanks to and from the Chair.

Issued by

A K Jha

Senior Director | NABET

Abbreviations:

AO	-	Applicant Organization
ACO	-	Accredited Consultant Organization
AC	-	Accreditation Committee
IA	-	Initial Accreditation
SA	-	Surveillance Assessment
EC	-	EIA Coordinator
FA	-	Functional Area
FAE	-	Functional Area Expert
FAA	-	Functional Area Associate
For sector numbers-		Refer the Scheme

For functional areas-

Refer the Scheme



Quality Council of India

National Accreditation Board for Education & Training



CERTIFICATE OF ACCREDITATION

M/s Enviro Infra Solutions Pvt. Ltd, Ghaziabad

301,302 & 305, SRBC, Plot No. INS - 12, Sector - 9, Vasundhara, Ghaziabad – 201012

is accredited under the QCI-NABET Accreditation Scheme for EIA Consultant Organizations (Version3) for preparing EIA/EMP reports in the following sectors:

Scope of Accreditation:

Sl. No.	Name of Sector	Cat.
1.	Mining of Minerals (opencast only)	B
2.	Offshore and onshore oil and gas exploration, development & production	A
3.	River Valley projects	A
4.	Thermal power plants	A
5.	Metallurgical industries (for ferrous only)	B
	Metallurgical industries (for non ferrous only)	A
6.	Cement plants	B
7.	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	A
8.	Distilleries	A
9.	Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks/ sanctuaries/coral reefs / ecologically sensitive areas including LNG terminal	A
10.	Isolated storage & handling of Hazardous chemicals (As per threshold planning quantity indicated in column 3 of schedule 2 & 3 of MSIHC Rules 1989 amended 2000)	A
11.	Ports, harbours, break waters and dredging	B
12.	Highways	A
13.	Building and construction projects	B
14.	Townships and Area development projects	B

Note: Name of approved EIA Coordinators and Functional Area Experts are mentioned in IAAC minutes published on website dated Dec 16, 2016.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions and on successful completion of Surveillance Assessment after 18 months. The renewal of accreditation shall be done through Re-accreditation process prior to expiry date of this certificate within 36 months

C.E.O

NABET

Certificate No.

NABET/ EIA/1619/ IA 0018

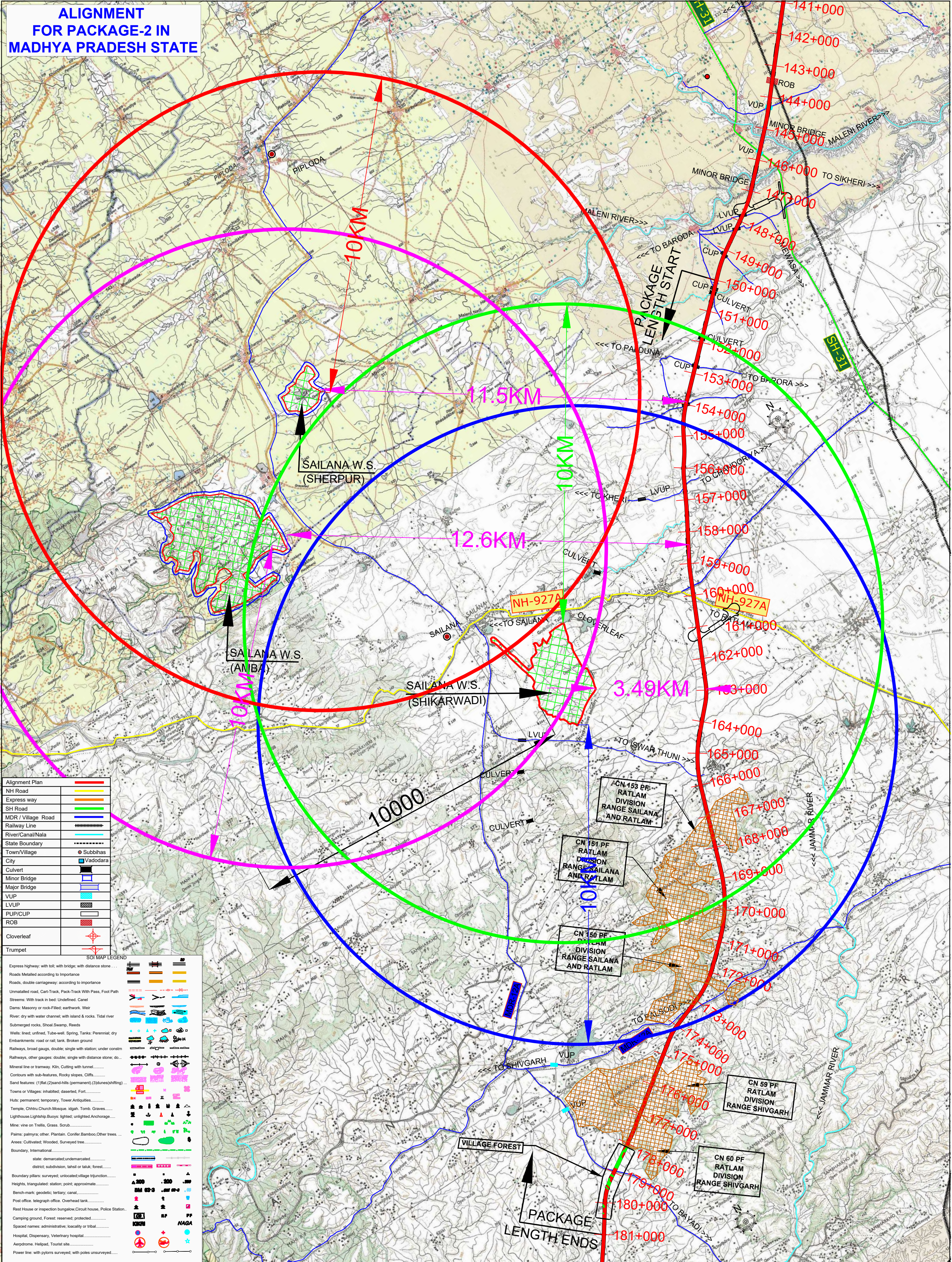
Valid up to

November 09, 2019

NABET is member of International Accreditation Forum (IAF) and Pacific Accreditation Cooperation (PAC).



Annexure-4: Detailed SOI map showing Sailana Wildlife Sanctuary



**ALIGNMENT
FOR PACKAGE-2 IN
MADHYA PRADESH STATE**

Alignment Plan	
NH Road	
Express way	
SH Road	
MDR / Village Road	
Railway Line	
River/Canal/Nala	
State Boundary	
Town/Village	
City	
Culvert	
Minor Bridge	
Major Bridge	
VUP	
LVUP	
PUP/CUP	
ROB	
Cloverleaf	
Trumpet	

Express highway, with toll, with bridge, with distance stone	
Roads Metalled according to importance	
Roads, double carriageway, according to importance	
Unmetalled road, Cart-Track, Pack-Track With Pass, Foot Path	
Streams: With track in bed, Undefined, Canal	
Dams: Masonry or rock-Filled, earthwork, Weir	
River: dry with water channel, with island & rocks, Tidal river	
Submerged rocks, Shoal, Swamp, Reeds	
Wells: lined, unfired, Tube-well, Spring, Tanks: Perennial, dry	
Embankments: road or rail, tank, Broken ground	
Railways, broad gauge, double, single with distance stone, do.	
Railways, other gauges: double, single with distance stone, do.	
Mineral line or tramway, Kln, Cutting with tunnel	
Contours with sub-features, Rocky slopes, Cliffs	
Sand features: (1)flat, (2)sand-hills (permanent), (3)dunes(shifting)	
Towns or Villages: inhabited, deserted, Fort	
Huts: permanent, temporary, Tower, Antiquities	
Temple, Chhtru Church, Mosque, Idgah, Tomb, Graves	
Lighthouse, Lightship, Buoys: lighted, unlighted Anchorage	
Mine: vine on Trellis, Grass, Scrub	
Palm: palmyra; other, Plantain, Conifer, Bamboo, Other trees	
Areas: Cultivated, Wooded, Surveyed tree	
Boundary, International	
state, demarcated, undemarcated	
district, subdivision, tahsil or taluk, forest	
Boundary pillars: surveyed, unlocated, village trijunction	
Heights, triangulated, station, point, approximate	
Bench-mark: geodetic, tertiary, canal	
Post office, telegraph office, Overhead tank	
Rest House or inspection bungalow, Circuit house, Police Station	
Camping ground, Forest, reserved, protected	
Spaced names: administrative, locality or tribal	
Hospital, Dispensary, Veterinary hospital	
Aerodrome, Heliport, Tourist site	
Power line: with pylons surveyed, with poles unsurveyed	

Annexure-5: DFO Ratlam letter to PCCF Wildlife Bhopal



कार्यालय वनमंडलाधिकारी, सामान्य वनमण्डल, रतलाम



सागोद रोड, रतलाम (म.प्र.)

टेलीफैक्स नं. (07412) 270418

E-mail Address - dfotrtlam@mp.gov.in

क्रमांक/वन्यप्राणी/2019/...1977

रतलाम, दिनांक : 06-06-2019

प्रति,

प्रधान मुख्य वन संरक्षक,
वन्यप्राणी एवं वन्यप्राणी अभिरक्षक
म.प्र. भोपाल

विषय :- Development of economic corridor, inter corridor and feeder routes to improve the efficiency of freight movement in India under Bharatmala Pariyojna (Lot No. 4/Packege-5) 8 laning of Delhi Vadodara section of NH-148N passing through Dist. Mandsour, Ratlam & Jhabua in Madhya Pradesh. - Bio Diversity study Report of Sailana Kharmour Wildlife Sanctuary towards grant of EC-Reg.

संदर्भ :- प्रबंधक, भारतीय राष्ट्रीय राजमार्ग प्राधिकरण का पत्र क्र-/NHAI/PIU/Ratlam/Environment/399,401,400 दिनांक 07-02-2019 प्रबंधक, भारतीय राष्ट्रीय राजमार्ग प्राधिकरण का पत्र क्र-/NHAI/PIU/Ratlam/Forest/553 दिनांक 10-04-2019


-0-


उपरोक्त विषयांकित संदर्भ में निवेदन है कि राष्ट्रीय राजमार्ग (नया नेशनल हाईवे 148) गुडगाव से बड़ोदरा तक भारत माला योजनान्तर्गत 8 लाईन मार्ग के अंतर्गत सैलाना अभयारण्य क्षेत्र का मौका निरीक्षण किया गया जिसमें पैकेज नम्बर 02 जो 150 से 181, 31 कि.मी. अंतर्गत ग्राम काण्डरवासा से खेरखुटा तहसील सैलाना के मध्य में ब्रीज, Culvert, SVUP, LVUP, VUP और Interchange इत्यादि का निरीक्षण किया गया उक्त मार्ग सैलाना अभयारण्य से 3.60 कि.मी. की दूरी पर स्थित है, जो ईको सेंसिटिव जोन के अंतर्गत आता है।

साथ ही प्रबंधक, भारतीय राष्ट्रीय राजमार्ग प्राधिकरण के पत्र क्र-/NHAI/PIU/Ratlam/Forest/553 दिनांक 10-04-2019 अनुसार आवेदक संस्था द्वारा Bio Diversity Report of Sailana Kharmour Wildlife Sanctuary प्रस्तुत किया गया है, एवं ग्राम खाण्डरवासा से खेर खुटा तहसील सैलाना में चैनेज क्र. 150 से 181 लम्बाई 31 कि.मी. में लगभग 85 स्ट्रेक्चर निर्माण किये जाने हेतु इस कार्यालय को अवगत कराया गया है।

अतः प्रस्तावित स्थल में निर्माण किये जाने वाले स्ट्रेक्चरों की सूची आवेदक संस्था से प्राप्त कर, स्ट्रेक्चरों की लम्बाई चौड़ाई क्षेत्रफल एवं जी.पी.एस रीडिंग मानचित्र में अंकित कर, प्रत्येक स्ट्रेक्चर की एक दूसरे से दूरी लगभग 0.3 कि.मी. के अंतराल में किया जाना प्रस्तावित है। जिसमें वन्यप्राणियों के आवगमन हेतु सुविधाएं एवं सुरक्षा हेतु पर्याप्त संरचनाओं का निर्माण किया जाना है।

संलग्न :- रिपोर्ट पत्रावली।


वनमण्डलाधिकारी
रतलाम


वन संरक्षक
वन्यप्राणी
म.प्र. भोपाल

File No. 1977/2019/Wild Life/Letter (WL-2019) doc

Annexure-6: Comments of PCCF Wildlife Bhopal

कार्यालय प्रधान मुख्य वन संरक्षक (वन्यप्राणी), मध्य प्रदेश

प्रगति भवन, भोपाल विकास प्राधिकरण, तृतीय तल, एम.पी.नगर, भोपाल

दूरभाष : 0755-2674318, 2674337, फैक्स : 0755-2766315

E-mail : pccfwk@mp.gov.in

क्रमांक/मा.वि./ 3969

भोपाल, दिनांक : 14-6-2019

प्रति,

वनगण्डलाधिकारी,

सामान्य वनगण्डल रतलाम

विषय :- Development of economic corridor inter corridor and feeder routes to improve the efficiency of freight movement in India under Bharatmala Pariyojana (Lot No. 4/Package-5).- NOC/CERTIFICATION REGARDING NON- APPLICABILITY OF NBWL FOR MP PACKAGE 1,2&3 SECTION, TERMS OF REFERENCE (TOR) FOR CONDUCTING ENVIRONMENTAL IMPACT ASSESSMENT, ISSUED BY MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE (MoEF&CC) VIDE THEIR LETTER NO. 10-64/2018-JA DATED 8th OCTOBER 2018

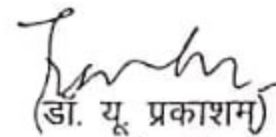
संदर्भ :- आपका पत्र क्रमांक/वन्यप्राणी/2019/1977 दिनांक 06.06.2019

उपरोक्त विषयांतर्गत लेख है कि भारत माला परियोजना के अंतर्गत दिल्ली से बड़ोदरा एक्सप्रेस हाइवे जो मंदसौर, रतलाम एवं झाबुआ जिले से होकर गुजरता है, जिसका आठ लेन मार्ग का निर्माण किया जाना प्रस्तावित किया गया है। उक्त मार्ग सैलाना अभयारण्य की सीमा से 3.6 कि.मी. की दूरी पर प्रस्तावित किया गया है, जो सैलाना अभयारण्य के ईको-सेंसेटिव जोन में स्थित होने के कारण सैलाना अभयारण्य पर मार्ग निर्माण से पड़ने वाले प्रभाव के आकलन हेतु बायोडायवर्सिटी रिपोर्ट संदर्भित पत्र से आपके द्वारा अनुमोदन हेतु इस कार्यालय को प्रेषित किया गया है। उक्त बायोडायवर्सिटी रिपोर्ट का अवलोकन करने पर निम्नानुसार कमियां परिलक्षित हुई हैं:-

1. प्रेषित बायोडायवर्सिटी रिपोर्ट किस व्यक्ति अथवा संस्थान द्वारा तैयार किया गया है? रिपोर्ट से परिलक्षित नहीं होता है।
2. प्रेषित बायोडायवर्सिटी रिपोर्ट किस व्यक्ति अथवा संस्थान द्वारा तैयार की गई है, क्या वे इस कार्य हेतु प्राधिकृत है? के संबंध में ऐसा कोई दस्तावेज संलग्न प्रेषित नहीं किया गया है।
3. प्रेषित बायोडायवर्सिटी रिपोर्ट पर सक्षम अधिकारी के हस्ताक्षर भी नहीं है।
4. प्रेषित बायोडायवर्सिटी रिपोर्ट में वन्यप्राणियों के लिए आवागमन (सड़क पार करना) एवं संरक्षण हेतु प्रावधानित मिटिगेशन मेजर्स भारतीय वन्यजीव संस्थान, देहरादून की Eco-Friendly Measures to Mitigate Impact of Linear Infrastructure on Wildlife के अनुरूप प्रस्तावित की गई है अथवा नहीं? यदि नहीं तो मिटिगेशन मेजर्स Eco-Friendly Measures to Mitigate Impact of Linear Infrastructure on Wildlife के अनुरूप प्रस्तावित कर इसका अपने अग्रिम में स्पष्ट उल्लेख किया जावे।

5. प्रेषित बायोडायवर्सिटी रिपोर्ट में वन्यप्राणी के संरक्षण एवं प्रबंधन हेतु 05 वर्ष के लिए 1.06 करोड़ रुपये प्रावधानित किये गये हैं, जो परियोजना की दृष्टि से अत्यंत न्यून है, इसमें वृद्धि की जावे।
6. उक्त रिपोर्ट में दुर्लभ प्रजाति के Flora-Fauna की जानकारी समावेश कर उनके संरक्षण एवं संवर्धन हेतु पर्याप्त उपायों का समावेश भी किया जावे।
7. उक्त रिपोर्ट में पेट्रोलिंग कैम्प एवं पेट्रोलिंग वाहन हेतु भी आवश्यक बजट का प्रावधान प्रावधानित किया जावे।
8. उक्त रिपोर्ट में Flora-Fauna के संरक्षण एवं संवर्धन हेतु उपयोग किये जाने वाले तकनीकी उपकरणों का समावेश किया जाना उचित होगा।

कृपया उपरोक्त बिन्दुओं पर कार्यवाही कर संशोधित बायोडायवर्सिटी रिपोर्ट अपने स्पष्ट अंगित के साथ उचित माध्यम से इस कार्यालय को प्रेषित किया जाना सुनिश्चित करें।


(डॉ. यू. प्रकाश)

मुख्य वन्यप्राणी अभिरक्षक एवं
प्रधान मुख्य वन संरक्षक (व.प्रा.), म.प्र.

भोपाल, दिनांक : 14-6-2019

क्रमांक/मा.चि./ 3970
प्रतिलिपि :-

1. मुख्य वन संरक्षक, उज्जैन/इन्दौर वृत्त की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।
2. प्रोजेक्ट मैनेजर, भारतीय राष्ट्रीय राजमार्ग प्राधिकरण, परियोजना क्रियान्वयन इकाई, बड़बड़ नाका के पीछे, सैलाना रोड़, रतलाम की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।



मुख्य वन्यप्राणी अभिरक्षक एवं
प्रधान मुख्य वन संरक्षक (व.प्रा.), म.प्र.