



सत्यमेव जयते

Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(INFRA-1)



Minutes of Minutes of the 360th meeting of Expert Appraisal Committee held on 21st March, 2024 through Video Conference for the projects related to Infrastructure Development, all Ship breaking yards including ship breaking units 7(b); Industrial Estate/Parks/Comple meeting INFRA-1 held from 21/03/2024 to 21/03/2024 **Date:** 13/04/2024

MoM ID: EC/MOM/EAC/188047/3/2024
Agenda ID: EC/AGENDA/EAC/188047/3/2024
Meeting Venue: N/A
Meeting Mode: Virtual
Date & Time:

21/03/2024	10:30 AM	05:30 PM
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1. Opening remarks

At the outset, Shri. Manmohan Singh Negi, Chairman, EAC welcomed the Members of the EAC and requested Shri Amardeep Raju, the Member Secretary of the EAC to initiate the proceedings of the meeting with a brief account of the activities undertaken by the Ministry under Infra-1 Division.

2. Confirmation of the minutes of previous meeting

The Committee confirmed the Minutes of 358th EAC meeting held on 27th February, 2024.

3. Details of proposals considered by the committee

Day 1 -21/03/2024

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Proposed Expansion of Dharamtar Jetty facility (Phase III) in village Dolvi of District Raigad, Maharashtra by J SW INFRASTRUCTURE LIMITED located at RAIGAD,MAHARASHTRA			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/MH/INFRA1/450952/2024	11-79/2013-IA.III	21/02/2024	Ports, harbors, breakwaters, dredging (7(e))

3.1.2. Project Salient Features

Subject: Expansion of cargo handling capacity from 33.95 MTPA to 57.0 MTPA at Dharamtar Jetty facility (Phase III) in village Dolvi of District Raigad, Maharashtra-ToR reg. Proposal No. IA/MH/INFRA1/450952/2024; File No. 10-79/2013-IA.III.

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

Details	Existing	After Expansion
Total Cargo Handling	33.95 MTPA	57.0 MTPA
Barge Size	2000 DWT to 3700 DWT	2000 DWT to 3700 DWT
		6000 DWT
Mini Bulk Carrier Size	8000 DWT	8000 DWT
Barge Unloaders	2 no. X 550 tph	2 no. X 550 tph
	5 no. X 2500 tph	5 no. X 2500 tph
		5 no. X 2500 tph
Mobile Harbour Crane	2 no. X 900 tph	2 no. X 900 tph
		1 X 1200 tph
Covered storage capacity	Yard A – 125 X 380 m	Yard A – 125 X 380 m
	Yard B – 125 X 400 m	Yard B – 125 X 400 m
Stacker	2 Nos	2 Nos
Reclaimer	Bucket wheel reclaimer- 3 Nos	Bucket wheel reclaimer- 3 Nos
	Portal reclaimer- 2 Nos	Portal reclaimer- 2 Nos
	Stacker cum reclaimer- 1 No	Stacker cum reclaimer- 1 No
Cross Country Conveyor	1 X 1200; 1 x 1500; 4 x 3000 t ph	1 X 1200; 1 x 1500; 4 x 3000 t ph
Jetty Outgoing Conveyor	1 X 1000; 2 x 5000 tph	1 X 1000; 2 x 5000 tph
		2 x 5000 tph

Sub- station	2 Nos.	3 Nos.	
Pump house	1 No.	2 Nos.	
S. No.	LU/LC	Area (ha)	%
1	Jetty/ Jetty Backup area	58.6	100
Total		58.6	100
Sr. no.	Commodity	Existing Quantity (Mt/yr)	Total Qty. after Expansion (Mt/yr)
1	Iron Bearing Raw Material (IBRM)	17.0	26.0
2	Coal Bearing Raw Material (CBRM)	8.00	10.0
3	Fluxes	3.00	7.00
4	HR coil, Sheets, CR coil in containers, Finished Steel Products, Steel Scrap	2.50	3.00
5	Slag / Fly Ash	1.00	1.00
6	Cement & Clinker	1.60	4.00
7	LPG, Propane, Butane, etc.	-	3.00
8	Edible Oil & other liquid cargo	-	1.00
9	Containers	0.85	1.00
10	Fertilizer, FRM, Gypsum, etc.	-	1.00
Grand Total (MTPA)		33.95	57.0

3.1.3. Deliberations by the committee in previous meetings

N/A

3.1.4. Deliberations by the EAC in current meetings

3.1.25 The EAC, taking into account the submission made by the project proponent, had a detailed deliberation in its 360th meeting of Expert Appraisal Committee held on 21st March, 2024 and **recommended** the proposal for grant of Terms of Reference (ToR) with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

3.1.5. Recommendation of EAC

Recommended

3.1.6. Details of Terms of Reference

3.1.6.1. Specific

Specific Conditions	
1.	<p>xxxii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.</p> <p>ii. In pursuance of Ministry's OM No stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.</p>

3.1.6.2. Standard

7(e)	Ports, harbors, breakwaters, dredging
Air Environment	
1.	The air quality monitoring should be carried out according to the notification issued on 16th November, 2009.
Baseline data	
1.	Examine baseline environmental quality along with projected incremental load due to the proposed project/activities.
Court/ Litigation records	
1.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
Environment Management/ Monitoring, Mitigative Measures and Risk Assessment details	
1.	Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.
1.	Details of desalination plant and the study for outfall and intake
1.	Submit details of a comprehensive Risk Assessment and Disaster Management Plan including emergency evacuation during natural and man-made disasters.
Environment Responsibility	

1.	As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, specific studies shall include all the activities required to be taken to fulfill these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
ESZ, CRZ, International Boundary and Acts	
1.	A detailed study on the impact of proposed activity on marine ecology and marine biodiversity with specific focus on the corals, mangroves and Mud flats in the proximity of the site should be conducted and required mitigation plan be submitted.
1.	Hydrodynamics study on impact of dredging on flow characteristics shall be carried out.
1.	A management plan for the area under which mangroves are or likely to be removed and compensatory mangrove plantation plan be submitted.
1.	Examine and submit detail of land use around 10 km radius of the project site and map of the project area and 10 km area from boundary of the proposed/existing project area, delineating project areas notified under the wild life (Protection) Act, 1972/critically polluted areas as identified by the CPCB from time to time/notified eco-sensitive areas/interstate boundaries and international boundaries.
1.	Erosion and accretion study at the mouth of the creek which is adjacent to the proposed site be carried out and submitted
1.	Detailed modelling studies to understand whether the selected site can withstand severe cyclones and develop design in accordance to due safety measures.
1.	Submit superimposing of latest CZMP as per CRZ Notification (2011) on the CRZ map. And also submit a copy of layout superimposed on the HTL/LTL map demarcated by an authorized agency on 1:4000 scales.
1.	Submit a complete set of documents required as per para 4.2 (i) of CRZ Notification, 2011.
Forest and Wildlife	
1.	Submit the details of compensatory plantation.
1.	Submit details of the trees to be cut including their species and whether it also involves any protected or endangered species.
1.	Explore the possibilities of relocating the existing trees.
1.	Measures taken to reduce the number of the trees to be removed should be explained in detail.
1.	Submit the present land use and permission required for any conversion such as forest, agriculture etc.
1.	land acquisition status, rehabilitation of communities/ villages and present status of acquiring Forest and Agricultural activities.
1.	The identification of species/ plants should be made based on the botanical studies.
1.	Landscape plan, green belts and open spaces may be described. A thick green belt should be planned all around the nearest settlement to mitigate noise and vibrations.
1.	Examine the details of afforestation measures indicating land and financial outlay

Land use, Land Acquisition and R&R	
1.	Submit details regarding R&R involved in the project
1.	Details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site.
Project details	
1.	Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry.
1.	The examination should justify site suitability in terms of environmental angle, resources sustainability associated with selected site as compared to rejected sites.
1.	The analysis should include parameters considered along with weightage criteria for short-listing selected site.
1.	Submit the status of shore line change at the project site
1.	A detailed draft EIA/EMP report should be prepared in accordance with the above additional TOR and should be submitted to the Ministry in accordance with the Notification.
1.	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
1.	Reasons for selecting the site with details of alternate sites examined/rejected/selected on merit with comparative statement and reason/basis for selection.
Rain Water Harvesting	
1.	Details of rainwater harvesting and utilization of rain water.
Remote Sensing & GIS	
1.	Analysis should be made based on latest satellite imagery for land use with raw images.
Road/Transport Connectivity and Traffic measures	
1.	Details of handling of each cargo, storage, transport along with spillage control, dust preventive measures.
1.	In case of coal, mineral cargo, details of storage and closed conveyance, dust suppression and prevention filters.
1.	An assessment of the cumulative impact of all development and increased inhabitation being carried out or proposed to be carried out by the project or other agencies in the core area, shall be made for traffic densities and parking capabilities in a 05 kms radius from the site. A detailed traffic management and a traffic decongestion plan drawn up through an organization of repute and specializing in Transport Planning shall be submitted with the EIA.
1.	Examine road/rail connectivity to the project site and impact on the existing traffic network due to the proposed project/activities
1.	A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.
Terrain and Topography	

1.	Details of ship tranquillity study.
1.	Details of bathymetry study.
1.	Submit a copy of layout superimposed on the HTL/LTL map demarcated by an authorized agency on 1:4000 scale along with the recommendation of the SCZMA.
1.	Submit the details of terrain, level with respect to MSL, filling required, source of filling materials and transportation details etc.
1.	The ecologically fragile area including CRZ 1A area etc. shall be demarcated and superimposed on the layout plan and submitted.

Waste Management, Drainage and STPs

1.	Details of oil spill contingency plan.
1.	Examine details of Solid waste generation treatment and its disposal.
1.	Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area
1.	Details of the layout plan including details of channel, breakwaters, dredging, disposal and reclamation.

Water Environment/Quality Analysis/ Hydrology and Water Bodies

1.	Submit the details of fishing activity and likely impacts on the fishing activity due to the project.
1.	Examine and submit the water bodies including the seasonal ones within the corridor of impacts along with their status, volumetric capacity, quality likely impacts on them due to the project.
1.	Examine the details of water requirement, impact on competitive user, treatment details, use of treated waste water. Prepare a water balance chart.
1.	Specific study on effects of construction activity and pile driving on marine life

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Development of Industrial Park at Manallur and Soorapoondi villages, Gummidipoondi Taluk, Thiruvallur District, Tamil Nadu over an extent of 279.995Ha. (691.587Acres) by STATE INDUSTRIES PROMOTION CORPORATION OF TAMILNADU LIMITED located at THIRUVALLUR, TAMIL NADU			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/TN/INFRA1/4638/64/2024	21-59/2015-IA.III	23/02/2024	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (7(c))

3.2.2. Project Salient Features

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

Date	Venue	District and State		Chairman
22.08.2023	K.V.C Mahal, Sathyavedu road, Madharpakkam Village, Gummidipoondi Taluk, Tiruvallur	Tiruvallur District, Tamil Nadu State		District Collector, Tiruvallur District.
Area break up		Acres	Hectares(Ha)	Percentage of developable area(%)
Industrial plot area (Including 33% green belt)		490.800	198.704	70.97
Common amenities (ie. Project office including medical dispensary, water supply, EB, Fire station etc)		19.040	7.709	2.75
Commercial activities (ie. Bank, ATM, Shops, canteen etc)		20.750	8.401	3.00
Solid waste management		5.000	2.024	0.72
Road, storm water drains		54.720	22.154	7.91
Green belt		101.277	41.003	14.65
Developable area		691.587	279.995	100.00

S.No	Type Industries	Approximate % of Industrial plot area	Industrial plot area in Ha	Industrial plot area in Acres
1	5(f) Non pharma industries such as Synthetic Acrylic polymers and resins, w	10	19.838	49.00

S.No	Type Industries	Approximate % of Industrial plot area	Industrial plot area in Ha	Industrial plot area in Acres
	water proofing compounds synthetic adhesives etc.,			
2	Non EC Category industries such as E vehicle and its components manufacturing, Automobile and accessories manufacturing, Engineering and fabrication, Plastic Industries etc.,	90	178.866	441.80
	Total	100	198.704	490.80
Water Bodies			Dist. (~km)	Direc.
Pond			Adjacent to Site	E
Pond			Adjacent to Site	S
Lake near Manallur			0.04km	W
Lake near Pannur			0.19km	S
Lake near Madarpakkam			0.30km	SW
Lake near Surapundi			0.39km	E
Pallavada Lake			0.65km	NW
Lake near Ramachandrapuram			0.68km	SE
Lake near Sanaputtur			0.80km	E
Stream near Iguvarpalaiyam			1.60km	ESE

Lake near Rshanagaram	1.89km	W
Lake near Nemalur	2.15km	SW
Lake near Sitturnattam	2.46km	SE
Lake near Vaniyamalli	2.48km	S
Lake near Kannambakkam	3.93km	N
Puvalambedu Lake	4.14km	S
Telugu Ganga/Satya Sai Ganga (TG) Canal	5.52km	W
KannankottaiThervoykandigaiReservoir(KKTK)	7.11km	SSW
Egumadurai Lake	7.11km	N
Canal near Reservoir	8.86km	SW
Pulicat Lake	8.92km	NE
Arani R	10.99km	SSE
Sulameni Eri	12.35km	SSW
Rakkampalaiyam Lake	12.53km	E
Chinnambedu Lake	13.88km	SSE
RallaEru	14.04km	NW
Uttukkottai Eri	14.74km	SW

Green belt	Area (Ha)	Percentage of developable area
Green belt in industrial plot area (33% by industries)	65.572	23.42
Green belt by SIPCOT	41.003	14.65
Total	106.575	38.07

Around 3,34,750 numbers of trees will be planted (for 106.575 ha @ 2500 trees / Ha by considering 80% survival rate & rate and 1700 Tree compensation).

3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

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3.2.5. Recommendation of EAC

Deferred for ADS

3.3. Agenda Item No 3:

3.3.1. Details of the proposal

Proposed Development of National Investment and Manufacturing Zone (NIMZ) in Prakasam District, Andhra Pradesh by ANDHRA PRADESH INDUSTRIAL INFRA STRUCTURE CORPORATION located at PRAKASAM, ANDHRA PRADESH			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/AP/INFRA1/4400/95/2023	10/23/2021-IA.II	04/03/2024	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (7(c))

3.3.2. Project Salient Features

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is

found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

Date	Venue	District and State	Chairman
24.11.2022	MSME Park, Mala kondapuram Village, Pamuru Mandal.	Prakasam District, Andhra Pradesh	Joint Collector & Additional District Magistrate.

S. No.	Land use/Land cover	Area (ha)	Area (%)	Remarks, if any
1	Settlement	40.56	0.70%	-
2	Agriculture, Plantation	571.19	9.88%	-
3	Agriculture, Crop Land	2580.48	44.65%	-
4	Agriculture, Fallow	1140.29	19.73%	-
5	Green	58.72	1.02%	-
6	Waste Land	1086.75	18.80%	-
7	Water Bodies – River	123.52	2.14%	-
8	Water Bodies – Ponds	151.31	2.62%	-
9	Road	27.00	0.47%	-
TOTAL		5779.82	100.00%	-

S. no.	Industry Category	Industry Specification	Industry Category
1	Engineering Goods	Heavy Engineering/Capital goods, Consumer Durables Light Engineering goods/Ancillary units	Red & White
2	PV Cell goods	Solar PV Park-PV cell, manufacturing units, Integrated unit for PV Cell and modules, BOS/ Ancillary	White
3	Agro Food Processing	Dairy Products, Shrimp Processing, Poultry product processing, Aqua & Poultry feed, Edible Oil, Spices	Red, Orange & Green
4	Defense Aero-Space	Aerospace-Civil & Defence, Defence items-Land Based, Naval Defence, Strategic Electronics, Airport Equipment, Drones/ UAV manufacturing, Robotics	Exempted

5	Non-Metallic Minerals	Refractories, Glass, Ceramics, Granite/Quartz stones, Sanitary Wares	Orange
6	EV Components	Lithium batteries, Motors and other EV parts, Charging Station	Red, Orange & Exempted
7	Textiles	Spinning-Yarn, Weaving- Fabrics, Apparels	Orange & White
8	Wood Processing	Plywood manufacturing, MDF Manufacturing, Furniture's	Orange and Green
9	Pharmaceuticals	Bulk Drugs and intermediates, (API) Formulations	Red & Orange

3.3.3. Deliberations by the committee in previous meetings

N/A

3.3.4. Deliberations by the EAC in current meetings

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3.3.5. Recommendation of EAC

Deferred for ADS

3.4. Agenda Item No 4:

3.4.1. Details of the proposal

Expansion and Modification of Industrial Estate of Area 425 ha for housing Cat-A Industries over an area of 41 ha within the existing Industrial area located at Village: Kakani, Tehsil: Luni, District: Jodhpur, Rajasthan by M/s Rajasthan State Industrial Development & Investment Corporation Ltd. by RAJASTHAN STATE INDUSTRIAL DEVELOPMENT & INVESTMENT CORPORATION LIMITED located at JODHPUR, RAJASTHAN			
Proposal For		Fresh ToR	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/RJ/INFRA1/46414/7/2024	10/6/2024-IA.III	04/03/2024	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones (7(c))

3.4.2. Project Salient Features

<p>“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted</p>

is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

Particulars	Area
Parcel of land reserved for Khatedars	44.38
Area under Industrial plots	219.653
Area under Commercial	34.134
Area under Services	10.363
Area under CETP/Solid waste Disposal	10.58
Open Area	8.258
Area under open HFL	14.250
Reserved Area	6.650
Area under Road	76.435
Total Area as per Scheme	425.00
Total Area as per Survey	424.70

S.no.	Type of Plot	Existing	Expansion	Final
1.	Textile Zone (Cat-B)			
	No. of Units	158	No Change	158
	Area (ha)	69.54		69.54

2.	Steel Zone (Cat-B)			
	No. of Units	69	-19	50
	Area (ha)	57.69	41	16.69
3.	General Zone – I			
	No. of Units	140	No Change	140
	Area (ha)	38.53		38.53
4.	General Zone –II			
	No. of Units	197	No Change	197
	Area (ha)	52.60		52.60
5.	Commercial Plot			
	No. of Units	77	No Change	77
	Area (ha)	7.08		7.08
6.	Cat-A Industries (Steel, Cement and Pesticides)			
	No. of Units	Nil	+19	19
	Area (ha)		+41	41

3.4.3. Deliberations by the committee in previous meetings

N/A

3.4.4. Deliberations by the EAC in current meetings

3.4.5. Recommendation of EAC

Recommended

3.4.6. Details of Terms of Reference

3.4.6.1. Specific

Specific Conditions	
1.	

3.4.6.2. Standard

7(c)	Industrial estates/ parks/ complexes/ areas, export processing Zones (EPZs), Special Economic Zones
Air Environment	
1.	In case DG sets are likely to be used during construction and operational phase of the project. emissions from DG sets must be taken into consideration while estimating the impacts on air environment. Examine and submit details.
Court/ Litigation Related	
1.	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
1.	Submit Legal frame work for the implementation of Environmental Clearance conditions - to be clearly spelt out in the EIA report.
Energy and Resources	
1.	Examine and submit details of use of solar energy and alternative source of energy to reduce the fossil energy consumption.
Environmental Management Plans and Mitigative Measures	
1.	Any further clarification on carrying out the above studies including anticipated impacts due to the project and mitigative measure, project proponent can refer to the model ToR available on Ministry.
1.	Examine separately the details for construction and operation phases both for Environmental Management Plan and Environmental Monitoring Plan with cost and parameters.
1.	Submit details of a comprehensive Disaster Management Plan including emergency evacuation during natural and man-made disaster.
Environment Status/Baseline Data Methodology	
1.	Examine baseline environmental quality along with projected incremental load due to the project taking into account of the existing developments nearby. (ii) Environmental data to be considered in relation to the project development would be (a) land, (b) groundwater, (c) surface water, (d) air, (e) bio-diversity, (f) noise and vibrations, (g) socio economic and health.

1.	Site justification of the identified industry sectors from environmental angle and the details of the studies conducted if any.
1.	Identify, predict and assess the environmental and sociological impacts on account of the project.
ESZ, CRZ Details	
1.	Details regarding project boundary passing through any eco- sensitive area and within 10 km from eco- sensitive area.
Forest and Wildlife Related Details	
1.	Submit the details of the trees to be felled for the project.
1.	An overall green area of at-least 33% of the Industrial Area should be developed with native species. The green area shall be 40% in case of critically polluted area. Green buffer in the form of green belt to a width of 15 meters should be provided all along the periphery of the industrial area.
1.	Submit the present land use and permission required for any conversion such as forest, agriculture etc.
Land Use, Land Acquisition, R&R	
1.	Examine the impact of proposed project on the nearest settlements.
1.	Submit details regarding R&R involved in the project
1.	The project boundary area and study area for which the base line data is generated should be indicated through a suitable map.
1.	Submit the details of the land use break-up for the proposed project. Details of land use around 10 km radius of the project site.
1.	Submit details of environmentally sensitive places, land acquisition status, rehabilitation of communities/villages and present status of such activities.
Noise Environment	
1.	Examine noise levels - present and future with noise abatement measures.
Project details	
1.	Reasons for selecting the site with details of alternate sites examined/rejected/selected on merit with comparative statement and reason/basis for selection. The examination should justify site suitability in terms of environmental damage, resources sustainability associated with selected site as compared to rejected sites.
1.	The analysis should include parameters considered along with weightage criteria for shortlisting selected site.
1.	Zoning of the area in terms of 'type of industries' coming-up in the industrial area based on the resource requirement along with likely pollutants with quantity from the various industries.
1.	Submit Roles and responsibility of the developer etc for compliance of environmental regulations under the provisions of EP Act.
1.	Examine the details of National Highways/State Highways/ expressways falling along the corridor and the impact of the development on them.

1.	Submit the details of the infrastructure to be developed.
1.	Justification of the parameters, frequency and locations shall be discussed in the EIA.
Rain Water Harvesting	
1.	Maximize recycling of water and utilization of rain water. Examine details.
1.	Examine soil characteristics and depth of ground water table for rainwater harvesting.
1.	Rain water harvesting proposals should be made with due safeguards for ground water quality
Remote Sensing/ GIS	
1.	Analysis should be made based on latest satellite imagery for land use with raw images.
1.	Check on flood plain of any river.
Road/Transport Safety and Traffic Aspects	
1.	Examine the details of transport of materials for construction which should include source and availability.
1.	Examine road/rail connectivity to the project site and impact on the traffic due to the proposed project.
1.	Present and future traffic and transport facilities for the region should be analysed with measures for preventing traffic congestion and providing faster trouble free system to reach different destinations in the city.
1.	A detailed traffic and transportation study should be made for existing and projected passenger and cargo traffic.
Soil Environment	
1.	Examine soil characteristics and depth of ground water table for rainwater harvesting.
Waste Management, Drainage and STPs Details	
1.	Submit a copy of the contour plan with slopes, drainage pattern of the site and surrounding area, and any obstruction of the same by the project.
1.	Examine details of solid waste generation treatment and its disposal.
Water Environment/Quality/Hydrology	
1.	Submit the source of water, requirement vis-à-vis waste water to be generated along with treatment facilities, use of treated waste water along with water balance chart taking into account all forms of water use and management.
1.	Ground water classification as per the Central Ground Water Authority

3.5. Agenda Item No 5:

3.5.1. Details of the proposal

Development of 4/6 lane (Greenfield) access controlled Expressway (Agra - Gwalior) which starts from village De ori, Design Ch. 0+000 in district Agra (Uttar Pradesh) and ends near Susera village, Design Ch.88+400 in Gwalior district in the states of Uttar Pradesh, Rajasthan and Madhya Pradesh (Total design length = 88.400 km) by Na

ational Highways Authority of India located at MORENA,MADHYA PRADESH			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/MP/INFRA1/465000/2024	10/40/2022-IA.III	05/03/2024	Road (7(f))

3.5.2. Project Salient Features

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

Date	Venue	District and State	Chairman
31/01/2024	Susera Village, Gird Tehsil,	Gwalior District, Madhya Pradesh	Additional District Magistrate
23/01/2024	Basaiya Village, Morena Tehsil	Morena District, Madhya Pradesh	Additional District Magistrate
13/01/2024	Loheta Village, Fatehabad Tehsil	Agra, District, Uttar Pradesh	Additional District Magistrate
02/02/2024	Marena Village, Rajakhera Tehsil	Dholpur District, Rajasthan	Additional District Magistrate

S.No.	Classification/Legend	Area in Ha.	Percentage (%)
1	Forest land	80.5089	0.90
2	Barren/Waste Land	1034.7234	11.60
3	Water Body	157.6708	1.75
4	Built-up	146.4255	1.67

5	Agricultural/Crop Land		7499.2714	84.08
	Total		8918.6	100
S.No.	Chainage	Water Bodies	Proposed Structure	Span Arrangement (m)
1.	8+000	Canal	Minor Bridge	1x20
2.	9+234	Canal	Minor Bridge	1x20
3.	12+880	Canal	Minor Bridge	3x40
4.	19+850	Canal	Minor Bridge	1x15
5.	23+997	Utangan River	Major Bridge	3x30
6.	47+200	Chambal River	Major Bridge	19x52+150+300+150+2x52
7.	51+972	Kota Barrage RMC Canal	Minor Bridge	1x50
8.	55+815	River	Major Bridge	2x35
9.	61+240	Canal	Minor Bridge	1x26.85
10.	68+600	Asan River	Major Bridge	5x30
11.	72+400	River	Major Bridge	2x30
12.	73+675	Canal	Major Bridge	15+40+15

3.5.3. Deliberations by the committee in previous meetings

N/A

3.5.4. Deliberations by the EAC in current meetings

3.5.5. Recommendation of EAC

Recommended

3.5.6. Details of Environment Conditions

3.5.6.1. Specific

Specific Conditions		
SL No	Proposed structure	Chainage
1	Cattle Underpass	33+025 to 33+030 2
2	Cattle Underpass	35+914 to 35+919 3
3	Cattle Underpass	38+500 to 38+505
4	Viaduct	38+595 to 38+855 5
5	Viaduct	39+067 to 39+483 6
6	Viaduct	39+980 to 40+500 7
7	Viaduct	41+148 to 41+372
8	Viaduct	48+292 to 48+708 12
9	Cattle Underpass	80+750 to 80+755

3.5.6.2. Standard

7(f)	Road
Compliance Reporting	
1.	The project proponent shall submit online six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change and also upload the same, including results of monitored data, on their company website.
1.	Beside fulfilling obligations under Corporate Social Responsibilities as per Company's Act, 2013, the proponent has to adhere to the followings Environment Responsibilities: i.The Company shall have a well laid down Environment Policy approved by the Board of Directors. ii.The Environment Policy shall prescribe for standard operating process/ procedures to bring into focus any infringements/ deviation/violation of the environmental or

	forest norms/ conditions. iii.The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished. iv.To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/ violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.
1.	The Ministry reserves the right to stipulate additional conditions, if found necessary.
1.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.
1.	For compliance of conditions during operation phase, PP shall either itself undertake the responsibility of compliance or ensure setting up institutional mechanism for compliance of conditions under intimation on the website of the Ministry of Environment, Forest and Climate Change.
General Instructions (Part A)	
1.	The proponent shall obtain permission from the competent authorities for tree felling along the proposed alignment.
1.	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to MoEF&CC and its concerned Regional Office.
1.	Approval/permission of concerned authority shall be obtained before drawing surface water from canal or any other sources.
1.	As per MoEF&CC's circular no. J-11013/41/2006-IA.II (I) dated 22.09.2008, provision shall be made for supply of kerosene or cooking gas and pressure cooker to the labourers, mobile toilets, mobile STP, safe drinking water, medical health care, Crèche and temporary structures for living during construction phase.
General Instructions (Part B)	
1.	The project proponent shall have a well laid down environmental policy duly approved by the Board of Directors (in case of Company) or competent authority, duly prescribing standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/violation of the environmental / forest / wildlife norms / conditions.
1.	Action plan for implementing EMP and environmental conditions along with responsibility matrix of the project proponent (during construction phase) and authorized entity mandated with compliance of conditions (during operational phase) shall be prepared. The year wise funds earmarked for environmental protection measures shall be kept in separate account and not to be diverted for any other purpose. Six monthly progress of implementation of action plan shall be reported to the Ministry/Regional Office along with the Six-Monthly Compliance Report.
1.	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.
1.	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.
1.	The project proponent shall prominently advertise it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days indicating that the project has been accorded environment clearance and the details of MoEF&CC/SEIAA website where it is displayed.
1.	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to

	display the same for 30 days from the date of receipt.
Note	
1.	The PP is under obligation to implement commitments made in the to the issues raised during public hearing Conceptual Plan/ Environment Management Plan, which forms the part of this EC.
1.	Further attention of project proponent is drawn towards the following Acts/ Regulations/ Statutes/ Guidelines issued from time to time: (a)All the Indian Road Congress (IRC) guidelines wherever applicable may be followed. (b)Provisions related to tree cutting as contained in the Forest (Conservation) Act, 1980 and related rules of the respective state. (c)Dust Mitigation Measures stipulated for Construction and Demolition Activities as provided in the amendment Notification GSR 94(E) dated 25.01.2018 of MoEF&CC. (d)Provisions for use of Fly ash as building material in the construction as per stipulated under Fly Ash Notification of September, 1999 and amended as on 27th August, 2003 and 25th January, 2016. (e)Provisions for management of construction and demolition activities related thereto as contained in Construction and Demolition Waste Management Rules, 2016.
1.	The above conditions shall be enforced in a time bound manner
1.	The Environmental Clearance to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/ Regulations or Statutes, as applicable, to the project.
Specific Conditions	
1.	Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. In case of the treated effluent to be utilized for irrigation/gardening, real time monitoring system shall be installed at the ETP outlet.
null	
1.	Construction camps shall be proposed 500 m away from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. Location for stockyards for construction materials shall be identified at least 1000m from water sources. Garbage tanks and sanitation facilities will be provided at camps.
1.	Construction spoils including bituminous material and other hazardous materials must not be allowed to contaminate water courses and the dump sites for such materials must be secured so that they shall not leach into the ground water. The non-usable bitumen spoils shall be disposed off in a deep trench providing clay lining at the bottom and filled with soil at the top (for at least 0.5m)
1.	The embankments/slopes and the slopes left after cutting shall be provided with vegetative growth to avoid soil erosion.
1.	Rain water harvesting including oil and grease trap shall be provided as prescribed by CGWB guidelines. Water harvesting structures shall be located at every 500m along the road. Vertical drain type rainwater harvesting structures shall be set up to minimize surface runoff losses of rainwater.
1.	Blasting shall be carried out during fixed hours (preferably during mid-day) or as permitted by the concerned authority. The timing shall be made known to all the people within 1000m (200m for pre-splitting) from the blasting site in all directions.
1.	The drain shall be at least 1m away from the toe of the embankment of the road adopting IRC guidelines. Longitudinal drains shall be provided all along the project road to ensure proper drainage of the area. In addition, adequate number of under passes and culverts to act as cross drainage structures shall also be provided.
1.	Sidewalk shall be provided along the bridges.

1.	Cut and fill works shall be carried out strictly in accordance with the design drawings proposed at the time of appraisal of the project.
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3.6. Agenda Item No 6:

3.6.1. Details of the proposal

Widening and Improvement of existing 2-lane to 4/6 lane with paved shoulders from existing km 124.488 (Ch: 12 2+200) to existing km 223.860 (Ch: 214+535) of Kushalnagar to Mysore section of NH-275 in the state of Karnataka (Total length-92.335km) by National Highways Authority of India located at MYSURU,KARNATAKA			
Proposal For		Fresh EC	
Proposal No	File No	Submission Date	Activity (Schedule Item)
IA/KA/INFRA1/464856/2024	10/21/2022-IA.III	07/03/2024	Road (7(f))

3.6.2. Project Salient Features

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.6.3. Deliberations by the committee in previous meetings

N/A

3.6.4. Deliberations by the EAC in current meetings

3.6.5. Recommendation of EAC

Deferred for ADS

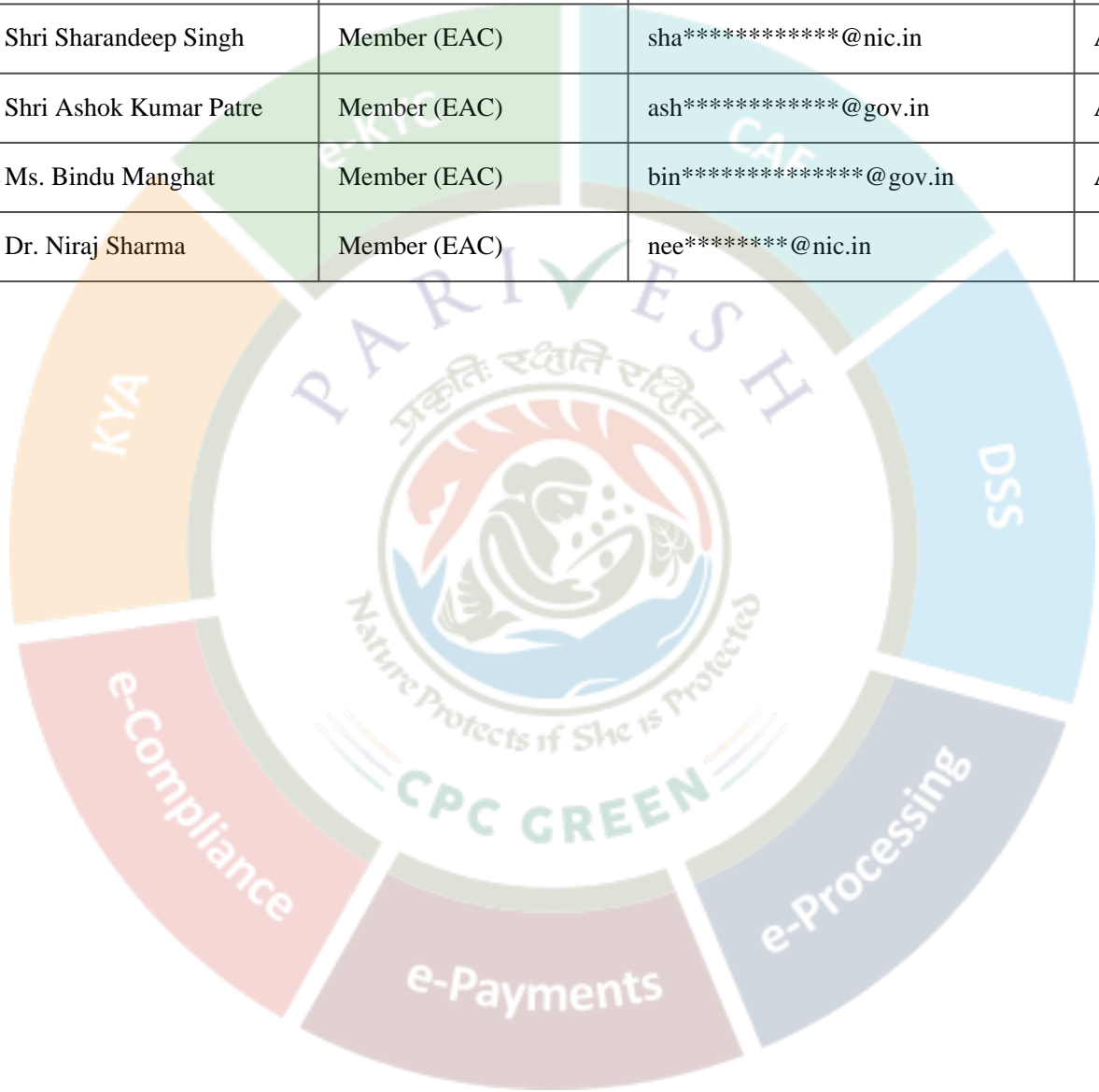
4. Any Other Item(s)

N/A

5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Shri Manmohan Singh Negi	Chairman, EAC	neg*****@hotmail.com	
2	Shri Amardeep Raju	Member Secretary (EAC)	ad.****@nic.in	
3	Shri S.Jeyakrishnan	Member (EAC)	suk*****@gmail.com	

4	Prof.V.K.Jain	Member (EAC)	drv*****@hotmail.com	
5	Dr. Jaya Kumar Seelam	Member (EAC)	see*****@gmail.com	
6	Dr. P.K.Dinesh Kumar	Member(EAC)	pkd*****@gmail.com	
7	Shri PrakashTewari	Member (EAC)	pra*****@gmail.com	
8	Dr B Kishore	Member(EAC)	kis*****@gmail.com	
9	Dr. M.V. Ramana Murthy	Member (EAC)	ram*****@gmail.com	
10	Shri Sharandeeep Singh	Member (EAC)	sha*****@nic.in	Absent
11	Shri Ashok Kumar Patre	Member (EAC)	ash*****@gov.in	Absent
12	Ms. Bindu Manghat	Member (EAC)	bin*****@gov.in	Absent
13	Dr. Niraj Sharma	Member (EAC)	nee*****@nic.in	



Minutes of the 360th meeting of Expert Appraisal Committee held on 21st March, 2024 through Video Conference for the projects related to Infrastructure Development, all Ship breaking yards including ship breaking units 7(b); Industrial Estate/Parks/Complexes/Areas, Export Processing Zones, Special Economic Zones, Biotech Parks, Leather Complexes 7(c); Ports, Harbors, Breakwaters, Dredging 7(e) and National Highways 7(f).

The 360th Meeting of Expert Appraisal Committee (EAC) of Infra-1(IA-III) through Video Conference held on 21st March, 2024 under the Chairmanship of Shri. Manmohan Singh Negi. The list of participants is annexed as Annexure-A. Site visit report for M/s. Shree Digvijay Cement Company Limited is enclosed as Annexure B

1. OPENING REMARKS OF THE CHAIRMAN.

At the outset, Shri. Manmohan Singh Negi, Chairman, EAC welcomed the Members of the EAC and requested Shri Amardeep Raju, the Member Secretary of the EAC to initiate the proceedings of the meeting with a brief account of the activities undertaken by the Ministry under Infra-1 Division.

2. CONFIRMATION OF THE MINUTES OF THE LAST MEETING.

The Committee confirmed the Minutes of 358th EAC meeting held on 27th February, 2024.

3. AGENDA WISE CONSIDERATION OF PROPOSALS

Agenda wise details of proposals discussed and decided in the meeting are as following:

Agenda Sr. No.3.1

Subject: Expansion of cargo handling capacity from 33.95 MTPA to 57.0 MTPA at Dharamtar Jetty facility (Phase III) in village Dolvi of District Raigad, Maharashtra-ToR reg.

Proposal No. IA/MH/INFRA1/450952/2024; File No. 10-79/2013-IA.III.

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.1.1 The project proponent and EIA consultant M/s BEIPL (Building Environment (India) Pvt. Ltd.) has made a presentation through video conferencing and provided the following information: -

3.1.2 Earlier, Environmental and CRZ Clearance (EC) for Expansion of Dharamtar Jetty

facility' in Village Dolvi of District Raigad, Maharashtra by M/s JSW Dharamtar Port Pvt Ltd, comprising quay of 1750m with cargo handling capacity of 33.95 MTPA has been obtained by the MoEF&CC vide letter no. F.No.11-79/2013-IA.II dated 26.11.2015 and was subsequently amended vide letters dated 26.03.2016 and 10.01.2020. The existing jetty facilities which are under operation at the moment as a part of Phase II development, includes 9 nos. of operational berths (Berth Nos. 1 to 9) constructed over a length of about 1050m out of the approved length of 1750m.

3.1.3 The instant proposal of M/s JSW Dharamtar Port is proposing Phase III expansion for increase in cargo handling capacity from 33.95 MTPA to 57.0 MTPA at Dharamtar Jetty facility located in the village Dolvi, District Raigad, Maharashtra. Proposed additional cargo shall be handled in the remaining berth length of 700 m (Berth No. 10 to 13) in addition to existing operational jetty of 1050m.

3.1.4 After expansion the following will change.

Details	Existing	After Expansion
Total Cargo Handling	33.95 MTPA	57.0 MTPA
Barge Size	2000 DWT to 3700 DWT	2000 DWT to 3700 DWT
		6000 DWT
Mini Bulk Carrier Size	8000 DWT	8000 DWT
Barge Unloaders	2 no. X 550 tph	2 no. X 550 tph
	5 no. X 2500 tph	5 no. X 2500 tph
		5 no. X 2500 tph
Mobile Harbour Crane	2 no. X 900 tph	2 no. X 900 tph
		1 X 1200 tph
Covered storage capacity	Yard A – 125 X 380 m	Yard A – 125 X 380 m
	Yard B – 125 X 400 m	Yard B – 125 X 400 m
Stacker	2 Nos	2 Nos
Reclaimer	Bucket wheel reclaimer- 3 Nos	Bucket wheel reclaimer- 3 Nos
	Portal reclaimer- 2 Nos	Portal reclaimer- 2 Nos
	Stacker cum reclaimer- 1 No	Stacker cum reclaimer- 1 No
Cross Country Conveyor	1 X 1200; 1 x 1500; 4 x	1 X 1200; 1 x 1500; 4 x

	3000 tph	3000 tph
Jetty Outgoing Conveyor	1 X 1000; 2 x 5000 tph	1 X 1000; 2 x 5000 tph
		2 x 5000 tph
Sub- station	2 Nos.	3 Nos.
Pump house	1 No.	2 Nos.

3.1.5 The project/activity is covered under category 'A' of item 7 (e) i.e. Ports, harbours, break waters, dredging of the schedule to the EIA Notification, 2006 and its subsequent amendments, and requires appraisal at Central level. The total cost of the project is 950 crores.

3.1.6 Land use/Land cover of project site.

S. No.	LU/LC	Area (ha)	%
1	Jetty/ Jetty Backup area	58.6	100
Total		58.6	100

3.1.7 Terrain and topographical features: Mostly flat terrain with the development ports & port related auxiliary activities and industrial developments. The area also comprises of water bodies and mix of undeveloped and agricultural land.

3.1.8 Details of water bodies, impact on drainage: Proposed project is located in Dharamtar Creek in the estuary of Amba River. The narrow branches of the Dharamtar creek traverse through northern region of existing port facility. The proposed project does not obstruct flow of creek water. Therefore, no impact is anticipated on drainage pattern of the project site.

3.1.9 Water requirements: The water requirement for the existing jetty is about 30 m³/hr and after expansion the water requirement will increase to 45 m³/hr. Water shall be required for drinking and domestic purpose, sprinkling at material handling yard and gardening. This water requirement is proposed to be met from the existing allocation to JSW steel plant from Amba River, Nagothane, K.T. Bandhara.

3.1.10 Tree cutting: The instant proposal does not involve any tree cutting.

3.1.11 Forest Diversion: The project does not involve any diversion of forest land. The project is not located within 10 km of Protected Areas (PA) including National Parks, Sanctuaries and Tiger Reserves etc. The project is also not located within the Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MoEF&CC.

3.1.12 Waste Management: STP: Sewage generated from the domestic consumption shall be treated in existing sewage treatment plant (STP) of 50 KLD capacity. The treated water would be used for the horticultural purposes.

3.1.13 Details of CRZ area: The CRZ map shall be prepared through an authorised agency of MoEFCC as part of the EIA study.

3.1.14 Details of shore line change: The project is located about 15 km upstream of Dharamtar creek with both the banks are protected by mangroves. It does not show erosion and/or accretion. Therefore, shoreline change is not anticipated.

3.1.15 Details of channel, breakwaters, dredging, disposal and reclamation: The project involves capital dredging of about 4,155,300 m³. Out of this, the hard material dredged will be about 1,000,000 m³, which will be used for reclamation of low-lying areas behind the berths. The balance of about 3,155,300 m³ of soft material will be dumped at designated locations near Mumbai Port Area as identified by MMB through CWPRS Modelling studies. Maintenance Dredging quantity shall remain same as 2,000,000 m³ as per existing MOEFCC clearance and the dredged material from maintenance dredging will also be dumped at designated locations near Mumbai Port Area as identified by MMB through CWPRS Model Report. Dredging shall be carried out through Maharashtra Maritime Board (MMB) or Inland Waterways Authority of India (IWAI).

3.1.16 Handling of each cargo: The jetty facility mostly handles CBRM and IBRM cargos of various type. The details are as follows:

Sr. no.	Commodity	Existing Quantity (Mt/yr)	Total Qty. after Expansion (Mt/yr)
1	Iron Bearing Raw Material (IBRM)	17.0	26.0
2	Coal Bearing Raw Material (CBRM)	8.00	10.0
3	Fluxes	3.00	7.00
4	HR coil, Sheets, CR coil in containers, Finished Steel Products, Steel Scrap	2.50	3.00
5	Slag / Fly Ash	1.00	1.00
6	Cement & Clinker	1.60	4.00
7	LPG, Propane, Butane, etc.	-	3.00
8	Edible Oil & other liquid cargo	-	1.00
9	Containers	0.85	1.00

10	Fertilizer, FRM, Gypsum, etc.	-	1.00
Grand Total (MTPA)		33.95	57.0

3.1.17 Handling: Cargo handling using Barge unloaders and Mobile harbour cranes in a controlled manner to avoid any spillage. Storage: Material storage in a closed covered shed provided with water sprinkling system. Also, the materials directly sent to the steel plant through outgoing conveyors of steel/cement plant. Transfer & Spillage Control: The closed conveyor gallery along with the junction/transfer towers are provided with dust suppression systems (DSS). Dust suppression systems with water sprinklers/fogging system has been provided to prevent the fugitive dust emissions during handling, transfer and storage. Further, the Greenbelts prevent/arrest/controls the fugitive emissions.

3.1.18 Details of fishing activity in the vicinity: No fishing activity is observed in the jetty area, also in the demarcated navigation channel in the Dharamtar creek. The small-scale artisanal fishing is done by local fishermen in narrow tidal channels and along the creek banks.

3.1.19 Brief description of Socio-economic condition of local people: The socio-economic status of the project surrounding region indicates that the region has good social infrastructure with availability of basic amenities to people. Around 53.27% of the population falls into the category of non-workers, while only 46.73% working population prevails in the study area region. Dispensaries are available at two villages namely, Poynad and Shahabaj. No other medical facilities are available in the rural part of the study area. However, private medical practitioners serve most of the villages in the study area. In most of the villages, water supply is either through tap water or well water. Hand pumps have been provided wherever tap water or well water is not provided.

3.1.20 Land acquisition and R&R issues involved: No Land acquisition and R&R issues involved in the project.

3.1.21 Employment potential, No. of people to be employed: The project has employment potential of 150 direct employees and 600 contract workers. The project would also open both secondary and tertiary employment opportunity in the area.

3.1.22 Benefits of the project: Social: The proposal will benefit the socio-economic development of the local people through various CSR activities. The benefits due to the new business developments would bring social gains from the project. Economical: Financial benefit to the Maharashtra Maritime Board (MMB) with the new business development from the proposed project. Benefit to both State and Central Govt. exchequer as the business grows. Environmental: Shall reduce the pollution as the cargo shall be brought in through the waterways instead of road, thereby reducing the air and noise pollution during transportation.

3.1.23 Details of Court cases: No court cases are involved.

3.1.24 During the EAC, the committee observed the following:

- i. As suggested by the Committee the PP agreed to remove the handling of POL from the proposed proposal.
- ii. PP proposed to Handling of the Coal and LPG, Propane, Butane, etc together which are flammable in nature and vulnerable to disasters thus, the committee suggested to the PP that coal may be handled in separate berth with the proper mitigation measures.

3.1.25 The EAC, taking into account the submission made by the project proponent, had a detailed deliberation in its 360th meeting of Expert Appraisal Committee held on 21st March, 2024 and **recommended** the proposal for grant of Terms of Reference (ToR) with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. No petroleum Jetty shall be Established in the Port
- ii. Coal and LPG, Propane, Butane, etc, which are flammable in nature and vulnerable to disasters shall be handled in separate berths with the proper mitigation measures.
- iii. Submit a copy of layout superimposed on the HTL/LTL map demarcated by an authorized agency on 1:4000 scale.
- iv. Recommendation of the Maharashtra CZMA shall be obtained and submitted.
- v. Submit superimposing of latest CZMP as per CRZ (2019) on the CRZ map.
- vi. Submit a complete set of documents required as per para 4.2 (i) of CRZ Notification, 2019.
- vii. Location for disposal of the dredge material, if any, shall be indicate in the KML file and the layout maps overlay on the approved CZMP map shall be submitted and site suitability study shall be conducted.
- viii. Copy of layout superimposed on the HTL/LTL map demarcated by an authorized agency on 1:4000 scale. CRZ mapping study shall include demarcation of HTL and LTL at / near the project site; Demarcation of ecologically sensitive entities such as Mangroves, Sand dunes, etc; Superimposition of HTL, LTL and ecologically sensitive areas along with the project site from the authorized institutes.
- ix. Chronological development of the existing port and its approvals like Environmental and CRZ clearances and CTO/CTE if any obtained need to be submitted.
- x. PP shall submit the latest Certified Compliance report of existing EC and CRZ clearance's from Integrated Regional Office, MoEFCC.
- xi. In the northern side of the Jetty mangroves are noticed all along the river. No activities of the project shall be proposed in this area or in the project area nearby mangroves which can adversely impact growth of these mangroves.
- xii. A subcommittee will visit the site before the completion of the EIA studies and will make suggestions to mitigate the impact of the project on mangrove, if any noticed during site visit.
- xiii. Considering the presence of mangroves adjacent to project area and likely impact of the project on the mangroves in long terms PP shall contribute towards mangrove

conservation in this area by way of preparing Mangrove Conservation Plan in consultation with state Mangrove cell and implementing it at project cost. The plan shall be part of EMP in the EIA report. Plan shall include new area identified for mangrove plantation, degraded mangrove area identified for enrichment, improving the tidal inundation through fish bone channel method, and maintenance & protection.

- xiv. PP need to submit existing types of cargos which is being handled at the port. The details need to be submitted, product wise and quantity wise.
- xv. Detailed Prelevel hydrographic survey shall be carried out.
- xvi. The impact study of erosion, sedimentation shall be carried out based on the study and its control and mitigation plan shall be placed in the EIA/EMP report.
- xvii. Advance technology for dredging shall be used to minimize the adverse impact on physical quality of water/avoid the turbidity of water
- xviii. Study on impact of dredging on hydrodynamic characteristics shall be carried out through the NIO or any other specialised institute.
- xix. Study the impact of dredging and dumping on marine ecology and draw up a management plan through the NIO or any other institute specializing in marine ecology.
- xx. The types of Cargos proposed to be handled at the port shall be submitted product wise and quantity wise.
- xxi. The impacts study on the hazardous materials handling and storage in worst case scenario shall be submitted along with the EIA/EMP report.
- xxii. Requirement of water, power, with source of supply, status of approval, water balance diagram, man-power requirement (regular and contract).
- xxiii. A certificate from the local body supplying water, specifying the total annual water availability with the local authority, the quantity of water already committed the quantity of water allotted to the project under consideration and the balance water available. This should be specified separately for ground water and surface water sources, ensuring that there is no impact on other users.
- xxiv. A certificate of adequacy of available power from the agency supplying power to the project along with the load allowed for the project.
- xxv. A certificate from the competent authority handling municipal solid wastes, indicating the existing civic capacities of handling and their adequacy to cater to the M.S.W. generated from project.
- xxvi. An assessment of the cumulative impact of all development and increased inhabitation being carried out or proposed to be carried out by the project or other agencies in the core area, shall be made for traffic densities and parking capabilities in a 05 kms radius from the site. A detailed traffic management and a traffic decongestion plan drawn up through an organization of repute and specializing in Transport Planning shall be submitted with the EIA.
- xxvii. Disaster Management Plan for the project shall be prepared and submitted.
- xxviii. Risk analysis and its management plan for handling different types of liquid cargos (if handling) shall be conducted and submitted.

- xxix. A detailed study on the impact of proposed activity on marine ecology and marine biodiversity with specific focus on the corals, mangroves and mud flats in the proximity of the site should be conducted and required mitigation plan be submitted by a nationally reputed institute.
- xxx. Details and status of court case pending against the project, if any.
- xxxii. A tabular chart with index for point-wise compliance of above ToRs. The specific ToRs as recommended above are in addition to all the relevant information as per the 'Generic Structure of EIA' given in Appendix III and IIIA in the EIA Notification, 2006.
- xxxiii. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfil these commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.
- xxxiiii. In pursuance of Ministry's OM No stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.

Agenda Sr. No.3.2

Subject: Development of Industrial Park in the area of 279.995Ha. (691.587Acres) at Manallur and Soorapoondi villages, Gummidipoondi Taluk, Thiruvallur District, Tamil Nadu by M/s State Industries Promotion Corporation of Tamilnadu Limited-(SIPCOT)-Environmental Clearance-reg.

[Proposal No: IA/TN/INFRA1/463864/2024; File No: 21-59/2015-IA.III]

"The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent."

3.2.1 The project proponent and EIA consultant M/s Hubert Enviro Care Systems (P)Ltd, Chennai has made a presentation through video conferencing and provided the following information: -

3.2.2 The proposed project is for Development of Industrial Park in the area of 279.995Ha. (691.587Acres) at Manallur and Soorapoondi villages, Gummidipoondi Taluk, Thiruvallur District, Tamil Nadu by M/s State Industries Promotion Corporation of Tamilnadu Limited-(SIPCOT). The project site is falling in between the geographical coordinates ranging from 13⁰ 26' 48.15" to 13⁰ 27' 15.37" N and 80⁰ 01' 21.79" to 80⁰ 01' 56.24" E.

3.2.3 Project scheduled under 7(c) Category 'A' (Industrial Estates/ Parks/SEZ etc) as per EIA Notification 2006 and its amendments as General Condition applicable as Interstate Boundary TN-AP is situated at ~3.13 Km (towards NNW) from the project boundary and Pulicat lake bird Sanctuary ~5.77 Km (towards NE). The total cost of the project is 353.28 crores.

3.2.4 Earlier, the above project was received in the Ministry on 24th December, 2019 for grant of EC. The proposal was considered by the Expert Appraisal Committee (EAC) for Infrastructure, CRZ and Other Miscellaneous projects in its meeting on 25th-26th August, 2020. The EAC after detailed deliberation recommended for grant of the EC with certain conditions, Ministry accorded the EC vide letter no. 21-59/2015-IA.III dated 10th November, 2020.

3.2.5 The Hon'ble NGT Southern zone, Chennai, in the matter of D. Ranjith Kumar Versus Union of India with G. Praveena Versus Union of India. Appeal No.32 of 2020 (SZ) With Appeal No.34 of 2020 (SZ) Judgement dated 30th September 2022, suspended the Environmental Clearance granted for establishing an industrial park in Manallur Village, Tiruvallur District vide F.No.21-59-2015-IA.III dated 10.11.2020 and also passed certain directions. In compliance of the Hon'ble Tribunal Judgment dated 30th September 2022 the above matter was placed before the EAC in its 312th meeting during 03rd-04th November, 2022. The Committee had a detailed deliberation in its 312th meeting on the above matter and informed the PP that Ministry has launched a single window online PARIVESH (Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single-window Hub) portal on 10th August, 2018 which automates the entire process of Environmental clearances starting from submission of application to grant of clearances. Thus requested the PP to submit the online application for grant of Terms of references in compliance of the Hon'ble Tribunal Judgment dated 30th September 2022.

3.2.6 As per direction of NGT, the MOEF&CC has considered the project in 312th EAC Meeting held on 04.11.2022. The EAC requested SIPCOT to submit online application in PARIVESH portal for the grant of ToR. Accordingly, application for ToR was uploaded vide Proposal No.: IA/TN/INFRA1/407090/2022 dated 18.11.2022 and the project was considered in the 316th EAC meeting held on 16/12/2022. ToR was issued for the project vide File no.:21-59/2015 IA.III dated 25/01/2023.

3.2.7 Public Hearing Details: the public hearing was conducted in the Tiruvallur District and Tamil Nadu State on 22.08.2023 the details are as following.

Date	Venue	District and State	Chairman
22.08.2023	K.V.C Mahal, Sathyavedu road, Madharpakkam Village, Gummidipoondi Taluk, Tiruvallur	Tiruvallur District, Tamil Nadu State	District Collector, Tiruvallur District.

3.2.8 Land use/Land cover of project site

Area break up	Acres	Hectares(Ha)	Percentage of developable area(%)
Industrial plot area (Including 33% green belt)	490.800	198.704	70.97
Common amenities (ie. Project office including medical dispensary, water supply, EB, Fire station etc)	19.040	7.709	2.75
Commercial activities (ie. Bank, ATM, Shops, canteen etc)	20.750	8.401	3.00
Solid waste management	5.000	2.024	0.72
Road, storm water drains	54.720	22.154	7.91
Green belt	101.277	41.003	14.65
Developable area	691.587	279.995	100.00

3.2.9 List to industries to be housed with the proposed project site, only for projects covered under 7(c) category of EIA Notification, 2006.

S.No	Type Industries	Approximate % of Industrial plot area	Industrial plot area in Ha	Industrial plot area in Acres
1	5(f) Non pharma industries such as Synthetic Acrylic polymers and resins, water proofing compounds synthetic adhesives etc.,	10	19.838	49.00
2	Non EC Category industries such as E vehicle and its components manufacturing, Automobile and accessories manufacturing, Engineering and fabrication, Plastic Industries etc.,	90	178.866	441.80

S.No	Type Industries	Approximate % of Industrial plot area	Industrial plot area in Ha	Industrial plot area in Acres
	Total	100	198.704	490.80

3.2.10 Terrain and topographical features: Predominantly Flat terrain with little undulations. It varies from ~11-29mAMSL. The site is mostly barren land with some trees. There are no water bodies within the site. Following topographical features present within 15 km radius.

3.2.11 Details of water bodies, impact on drainage:

Water Bodies	Dist. (~km)	Direc.
Pond	Adjacent to Site	E
Pond	Adjacent to Site	S
Lake near Manallur	0.04km	W
Lake near Pannur	0.19km	S
Lake near Madarpakkam	0.30km	SW
Lake near Surapundi	0.39km	E
Pallavada Lake	0.65km	NW
Lake near Ramachandrapuram	0.68km	SE
Lake near Sanaputtur	0.80km	E
Stream near Iguvarpalaiyam	1.60km	ESE
Lake near Rshanagaram	1.89km	W
Lake near Nemalur	2.15km	SW
Lake near Sitturnattam	2.46km	SE
Lake near Vaniamalli	2.48km	S
Lake near Kannambakkam	3.93km	N
Puvalambedu Lake	4.14km	S

Telugu Ganga/Satya Sai Ganga (TG) Canal	5.52km	W
KannankottaiThervoykandigaiReservoir(KKTK)	7.11km	SSW
Egumadurai Lake	7.11km	N
Canal near Reservoir	8.86km	SW
Pulicat Lake	8.92km	NE
Arani R	10.99km	SSE
Sulameni Eri	12.35km	SSW
Rakkampalayam Lake	12.53km	E
Chinnambedu Lake	13.88km	SSE
RallaEru	14.04km	NW
Uttukkottai Eri	14.74km	SW

3.2.12 Water requirements: **Construction Phase:** The water requirement for the project is calculated as 63 KLD and same will be sourced from Private water suppliers. **Operation Phase:** Total water requirement for the project during operation phase is 5956 KLD. Fresh water requirement of 685 KLD and TTRO water requirement of 3365KLD will be sourced from Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB). The balance water of 1906 KLD will be met from recycling of treated wastewater. There will be no extraction of the ground water.

3.2.13 Waste Management: Due to the proposed industrial estate during construction phase Organic waste is expected to generate 27kg/day and during operational phase 2430(kg/day). Inorganic waste will be generated 18kg/day during construction phase and 1620 kg/day will generated during operational phase. An in house independent Solid Waste Management facility over an area of 5 Acres (Sheds for recovery and recycling facility including shed for E-waste management) has been earmarked for Solid Waste Management Facility. **Hazardous waste:** Hazardous wastes generated from the allotted industries will be managed by the industries and it will be stored in designated areas within their premises and disposed as per Hazardous waste (Management and Transboundary) Rules 2016. **E-waste:** Individual industries will have their own E-waste storage areas and the same will be disposed by individual industries as per E-waste management rules 2022. **Construction & demolition waste:** Construction and demolition waste generated during the site clearance activities will be collected and disposed as per C&D rules, 2016. **Plastic waste:** As per Tamil Nadu Government Order (Ms) No.84 Environment and Forests (EC.2) department dated

25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. SIPCOT will instruct the individual industries to comply according with the G.O. **Wastewater:** Individual industries will have their own Sewage Treatment Plants. Treated sewage will be recycled for flushing and green belt development within their premises as per CPCB/TNPCB guidelines. Individual industries will have their own Effluent Treatment Plants and will be mandated to ensure Zero Liquid Discharge concept as per CPCB/TNPCB guidelines. Treated effluent will be recycled for process and utilities purpose. Individual industries will be instructed to provide all pollution control measures as per CPCB/TNPCB norms. There will be no outfall outside their Premises.

3.2.14 Details of tree cutting and Green belt development: Total No. of trees within the site are 2153. Out of which 170 trees will felled down due to proposed project. To Compensate that trees 1700 trees will be planted in green belt area. Green belt is proposed in an area of 106.575 Ha(38.07% of the developable area). The details are as following.

Green belt	Area (Ha)	Percentage of developable area
Green belt in industrial plot area (33% by industries)	65.572	23.42
Green belt by SIPCOT	41.003	14.65
Total	106.575	38.07

Around 3,34,750 numbers of trees will be planted (for 106.575 ha @ 2500 trees / Ha by considering 80% survival rate & rate and 1700 Tree compensation).

3.2.15 Diversion of the Forest land: The instant proposal doesnot involved any forest land. Pulicat Bird Sanctuary is located at a distance of ~5.77km in the direction of NE direction from the proposed project site. Rapid Biodiversity Inventory Survey has been conducted by the Green works trust for an area of 10 km radius around Proposed SIPCOT Industrial Park, Manallur. Standing Committee of National Board for WILD life has been recommended the proposal vide letter no.WL-6/16/2024-WL dated 7th February, 2021. Based on the recommendation of the NBWL office of the Principal Chief Conservator Forests(HoFF), Chennai granted the No objection certificate vide letter Ref No.WL5/24360/2023 dated 12.02.2024.

3.2.16 Energy conservation measures with estimated saving: Solar panels will be proposed in the roof top of Project office. Solar power will be utilized for the IP internal road lighting /common areas /wherever possible. Apart from this, individual industries will be advised to utilize solar energy to reduce power consumption.

3.2.17 Details of Rain Water Harvesting: Hydro-geological Study has been conducted for the proposed project site. Based on the geophysical investigation of the site, the results of the

Vertical Electrical Sounding shows the ground water conditions of the locations which clearly indicates that the depth of water level varies from 2.9-6.2 m BGL in shallow aquifers, whereas 45-50 m depth BGL in deep aquifers. It is concluded that the neighbouring core zone area is considered to have good groundwater potential. 6594 No's of rain water harvesting pits are proposed and Excess runoff will be diverted to nearby water bodies (after filtration) through storm water drain (provided along the Road side).

3.2.18 Land acquisition and R&R issues involved: Entire land is under the possession of SIPCOT and there is no R & R for the proposed IP. Originally, Administrative Sanction was given for acquisition of 303.75 Ha (300.765 Ha of poramboke land and 2.985 Ha of patta land) for the development of Industrial Park at Manallur vide G.O (Ms) No.119 dated 07.06.2013. Later, poramboke land extent was reduced to 283.08 Ha vide Government of Tamil Nadu land alienation G.O(Ms)No.285 dated 03/08/2018. Further, 3.085Ha of poramboke land has been excluded vide Thiruvallur District Collector vide letter no. 14888/2018 dated 10.06.2019 and 2.985Ha of patta land is also excluded from land acquisition and the total area of the Industrial Park is reduced to 279.99.5 Ha.

3.2.19 Employment potential: The manpower requirement includes both the technical and non-technical personnel. During construction phase total 100 people will get employment and during the operational phase total 9000 people will get employment. Local People will be employed from the surrounding villages. During Operational phase,

3.2.20 Benefits of the project: there will be both Direct and Indirect employment generation. Proposed project will also attract generation of additional revenue to the Government by means of Taxes and duties. Proposed Industrial Park facility will attract commercial establishments in the surrounding area.

3.2.21 Details of Court cases: There are no court cases. However, National Green Tribunal (NGT) has passed Judgment vide Order dated 30.09.2022 and has directed MoEF &CC to issue the Environmental Clearance.

3.2.22 During the EAC, the Committee observed the following.

- i. As per the ToR condition a Biodiversity Inventory Survey has been conducted by the Green works trust, however, no conservation plan has been prepared. The PP shall prepare the conservation plan and get it reviewed by SACON; and recommendations, if any, shall be incorporate in the report. Thereafter PP shall get approval/recommendations of the concern state forest department and FD, Pulicat lake bird Sanctuary. The final Biodiversity Plan shall be submitted to the Ministry for further consideration.
- ii. While going through the details of the Public hearing it was observed as intimated by the people that concerned Gram Sabha did not clear the project. During presentation of the proposal before the EAC PP negated the statement of the People. Therefore, PP may submit the written clarification from the concerned

district authority in this regard.

- iii. No energy conservation plan including use of solar energy has been prepared which need to be submitted

3.2.23 The EAC, after examining the documents submitted by the project proponent and detailed deliberations in its 360th meeting held on 21st March, 2024 **defer** the proposal for want of above information. The proposal may consider after submission of the above said information.

Agenda Sr. No.3.3

Development of National Investment and Manufacturing Zone (NIMZ) in an area of 14,282.24 acres (5779.82 Ha) at Ayyannakota, Malakondapuram, Bodavada, Renimadugu, Siddavaram, Villages, Pamuru Mandal Peddairlapadu P.C. Palli, villages Mandal, Prakasam District, Andhra Pradesh by M/s Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited-Environmental Clearance reg.

Proposal No :IA/AP/INFRA1/440095/2023, File No :10/23/2021-IA.III

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.3.1 The project proponent and EIA consultant M/s Voyants Solutions Private Limited, Gurgoan has made a presentation through video conferencing and provided the following information: -

3.3.2 The proposal is for Development of National Investment and Manufacturing Zone (NIMZ) in an area of 14,282.24 acres (5779.82 Ha) at Ayyannakota, Malakondapuram, Bodavada, Renimadugu, Siddavaram, Villages, Pamuru Mandal Peddairlapadu P.C. Palli, villages Mandal, Prakasam District, Andhra Pradesh by M/s Andhra Pradesh Industrial Infrastructure Corporation (APIIC) Limited.

3.3.3 The proposed project site extends between longitudes 79032’59.15”E & 79037’56.96”E and latitudes 1502’44.60”N & 15010’4.32”N.

3.3.4 Project scheduled under 7(c) Category ‘A’ (Industrial Estates/ Parks/ SEZ etc) as per EIA Notification 2006 and its amendments. Total cost of the project is Rs.4,381 crores.

3.3.5 The ToR proposal was considered by EAC in its 262nd meeting held during 25th-27th May 2021 and 273rd meeting during 16th-17th September, 2021. ToR was issued for the project vide file no. 10/23/2021-IA.III dated 11th October, 2021.

3.3.6 Public Hearing Details: The public hearing was conducted in the Prakasam District Andhra Pradesh on 24/11/2022 the details are as following.

Date	Venue	District and State	Chairman
24.11.2022	MSME Park, Mala kondapuram Village, Pamuru Mandal.	Prakasam District, Andhra Pradesh	Joint Collector & Additional District Magistrate.

3.3.7 Land use/Land cover of project site.

S. No.	Land use/Land cover	Area (ha)	Area (%)	Remarks, if any
1	Settlement	40.56	0.70%	-
2	Agriculture, Plantation	571.19	9.88%	-
3	Agriculture, Crop Land	2580.48	44.65%	-
4	Agriculture, Fallow	1140.29	19.73%	-
5	Green	58.72	1.02%	-
6	Waste Land	1086.75	18.80%	-
7	Water Bodies – River	123.52	2.14%	-
8	Water Bodies – Ponds	151.31	2.62%	-
9	Road	27.00	0.47%	-
TOTAL		5779.82	100.00%	-

3.3.8 List of industries to be housed with the proposed project site.

S. no.	Industry Category	Industry Specification	Industry Category
1	Engineering Goods	Heavy Engineering/Capital goods, Consumer Durables Light Engineering goods/Ancillary units	Red & White
2	PV Cell goods	Solar PV Park-PV cell, manufacturing units, Integrated unit for PV Cell and modules, BOS/Ancillary	White
3	Agro Food Processing	Dairy Products, Shrimp Processing, Poultry product processing, Aqua & Poultry feed, Edible Oil, Spices	Red, Orange & Green
4	Defense Aero-Space	Aerospace-Civil & Defence, Defence items-Land Based, Naval Defence, Strategic Electronics, Airport Equipment, Drones/ UAV manufacturing, Robotics	Exempted

5	Non-Metallic Minerals	Refractories, Glass, Ceramics, Granite/Quartz stones, Sanitary Wares	Orange
6	EV Components	Lithium batteries, Motors and other EV parts, Charging Station	Red, Orange & Exempted
7	Textiles	Spinning-Yarn, Weaving- Fabrics, Apparels	Orange & White
8	Wood Processing	Plywood manufacturing, MDF Manufacturing, Furniture's	Orange and Green
9	Pharmaceuticals	Bulk Drugs and intermediates, (API) Formulations	Red & Orange

3.3.9 Terrain and topographical features: The general terrain in the project area is undulating since the area is large and it covers an area of about 5779.82 Ha. The area has maximum elevation of 208 meters towards Northern-Eastern boundary of the project; but in most of the areas elevation ranges between 62 m to 123 meters (maximum elevation found towards North and North-west part of the project area and lowest elevation found at South and Southeast part of the project area).

3.3.10 Details of water bodies, impact on drainage: The natural drainage flow within the site is from North-west and North-north-west side and flows south and South-east and ultimately flows diverge to different flows namely Narella Vagu, Duppalabanda Vagu, Tamidepindi vagu etc. to drain on Manneru River flowing south of the proposed project site at a distance of about 1.42 Km.

3.3.11 Major water streams flowing within the site will be retained and 9m of green buffers will be provided along the waterbody and river stream. Total area identified is 90.69 Ha for green buffer around the streams/waterbody norms.

3.3.12 The primary and secondary stream will be retained for natural drainage and surface water flow. As most of the surface flow is not perennial but rain fed, tertiary and quaternary streams would be re-aligned according to the project area drainage requirement.

3.3.13 Water requirements: The total water i.e. 98 MLD shall be sourced from Pula Subbaiah Velugonda irrigation Project for the proposed NIMZ project. There will be dedicated intake system and pipeline for the said project from dam. This will lead to availability of water in the project area throughout the year in sufficient quantity. Water supply demand is estimated based on the proposed land use, built-up area and the population densities proposed in the master plan. Water requirement for construction activity and for domestic use of the labour will be fulfilled from local water supply. Application for Water Allocation has been submitted to Water Resources Department, Govt. of Andhra Pradesh. Approval of the same is under process. the project will not use ground water.

3.3.14 Diversion of forest land: The project doesn't involve any Diversion of Forest Land.

3.3.15 the project is not located within 10 km of Protected Areas (PA) including National Parks, Sanctuaries and Tiger Reserves etc. the project is not located within the Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area (ESA) notified by the MOEF&CC.

3.3.16 Waste Management: Overall estimated 677 TPD solid waste will be generated during operational phase. Separate dry and wet waste bins for each unit at ground level will be provided. Non-Biodegradable/dry solid waste will be handed over to authorized recycler or Municipal waste management for further handling & disposal purpose. Biodegradable solid waste will be used for Composting. Industries will ensure that all industrial solid waste generated within their respective facility will be disposed through authorized recyclers / disposal facility. The Hazardous waste generating from individual industries shall be transferred to TSDF facility, at Raviguntapalli Village, in SPSR Nellore District, which is almost 133 km away from the project site and an alternatively option for on-site treatment facility will be explored.

3.3.17 CETP details: CETP with capacity of 55 MLD (approx.) will be installed at site. The waste water generated from the Industries shall be treated in individual unit for Primary treatment and further transferred to CETP through common Trade effluent drainage system and shall be treated in CETP and reused. Treatment process proposed for CETP will be activated sludge method. STP details: All the domestic wastewater from non-processing areas will be treated in STP having a proposed capacity of ~30 MLD to meet the discharge requirements using MBBR technology. Recycled water from STP proposed would be used for flushing, greenbelt development etc.

3.3.18 Details of tree cutting and Green belt development: Total 2,437 nos. of trees identified within project area during environmental screening and survey. Master plan has been prepared in such a manner to maintain the existing trees to the maximum possible extent.

3.3.19 In order to raise the green belt around the project area and roads, 797,271 sapling of different species of plants/shrubs will be planted. Greenbelt will be developed around the streams/waterbody, project boundary and in the surrounding of village habitation.

3.3.20 Energy conservation measures with estimated saving: Solar power will be sourced through roof-top solar power generation on the buildings of industrial park and the generated power (Approx. 134.2 MW, 11.49% of total power requirement) will be used in lighting of common areas and road network. To minimize the petroleum fuel in transportation, use of electric operated vehicle will be promoted at the industrial park.

3.3.21 Land acquisition and R&R issues involved: As per the draft Conceptual Master Plan approximately 14282.24 Acres of land would be required for the development of proposed NIMZ in Prakasam District, Andhra Pradesh. Out of total land, approximately 6808.55 acres of land shall be acquired from patta land (private land), 2698.08 acres from assigned land, 3213.02 acres from government land and the balance land (1562.59) is water bodies, drains, roads etc. The patta land (6808.55 acres) is being acquired by Revenue Department with mutual negotiation with land owner/patta holders and as per RFCTLARR (Andhra Pradesh

Amendment) Act 2018 and national RFCTLARR Act 2013.

3.3.22 Employment potential: Approximately, 3.15 lakhs of employment shall be generated during project construction and operation phase.

3.3.23 Benefits of the project: The proposed project will have significant beneficial impacts on the social infrastructure of the area. Improved income and employment opportunities for local people during construction and operation phase of the project, will significantly contribute to improvement in social infrastructure. The basic objective of developing NIMZ is attracting investments and thereby improving economic conditions locally and at national level. As it is a national level project, a good number of transportation facilities will be there which will indirectly increase the job opportunities and economic growth of that area. The logistics will be easily available at very low cost due to reduction in transportation cost. This will benefit the economy, both national and local levels.

3.3.24 Details of Court cases: No Court Case is pending against the project.

3.3.25 During EAC, the Committee observed the following:

- i. The total area of the project during the TOR application was 14,378 Acre (5,818 ha). However, Forest Department, Ongole during Joint verification observed that about 95.76 acre area is coming under forest land as per NOC received from District Forest Officer (DFO), Ongole dated 03.05.2023. Which is further reduced from the project area to avoid any diversion of forest land. No additional land has been considered after grant of TOR. So, now total area of the project site has an extent of 14,282.24 acres (5779.82 Ha).
- ii. The PP need to demarcate the portion of forest patch where forest area is removed from the existing layout. PP shall also submit the letter from the State forest department clearly stating that the revised industrial area does not have any forest land.
- iii. Since, natural drainage pattern is seen in/around the proposed project site, it is important to have a detailed hydrogeological study on the catchment area of the drainage system within core zone of the project area.
- iv. Also it is observed that there are three water bodies bodies/tanks/lakes namely Manner, Rallapadu, Mopadu nearby the proposed industrial estate. PP shall demarcated the water bodies drainages inside and near by the proposed industrial estate and the mitigation safety measures taken shall be submitted along with the layout.
- v. The layout shall be revised by providing the 50 meter thick plantation all around the canals/drainages rivers passing through project area.
- vi. Wildlife conservation and management plan is under process of the approval of the State forest Department, PP shall submit the approved Conservation plan.
- vii. Letter for water supply from the concern water supply sources

- viii. Provision for a Garland drain around the waterbodies and all along the length of channels/rivers/nallah within the project area shall be made to stop flow of industrial effluents in these water bodies

3.3.26 The EAC, after examining the documents submitted by the project proponent and detailed deliberations in its 360th meeting held on 21st March, 2024 defer the proposal. The proposal shall be considered once the information is received as per the above observations.

Agenda Sr. No.3.4

Expansion and Modification of Industrial Estate of Area 425 ha for housing Cat-A Industries over an area of 41 ha within the existing Industrial area located at Village: Kakani, Tehsil: Luni, District: Jodhpur, Rajasthan by M/s Rajasthan State Industrial Development & Investment Corporation Ltd-Terms of References(ToR) reg.

[Proposal No:IA/RJ/INFRA1/464147/2024; File No :10/6/2024-IA.III]

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.4.1 The project proponent and EIA consultant M/s Grassroots Research and Creations India Private Limited has made a presentation through video conferencing and provided the following information: -

3.4.2 The proposal is for Expansion and Modification of Industrial Estate of Area 425 ha for housing Cat-A Industries over an area of 41 ha within the existing Industrial area located at Village: Kakani, Tehsil: Luni, District: Jodhpur, Rajasthan by M/s Rajasthan State Industrial Development & Investment Corporation Ltd.

3.4.3 Earlier, Environment clearance was obtained from SEIAA, Rajasthan for setting up Industrial Area with 335 No. of plots (Textile – 115, Steel – 84, General – 136) vide File No. F1(4)/SEIAA/SEAC-Raj/Sectt/Project/Cat.1(a)B1(6212)/16-17 dated 23.06.2017. CTE was also obtained from Rajasthan State Pollution Control Board vide File No. F(Tech)/Jodhpur(Luni)/2686(1)/2018-2019/1548-1550 dated 14.06.2018. The existing industrial area falls under Category ‘B1’ of Schedule 7(c) as per the EIA Notification, 2006 & its amendment till date.

3.4.4 Now, RIICO wants to add some units in an area of 41 ha within the existing area of 423.963 ha which falls under category ‘A’ (due to housing of Cat A industries) as per the EIA Notification, 2006 & its amendment till date.

3.4.5 Landuse/Landcover of project site:

Particulars	Area
Parcel of land reserved for Khatedars	44.38
Area under Industrial plots	219.653
Area under Commercial	34.134
Area under Services	10.363
Area under CETP/Solid waste Disposal	10.58
Open Area	8.258
Area under open HFL	14.250
Reserved Area	6.650
Area under Road	76.435
Total Area as per Scheme	425.00
Total Area as per Survey	424.70

3.4.6 List to industries to be housed with the proposed project site, only for projects covered under 7(c) category of EIA Notification, 2006:

S.no.	Type of Plot	Existing	Expansion	Final
1.	Textile Zone (Cat-B)			
	No. of Units	158	No Change	158
	Area (ha)	69.54		69.54
2.	Steel Zone (Cat-B)			
	No. of Units	69	-19	50
	Area (ha)	57.69	41	16.69
3.	General Zone – I			
	No. of Units	140	No Change	140
	Area (ha)	38.53		38.53

4.	General Zone –II			
	No. of Units	197	No Change	197
	Area (ha)	52.60		52.60
5.	Commercial Plot			
	No. of Units	77	No Change	77
	Area (ha)	7.08		7.08
6.	Cat-A Industries (Steel, Cement and Pesticides)			
	No. of Units	Nil	+19	19
	Area (ha)		+41	41

3.4.7 Terrain and topographical features: Jodhpur district forms part of the Great Thar Desert of Rajasthan. In this arid region, there are sand dunes, alluvial areas dotted with few hillocks and hill chains scattered in the area. In the eastern part of the district, the area between Bilara and Jodhpur is covered by alluvium deposited due to the fluvial action of Luni River system. The eastern part of the district exhibits gentle undulating topography interrupted by small ridges of hard rocks. The general elevation of plains varies from 300 m amsl in the north to 150 m amsl in the south. The regional slope is from north-east towards southwest direction. Orientation of alluvial plain area follows the Luni River and its tributaries. Sand dunes occupy a major part of the district north of Vindhyan escarpment in northern and northwestern part of the district. The sand dunes are transverse and longitudinal type formed due to aeolian action and overlies the denuded consolidated formations. Ridges composed of comparatively resistive rocks like granite, rhyolite and Jodhpur sandstone are found extending from Shergarh in the west to Bilara in the east. The alluvial and sand filled valleys are separated by the ridges whose crest elevation ranges from 325 to 460 m amsl. In the northern part of the district, the highest peak of the hill is 284 m amsl. The presence of boulder bed exhibit striking plain topography around Bap and low lying outcrops of limestone, shale and sandstone layers are observed part of the district near Phalodi.

3.4.8 Details of water bodies, impact on drainage: Luni River is located at the distance of 0.05 km, West side and Agriya Bala Jhor is located at the distance of 4.3 km, SE.

3.4.9 Water requirements: Total Water requirement after Expansion is 9150 KLD (Water requirement as per EC is 8400 KLD and Additional Water for Expansion :- 750 KLD). Water will be sourced from PHED water supply.

3.4.10 Tree Cutting: No tree cutting involved.

3.4.11 Diversion of forest land: The project does not involved any forest diversion.

3.4.12 The project is not located within 10 km of Protected Areas (PA) including National Parks, Sanctuaries and Tiger Reserves. The project does not is located within the Eco-Sensitive Zone (ESZ) or Eco-Sensitive Area(ESA) notified by the MoEF&CC.

3.4.13 Waste Management: CETP details: ETP will be installed by individual industrialist or CETP will be installed by industrial association as per requirement. STP details: STP will be installed by individual industrialist.

3.4.14 Land acquisition and R&R issues involved: Total land is under possession of proponent.

3.4.15 Employment potential: Total Employment after expansion will be 1000 persons including 750 as direct and 250 as indirect employment.

3.4.16 Benefits of the project: Constructing Industrial Estates has lots of advantages, as it will be easy to handle all the issues of industries present at one location rather than disperse at different locations. Getting rid of health hazards and damages of buildings which may be caused by accidents occurring in factories and workshops. Industrial Estates will have among other things their own water supply, water networks, sanitation networks, electric power connection and distribution system and standby generator, thereby decreasing noteworthy the load for the cities supply, distribution and disposal networks. Constructing Industrial Estates encourages local investors and foreign companies to invest in this country. The existence of Industrial Estates means, investors are not forced to go through a complicated process that can last years in developing countries (searching a suitable land, getting the necessary permissions from the concerning authorities, constructing infrastructure and get necessary services). Encouraging investors through the construction of Industrial Estates contributes to create sustainable jobs, decrease unemployment and reduce poverty. In addition to the direct employment at the industrial estate, big number of indirect jobs is created. Workers' skills enhancement is also a noteworthy advantage. Investors contribute to the development of the national economy through paying rent for the lot or buying the lot, taxes paid by themselves and by their employees, producing goods not existing at the local market and as such reducing the import rate, production of products at competitive costs which can be exported to foreign markets.

3.4.17 Details of Court cases: No court cases pending.

3.4.18 During the EAC, the committee observed the following:

- i. The proposed Expansion and Modification of Industrial Estate over an area of 41 ha of the existing industrial estate of Area 425 ha for housing Cat-A Industries is adjacent to the water bodies. There is scope to shift the proposed 41ha towards north side or other except the southward side avoiding the water body. PP shall explore the other options while submitting the EIA/EMP report.

3.4.19 The EAC, taking into account the submission made by the project proponent, had a detailed deliberation in its 360th meeting of Expert Appraisal Committee held on 21st March, 2024 and **recommended** the proposal for grant of Terms of Reference (ToR) with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. Location of category A industries are closer to water bodies. Therefore category A industries shall be shifted to the location which are away from the water bodies and also does not fall in catchment areas of these water bodies
- ii. Detailed green belt plan with layout shall be prepared. Minimum 50-meter-wide multi-layered green belt shall be provided around waterbody. This 50-meter-wide green belt shall be on both side of the Luni river all along its length within project area.
- iii. Garland Drainage shall be created between waterbodies on one side and industrial plots on other side.
- iv. List of industries proposed in category A shall be submitted along with revised lay out of the industrial park
- v. Cumulative impact assessment studies considering the proposed industries and existing industries be carried out along with the mitigation plan.
- vi. Since, natural drainage pattern is seen in/around the proposed project site, it is important to have a detailed hydrogeological study on the catchment area of the drainage system within core zone of the project area.
- vii. No natural drainage/nallahs shall not be diverted those will be restored with green buffer area. All streams of first order shall be mapped in the hydrography map and adequate mitigation measures for continuity and preservation of natural drainage in the project site and vicinity of the project.
- viii. Water treatment plant of effluent, recycle/ reuse and disposal should be well planned.
- ix. Processed effluent/waste water shall not be allowed to mix with storm water. The storm water from the premises shall be collected and discharged through a separate conveyance system.
- x. The Action Plan on the compliance of the recommendations of the CAG as per Ministry's Circular No. J-11013/71/2016-IA.I (M) dated 25th October, 2017 needs to be submitted at the time of appraisal of the project and included in the EIA/EMP Report.
- xi. As per the Ministry's Office Memorandum F.No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent, based on the commitments made during the public hearing, shall include all the activities required to be taken to fulfill these

commitments in the Environment Management Plan along with cost estimates of these activities, in addition to the activities proposed as per recommendations of EIA Studies and the same shall be submitted to the ministry as part of the EIA Report. The EMP shall be implemented at the project cost or any other funding source available with the project proponent.

- xii. In pursuance of Ministry's OM No stated above the project proponent shall add one annexure in the EIA Report indicating all the commitments made by the PP to the public during public hearing and submit it to the Ministry and the EAC.

Agenda Sr. No.3.5

Development of 4/6 lane (Greenfield) access controlled Expressway (Agra - Gwalior) which starts from village Deori, Design Ch. 0+000 in district Agra (Uttar Pradesh) and ends near Susera village, Design Ch.88+400 in Gwalior district in the states of Uttar Pradesh, Rajasthan and Madhya Pradesh (Total design length = 88.400 km) by M/s National Highway Authority of India-Environmental Clearance reg.

[Proposal No: IA/MP/INFRA1/465000/2024; File No :10/40/2022-IA.III]

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.5.1 The project proponent and EIA consultant M/s Centre for Envotech & Management Consultancy Pvt. Ltd., Bhubaneswar has made a presentation through video conferencing and provided the following information: -

3.5.2 The proposed project is for Development of 4/6 lane (Greenfield) access controlled Expressway (Agra-Gwalior) which starts from village Deori, Design Ch. 0+000 in district Agra (Uttar Pradesh) and ends near Susera village, Design Ch.88+400 in Gwalior district in the states of Uttar Pradesh, Rajasthan and Madhya Pradesh (Total design length = 88.400 km) by M/s National Highway Authority of India.

3.5.3 The proposed project starts near Deori village (Design Ch. 0.000) in district Agra and ends near Susera village merge into Gwalior bypass (Design Ch.88.400) in the states of Uttar Pradesh, Rajasthan and Madhya Pradesh having a total length of 88.400 Km. The proposed project starts near Deori village (Design Ch. 0.000) in district Agra (27°5'8.57" N 78°1'22.23"E) near village Adampur and ends near Susera village merge into Gwalior bypass (Design Ch.88.400) (26°19'20.71" N, 78°10'38.11"E) in the state of Uttar Pradesh, Rajasthan and Madhya Pradesh having a total length of the project 88.400 Km.

3.5.4 Project scheduled under 7(f) Category 'A' (Highways) as per EIA Notification 2006 and its amendments. Total cost of the project is Rs. 4067.79 crores.

3.5.5 The TOR proposal was earlier considered in the 310th meeting of Expert Appraisal Committee (EAC) held during 11th October 2022 and 321st meeting during 28th-1st March 2023. The Terms of Reference (ToR) granted by the Ministry vide letter No.10/40/2022-IA.III dated 6th April 2023.

3.5.6 Public Hearing Details: The public hearing has been successfully conducted in Morena, Agra, Gwalior and Dholpur districts in the states of Madhya Pradesh, Uttar Pradesh and Rajasthan respectively. The details are as following:

Date	Venue	District and State	Chairman
31/01/2024	Susera Village, Gird Tehsil,	Gwalior District, Madhya Pradesh	Additional District Magistrate
23/01/2024	Basaiya Village, Morena Tehsil	Morena District, Madhya Pradesh	Additional District Magistrate
13/01/2024	Loheta Village, Fatehabad Tehsil	Agra, District, Uttar Pradesh	Additional District Magistrate
02/02/2024	Marena Village, Rajakhera Tehsil	Dholpur District, Rajasthan	Additional District Magistrate

3.5.7 Land use/Land cover of project site(Within 500m from the ROW)

S.No.	Classification/Legend	Area in Ha.	Percentage (%)
1	Forest land	80.5089	0.90
2	Barren/Waste Land	1034.7234	11.60
3	Water Body	157.6708	1.75
4	Built-up	146.4255	1.67
5	Agricultural/Crop Land	7499.2714	84.08
	Total	8918.6	100

3.5.8 Right of Way (RoW): The proposed project will have 60m RoW.

3.5.9 Terrain and topographical features: Mostly plain followed by rolling/undulating terrain, predominately agriculture followed by fallow, wastelands, forest and habitations.

3.5.10 Details of water bodies, impact on drainage: the details of the major water bodies crossing the proposed highway are as following:

S.No.	Chainage	Water Bodies	Proposed Structure	Span Arrangement (m)
1.	8+000	Canal	Minor Bridge	1x20
2.	9+234	Canal	Minor Bridge	1x20
3.	12+880	Canal	Minor Bridge	3x40
4.	19+850	Canal	Minor Bridge	1x15
5.	23+997	Utangan River	Major Bridge	3x30
6.	47+200	Chambal River	Major Bridge	19x52+150+300+150+2x52
7.	51+972	Kota Barrage RMC Canal	Minor Bridge	1x50
8.	55+815	River	Major Bridge	2x35
9.	61+240	Canal	Minor Bridge	1x26.85
10.	68+600	Asan River	Major Bridge	5x30
11.	72+400	River	Major Bridge	2x30
12.	73+675	Canal	Major Bridge	15+40+15

3.5.11 The natural drainage of the project impacted area shall be maintained through improvement of 192 nos. of culverts, 08 nos. of major bridges on rivers/canals and 23 nos. of minor bridges. The proposed alignment does not pass through any flood prone area.

3.5.12 Water requirements, sources (during construction and operation phases) and NOC: The total peak demand of water for construction phase will be about 9000 KLD. Current water demand is only indicative in nature which may differ during construction phase. The water requirement shall be extracted from local surface/ground water (which is easily available) after taking necessary permission before the construction of the project by the appointed contractor. No groundwater is envisaged.

3.5.13 Diversion of forest land: The proposed project highway will require diversion of 3 ha. land of Sanichara Protected forest land from Design Ch. 80+230 to Design Ch. 80+730 (Total length:500m) in Morena district in the state of Madhya Pradesh. The forest diversion proposal has been uploaded on PARIVESH portal via. Proposal No. FP/MP/ROAD/427210/2023 and is under process for Stage-1 clearance.

3.5.14 The proposed project road falls in the Core Zone of National Chambal Sanctuary in the states of Rajasthan and Madhya Pradesh. In Rajasthan (Dholpur), the proposed project from design Ch. 45+760 to design Ch. 47+120, having total length of 1.36 km falls in core zone of National Chambal Sanctuary. In Madhya Pradesh, the proposed project from design Ch. 47+120 to design Ch. 48+130, having total length of 1.01 km falls in core zone of National Chambal Sanctuary. Therefore, the total non-forest area of the project falling in the core zone of National Chambal Sanctuary is 14.223 ha. The Wildlife Clearance proposal has been uploaded in PARIVESH portal via Proposals No. WL/RJ/ROAD/431951/2023 and WL/MP/ROAD/427711/2023 and is under process.

3.5.15 The proposed project road falls in the Eco Sensitive Zone (ESZ) of National Chambal Sanctuary in the states of Rajasthan and Madhya Pradesh. In Rajasthan (Dholpur), the proposed project from design Ch. 22+528 to design Ch. 45+760, having total length of 23.232 km falls in ESZ of National Chambal Sanctuary. In Madhya Pradesh, the proposed project from design Ch. 48+130 to design Ch. 50+130, having total length of 2 km falls in ESZ of National Chambal Sanctuary. Therefore, the total non-forest area of the project falling in the Eco sensitive zone of National Chambal Sanctuary is 51.34 ha. The Wildlife Clearance proposal has been uploaded in PARIVESH portal via Proposals No. WL/RJ/ROAD/431951/2023 and WL/MP/ROAD/427711 / 2023 and is under process.

3.5.16 The proposed project is passing through Taj Trapezium Zone (TTZ) at a length of 19.500 km. The proposed project is passing through Taj Trapezium Zone (TTZ) at a length of 19.500 km. For tree cutting in the TTZ the clearances is required.

3.5.17 A Rapid Biodiversity Assessment and Wildlife Conservation / Mitigation plan was prepared by Zoological Survey of India (ZSI) (**Annexure-I**). The proposed Budget for interventions to be implemented by Divisional Forest Office as suggested by ZSI has been kept in the EMP and accordingly NHAI will implement on it.

3.5.18 The EIA/EMP Report has been prepared incorporating all the recommendations made by PCCF's (WL), Bhopal and Jaipur. Construction of nets on both sides of the bridge at a minimum height of 2m. NHAI has proposed installation of light and Sound barrier on both sides of the bridge in the entire length which will serve the intended purpose of nets and mitigation structures as per report of ZSI and as suggested by Forest Department has been incorporated in the project. The wildlife Clearance has already been applied by NHAI. Further, suitable light and sound barriers, elevated Wildlife Suspension bridge/Cable stayed bridge, viaducts, Creation of Cattle underpass/viaducts for wildlife species, Installation of fencing on both the side of the road passing through agricultural and badland areas as per the recommended chainages/locations will be installed as per the recommendations by ZSI,

Kolkata.

3.5.19 The provision of cross drainage structures like 08 nos. of major bridges, 23 nos. of minor bridges, 42 nos. of underpasses and 192 nos. of box culverts, 23 nos. of box crossings have been proposed on the highway in consultation with state CWLW and State Forest Department and as per the recommendations by ZSI.

3.5.20 Waste Management: 500 kg/day (approx.) during construction phase and 50 kg/day (approx.) during operation phase at tolls and wayside amenities area within PROW may be generated. Bio degradable waste shall be disposed through bio composting and other waste through landfill site.

3.5.21 Details of tree cutting and Green belt development: Approx. 2855 nos. of trees will be affected due to the proposed project out of which only 177 nos. of trees in protected forest land and remaining 2678 nos. of trees in non-forest land. The avenue plantation will be carried out as per IRC SP-21 and National Green Highway policy 2015 within the available ROW.

3.5.22 Energy conservation measures with estimated saving: The proposed access controlled greenfield highway project will act as a fuel saving and reduction in travel time.

3.5.23 Details of Rain Water Harvesting: Rainwater harvesting structures shall be provided as per IRC-SP-58 at the interval of 500 m on either sides of carriageway as per availability of RoW and depending on the water table of first aquifer (Approx. 100 nos. of structures shall be constructed). The pits shall be at least 3-5m above the highest groundwater level at the specific location. Oil and grease traps shall also be provided to trap the same from contaminating the groundwater. The total cost of the rainwater harvesting structures including its maintenance is Rs. 1,00,00,000 and this cost has been covered in the EMP cost.

3.5.24 Land acquisition and R&R issues involved: The total land acquisition for the proposed project is 561.277 ha out of which 480.587 ha is private land, 77.69 ha is Government land and remaining 3 ha. land is of Sanichara Protected forest. The proposed RoW of the project is 60m. The project is 6 lanes access control highway configuration.

3.5.25 Employment potential: During the construction of the road project around 1000 persons would be employed temporarily for a period of 2.5 years. However due to construction of toll plazas approx. 10 persons will be employed on permanent basis and 100 nos. of employees on temporary basis. The total manpower requirement for the project is approx. 1100. Preference will be given to local people for employment.

3.5.26 Benefits of the project: The proposed project would act as the prime artery for the economic flow to this region. Enhanced connectivity between rural & urban population which will benefit the all sections of the society like general population, small-medium-large scale industries, farmers, businessmen etc. Strengthening of both rural & urban economies which in turn will improve economic scenario of the state and country.

3.5.27 Details of Court cases: No court cases pending.

3.5.28 The EAC, after examining the documents submitted by the project proponent and detailed deliberations in its 360th meeting held on 21st March, 2024 **recommended** the proposal for Environmental Clearance with the specific conditions, as mentioned below, in addition to all standard conditions applicable for such projects:

- i. A long span elevated Wildlife Suspension bridge/Cable stayed bridge from Chainage no. 46+910 to 47+510 and viaduct from Chainage no. 45+922 to 46+910 and 47+510 to 47+614 shall be constructed without disturbing the basking /breeding ground for Critically Endangered species and thus provide safe ravine habitat. Further sound and light barriers along with net structure on both the side of the bridge prevent dumping of waste material in river from the bridge should also be installed in all the mentioned structure. Construction activities shall be avoided during the nesting period i.e. March-May, for both Indian Gharial and Marsh crocodile.
- ii. In addition to above structures following structures shall also be constructed to ensure free movement of the wildlife

SL No	Proposed structure	Chainage
1	Cattle Underpass	33+025 to 33+030 2
2	Cattle Underpass	35+914 to 35+919 3
3	Cattle Underpass	38+500 to 38+505
4	Viaduct	38+595 to 38+855 5
5	Viaduct	39+067 to 39+483 6
6	Viaduct	39+980 to 40+500 7
7	Viaduct	41+148 to 41+372
8	Viaduct	48+292 to 48+708 12
9	Cattle Underpass	80+750 to 80+755

- iii. In partial Modification of the ZSI recommendations the specifications for Cattle passes and viaducts which need to be modified to make them suitable for wildlife crossing shall be as per species specific recommendations of the WII guidelines. Considering Sambhar as the tallest animal likely to use these structures as openness index of atleast 1.12 shall be maintained. The road having a RoW of 60 meter is likely to have atleast 30-meter width. Therefore to maintain openness index of 1.12 the specifications of underpasses shall be 6 meter high, 6 meter wide and 30 meter long (width of carriageway, median & Shoulders in road) .
- iv. Habitat improvement plan, conservation and management plan for schedule I species, soil and water conservation plans, Forest Fire Management plan, Sustainable tourism plan, awareness programs, formation of Task Force proposed in ZSI report shall be executed at the project cost.
- v. Cost estimates for above interventions shall be reviewed in consultation with the concerned DFO and be revised if felt necessary
- vi. All the mitigations recommended and commitments made in the biodiversity Management & Conservation Plan shall be implemented in letter and spirit. The status of implementation of Wildlife Management & Conservation Plan shall be submitted to the Regional Office of the Ministry along with 6 monthly compliance report.
- vii. All the recommendations made by PCCF's (WL), Bhopal and Jaipur shall be implemented in letter and spirit. Nets on both sides of the bridge shall be constructed of at a minimum height of 2m.
- viii. The wildlife Clearance has already been applied by NHAI. Further, suitable light and sound barriers, elevated wildlife suspension bridge/cable stayed bridge, viaducts, cattle underpass/viaducts for wildlife species, installation of fencing on both the side of the road passing through agricultural and badland areas as per the recommended chainages/locations will be installed as per the recommendations by ZSI, Kolkata.
- ix. Conservation and management activities recommended by the Zoological Survey of India (ZSI) for the schedule-I species and other wild life species shall be implemented in consultation with the concern state forest department.
- x. Wildlife movement during the construction be monitored by ZSI/forest department and if found necessary additional over/underpasses be developed. Provision for the same be made in the project budget and provided to state forest department upon request. Specific budget be provided to ZSI towards the monitoring of animal movement during the construction phase and provide recommendation for additional over/underpasses if necessary.
- xi. No tree can be felled/transplant unless exigencies demand. Where absolutely

necessary, tree felling shall be with prior permission from the concern Authority. Old, large and heritage value trees should be retained based on girth and age regulations as may be prescribed by the Forest Department. Where the trees need to be cut/transplanted with prior permission from the concerned local Authority, compensatory plantation in the ratio of 1:10 (i.e. planting of 10 trees for every 1 tree that is cut/ non-survival of any transplanted tree) shall be done and maintained. Plantations to be ensured species (cut) to species (planted). All the plantation will be done by state forest department as deposit work and not by private contractors.

- xii. The proposed project is passing through Taj Trapezium Zone (TTZ) at a length of 19.500 km. Approx.663 nos.of proposed to be cut in this zone, for tree cutting necessary clearance from the authorities of TTZ may be obtained.
- xiii. Green belt development (tree plantation) in lieu of the trees being felled in non-forest land should be carried out by the State forest department as deposit work and not by the private contractor. Green belt must be developed using exclusively native species including significant number of ficus trees. No exotic species to be used for the same. A comprehensive plan for plantation shall be prepared in consultation with state forest department (executing agency) including the costs involved. Such compensatory plantation will be over and above the compensatory afforestation to be carried in lieu of the diversion of forest land, if any.
- xiv. Trees with heronry (breeding ground for herons, egrets, etc), pelicanary or community nesting of birds like Painted Storks, Ibis, Egrets, Pelican, etc will not be allowed to fell. In case of presence of such, alignment will be required to be changed to save such trees.
- xv. No Ground water shall be extracted and used. Approval/permission of concerned authority shall be obtained before drawing surface water from canal or any other sources.
- xvi. The proponent shall obtain permission from the competent authorities for tree felling along the proposed alignment.
- xvii. Rain water harvesting pit shall be at least 3 - 5 m above the highest ground water table.
- xviii. In borrow pits, the depth of the pit shall be regulated such that the sides of the excavation will have a slope not steeper than 1:2, from the edge of the final section of bank. Soil erosion checking measures shall be carried out. Details for borrow area operation and rehabilitation given in EIA report shall be followed.
- xix. Quarry areas shall be barricaded during mining operations. The abandoned quarry shall be developed as water reservoirs with proper fencing around quarry area.
- xx. In all the construction sites within 150 m of the nearest habitation, noisy construction work such as crushing, concrete mixing will be stopped during the

night time between 10.00 pm to 6.00 am. No noisy construction activities will be permitted around educational institutions/health centers (silence zones) up to a distance of 100 m from the sensitive receptors. All plants and equipment used in construction shall strictly conform to the CPCB/SPCB noise standards.

- xxi. Traffic Control Devices/Road Safety Devices/ Roadside Furniture including various types of cautionary, informatory, regulatory as mandatory signboards, road markers, studs, etc. shall be provided at appropriate locations all along the project stretch in accordance with the specifications laid down in Manual of Specifications and Standards for Expressways (IRC: SP:99-2013) and IRC:8, IRC:25, IRC:26, IRC:35, IRC:67, IRC:79, IRC:103 and Section 800 of MORTH Specifications.
- xxii. All the major, minor bridges and culverts should not affect the drainage systems. Flood plains of the rivers/ drainage systems are not to be disturbed.
- xxiii. Afforestation using compensatory plantation in the ratio of 1:10 shall be carried out by state forest department as deposit work and not by private contractors. Native tree species shall be provided as per the IRC Guidelines on Landscaping and Tree Plantation (IRC: SP:21-2009). Effort should be made to plant native trees and Ficus species on both sides of the alignment. Special attention shall be given for protecting giant trees, and locally important trees (having cultural importance) and should be identified chain-age wise.
- xxiv. Project alignment should be managed in such a way to save the Heritage/old trees supposed to be affected by the proposed alignment. xvii. Trees with heronry (breeding ground for herons, egrets, etc), pelicanary or community nesting of birds like Painted Storks, Ibis, Egrets, Pelican, etc will not be allowed to fell. In case of presence of such, alignment will be required to be changed to save such trees.
- xxv. As per the Ministry's Office Memorandum F. No. 22-65/2017-IA.III dated 30th September, 2020, the project proponent shall abide by all the commitments made by them to address the concerns raised during the public consultation. The project proponent shall initiate the activities proposed by them, based on the commitment made in the public hearing, and incorporate in the Environmental Management Plan and submit to the Ministry. All other activities including pollution control, environmental protection and conservation, R&R, wildlife and forest conservation/protection measures including the NPV, Compensatory afforestation etc., either proposed by the project proponent based on the social impact assessment and R&R action plan carried out during the preparation of EIA report or prescribed by EAC, shall also become part of EMP and shall be implemented.
- xxvi. Proponent shall keep the finish road level sufficiently elevated from ground level with provision of railing on both sides to restrict animal crossing in order to avoid the possibility of wildlife injury/death. Animal underpasses, watch tower, water holes and other mitigation measures proposed shall be constructed in supervision of

forest department.

- xxvii. While constructing the over bridges as proposed over major water bodies efforts should be made to avoid construction of pillars in beds of water bodies.

Agenda Sr. No.3.6

Widening and Improvement of existing 2-lane to 4/6 lane with paved shoulders from existing km 124.488 (Ch:122+200) to existing km 223.860 (Ch:214+535) of Kushalnagar to Mysore section of NH-275 in the state of Karnataka (Total length-92.335km) by M/s National Highways Authority of India-Environmental Clearance reg.

Proposal No: IA/KA/INFRA1/464856/2024; File No: 10/21/2022-IA.III.

“The EAC noted that the Project Proponent and the consultant have given undertaking that the data and information given in the application and enclosures are true to the best of their knowledge and belief and no information has been suppressed in EIA/EMP report. If any part of data/information submitted is found to be false/misleading at any stage, the project will be rejected and Environmental Clearance given, if any, will be revoked at the risk and cost of the project proponent.”

3.6.1 The project proponent and EIA consultant M/s Mantras Green Ressources Ltd has made a presentation through video conferencing and provided the following information: -

3.6.2 The proposal is for Widening and Improvement of existing 2-lane to 4/6 lane with paved shoulders from existing km 124.488 (Ch: 122+200) to existing km 223.860 (Ch: 214+535) of Kushalnagar to Mysore section of NH-275 in the state of Karnataka by M/s National Highways Authority of India.

3.6.3 The proposed project is a partially greenfield section of NH-275. The NH-275 starts at Bantwal and ends at Bengaluru in Karnataka State which connects Dakshina Kannada, Kodagu, Mysuru, Mandya, Ramnagaram and Bengaluru districts in Karnataka State. This highway was previously SH-88, which was developed by M/s. Karnataka Road Development Corporation Limited, Bengaluru during the year 2012. SH-88 was recently upgraded and declared as NH-275 vide notification dated 4th March 2014 by Ministry of Road Transport & Highways (MoRT&H), Government of India (GoI).

3.6.4 The proposed project starts from Kushalnagar bypass of NH-275 (design Ch:122+200) after Anekadu forest area and ends near Paschimavahini (design Ch: 214+535). The total length of the project is 92.335 km with RoW 45 m at urban and 60 m at rural areas. The proposed partially greenfield alignment starts at 12°26'19.91"N 75° 54'19.79"E and ends at 12°24'15.71"N,76°40'47.79"E.

3.6.5 Project scheduled under 7(f) Category ‘A’ (Highways) as per EIA Notification 2006 and its amendments. Total cost of the project is Rs. 4128.92 crores.

- i. During presentation, the committee observed that ToR was granted on 5th May 2022

and while granting the TOR the committee prescribed the specific TOR no1. 'NHAI will design the alignment as per the suggestions of the concerned Forest Department of Govt. of Karnataka with necessary structural provisions for safe passage of wildlife and re-alignment for saving of Forest patch'. Keeping a view that (i) The proposed alignment is passing through the notified Eco-Sensitive Zone (Ch: 208+900 to Ch:209+550) of Ranganathittu Bird Sanctuary. (ii) Also the alignment is falling within 10 km radius of Nagarhole Tiger Reserve and Arabithittu Wildlife Sanctuary.

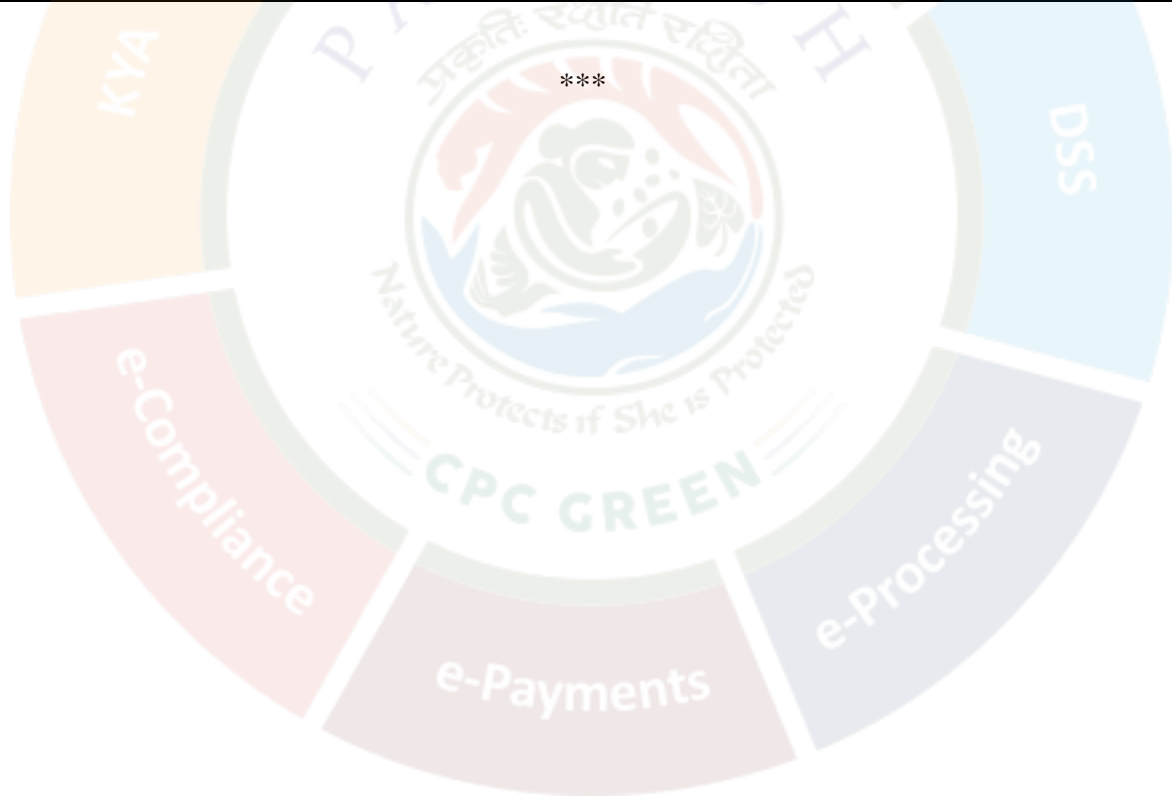
- ii. However, The NHAI/EIA Consultant submitted the Minutes of the Meeting of Eco-Sensitive Zone monitoring Committee of Ranganathittu Bird Sanctuary held on 3rd November, 2020 at Ranganathittu which is before grant of ToR.
- iii. NHAI/EIA Consultant vide letter dated 14.08.2023 which is in Kannada language and could not read it thus the Committee requested the PP to translate in English language and submit the same.
- iv. Also requested that as per Specific ToR mentioned in the ToR letter dated 05th May, 2022 action taken by NHAI shall submit.
- v. In Kodagu district public hearing was conducted by the Assistant Commissioner. PP shall provide the clarification whether Assistant Commissioner is authorised to conduct public hearing.

3.6.6 In view of the above, the committee **defer** the proposal and requested the Member Secretary the proposal may consider after submission of the above information for further consideration pls.



Annexure-A List of the Expert Appraisal Committee (Infra-I) Members participated during 360th Meeting held on 21st March, 2024.

S.no	Name	Designation	27 th February, 2024.
1	Shri.Manmohan Singh Negi	Chairman	Present
2	Shri.S.Jeyakrishnan	Member	Present
3	Prof.V.K Jain	Member	Present
4	Dr. Jaya Kumar Seelam	Member	Present
5	Dr.P.K.Dinesh Kumar	Member	Present
6	Shri. PrakashTewari	Member	Present
7	Dr. M.V. Ramana Murthy	Member	Present
8	Shri. Sharan Deep Singh	Member	Absent
9	Shri Ashok Kumar Patre	Member	Absent
10	Ms.BinduManghat	Member	Absent
11	Dr. Niraj Sharma	Member	Present
12	Dr. B. Kishor	Member	Present
13	Shri AmardeepRaju	Member Secretary	Present



Site visit report of EAC(Infra-I) Sub-Committee for the following projects.

- I. Item no. 3.5 of 338th EAC: Expansion of Existing Lighterage Jetty to Increase Capacity of Cargo Mix from 0.56 Million Tonnes Per Annum to 5.00 Million Tonnes Per Annum at P.O.: Digvijaygram, Sikka-361140, District: Jamnagar (Gujarat) by M/s. Shree Digvijay Cement Company Limited. -Terms of Reference-Reg. Proposal no: IA/GJ/INFRA1/438303/2023; File No. 10/59/2023-IA.III.**
- II. Item no. 3.6 of 338th EAC: Revamping of old Jetty and strengthening and development of the existing berth for bulk cargo through direct berthing facilities for handling capacity of 4.00 Million Tonnes per annum, located at P.O.: Digvijaygram, Sikka-361140, District: Jamnagar (Gujarat) by M/s. Shree Digvijay Cement Company Limited-Reg. Proposal No: IA/GJ/INFRA1/438395/2023; File No. 10/57/2023-IA.III.**

1. Project Background.

The above mentioned proposals item no. 3.5 and 3.6 were placed before the EAC in its 338th meeting of Expert Appraisal Committee held on 24th August, 2023 and the EAC deferred the proposal for grant of Terms of Reference (ToR) for the want of following documents/information(s):

- i. Item 3.5: Expansion of Existing Lighterage Jetty to increase capacity of cargo mix from 0.56 million tonnes per annum to 5.00 million tonnes per annum and also proposed in other project that M/s SDCCL is now in the process of enhancing its cement plant capacity and is desirous of handling additional cargoe. SDCCL envisages to increase cargo handling rate of the existing berth at Old deep water Jetty to the capacity of approximately 4.00 MTPA.
- ii. Coal will be main cargo (2 MMTPA) besides other cargo such as Cement, Clinker, Gypsum, Limestone, Pet coke, Fly ash, Bauxite, Sandstone, Iron Ore, Sulphur, Fertilizer, Soda ash, Containers, Refractory Bricks, Bentonite, Alternate Fuels & Raw materials (AFR) and Other bulk materials.
- iii. EAC observed that the proposal aims to use both mechanical as well as lighterage operations. Committee was concerned about the increased pollution risks in several manners and especially considering that the boundary of Marine National Park and Sanctuary is in a very close proximity of the proposed project. Therefore, it has been decided that a EAC sub-committee will visit the site before grant of the ToR.
- iv. **Item no. 3.6:** EAC also could not understand why it is proposed to handle less cargo i.e. 4 MMTPA on more modern and mechanical operation facilities as proposed at

this facility than proposed expansion of existing lighterage jetty of 5 MMTPA as per agenda item 3.5.

- v. The Sub-committee will evaluate the cumulative impact of agenda item no. 3.5 and 3.6 considering that these are inter-dependent projects.
- vi. Committee also noted that EIA-EMP should be done in a cumulative fashion considering that both projects are inter-linked and are in very close proximity.

2. Site Visit and Brief of Project.

Accordingly, a site visit by the Sub-committee was conducted on 17th-19th March, 2024 for the proposed project., PP (M/s. Shree Digvijay Cement Company Limited) inter-alia presented a brief on the following projects to the sub-Committee as following.

- i. M/s. Shree Digvijay Cement Company Limited (SDCCL) owns and operates a state of the art modern technology & fully automatic cement plant at Digvijaygram (Sikka) in Jamnagar District. The current capacity of the cement plant is 1.8 million tons. Presently, the cement plant, operates a Lighterage Jetty facility near the cement plant to aid its plant operations. The Lighterage Jetty facility is capable of handling barges / vessels with 3,000 - 5,000 DWT. The mother vessel (5,000 - 35,000 dwt) is anchored at the anchorage point, approximately 7 to 10 kms from the port site. SDCCL is now in the process of enhancing its cement plant capacity and is desirous of handling additional cargo.
- ii. SDCCL also envisages to increase cargo handling rate of the existing berth at old Jetty and lighterage jetty constructed approximately in early 1953s in order to enable handling of such additional cargo volumes to aid its plant expansion. SDCCL is exploring the possibility of revamping & expanding its marine infrastructure to enable handling of such additional cargo volumes to aid its plant expansion.
- iii. Now, SDCCL envisages to increase cargo handling capacity from 0.56MTPA to 5.00 MTPA at lighterage jetty (item no. 3.5) and cargo handling capacity of 4.0MTPA (item no. 3.6) mix bulk cargo after Revamping of old the Jetty in view of this SDCCL is exploring the possibility of rejuvenating & expanding its marine infrastructure to enable handling of such additional cargo volumes to aid its plant expansion.

Shree Digvijay Cement Co. Ltd is proposing two projects:

Item no. 3.5: (i) 'Expansion of Existing Lighterage Jetty to increase capacity from 0.56 million tonnes per annum to 5.00 million tonnes per annum at P.O.: Digvijaygram, Sikka-361140, District: Jamnagar (Gujarat) by M/s. Shree Digvijay Cement Company Limited'.

- i. The rejuvenation of the project of existing marine facilities of SDCCL for handling of

captive & commercial bulk cargo will include the following major facilities which will enhance the cargo handling.

- a) Lighterage Jetty Berths for handling of bulk cargo through barge Lighterage operation
- b) Deepening of the Channel for ease of manoeuvring at Lighterage jetty
- c) Yard development for storage of dry bulk cargo.

ii. Proposed expansion Details.

S.no	Handling Material	Quantity (MTPA)		
		Existing	Proposed	Total Proposed
1	Lighterage Jetty Solid / Bulk Material *	0.564 (Cement, Clinker, Fertilizers, Fly ash & Coal etc)	4.436	5.000
Total		0.564	4.436	5.000

iii. Land use planning (area break-up)

Sr. No.	Details	Area Existing (In Hectare)	Area Proposed (In Hectare)	Area Total (In Hectare)
1	Lighterage Jetty	22.71	0.00	22.71
2	Storage Area including Greenbelt Area	0.00	2.89	2.89
Total		22.71	2.89	25.60

iv. Configuration and Dimensions of the Jetty.

S. no.	Existing jetty
1	Lighterage Jetty-(Strengthening of Jetty Structure-150 meters Existing Jetty) Lighterage Jetty- 207 meters x 20 meters wide of Jetty
2	Strengthening & Development of Existing Shallow Water Berth & Approach road. (Size- Length : 534 meters x width: 24.25 meters)
3	Dredging at Lighterage Jetty & 1.7km channel (Size- Length : 148799 meters x Height: 3 meters) ~0.5 Million cum in 1.7 km channel & at jetty area

Item no. 3.6: (ii) Revamping of old Jetty and strengthening and development of the existing berth for bulk cargo through direct berthing facilities for handling capacity of 4.00 Million Tonnes per annum, located at P.O.: Digvijaygram, Sikka-361140, District: Jamnagar (Gujarat) by M/s. Shree Digvijay Cement Company Limited.

- i. The revamping project of the existing marine facilities of SDCCL for handling of captive and commercial cargo will includes the Following major facilities which will enhance the cargo handling.
 - a) Strengthening and development of the existing berth for bulk cargo through direct berthing facilities.
 - b) Development of approach road from existing berth to storage area.
 - c) Deepening of the Channel for ease of manoeuvring at old jetty.

d) Storage Area development for storage of bulk cargo.

ii. Project Details:

S.no	Handling Material	Existing Quantity(MTPA)	Proposed Quantity(MTPA)	Total Proposed Quantity(MTPA)
1	Old Jetty Solid/Bulk Material *	0.00	4.00(Cement, Clinker,Fertilizers, Fly ash & Coal etc)	4.00
	Total	0.00	4.00	4.00

iii. Land Use Planning (Area break-up)

S.no	Details	Existing Area (In Hectare)	Proposed area (InHectare)	Area Total (In Hectare)
1	Old Jetty	0.00	21.00	21.00
2	Storage Area including Greenbelt Area	0.00	10.06	10.06
	Total	0.00	31.06	31.06

iv. Configuration and Dimensions of old Jetty after modernization:

- a) Berth dimensions (Size- Length:250 meters x width: 20 meters)
- b) Approach to Berth (Size- Length: 516.36 meters x width: 13.8 meters)
- c) Approach Bund: (Size- Length: Size- 2750 meter)

3. Material handling process of Both the proposed jetties.

- i. Shree Digvijay Cement has plans to handle mother vessels through lighterage operation, the mother vessel will be anchored at the anchorage point at Sikka located around 7.0 km from deep sea jetty and 10.0 km from the Lighterage Jetty. Handling of Dry Bulk Seafaring Vessels will be done thru Lighterage Operation at Lighterage Jetty (Partially Lighterage & Partially Direct-Berthing) at Deep Sea Jetty. The mother vessels are equipped with the derricks on top of it to load and unload the cargo. The general cargo handling rate of the derricks range from 800 to 1000 tons per hour. Simultaneously two barges can be handled in bigger size mother vessels. The mother vessels are loaded/unloaded through barge lighterage operation till its reaches the desired draft limit to manoeuvre safely.
- ii. At deep sea jetty area, the bed level ranges around 8.00 to 8.50 m below Common Draft. Hence, the mother vessels will be required to unload through barge operation at anchorage point till mother vessel's draft reaches to 7.65m. All vessels of > 10000 DWT will be anchored at deep sea at the anchorage point at Sikka.
- iii. However, for the Lighterage Jetty, to handle the mother vessels through lighterage operation thru barges ranging from sizes of 3000 DWT which will transfer the cargo using ship mounted crane between seafarer mother vessels and lighterage jetty

location. All Vessel capacity upto 10000 DWT will be anchored at deep sea. Further, vessel having the capacity upto 10000 DWT will be anchored at old jetty.

- iv. Material unloaded at old jetty as well as lighterage jetty will be handled through mechanized method like ship unloader, grab bucket unloader, etc., and further handled through conveyor belt / pipe conveyor from the both jetties (Lighterage / Old Jetty) to stack yard-1 and 2.

4. Observations and recommendations of the Sub-committee.

- i. A site visit was conducted during the high tide period by the subcommittee.
- ii. The committee noticed that the Marine National Park & Sanctuary (MNPS) Jamnagar is located approximately 3 km away from the project site. In view of the existence of marine national park, a study on impact of dredging and dumping on marine ecology is suggested along with a management plan in consultation with forest department.
- iii. The Committee also advised to conduct a cumulative impact assessment on pollution load, by taking into consideration of both projects, including spillage during transshipment, loading/unloading operations at both jetties. A suitable material handling system to be designed to minimise pollution.
- iv. The health assessment of existing jetties to be made and replaced with new open sea jetty and strengthening of old road and jetty.
- v. PP shall prepare a separate mangrove conservation plan in consultation with the state forest department for the areas including degraded mangrove areas identified in the CRZ.
- vi. As committed during discussion in site visit, approach road for existing lighterage Jetty shall be strengthened. In the layout plan/conceptual plan the road shall be clearly demarked with dimensions.
- vii. Revamping and development of existing berth, *inter alia* include new piling followed by construction of berth. The same shall be clearly mentioned in the project description of EIA/EMP along with the components which shall be part project including dismantling of old piles and structures.
- viii. The details of cargo handling and its quantity shall be included in the EIA/EMP report.
- ix. PP shall explore the option to make the cover sheds for storage area. The storage area shall be outside the CRZ area.
- x. The Committee also observed that during the presentation it was mentioned that the Storage area including in the proposed Greenbelt Area however, the committee advised that, the land allotted for the greenbelt and storage shall be drawn separately and same shall be demarcated in the layout plan/conceptual plan.

List of Participants

A sub-committee of the following members participated in the visit of M/s Shree Digvijay Cement Company Ltd. at P.O. Digvijaygram, Sikka, District Jamnagar, Gujarat.

S. No.	Name	Designation
1.	Shri. S. Jeyakrishnan	Member (EAC)
2.	Dr. M.V. Ramana Murthy	Member (EAC)
3.	Dr. V K Jain	Member (EAC)
4.	Shri. Ramesh Anguluri	R.O. (Infra-1)- Representative of Ministry

Following representatives from M/s Shree Digvijay Cement Company Ltd. were present during the visit at Shree Digvijay Cement Company Project Site:

S. No.	Name	Designation
1.	Shri. R. Krishnakumar	CEO
2.	Dr. Girish Mehta	Vice President – Mineral Resource Management & Logistics
3.	Dr. Milan Trivedi	Sr.General Manager – Projects & Capex
4.	Shri. Syed Mohsin Ali	Dy.General Manager – Strategy

Following representatives from DPR Consultant/EIA Consultant are attended were present during the visit at Shree Digvijay Cement Company Project Site:

1	Mr JiyalalJaiswar	M/S Aqua Air Environmental engineers pvt. Ltd.,Surat
2	Mr Sanjeev Kapasi	M/s Global Marine Engineering consultancy, Ahmedabad

Annexure B: Project Map & Site Photographs.



Existing Litrage Jetty.



Approach Road for Litrage Jetty.



Proposed approach conveyor belt path for Revamping Jaetty.



Proposed Revamping Jaetty Piles.



**A report on Rapid biodiversity assessment
and wildlife conservation/mitigation plan for
Development for Six lane Greenfield Road from
Agra to Gwalior section in the state of Uttar
Pradesh, Rajasthan and Madhya Pradesh (total
length 88.4km).**

Funded by

National Highway Authority of India

Submitted by

Zoological Survey of India,

Kolkata

February, 2023

The Team

Principal investigators

1. Dr. Dhriti Banerjee, Director, ZSI, Chief Project Coordinator
2. Dr. Lalit Kumar Sharma, Scientist-E, ZSI, Coordinator
3. Dr. Shovik Sen, Scientist-D, ZSI, Co-PI
4. Dr. Mukesh Thakur, Scientist-D, ZSI, Co-PI

Researcher

Ms. Amira Sharief, Research Associate, Mr. Saurav Bhattacharjee, Senior Research Fellow, Mr. Ritam Dutta, Project Biologist and Mr. Hemant Singh, Project Biologist, ZSI, Kolkata

Funding Agency

National Highway Authority of India, Government of India

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Chapter: 1

1. INTRODUCTION

1.1 . Background to the project

Forest being an inherent component of our ecosystem needs a scientific way of their management, for which advance and technological innovations will play major roles. The pressure on existing forest resources is immense in India due to developmental activities and also because of increasing human population. The transportation infrastructure is vital for promoting trade and commerce and associated investments hence play significant role in the economic development of the country. In the present scenario, Government of India is investing considerable amount of funds in the infrastructure sector where construction of new roads and highways is on the top priority for the overall development of the country. Since the national highways are considered as the lifeline of economic growth of the country and will play a pro-vital role in eradicating poverty from the country and especially from rural India. Most recently, Government of India has launched a flagship program “Bharatmala” which aims at development of new and improvement of existing highways through the country as important economic corridors, inter corridors and feeder routes to improve the efficiency of freight movement in India. Moreover, in addition to this road network, Government of India has also decided to create economic zones along the envisaged highways which will surely increase the livelihood of villagers but will also put pressure on the natural

resources. Often it is observed that major highways that passes through the forested landscapes threaten the faunal resources in these landscapes. In India, road development projects have been overlooked and often undervalued the environment and forest ecosystem which are providing several types of ecosystem services for the human kind. Especially in mountainous landscapes, the severity of threat is very high since on one side the topography of mountains is fragile and on the other these mountainous landscapes of the country are largely covered by forests, the locals depend upon for their daily chores. Furthermore, in mountainous regions of the country some of the most underprivileged rural communities live in remotely located villages and hamlets which are deep in forests or in the fringes.

Besides the economic importance, the highways that pass through the wide range of habitats are also home to some of the top conservation priority species. Many a time, it has been observed that such linear developments have negatively impacted the species populations and also resulted in degradation of habitats. Studies are available which have highlighted that roads also play a significant role in spreading of invasive species of plants and animals. The invasive species infestation is quite evident from the fact that today in India much of the roads and rails networks are infested by invasive plant species such as *Parthenium* and *Lantana camera* etc.

Further, several studied are available which have highlighted that many wild animal species representing different groups are getting killed due to road accidents and speeding vehicles passes through roads which traverse the forested habitats. By far, worldwide, roads are significantly impacting the species populations and resulting in fragmentation of habitats. Since development of road through forest leads to reapportionment of habitat into smaller and more isolated patches of habitat which animals usually tend to avoid. Such types of fragmentation of roads lead to adverse genetic effects, increasing noise pollution and visual disturbance, changes vegetative composition, alters the type and quantity of food base, disrupts the flows of energy and nutrients, increase opportunities for exploitation by humans and also results in increasing man-animal conflicts.

Globally, it has been realized that the linkages of ecosystem and development are deep rooted since development cannot sustain without environmental safeguard. In this context, it is imperative to preserve the forests and manage them sustainably, so as to secure livelihood, conserving biological diversity as well as to develop sustainably. In India, degradation of forest and environmental pollution are major problems which have significant bearing on developmental agenda. In view of the fact that, development impact ecosystem while ecosystem sustain development, the investments under the mega programmes of the Government of India including "Make in India"

program and “Bhartmala” should be environment friendly so that such development programs can be made sustainable and eco-friendly.

In 2015, the Ministry of Road Transport and Highways, GoI promulgated ‘Green Highways Policy 2015’ to develop green corridors along the National Highways for sustainable environment and inclusive growth. The National Green Highways Mission under the National Highways Authority of India (NHAI) has been entrusted with the task of planning, implementation and monitoring plantations along one lakh km network of National Highways. These green corridors not only improve the environment of the highways but will also contribute towards conservation of local biodiversity and further contribute towards achieving the goal of bringing one third of the India’s land under forest cover as per the National Forest Policy, 1988 of India.

In addition to the steps taken by the NHAI under the National Green Highways Mission, there is a need to generate data about the impacts of roads and vehicles on the local biodiversity for every project under the Environment Impact Assessment (EIA) Notification, 2006 and subsequent amendments under the Environment (Protection) Act, 1986. Hence, the NHAI, Project Implementation Unit, Gwalior, Madhya Pradesh through the DPR consultant organization M/s LEA. Associates South Asia Pvt. Ltd. approached Zoological Survey of India, Kolkata for conducting a biodiversity assessment in the impact area of a road alignment project as well as to develop a conservation/mitigation plan for the anticipated impacts on the fauna of the landscape. Therefore, with reference to the letter-number LASA/73580/2023/AG/01 dated 29/03/2023 a study was conducted by the ZSI aiming at assessing the faunal distribution along the proposed road, identify wildlife corridor around the area and then finally to develop a conservation action plan on selective species as per the ToR provided by the MoEFCC’s EAC committee.

1.2. Objectives of the Project

The objectives given below: -

- 1. Rapid biodiversity assessment of the study landscape.**
- 2. Understanding the possible impacts of road and vehicle traffic on fauna in study landscape.**
- 3. Development of conservation action plan on selected threatened species of the area and the local biodiversity in general.**



Chapter: 2

2. MATERIAL AND METHODS

2.1. Study Area

A study has been conducted on the proposed road alignment Greenfield corridor from Agra to Gwalior starting from Deori village and terminate near village Susera in the state of Uttar Pradesh, Rajasthan and Madhya Pradesh to understand the biodiversity and to develop conservation action plan on selective species. We have conducted field surveys in the entire landscape as per the map in ToR and also conducted vehicle surveys on all roads in the landscape to document road kills. We did intensive survey in the region to understand the existence of any corridor for the wildlife species to move to another suitable area nearby in selected segments of the landscape. The study was conducted on November 2023. The proposed alignment passes through ESZ Zone, of ravines area of Chambal, National Chambal Sanctuary in Madhya Pradesh and agricultural throughout the alignment with a patch of forested landscape in the chainage no.45+900 to 47+300 and 38+500 to 40+500.

2.2. Brief Methods

The objectives under the proposed monitoring project have been achieved by following methodology given below:

Objective 1: Faunal diversity assessment of the study landscape with a special focus on avifauna of the landscape.

Methodology: A systematic reconnaissance surveys were conducted on the entire study landscape for the identification of the intensive study area where rigorous sampling were conducted with the help of conventional distance sampling strategy and also with the help of advanced equipment such as remotely operated camera traps and delay cameras. The whole study area was classified into 2 X 2 km grids. A team of researchers systematically visited the selected grids and collected data on species diversity as well as abundance of species mammals, birds, reptiles, amphibians, and other indicator minor taxa including butterflies etc. For the sign survey, we cover selected grids by 2-6 km length trails for documenting faunal diversity on November 2023. Cumulatively, a total of 21 trails were walked of 2-6 km in length with 176 km of team effort for documenting faunal data. We also performed point count method to records the avian fauna in the study area.

For all direct or indirect signs (direct sighting, fecal matter, hair) of vertebrates, GPS coordinates, altitude, sign type, terrain, forest type, and photographs were recorded. The collected data with respect to a number of species, richness, and evenness were analyzed using standard biodiversity analysis indices such as Shannon index, Simpson index to understand the diversity at different levels such as alpha and beta diversity. Further we also collect data on road kills of wildlife through direct observation, from forest department and local resident villagers in the landscape to understand the magnitude of wildlife loss because of collisions with vehicles for developing strategies which can be used to avoid road kills of wildlife.

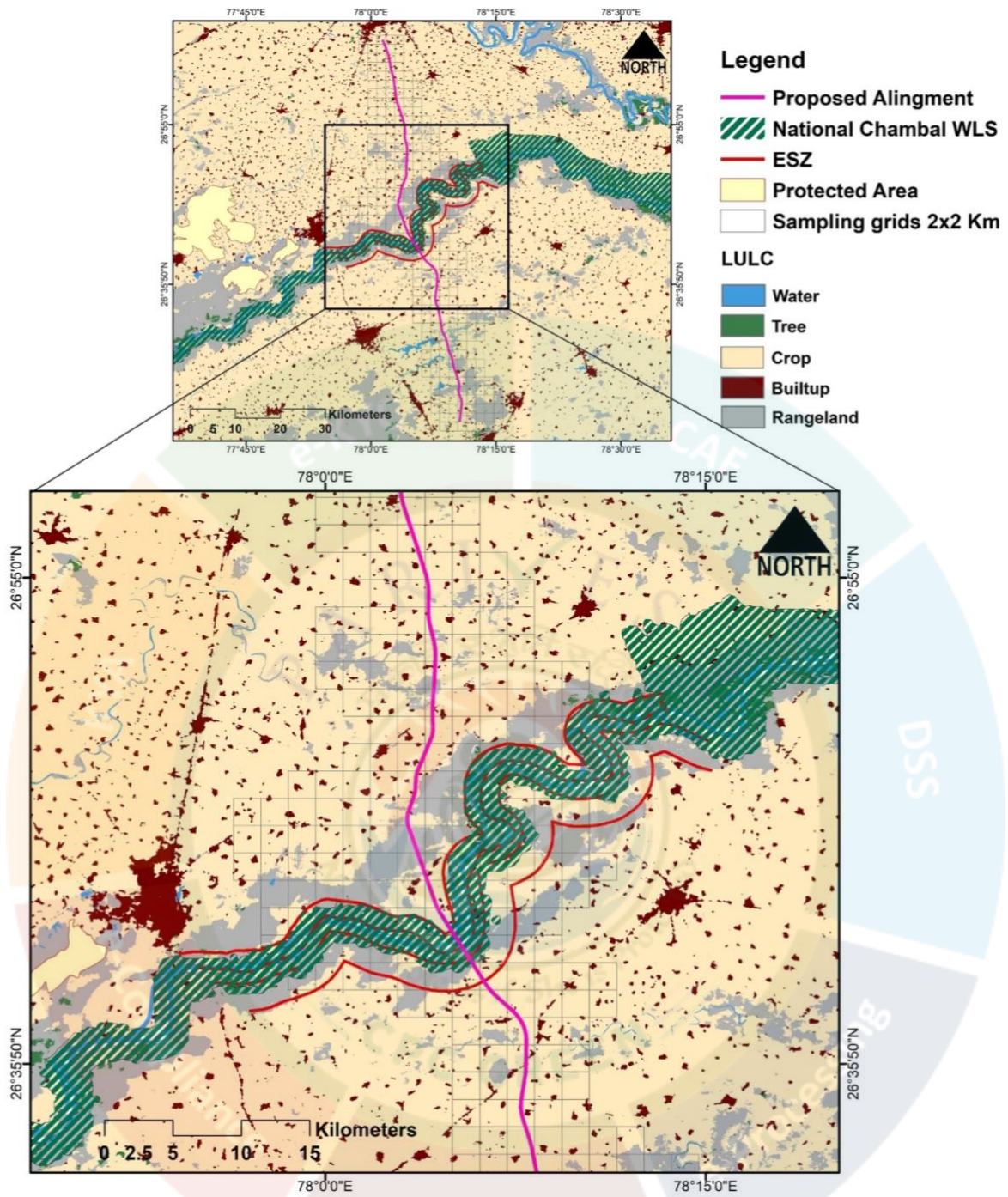


Figure 1: (a) Map showing the Study landscape with proposed alignment.



Figure 2: Sign documentation and scat collection

Objective 2: Understanding the possible impacts of road and vehicle traffic on fauna in the study landscape through collecting road kill data in the landscape.

Methodology: For understanding the direct and indirect impacts, efforts were made in about 0-6km on both the sides of the study highway. Further we also surveyed nearby existing road along the proposed alignment deployed few camera traps on the proposed road alignments to document the species composition and diversity and to understand the activity pattern and the community structure and ecosystem complexity. Early morning and late-night surveys were conducted repeatedly in an area where the proposed road alignment bifurcate the forested habitat.

A combination of GIS and field data were used in the landscape to understand the impacts of proposed road alignment on the habitat quality, data on wildlife mortality (road kills) on all the types of existing roads in the study landscape. We systematically try to documented the road kills by the vehicles on the roads using the vehicular transects near the proposed alignment to document the animal movement near the existing road.

Objective 3: Development of conservation action plan on selected threatened species of the area at the local biodiversity in general.

Methodology: Based on the biodiversity assessment study as well as identification of wildlife corridors which may get negatively impacted by the habitat fragmentation and by the movement of vehicular traffic, suitable conservation and management plan which can mitigate the impacts of the developmental project on the wildlife present in the landscape were provided.

The conservation plan was based on the core principles of wildlife management as well as the guidelines developed by Wildlife Institute of India in relation on linear infrastructure development. The management plan was also suggested the methods and strategies to avoid road kills of wildlife in the project area as the road kill management plan.



2. RESULTS

Objective 1: Faunal diversity assessment of the study landscape:

The study landscape is largely composed of agricultural land however their continuous stretch of ravines of Chambal river with discontinuous stretch of Badlands (forested habitat) near the ravines habitat connecting the National Chambal Sanctuary (NCS) which may possess structural connectivity. The Chambal River is 960 Km long originates from Janapav valley at Malwa ridge (Kaushik and Ghosh 2015) and joins the Yamuna River near Bareh in Uttar Pradesh. The NCS consists of a 600km long arc of the Chambal River. The NCS is one of the most important habitats where several globally threatened fauna survive. Apart from being a strong candidate for World Heritage and Ramsar Convention listings, the NCS is also subject to international treaties like the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), which lists both flagship species of the NCS - the Gharial *Gavialis gangeticus* and Gangetic River Dolphins *Platanista gangetica*. The river stretches from Pali to Chakar nagar recorded to be the most significant area for the conservation of Gharial, Gangetic River Dolphins and Red-crowned Roofed Turtle (*Batagur kachuga*). It also serves as wintering sites for migratory birds (Bar Headed Goose, Indian Spot billed Duck, Painted Stock, Asian

Open bill, Woolly neck stock, Little grebe, Great white –Pelican, Black headed Ibis, Red nape Ibis Names of Bird).

After the reconnaissance survey in the entire landscape, we made a preliminary field effort in the proposed alignment of Agra to Gwalior in Uttar Pradesh, Rajasthan and Madhya Pradesh which has resulted in documentation of Eighteen (18) species of mammals using signs, animal droppings, and direct sightings (Annexure 2). A total of 94 signs of non-invasive evidences of mammals were recorded in the study period. The overall encounter rate was highest for Nilgai (0.053 ± 0.011), followed by Wild Boar (0.041 ± 0.009), Rhesus Macaque (0.040 ± 0.008) and Golden Jackal (0.048 ± 0.007) they were more or less uniformly distributed in most of the sampling trails walked.

Moreover, a total of 43 and 27 individuals of gharial and Muggers were recorded near the from the sampling stations respectively (Table 1). Our field observation and interactions with local communities and forest departments revealed that the Chambal Ravine habitat host many threatened species. We have also marked the important ravine sites based on the number of individuals of Gharial and Muger recorded during the study (Table 1). However, for further intensive sampling in the landscape we will perform camera trapping in the study landscape.



Figure 3: Badland near the Chambal River.

Table:1: Gharial and Mugger recorded during the survey in the study landscape.

River Upstream ↓ Downstream	Sampling Sites	Gharial					Mugger				
		Adult	Sub adult	J	Y	H	Adult	Sub adult	J	Y	H
	Gudha chambal	9	2	-	-	-	4	1	-	-	-
	Dholpur bridge	8	3	1	-	-	8	4	-	-	-
	Bhaveshwari ghat	10	2	-	-	-	4	3	-	-	-
	Mal basai	5	2	-	-	-	-	-	-	-	-
	Bindwa	9	1	1	1		7	2	-	-	-
	Total	54					33				

(Note: J, Y, H here represent the Juvenile, Yearling and Hatchling)



Figure 4: Pictures of few major reptile's species documented during the study period. a). Indian grey mongoose b). Nilgai c). Gharial d). Mugger crocodile.

However, for understanding the bird's diversity in the study landscape we used 52 sites for Point Count samples along with the opportunistic sampling during the transects/ trails walked. A total of 147 species of birds were reported (Annexure 1) and rank abundance test revealed that Charadriidae family was the most dominant family followed by Phasianidae, Ardeidae, Motacillidae, Laridae, Columbidae, Pycnonotidae, Phalacrocoracidae etc. (Fig. 5). Avian diversity in the Chambal ravine habitat is higher because of the presence of winter migratory birds during the survey period.

A total of Nine species of reptiles and three species of Amphibians were recorded during the survey (Annexure 2). Among the recorded species the Gharial (*Gavialis gangeticus*) is listed as Critically Endangered species, Indian softshell turtle (*Nilssonia gangetica*) is listed as Endangered, Indian roofed turtle (*Pangshura tecta*), Mugger (*Crocodylus palustris*) is listed as Vulnerable species as per the IUCN Red List and schedule I species.

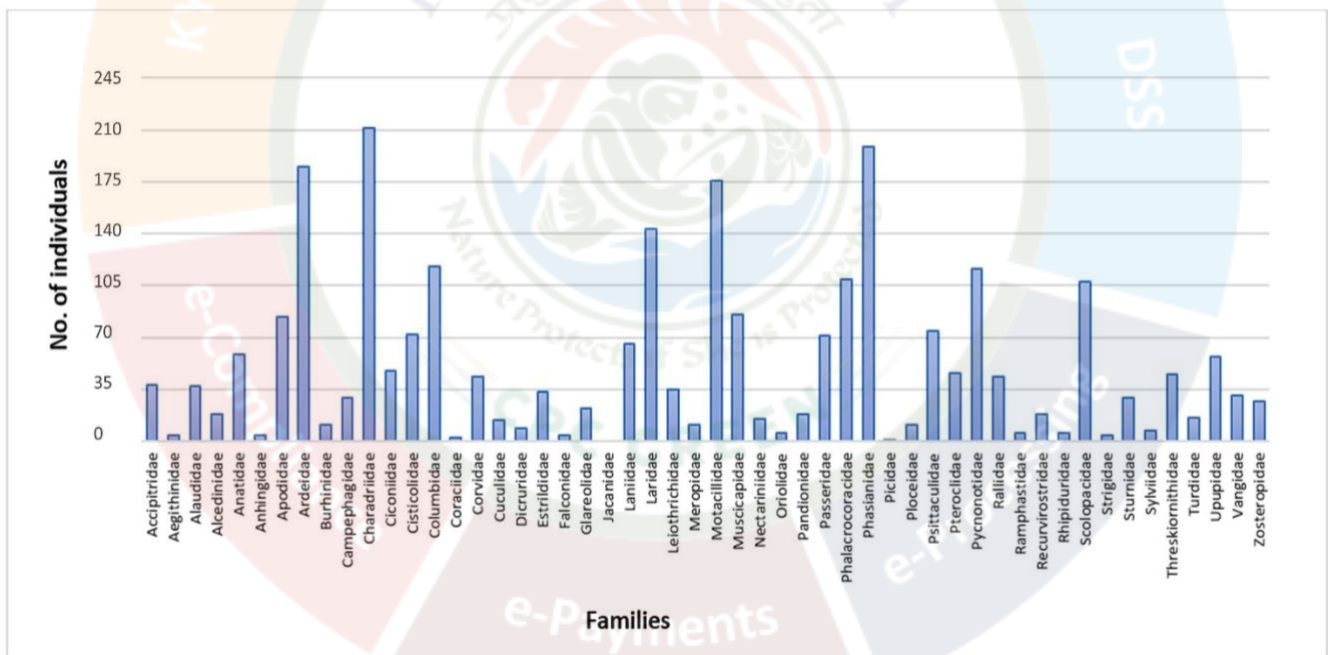


Figure 5: Bar depicts the rank abundance of families of Aves in the studied landscape.





Figure 6: Pictures of few Bird species documented during the study period.

a). Egyptian vulture b). Ruddy shelduck c). Bar-headed goose d). Brown rock chat e). Black Kite f). River Lapwing g). Grey heron h). Asian Openbill stock i). Woolly-necked stock j). Red-naped ibis k). Kentish Plover l). Black winged stilt.

Objective 2: Understanding the possible impacts of road and vehicle traffic on fauna in study landscape

To understand and predict the possible anticipated negative impacts of the vehicular movement on the proposed alignment, we have conducted surveys on the Bhatpura Dang road, Rairudabra Bypass road, Mumbai-Agra National Hwy, Ambah-Morena Road, Rajakhera Road, Thogapura Road, Morena road, Johan Road, Gunpur Road, MDR130W road, Khurd Devri Road etc. and many other selected linked roads located close to the proposed new alignment. These roads were surveyed daily in early morning and late evening hours to document the animal movement and road kills if any as per the proposal. Moreover, we also surveyed the non-metallic (kuchha roads) roads exists in the landscape to document the landscape utilization by the wildlife species. In addition, we have used vehicular transects where two observers were recording the presence of road kills on both sides of the existing roads.



Figure 7: A view of existing highway (Bateswar Temple Road Madhya Pradesh) to the proposed alignment.

We found that the area is composed of linear infrastructure (Road, link roads) already existing in the landscape and are transecting the Badland Forest habitat and mostly agricultural land

which are inhabited by many Schedule I wildlife species. (Sambar, Black Buck, Golden Jackal, Desert fox, Sambar, Striped hyaena, Jungle Cat, Indian grey mongoose etc in the study landscape.

Our preliminary survey with a total vehicle transects of about 545.5 km covered in 54.2 hours has resulted in documentation of only 6 road kills of Dog and 1 road kills of Rhesus Macaque (*Macaca mulata*). Moreover, local peoples also reported about the road kill of Nilgai and Mongoose frequently in the villages link road parallel passing to Chambal Canal. Presence of electric fencing around the agricultural land and absence of underground safe passage for animals restricted the animal movements results in frequent road kills in this landscape.



Figure 8: Road kill of dog recorded during the survey in the landscape.

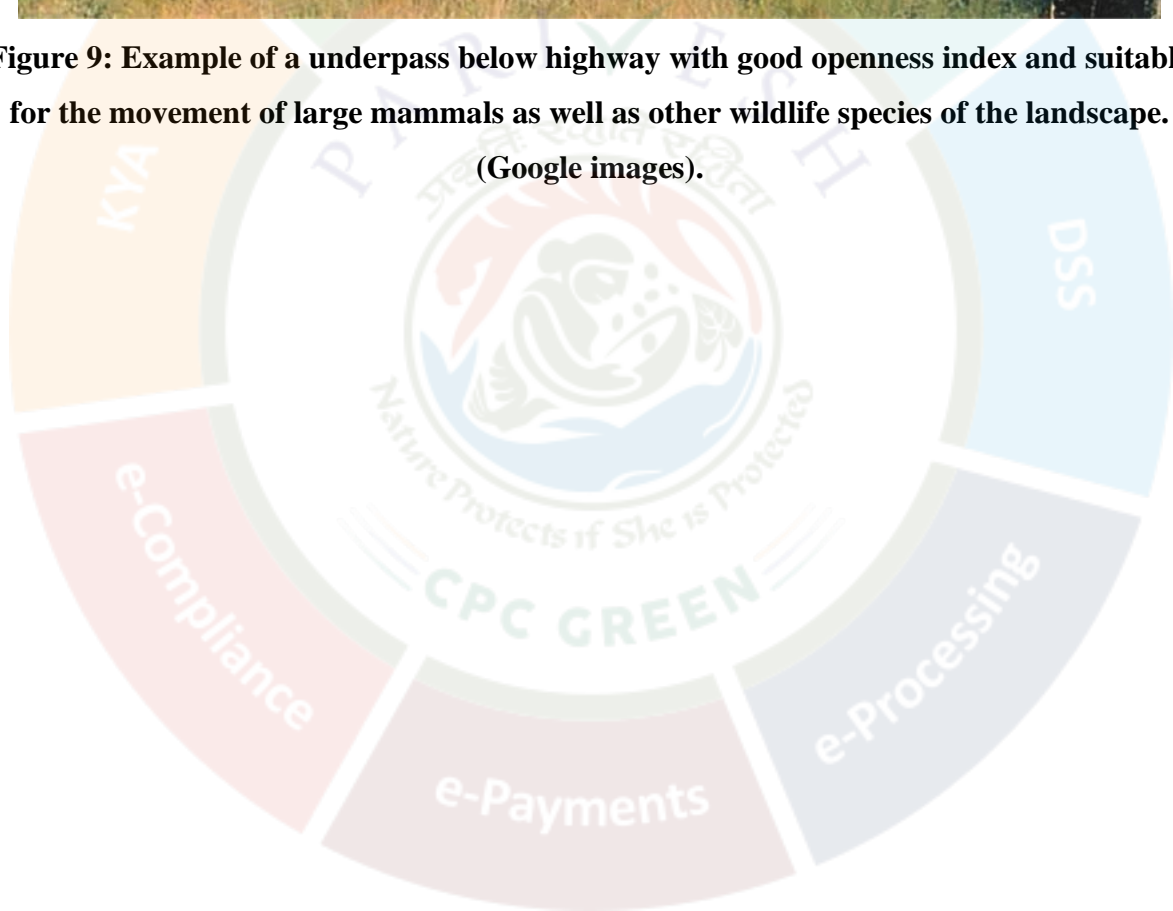
Usually, species which feed from the surface of the roads are prone to get hit by a vehicle and in the case of the birds flying low are very often killed whilst crossing roads. The main reason for the road kill of the species is food, whether anthropogenic or natural. For example, the vehicles often kill carnivorous birds while feeding on the roadkills. In addition to searching for food, road crossing by wildlife species is been associated with breeding, i.e., finding a mate or following a mate. However, in this study we have found many direct and indirect evidence that establishes the presence of rare and threatened species in this landscape.

The uneven forest patches surrounded with agricultural land with restrict the large animal movement. Hence, considering the fact that the study area has low connectivity corridor along the proposed road alignment may have little impact on wildlife species of the landscape directly and indirectly. However, many studies are available that have highlighted that the vehicular disturbance and road avoidance by animals may have greater ramifications to wildlife conservation. Similarly in this case of the present study area, such anticipated impacts can possibly occur because the landscape is ecologically rich in terms of wildlife species abundance. Further, much of the land use in the area under these three-forest patch is suitable for sensitive species and is home to species which are of most conservation importance.

All roads, specifically the broad highways, may serve as barriers or filters to some animal movement. The taxons such as reptiles and amphibians are the most impacted vertebrate groups by road networks. Additionally, the road support infrastructure such as lobes and coves on the outer road side boundaries probably affect crossing locations and rates. Hence, there is a need to create more permeable infrastructure to reduce the demographic threats expected to be because of the barrier effects. Therefore, creation of movement support infrastructure will diminish the barriers effect in the following mentioned chainage no. (Table 2) can be suitable for construction of underpasses in this landscape without disturbing the vulnerable existing wildlife habitats (of Black buck, Sambar, Wild boar, Black-naped hare, Indian Grey Mongoose, Desert Fox, Golden jackal, Small indian civet and jungle cat etc.) are identified during the survey Nevertheless, considering the possibility of wildlife movement there NHAI must construct an underpass or a duct for providing safe passage by enlarging the size of the planned culvert at the above-mentioned chainage no. This recommended underpass should have at least 4m height, and minimum 5m width and length equal to the width of the proposed road (Figure 9). The ground inside an underpass should be natural and have vegetation palatable to ungulates. The vegetation or bushes should be planted on both openings of the underpass to facilitate animal movement through the underpass.



Figure 9: Example of a underpass below highway with good openness index and suitable for the movement of large mammals as well as other wildlife species of the landscape. (Google images).





Chapter: 4

4. WILDLIFE CONSERVATION ACTION PLAN

In recent years, the ecological effects of roads on ecosystems and landscapes have extensively been recognized (Andrews, 1990; Bennett, 1991; Forman and Alexander, 1998; Spellerberg, 1998; Carr et al., 2002; Havlick, 2002; Trombulak and Frissell, 2002). We understand that the roads are the basic infrastructures for the country's development. However, it is also essential to consider the wildlife species inhabiting areas where such large-scale linear infrastructures are planned. Hence, a proper assessment of the landscape with respect to landscape utilization by the wildlife species is pro-vital to ensuring long term viability of wildlife species. These linear infrastructure results in local extirpation of wildlife species if due considerations are not given to landscape assessment in terms of animal movements.

The Lower Chambal valley, encompassing the lower reaches of the Chambal River, spans approximately area of 4800 km² (Sharma 1979) (Figure. 3). The formation of Badlands is an interesting phenomenon and are considered to be an effect of the Himalayan orogeny (Ahmad 1968; Sharma 1968; Agarwal et al. 2002) and also due to intensification of southwest monsoon

in Pleistocene – Holocene (Gibling et al. 2005). Due to the Himalayan orogeny, the forebulge of Himalayan foreland basin (Gibling et al. 2005; DeCelles 2011) resulted an uplift (Agarwal et al. 2002) which forced the Chambal River to attain a new equilibrium. Further On attaining the new equilibrium, the Chambal River incised into its own deposited sediments in due process results in formation of Badlands, on both sides of the Chambal River (Sharma 1979). Further the presence of fragmented dry deciduous scrub and ravine thorn forest in the study landscape can be attributed with the fact that the landscape host important wildlife species resulting via structural connectivity.

We found that the study landscape is relatively rich in terms of biodiversity. The study landscape near Chambal River, specifically in the area between the **Chainage no. 38+500 to 40+500** are significant. The presence of Badlands in the regions may serve as an important habitat for the wildlife, particularly for species such as the Desert fox, Golden Jackel and Striped hyena. These areas often act as hiding spots or dens for these animals. Thus, construction of viaduct could be beneficial for wildlife crossing, will be useful in wildlife crossing as it provides safe passages for crossing the linear structure. This will help in reducing the risk of wildlife-collisions and facilitate the natural movement of wildlife in their habitat.

We have recoded and identified important basking site for Critically endangered Gharial, Red Crowned roofed turtle and vulnerable mugger species near **Chainage no. 46+910 to 47+600** along with few winter migratory birds species. Thus, the creation of an elevated Suspension bridge/Cable stayed bridge (change no **46+910 to 47+510**) and from **45+ 922 to 46+910** and **47+510 to 47+614** viaduct without disturbing the basking /breeding ground for this species in ravine habitat will be useful in conserving the habitat of this important species.

We found that the study landscape is relatively rich in terms of biodiversity. The presence of agricultural croplands, dry deciduous scrub forest, ravine thorn forest along the Chambal River, degraded lands and rural human habitations suggests a diverse range of habitats in the area. The **Chainage no. 80+750 to 80+755** stretch found to be an important dry deciduous scrub habitat site for the wildlife species like Striped hyena, Desert Fox, etc. Dry deciduous scrub habitats are often crucial for various wildlife species, providing them with food and shelter. Thus, the construction of viaduct could play an important role in facilitating wildlife movement. Furthermore, it is recommended that NHAI shall also install suitable light and sound barriers on both the sides of the road at the chainage provided in the Table 2 as a strategy to mitigate and reduce sound and light related impacts in the selected ravine habitat of threatened species in the landscape.

Further We also suggest having cattle underpass as well as culverts at regular intervals throughout the road passing through the non-forest areas to facilitate movement of reptiles and other ground dwelling animals. This will reduce the possibility of ground dwelling animals getting killed on roads as several studies have revealed that these passages are very effective in decreasing levels of road mortality and isolation.

However, to safeguard the biodiversity of the landscape, it is recommended to adopt a conservation action plan which is futuristic and data-driven. The conservation action plan should be based on a specific objective which is on priority considering the threats to wildlife species because of the proposed development project. The wildlife conservation action plan, in the present study aims to provide remedies or strategies for the long-term viability of wildlife species. These strategies should be implemented with the active support and supervision of the Divisional Forest Officer of the area. The construction activities of the project could result in impacting the flora as well as the fauna of the area through the clearing of native vegetation (habitat), works around and within the ravine habitat, noise, vibration, light impacts, disturbance or contamination of soil by construction material, barrier effects on wildlife (such as genetic isolation, increased competition, impacts of home ranges and territories of large reptiles and territorial mammals which might be using the area occasionally), the spread of weeds, infestation of invasive species, road kills.

Hence, considering the above possible impacts on wildlife and biodiversity of the area based on the wildlife assessment in the study area, a set of few management strategies are recommended: -

1. Habitat improvement in selected segment of the proposed alignment:

The alignment segment from **Chainage no. 38+500 to 40+500, 46+900 to 47+600 and 80+400 to 80+600** are identified as an important area in terms of possible wildlife movement. Hence, precautionary management strategies such as improvement of habitat for wildlife species should be taken up by the National Highway Authority with the active support of the local Forest Department of both the state Madhya Pradesh, Rajasthan and Uttar Pradesh in the study landscape.

Moreover, during the early 1970s, four major dams undertaken over Chambal River namely Gandhi Sagar dam, Rana Pratap Sagar dam, Jawahar Sagar dam and Kota Barrage along with one Drinking water project dholpur city and two Lift irrigation project in dholpur, Rajasthan and Pinahat had reduced the flow of the Chambal River by 50% below the Kota Barrage to pali, which already lead to a reduction in the Gharial and dolphin habitat in NCS (Hussain et al.

2011). Further new proposed project namely Dholpur lift Irrigation Project, Morena City drinking water project, Sheopur city drinking water project will possibly impact the habitat of the important species in NCS. Hence, Maintaining the environmental flows will be a key step in achieving Good Ecological Status of the river

The National Chambal Sanctuary is a tri-state sanctuary, falls separately under Rajasthan, MP and UP. Strategically Effective management of the protected area has suffered due to this lack of co-ordination between the departmental co-ordination of these states. Other government agencies such as the Water Resource Department, Fishery Department, Public Works Departments (PWD), Irrigation Department, Municipal Corporation and Agriculture Department also need to be onboard for conservation of NCS. The government of Madhya Pradesh has gazetted the National Chambal Sanctuary within its territory, the final notification after settlements not been completed. It is very necessary step to complete the process of rationalization of boundaries and demarcation based on a combination of the gazette notifications, GIS based approach for all three states.

Annual Workshops and training programs should be Conducted for both regarding the importance and conservation of the threatened species and also the matter that will deal with the dependency of local villagers on the resources available from the sanctuary by developing alternate livelihood options. Mentioned Programs Should be initiated by Local governments, forest departments, tourism Departments, involving NGOs, local schools and colleges and other institutions, villagers. Further precautionary management strategies such as improvement of habitat for these species should be taken up by the National Highway Authority with the active support of the local Forest.

Illegal Sand mining is recorded to be the biggest threat for the sanctuary. It is degrading the critical habitat of threatened species, the sand bed which are the nesting/breeding ground of these species, but also affecting the morphology of the river and its water retaining properties. Lack of support from other law enforcing agencies further aggravates the issue. Strict action plan (SAP) should be developing with special task force (STF) under central authority that will look after these situations so to restore the riverine habitat and ensure the future conservation and management plans for NCS. Development of Sustainable ecotourism with infrastructure development in this sand mining area will help in creating attention to these sites and thus help in minimizing the illegal sand mining activities.

The habitat improvement should also include the creation of waterholes in few sites, plantation of local species of shrubs, herbs and trees in the 2 km radius of the mentioned **Chainage no proposed in Table 2.** The aim is to ensure water and food availability for the

wildlife species in the landscape because linear structures results in fragmentation and degradation of habitat. Local plantation models with a composite of all three grasses, shrubs, and trees should be adopted for plantation in the area. In the case of trees and shrubs, preference should be given to local fruit-bearing species used by the wildlife species. Species such as Sambar, Nilgai, Black buck were the important ungulate in the landscape, In which Nilgai and Black buck is known to be involved in conflict with local communities by way of depredating on crops hence the mitigate such crops losses to the local communities plantation of suitable fodder species in designated forest lands will be helpful. Moreover, in this forest segment where the proposed alignment is passing has some important scrublands which are important for the species which prefer degraded and scrublands hence while implementing the habitat improvement strategies these open scrublands should not beplanted with trees and the natural composition of such areas should be maintained. However, the impacts of such linear projects are unavoidable, but the efforts should be made to conserve and maintain the natural composition.

2. Conservation Action Plan for Schedule – I species found in the study area:

a) Conservation action plan for Indian Gharial (*Gavialis gangeticus*):

General description: It is a piscivorous reptile endemic to the Indian subcontinent, inhabits the river systems of northern India and Nepal, showing high population at National Chambal Sanctuary (600km²), it is largely defined by its long and thin jaws, adult male has a conspicuous narial excrescence commonly called ghara. They usually feed on fish. Gharials prefer calm and quiet areas of fast-flowing rivers and often seen basking on sand banks and during the wet season monsoons they move into side channels to avoid heavy flows of the main river. The causes of decline include historic overhunting for skins, trophies, eggs and indigenous medicine, and more recently the construction of dams, barrages, irrigation canals, siltation, changes in river courses, artificial embankments, sand-mining, riparian agriculture, domestic and feral livestock, pollution and fishing, which remains a major threat as gill nets continue to rapidly kill gharial of all sizes even in protected areas.

Conservation and management strategy: The major threats faced by the species are Fishing, Agriculture, Sand mining, Development programmes and water pollution. Gharial's diet consists mostly of fishes hence illegal fishing causes reduction in prey species which directly affects the species population, fishing done by using motor boats in some cases results in motor boat accidents, fishing also results in water pollution when the fishermen dump damaged nets into water which results in accidental drowning in fishing nets, in some cases they are

intentionally killed or de-beaked by fishermen. In case of agriculture the farmers encroach the banks of the river to grow crop thereby reducing the sand flats which destroys the Basking and breeding sites of the species, Sand mining also causes the same negative effects as agriculture, Overall agriculture and sand mining reduces the species distribution by destroying their habitat. Developmental programs such as bridge construction, barrages etc cause the change in the level and speed of the flow of the river which change the fish diversity and population. The change in water flow speed also changes the size of sand flats hence damaging the habitat. The conservation can be done by regulating fishing in important gharial habitats by implementing strict regulations, conducting sustainable sand mining by cracking down on illegal sand mining and increasing the basking and nesting sites by preventing River bank encroachment. By conducting public awareness programmes in villages and educating them about the importance of the species also plays an important role in the conservation of the species.

b) Conservation action plan for Mugger/Marsh crocodile (*Crocodylus palustris*):

General description: It has a medium size with maximum length of about 4.5 m, and snout of marsh crocodile is broadest of any living specie of the genus *Crocodylus*. The Marsh Crocodile is top predator and keystone specie, plays an integral role in maintaining the structure and function of fresh water ecosystem. It is a keystone species of slow flowing fresh water ecosystem. The Juveniles of marsh crocodile generally feed upon small fish, insects and crustaceans. Adults eat larger fish, snakes, turtles, amphibians, birds, monkeys, deer and buffalo species. The mugger crocodiles live in the hole's nearest to water bodies During the summer crocodiles undergo aestivation, a period of inactivity in which they buried themselves in deep burrows for maintenance of humidity. During the winter, marsh crocodiles come out to take bask in the direct sunlight to maintain their body temperature. The female marsh crocodile digs about 2 feet deep holes in the sand to lay their eggs. The causes of decline include construction of dams and diversion of water channels for irrigation purpose, soil erosion and further degradation in its habitat.

Conservation and management strategy: The principal threats to the Mugger were previously identified as habitat destruction and fragmentation, drowning in fishing nets, egg predation by people, and the use of crocodile parts for medicinal purposes. Crocodiles are key stone species which play a major role to help maintain the ecosystem structure and function through predation on fish, recycling of nutrients in food chains and they also maintain of aquatic habitat during the droughts period, hence awaking all the importance to locals helps in conserving. In earlier studies it is estimated that toxic chemical contaminants, pollution and metabolites are serious threats to the marsh crocodile, government should take precautions that

no industrial development should happen in the areas and release the waste into the water. Sand mining along the river for construction purposes and agricultural activities on the sandy banks has increased considerably, which is affecting the Gharials, Muggers, as they need to do basking, which will help them in maintaining body temperature. when it wants to cool back down it can move out of the sun into the shade or a water, due to sand mining crocodiles are having less place for basking which affects them in maintaining the body temperature. Decrease in anthropogenic pressure in the habitat plays a vital role in conserving the species.

c) Conservation action plan for Gangetic River Dolphin (*Platanista gangetica*):

General description: The Ganges River dolphin lives in freshwater, usually 2.2-2.6 meters long (7–8 ft), has been recognized by the government of India as its National aquatic animal. It has a rectangular, ridgelike dorsal fin and females tend to be larger than males. They have an elongated, slender snout with sharp and very pointed teeth. Their flippers and tail flukes are large and broad They have a large melon head used for echolocation because they cannot see well. Their eyes are usually small due to the cloudy water. Ganges river dolphins use echolocation to find food. They eat crustaceans such as prawns and fish including carp, mahseer, and even sharks such as the Ganges shark (*Glyphis gangeticus*). They may also take birds and turtles. The causes of decline include anthropogenic pressure constructions and usage of water from river for agriculture activities.

Conservation and management strategy: The major threats faced by the species are Water development projects, Dredging and loop cutting and water pollution. Conservation of the species can be achieved by conducting proper EIA of major water development projects, Structures should be designed and included in barrages, dams and regulators to facilitate upstream and downstream migrations of fish and other aquatic fauna. Appropriate water level should be maintained if the river is being diverted for irrigation purposes so that the aquatic life is not severely impacted. Designs for fish bypass structures should be evaluated according to the circumstances of the environment. Proper guidelines should be made for fishing and tourism practices, such as control usage of motor boats to fish and Sustainable fishing. Public awareness programs should be conducted to improve the conservation effects.

d) Conservation action plan for both Hard- and Soft-shelled Turtles

General description: Chambal supports 8 of the 26 rare turtle species found in India. The soft-shelled ones include Indian softshell turtle, Indian Peacock Softshell Turtle, Narrow-headed Softshell Turtle and the hard-shelled ones include Red crowned roofed turtle, Crowned River turtle, Three striped roofed turtle, Indian roofed turtle, Indian tent turtle, Tricarinate Hill Turtle, Indian flapshell turtle and Indian star tortoise. The turtles like to bask in the sun on land. In the

breeding season, the heads and necks of male turtles exhibit bright red, yellow and blue coloration. The females excavate nests in which they lay clutches of up to thirty eggs. The critically endangered Red Crowned Roofed Turtle is one of the 24 species endemics to India, is characterized by the bright colors such as red, yellow, white and blue on the faces and necks of the males. It is a freshwater turtle species, and found in deep flowing rivers with terrestrial nesting sites. Diet of the species consists exclusively of water plants.

Conservation and management plan: Multiple threats are confronted by the soft shelled and hard-shelled turtles in the riverine habitats, the significant proportion of which are related to human activity. Some immediate goals for turtle protection include tackling the illicit international trade in turtles and their products through the enactment of regulations and agreements. minimize the amount of turtle deaths caused by commercial fishing by imposing Turtle Excluder Device (TED) and gill net regulations. Protect nesting habitat by establishing parks and refuges, or by instating regulations in accordance with public education campaigns. Distressing nesting sites should be overlooked. Enforce national and international laws to reduce harmful emissions and solid waste dumping into rivers and nearshore waters. Continue research and monitoring activities to monitor the population and focus conservation efforts where they are most needed. Increase public awareness and community participation in turtle conservation through educational programmes. India has envisioned to the United Nations Convention on International Trade in Endangered Species of Wild Fauna and Flora that riverine species be moved from Appendix II to Appendix I. The species is incredibly susceptible to major hydrological projects and the effects they have on river flow dynamics and nesting beaches, in addition to water pollution. Entanglement in fishing nets has had a significant impact on subpopulations even though human activities on and along the river are disturbing. The main threats to these species are habitat degradation resulting from contamination, large-scale development activities such as water extraction for direct utilization and irrigation, and irregular flow from upstream dams and reservoirs. Sand mining and the agricultural production of seasonal crops along the Chambal River have a massive effect on the sandbars used by the species for nesting. The animal's extinction is also impacted by overharvesting for unauthorized ingestion and illegal international trade.

e) **Conservation and management strategies for feline species (Leopard and Jungle cat)**

General descriptions for Common Leopard: Common leopard is a top carnivore species in the study area and is present in good numbers in the entire landscape. The most adaptable big cat of the Indian subcontinent, the leopard has a clear yellow coat marked with black rosettes. It has a small, spotted head, powerful jaws and a long tail, and its underside is white. The

normal colour of the coat varies considerably in intensity from gold to tawny. The rosettes are unique in individual leopards, like the stripes of a tiger. They are good at hunting langurs up in the trees, while at the same time equally good at surviving on hares, rodents and even birds like the peafowl and junglefowl if larger prey is not available. They hunt equally well diurnally and, in the night, the former probably being an adaptation in tiger habitat. They also prey upon cattle, dogs and even children at times thus earning notoriety as man-eaters. As they are often sighted near habitations in rural India, the leopard is mistakenly considered to be not under threat and there is a need to develop strategies for their long-term viability in the landscape.

General descriptions for Jungle Cat: Jungle Cat has a pale sandy or isabelline pelage with black spots all over its body. The underparts are unspotted and whitish. The ears are medium sized and the same colour as the body with very few, small hairs at the tip. Two clear black markings are present on its cheeks and the inner side of its forelimbs. The tail is long and thin, and tipped black. It has spots near the base and rings near its tips. On the whole throat is long-legged, long-tailed, and long-bodied compared with domestic cats, It often interbreeds with domestic cats and in areas where both are found, cats may be seen with a dark greyish coat that is spotted or striped like the Desert Cat's. It is the only cat that inhabits in burrow like foxes, it prefers Low-lying scrub forest, semi-arid and desert areas, and cultivated tract.

Conservation and management strategy for both for feline species: The strategies should help in minimizing the impacts of developmental activities as well as to mitigate human-wildlife conflict by the felids/ cat species in the landscape. The habitat improvement, protection should be considered only in areas close to the native forests with canopy, the scrublands should not be used for plantation of tree species. Creation of waterholes at few locations in the designated forest lands and properly managing existing water bodies is essential to maintain the flow of rain waters. Further efforts should be made towards plantation and management of fodder species in the landscape. Additionally, the implementation of awareness programmes about the importance of the species among the local communities will greatly benefit the species.

f) Conservation and management strategies for Striped Hyaena:

General Description: The Striped Hyaena is a large, shaggy, buff-coloured animal that looks like a canid at first appearance. Like all hyaenas, it has a heavyset body balanced on spindly legs of which the forelegs are longer than the hind ones, giving it an ungainly slouched appearance. The muzzle and the throat are black. The patch around the throat has dense fur and thick skin. The tail is long and shaggy. There are four toes on each feet bearing non- retractable canid-like claws. It prefers Open scrub and dry thorn forests, often found near human

habitation. Avoids true deserts it also frequents arid and semi-arid areas. Habitat preference is linked to availability of denning sites, which could be caves in rocky terrain, burrows dug by them, or even those by porcupines. Striped Hyenas are protected under Schedule I of the Wildlife Protection Act, 1972, but an underrated species that merits more conservation consideration. The most prominent danger to Striped Hyena population in India is man-animal conflict, poisoning, habitat destruction, hunting, and poaching for body parts. Striped hyenas play an imperative part in keeping up a biological system and acting as pest control.

Conservation and management strategy: Open scrub and dry thorn forests and other habituated related to the species should be conserved. The scrublands should not be used for plantation of tree species. Creation of waterholes at few locations in the designated forest lands and properly managing existing water bodies is essential to maintain the flow of rain waters. the implementation of awareness programmes about the importance of the species among the local communities will greatly improve the conservation efforts.

g) Conservation and management strategies for Canidae species:

General description for Golden Jackel: Golden Jackel is a medium-sized canid, the Golden Jackal's scraggy, buff-grey coat is not as smooth as the foxes, nor as dense as that of the wolf. The buff coat is interspersed with black hair especially on the back as if it has donned a grizzled coat while the head and sides of the legs are tawny red in colour. The underside, throat and the area around the eyes and lips are white. Pelage colour can vary seasonally from pale cream to tawny. The tail is bushy and medium-sized and has a black tip like that of the wolf and the Indian Fox. It is a successful hunter, especially of rodents, the jackal has an undeserved reputation as a scavenger. Its eerie howls are characteristic of the Indian countryside and jungle. It prefers Forests, grasslands, mangrove, urban and semi-urban areas. Tolerates human presence more readily than the wolf and is thus often seen around human settlements.

General description for Indian wolf: Greyish fulvous, usually with a brownish tinge, sometimes much mixed with black on the back; some have a reddish tinge, Hair is of varying shades of light brown from the base to near the end and tips black on the back, Coarse white hairs are mixed with the finer fur near the skin. The hairs on the tail have generally black tips. Lower parts dingy white. The Indian wolf, although somewhat gregarious, is not known to associate in large packs It is also rather a silent animal, but sometimes. It barks like a pariah dog. It is rarely, if ever, heard to howl. Indian wolves' prey on all mammals or birds they can kill, but especially on sheep, goats, and antelopes. in some parts of India, carry away many children yearly, usually taking them from villages. They course and run down hares and foxes, and occasionally attack cattle.

Conservation and management strategy: In the present landscape the strategy should be focused with objectives to improve the habitat quality. one of the major threats to smaller canid species are street dogs hence population control of street dogs is necessary. Awareness creation about the species among the local communities and capacity enhancement of the local forest frontline staff towards their population monitoring for conservation and management. Hence, it is provided to have integrated habitat improvement planning in the landscape with focus on improving connectivity as well as enhancing prey base in its distribution range.

h) Conservation and Management strategies for Sambar:

General Description: Sambar is a typical forest deer with a shaggy, dark brown coat, and large spreading antlers, the Sambar is India's largest deer, robust three-tined antlers, a long and a dark coat." The antlers in the Sambar are three-tined with a long, acutely angled brow tine and a main beam that forks into a terminal fork. They often feed in shallow water and when chased by predators such as Dholes, take to water, splashing loudly with their hooves to confuse their attacker. Stamping of feet or raising of hoof as if to stamp is a sign of alarm. They move through forests very silently for their exceptionally large size. It has wide-ranging habitat types from mixed deciduous forest, arid and dry forests, shola grasslands, pine and oak and evergreen forests. Prefers moist habitat with undulating terrain. River and stream banks are chosen for daytime rests.

Conservation and management strategy: The major threats for sambar are urbanization, change in vegetation of forests, plantations, mining, quarrying and hunting etc. Hence to conserve this species sustainable development methods must be followed planning of road ways and railways through animal corridors must be regulated and animal passages must be built for safe crossing of animals on roads. Awareness creation about the species among the local communities should be done to reduce hunting. Electric fences should be built according to proper norms provided by the forest government.

i) Conservation action plan for Bengal Monitor Lizard

General description: In the study area one species belonging to this family was recorded. Bengal monitor lizard (*Varanus bengalensis*). It is one of the most widespread reptile species found in india.it ranges all the way from Himalayas to peninsular India. They are usually solitary and shy in nature and are found on ground. They have a varied diet consisting of both vertebrates and invertebrates. They feed on insects, frogs, snails, ants, termites, lizards etc. They are mostly found in forests but sometimes venture into agricultural fields. They are not territorial in nature and increase or decrease their range based upon availability of food. They move very fast on land and are known to stand on hind legs during fighting rival males. In Telugu it is called as

Udumu and in some areas it is treated as a delicacy. Bengal monitor lizard is listed as NT in IUCN red list and the population trend has been decreasing. Appropriate measures should be taken for their conservation.

Conservation and management strategy: This species is one of the frequently trafficked animals in India. They are hunted and trafficked for the skin and genitals which are used in traditional medicine as well as for human consumption. This species should be given special attention as it is included under Schedule I of Wildlife Protection Act -1972. It can be conserved by creating awareness distribution of pamphlets and other local media containing information, picture, and conservation message about the species in local schools institutions. Conducting awareness programmes in villages and district administrative staff during international events such as “Wildlife Week” and national events such as “Van Mahotsav”

j) Conservation action plan for Accipitridae family bird species in the study area:

General description: In this family birds such as Oriental honey buzzard, Black-winged kite, shikra, Brahminy kite, Black kite etc. (least concern) and Egyptian vulture (Endangered), Indian spotted eagle, great tawny eagle (Vulnerable) etc. are sighted in the study area. The size and call vary from one to the other. They vary according to their diet. They feed on prey items from insects to medium-sized mammals. Some feed on carrion and a few feeds on fruit. The Accipitridae have a cosmopolitan distribution, being found on all the world's continents (except Antarctica) and a number of oceanic island groups. Some species are migratory. They kill their prey by squeezing and puncturing it with their talons. They usually nest in trees, and most pairs mate for more than one year. They are excellent fliers and have a great sense of sight.

Conservation and management strategy: This species is very commonly found in human settlements as well as around agricultural habitats and scrublands near human habitations. It can be conserved by increasing the tree cover in the study area which will provide shelter and roosting to the Species in the family. Awareness programmes (community and school level) for conservation of Bird of Preys in the study area as well as negative effects of Chemical pesticide and how it is harmful to the food chain of such species is very essential and the same can be achieved through organizing competitions during “Wildlife Week” and “Van Mahotsav” celebrations by active involvement of local community. - Some provision of rewards to informers for the control of poaching and illegal trade in wildlife. Carrying out census and research projects to know the potential threats and population status of the species in collaboration of local schools, colleges, panchayats and forest department. Another way to help preserve the endangered species is to create society dedicated to ecological ethics. All the

conservation measures will be implemented with the help of and in the consultation of the district forest department.

k) Management strategies for Water bird species in the study area:

General description for Laridae family bird species in the study area: In this family Indian skimmer, Black-bellied tern (Endangered), River tern (Vulnerable), need to be conserved. They are slender, lightly built birds with long, forked tails, narrow wings, long bills, and relatively short legs. Most species are pale grey above and white below, with a contrasting black cap to the head. Breeding is observed between February and May with peak activity in April. Chicks run away from intruders or predators, fledglings and adults usually fly when rapid movement is necessary. They often perch on rocks, or boats within and above nesting or feeding territories.

General description for Threskiornithidae family bird species in the study area: In this family Black-headed Ibis (Near-threatened) is sighted in the study area. Ibises all have long, downcurved bills, and usually feed as a group, probing mud for food items, usually crustaceans. They are monogamous and highly territorial while nesting and feeding. Most nest in trees, often with spoonbills or herons. A large wader with a white body and bare black head and neck. Males and females look similar and both have grayish tail feathers. It probes into mud and shallow water with its long, down curved black bill, sometimes submerging its entire head. It inhabits freshwater marshes, lakes, rivers, flooded grasslands, paddy fields, tidal creeks, intertidal mudflats, mangroves, saltmarshes and coastal lagoons, usually in coastal wetlands or extreme lowlands, but occasionally up to 950 m. Diet includes frogs, tadpoles, snails, adults and larvae of insects, and worms; also, fish and crustaceans, probably more commonly when feeding in coastal areas; occasionally plant matter.

General description for Burhinidae family bird species in the study area: In this family we sighted Great thick-knee, an odd-looking wader with a dark mask, staring pale eyes, and a large heavy bill. Flashing black-and-white wingtips, revealed in flight, recall those of lapwings. Found on the banks of flowing rivers and lakes with rocky or sandy shores. Usually seen standing still on shore, though can be quite shy, often flushing even at a distance. No similar species in its range and habitat. The diet of these thick-knee species is mostly invertebrates. Large insects, crustaceans and other invertebrates are their primary food. The long massive bill is used to detect and dig up prey. The breeding season of these great thick-knee species is from February to July in India. The breeding sites are located on riverine shingle and pebble beds.

General description for Charadriidae family bird species in the study area: In this family we sighted River Lapwing, the black, gray, and brown coloration of this medium-sized shorebird makes it unique. As the name suggests, this species is primarily tied to rivers, where

it is often seen foraging in pairs on riverbanks or exposed islands. The breeding display, given on the ground, includes stooping, spinning, stretching and crest-raising. The river lapwing nests on shingle and sand banks from March to June. It lays two eggs on a ground scrape. It feeds on insects, worms, crustaceans and molluscs in nearby wet grassland and farmland. It is not gregarious.

General description for Ciconiidae family bird species in the study area: Birds such as painted stork, Asian openbill, black stork, black-necked stork are migratory species, and few are near threatened species. Storks are large, long-necked wading birds with long stout bills. They consume on wide variety of prey items insects, frogs, toads, rodents, snakes, earthworms, mollusks, crustaceans, majority on fishes. They usually forage in flocks when they are not breeding and alone in small groups when it is breeding. In the dry season, the storks usually forage by slowly walking forward with its bill submerged in water while groping for food. During the wet season, this method is used about 40% of the time to catch food. The breeding season lasts from mid-august and continues till February or even March in the study area.

Conservation and management strategy of above-mentioned water bird species: Along with natural predators the major threat to water birds are anthropogenic activities. Moreover, water pollution due to agricultural and industrial chemicals affects the water birds that depend on the rivers for food. Activities like sand mining and movement of fishing boats and tourism boats to the nesting areas might have long-term effects on nesting-islands. Increase and decrease in the level of water in the river which leads to nest flooding and nest predation by dogs. Restricting such activities in the areas where they perch and breed helps in conserving the species. Carrying out census and research projects to know the potential threats and population status of the species in collaboration of local schools, colleges, panchayats and forest department. Engaging the local villagers with forest department for guarding the breeding site will be vital for conserving the species.

3. Soil and water conservation:

The study landscape is predominately an agriculture landscape where soil and water conservation measures are essential for the conservation of biodiversity as well as for preventing the land degradation. Hence, soil and water conservation strategies such as contour trenches should be constructed in areas close to forested habitats. Construction of reservoirs in help in reducing the dependency of water from the river and help in recharging the ground water

Further, methods such as cover cropping, and planting windbreaks of one or more tree or shrub species to provide shelter from wind and to protect soil from erosion should be adopted. Rainwater harvesting structure shall also be developed in selected sites in the designated forest lands which can act as a water source in dry seasons for wildlife species. A survey pertaining to identifying such sites should be conducted in the study landscape with the help of the agriculture department and a research organization with expertise in this domain.

4. Landscape based habitat improvement:

Habitat connectivity analysis in the present study indicated that the landscape has a well connectivity in forested habitat, however due to the forestry practices and human intervention deforestation and habitat fragmentation observed, which may isolated and does not provide a viable corridor for wildlife species. The natural land cover in the study area is under the processes of degradation which possesses rich biological diversity. Hence, considering the variability in land use and land cover, a landscape-based approach should be adopted to improve land productivity and safeguard biodiversity. The best practices pertaining to degraded land rehabilitation and sustainable forest management should be adopted to improve the green cover and the habitats of the wildlife species. The landscape-based habitat improvement becomes critical to articulate vision for conservation with quantifiable objectives that offer unambiguous signposts for measuring progress. To develop landscape-level management strategy it becomes vital to have detailed knowledge of all live forms of the mosaic. So there is a need to conduct a long-term study to assess the overall biodiversity in the landscape to develop a comprehensive habitat management strategy. Fragmentation due to the construction of road and various other intervention of the project will result in habitat destruction for flora and fauna. Suitable species shall be identified for habitat enrichment in consultation with expert research organization (Zoological Survey of India, Kolkata, Indian Council of Forestry Research and Education, Dehradun, Wildlife Institute of India, Dehradun). To identify suitable species for the habitat enrichment, there is a need to conduct long-term studies on the ecology and behavior of the herbivores species occurring in the landscape. Relic habitats should be identified in the landscape for enrichment and improvement.

5. Forest fire management:

Considering the fact that the landscape is disturbed by frequent jhum cultivation and other forest fire practices it is imperative to have stringent fire management strategy. There is a need to adopt a proactive forest fire management strategy by developing a fire management calendar

at range level and by creating new and maintaining old fire lines to prevent large-scale fires. Awareness creation among the locals as well as installation of forest fire vulnerability signage's will be of great help in reducing the forest fire vulnerability in the landscape.

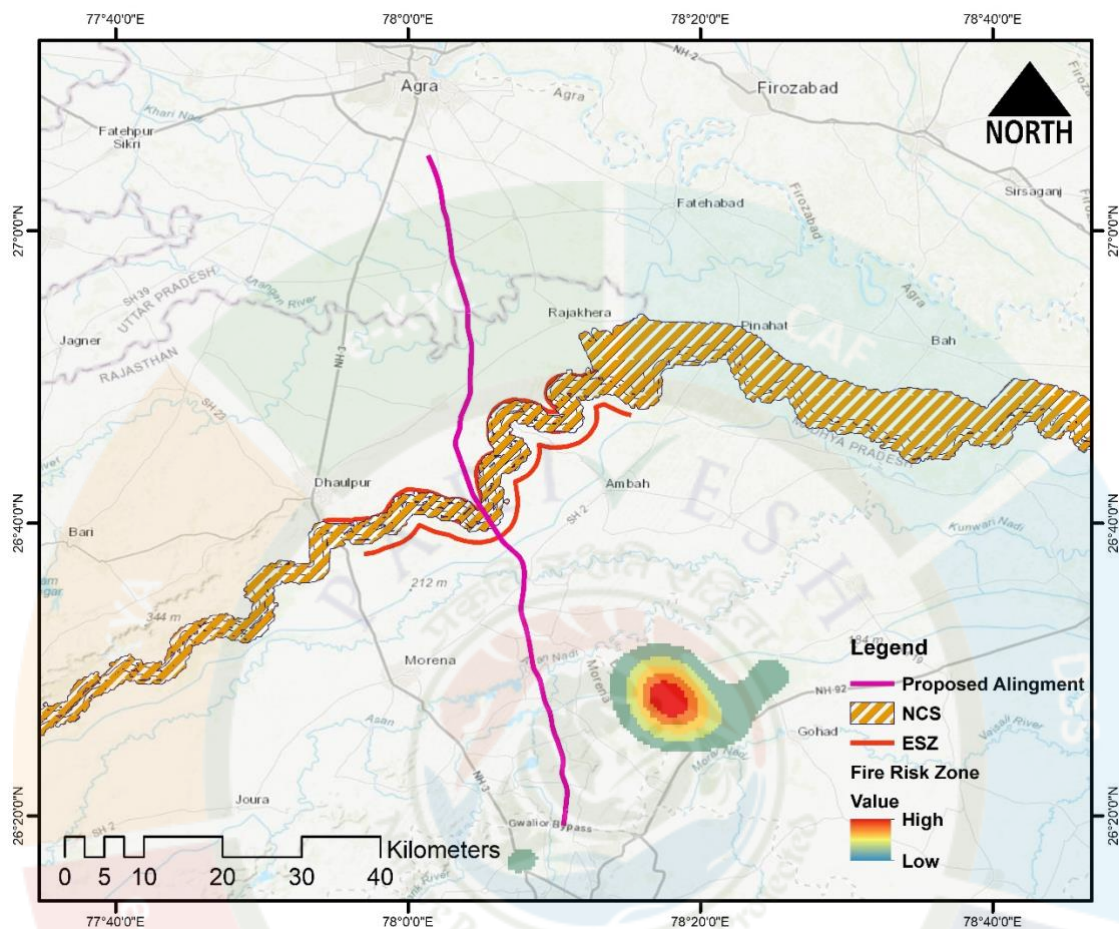


Figure 10: Forest fire hotspot map for the intensive study site

6. Monitoring and Evaluation:

The monitoring and evaluation (M&E) framework is important to ensure the implementation of management strategies suggested in the plan. Monitoring and Evaluation Indicator Framework, in context to the present study is an overarching framework for biodiversity conservation which is intended for assessing the management outputs as intended in the objective of the management plan. The M&E shall be carried out systematically to ensure construction activities comply and adhere to environmental provisions and standard specifications. It is the responsibility of the local Forest Department in collaboration with the National Highway Authority of India to conduct regular monitoring of the project to verify the results of implementation of wildlife management activities suggested in the conservation action plan. The responsibility for mitigation monitoring during the operation phase shall lie with the project authorities. A midterm impact review is also essential for the implementation

of the management plan hence, progress and outcomes of the suggested strategies shall be reviewed once in five years. Furthermore, the project management authority shall hire a third party evaluation/ consultant to report the compliance on activities suggested in the conservation action plan.

7. Sustainable Ecotourism development:

Utilizing ecotourism as an effective tool for conservation and development helps in sustainable change in the area. Implementing workshops in the department and local people and bringing awareness about the importance and role of developing ecotourism play a vital role in sustainable development of riverine ecosystem. Ecotourism is also developed through cultural tourism activities so that it is aligned with ecotourism development which is based on the uniqueness and condition of existing areas through development by empowering communities to develop socially and improve social status in society. Responsible travel to the natural areas where the fauna recites and restricting tourism at the breeding sites of the birds, Gharials and muggers should be implemented. However, the existing tourism in the form of boat safaris under Chambal Dholpur Bridge run by both the Rajasthan and MP states and Chambal safari in Palighat run by rajasthan are not well developed. Another proposed tourism at Barai, in the Bhind district. Developing an eco-friendly resort for tourists and a safe eco-friendly boating helps in maintaining the distinctiveness of the area. By the development of eco-friendly resorts employment and income increases and it plays a vigorous role in reduction of illegal sand mining at the river banks considering the fragile nature of riverine ecosystem. Popularizing these Tourism sites using media, posters, banners, with online departmental websites, online portal service for booking etc. as in present scenarios only limited peoples are aware about the tourism and also scare due to presence of illegal sand mining mafias.

4.1. Budgetary allocation for implementing the conservation action plan.

The wildlife conservation action plan has been designed considering the impacts of the proposed alignment on the landscape biodiversity. The actions suggested in the plan need to be implemented by two agencies, i.e., the project authorities (National Highway Authority of India) and the Divisional Forest Office of Rajasthan, Madhya Pradesh and Uttar Pradesh.

Activities to be done by NHAI

The details of the activities that need to be implemented by the NHAI are given below:-

1. Creation of an elevated Wildlife Suspension bridge/Cable stayed bridge without disturbing the basking /breeding ground for of Critically Endangered species from **Chainage no. 46+910 to 47+510** and viaduct from **Chainage no. 45+922 to 46+910 and 47+510 to 47+614** thus provide safe ravine habitat. Further sound and light barriers along with net structure on both the side of the bridge prevent dumping of waste material in river from the bridge should also be installed in all the mentioned structure. However it is also crucial to schedule construction activities with great care, specifically **avoiding the nesting period i.e. March-May**, for both Indian Gharial and Marsh crocodile. These will minimize potential disturbance to these species during their sensitive reproductive phase.
2. Creation of Cattle underpass/viaducts for wildlife species specified in the chainage no. in table 2 of the proposed alignment. Underpass/viaduct for providing safe passage by enlarging the size of planned culvert at given chainage. This recommended underpass should have at least 4m height, and minimum 5m width and length equal to the width of the proposed road and should be rectangular in shape. Also, sound and light barriers should also be installed in all the mentioned structures.

Table:2: Construction of Underpass in the following Chainage no. in study area.

Sl. No.	Proposed Structures	Chainage No.
1	Cattle Underpass	33+025 to 33+030
2	Cattle Underpass	35+914 to 35+919
3	Cattle Underpass	38+500 to 38+505
4	Viaduct	38+595 to 38+855
5	Viaduct	39+067 to 39+483
6	Viaduct	39+980 to 40+500
7	Viaduct	41+148 to 41+372
8	Viaduct	45+922 to 46+910
9	Suspension bridge/Cable stayed bridge	46+910 to 47+510
10	Viaduct	47+510 to 47+614
11	Viaduct	48+292 to 48+708
12	Cattle Underpass	80+750 to 80+755

3. Installation of fencing on both the side of the road passing through agricultural and badland areas will prevent roadkill's in the proposed alignments.
4. Installation of signage about conservation of wildlife and forest fire do's and don'ts.
5. Signages for the speed limit at necessary locations.

The budget for implementing the above shall be included in the planned project by the NHAI.

Activities to be done by respective Divisional Forest Office

The management activities that need to be implemented by the DFO, are below:-

1. The foremost step will be completing the process of rationalization of boundaries and demarcation based on a combination of the gazette notifications, GIS based approach for all three states. This will further helpful in smooth function and helpful for conservation and management of NCS by the States departments.
2. Habitat improvement in selected segments of the proposed alignment. Area base habitat management including habitat improvement through adopting agroforestry plantation models, plantation of aonla at the agro-forestry interface, promotion of fruit bearing plants such as Black plum (*Syzygium cumini*), Ber (*Zizypus mauritiana*), Tamarind (*Tamarindus indica*) Arjun Indian almond (*Terminalia arjuna*), and large canopy trees like Neem (*Azadirachta indica*), Axlewood (*Anogeissus latifolia*) in the study landscape with sustainable plantation so that scrubland habitat remain intact for habitat improvement for the wildlife species. Further creation of check dams, waterholes can help in water scarcity during the summer season.
3. Conservation and management activities for the schedule-I species (Indian Gharial, Mugger/Marsh crocodile, Gangetic River Dolphin, Smooth Coated Otter, Hard- and Soft-shelled Turtles, Leopard, Jungle cat, Striped Hyaena, Golden Jackel, Indian wolf, Sambar, Bengal Monitor lizard, Indian Peafowl, Water bird species, Black-headed Ibis, Great thick-knee, Charadriidae family bird species, and Ciconiidae family bird as per the plan suggested.
4. Development of Strict Action Plans (SAP) and creation of special task force (STF) team governing by both central states departments for actively monitoring and the illegal sand mining activities destroying the critical nesting/breeding ground threatened species in NCS.
5. The already completed and ongoing projects mentioned above the Chambal River has already reduced the water flow affecting the habitat of Gharial and Gangetic dolphin in NCS. Thus it is an important concern and continuous monitoring and regulating of water flow should be checked by respective states forest department.

6. Constructions of an eco-friendly resorts for tourists and a safe eco-friendly boating near the Tourism spots with onboarding the Tourism departments helps in maintaining the distinctiveness of the area. By the development of eco-friendly resorts employment and income increases and it plays a vigorous role in reduction of illegal sand mining at the river banks considering the fragile nature of riverine ecosystem.
7. To Popularize the Tourism sites using media, posters, banners, with online departmental websites, online portal service for booking etc. as in present scenarios only limited peoples are aware about the tourism and scare due to presence of illegal sand mining mafias.
8. Soil and water conservation strategies in selected sites should be based on the topography of the area. Best practices such creations of reservoir, water holes, and canals, construction of check dams, and at least two rainwater harvesting structures in the nearby hill belt in the designated forest land. These strategies should be adopted by following the principles of integrated watershed management. Moreover, the site selection shall be done based on understanding of the land slope, existing water ways, and roads so that the runoff is effectively managed. For example, in Rajasthan State of India “Chauka System” found to be effective in channelizing runoff, recharging soil moisture, augment ground water, and enhancing land productivity and biodiversity conservation.
9. To prevent and controlling forest fires in the landscape the Divisional Forest Officer should create new fire lines as well as maintain the existing fire lines and other structures ahead of fire season. Furthermore, awareness shall be created among the communities about the impacts of fire and the do’s and don’ts to mitigate fires. Further, signage should be in installed in most vulnerable sites. In case of the proposed alignment road such types of signage shall be installed after an interval of 5km in the areas near to forests to prevent accidental fires.
10. Training programmes for the local communities for rural enterprise development, wildlife monitoring training programmes dealing with the dependency of local villagers on the resources available from the sanctuary by developing alternate livelihood options by the Forest Department frontline staff, and capacity enhancement of the Forest Division through procurement of equipment’s necessary for monitoring and animal handling to mitigate human-wildlife conflicts.
11. Monitoring and Evaluation of the progress towards achieving the management recommendations as well as the impacts of the strategies through hiring a third-party agency once in three years.

Proposed Budget for interventions to be implemented by Divisional Forest Office,

S no.	Activity	Estimated cost (in lakh)
1	Habitat improvement in selected segments of the proposed alignment (plantation models)	120.00
2	Conservation and management activities for the schedule-I species.	70.00
3	Soil and water conservation strategies.	50.00
5	Forest fires management in the landscape.	30.00
6	Training and awareness programmes.	35.00
7	Special Task force formation	80.00
8	Monitoring and Evaluation cost.	30.00
9	Sustainable Ecotourism	120.00
	Total	Rs. 535 lakh (5.35 Crore)

References

- Agarwal KK, Singh IB, Sharma M et al (2002) Extensional tectonic activity in the cratonward parts (peripheral bulge) of the Ganga Plain foreland basin, India. *Int J Earth Sci* 91:897–905. doi:10.1007/s00531-002-0265-z
- Ahmad E (1968) Distribution and causes of gully erosion in India. In: 21st international geographical congress. New Delhi, p Section IV.
- Andrews, A., 1990. Fragmentation of habitat by roads and utility corridors: a review. *Australian Zoologist* 23, 130–141.
- Angelsen, A., Kaimowitz, D., 1999. Rethinking the causes of deforestation: lessons from economic models. *The World Bank Research Observer* 14, 73–98.
- Ashley, E. Paul; Robinson, Jeffrey T. (1996). "Road mortality of amphibians, reptiles and other wildlife on the Long Point Causeway, Lake Erie, Ontario". *Canadian Field Naturalist*. 110 (3): 403–412
- Bennett, A.F., 1991. Roads, roadsides and wildlife conservation: a review. In: Saunders, D.A., Hobbs, R.J. (Eds.), *Nature Conservation 2: The Role of Corridors*. Chipping Norton, Australia, Surrey Beatty, pp. 99–117.
- Carr, L.W., Fahrig, L., Pope, S.E., 2002. Impacts of landscape transformation by roads. In: Gutzwiller, K.J. (Ed.), *Applying Landscape Ecology in Biological Conservation*. Springer-Verlag, New York, pp. 225–243.
- DeCelles PG (2011) Foreland basin systems revisited: variations in response to tectonic settings. In: Busby C, Azor A (eds) *Tectonics of sedimentary basins*. John Wiley & sons, New York, pp 405–426.
- Forman, R.T.T., Alexander, L.E., 1998. Roads and their major ecological effects. *Annual Review of Ecology and Systematics*, 207–232.
- Gibbs J. P. and Shriver W. G. 2002. Estimating the effects of road mortality on turtle populations. *Conservation Biology* 16: 1647-1652.
- Gibling MR, Tandon SK, Sinha R, Jain M (2005) Discontinuity bounded alluvial sequences of the Southern Gangetic Plains, India: aggradation and degradation in response to monsoonal strength. *J Sediment Res* 75:369–385. doi:10.2110/jsr.2005.029

- Havlick, D.G., 2002. No Place Distant: Roads and Motorized Recreation on America's Public Lands. Island Press, Washington.
- Jeganathan, P., Green, R. E., Norris, K., Vogiatzakis, I. N., Bartsch, A., Wotton, S. R., & Rahmani, A. R. (2004). Modelling habitat selection and distribution of the critically endangered Jerdon's courser *Rhinoptilus bitorquatus* in scrub jungle: an application of a new tracking method. *Journal of Applied Ecology*, 41(2), 224-237.
- Kušta, Tomáš; Keken, Zdeněk; Ježek, Miloš; Holá, Michaela; Šmíd, Petr (2017). "The effect of traffic intensity and animal activity on probability of ungulate-vehicle collisions in the Czech Republic". *Safety Science*. 91: 105–113.
- Rajeshkumar N. and Balasubramanian P., 2011. Habitat use and food habits of Indian Peafowl *Pavo cristatus* in Anaikatty hills, Western Ghats. *Indian Birds*, 7(5), pp.125-127.
- Sharma HS (1968) Genesis of Ravines of the Lower Chambal Valley, India. In: 21st international geographical congress. New Delhi, p Section IV.
- Sharma HS (1979) The physiography of the lower chambal valley and its agricultural development: a study in applied geomorphology. Concept Publishing, New Delhi.
- Spellerberg, I.F., 1998. Ecological effects of roads and traffic: a literature review. *Global Ecology and Biogeography* 7, 317–333.
- Theobald, D.M., Miller, J.R., Hobbs, N.T., 1997. Estimating the cumulative effects of development on wildlife habitat. *Landscape and Urban Planning* 39, 25–36.
- Trombulak, S.C., Frissell, C.A., 2002. Review of ecological effects of roads on terrestrial and aquatic communities. *Conservation Biology* 14, 18– 30.



Annexure

Annexure 1: Checklist of avian fauna of the studied landscape.

SL.NO	FAMILY	COMMON NAME	SCIENTIFIC NAME	IUCN	WPA
1	Accipitridae	Shikra	<i>Accipiter badius</i>	Least Concerned	Schedule I
2	Accipitridae	Bonelli's Eagle	<i>Aquila fasciata</i>	Least Concerned	Schedule I
3	Accipitridae	Tawny Eagle	<i>Aquila rapax</i>	Vulnerable	Schedule I
4	Accipitridae	White-eyed Buzzard	<i>Butastur teesa</i>	Least Concerned	Schedule I
5	Accipitridae	Eurasian Buzzard	<i>Buteo buteo</i>	Least Concerned	Schedule I
6	Accipitridae	Long-legged Buzzard	<i>Buteo rufinus</i>	Least Concerned	Schedule I
7	Accipitridae	Short-toed Eagle	<i>Circaetus gallicus</i>	Least Concerned	Schedule I
8	Accipitridae	Pallid Harrier	<i>Circus macrourus</i>	Near-threatened	Schedule I
9	Accipitridae	Greater Spotted Eagle	<i>Clanga clanga</i>	Vulnerable	Schedule I
10	Accipitridae	Indian Spotted Eagle	<i>Clanga hastata</i>	Vulnerable	Schedule I

11	Accipitridae	Black-winged Kite	<i>Elanus caeruleus</i>	Least Concerned	Schedule II
12	Accipitridae	Booted Eagle	<i>Hieraaetus pennatus</i>	Least Concerned	Schedule I
13	Accipitridae	Black Kite	<i>Milvus migrans</i>	Least Concerned	Schedule II
14	Accipitridae	Egyptian Vulture	<i>Neophron percnopterus</i>	Endangered	Schedule I
15	Accipitridae	Changeable Hawk Eagle	<i>Nisaetus cirrhatus</i>	Least Concerned	Schedule I
16	Accipitridae	Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>	Least Concerned	Schedule II
17	Accipitridae	Crested Serpent Eagle	<i>Spilornis cheela</i>	Least Concerned	Schedule I
18	Aegithinidae	Common Iora	<i>Aegithina tiphia</i>	Least Concerned	Schedule II
19	Alaudidae	Oriental SkyLark	<i>Alauda gulgula</i>	Least Concerned	Schedule II
20	Alaudidae	Ashy-crowned Sparrow Lark	<i>Eremopterix griseus</i>	Least Concerned	Schedule II
21	Alaudidae	Crested Lark	<i>Galerida cristata</i>	Least Concerned	Schedule II
22	Alcedinidae	Common Kingfisher	<i>Alcedo atthis</i>	Least Concerned	Schedule II
23	Alcedinidae	Pied Kingfisher	<i>Ceryle rudis</i>	Least Concerned	Schedule II
24	Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Least Concerned	Schedule II
25	Anatidae	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	Least Concerned	Schedule II
26	Anatidae	Bar-headed Goose	<i>Anser indicus</i>	Least Concerned	Schedule II
27	Anatidae	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Least Concerned	Schedule II
28	Anatidae	Ruddy Shelduck	<i>Tadorna ferruginea</i>	Least Concerned	Schedule II
29	Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	Near-threatened	Schedule I
30	Apodidae	Little Swift	<i>Apus affinis</i>	Least Concerned	Not listed
31	Apodidae	Asian Palm Swift	<i>Cypsiurus balasiensis</i>	Least Concerned	Schedule II
32	Ardeidae	Grey Heron	<i>Ardea cinerea</i>	Least Concerned	Schedule I
33	Ardeidae	Intermediate Egret	<i>Ardea intermedia</i>	Least Concerned	Schedule I

34	Ardeidae	Indian Pond Heron	<i>Ardeola grayii</i>	Least Concerned	Schedule I
35	Ardeidae	Cattle Egret	<i>Bubulcus ibis</i>	Least Concerned	Schedule I
36	Ardeidae	Striated Heron	<i>Butorides striata</i>	Least Concerned	Schedule I
37	Ardeidae	Little Egret	<i>Egretta garzetta</i>	Least Concerned	Schedule I
38	Burhinidae	Great Thick-knee	<i>Esacus recurvirostris</i>	Near-threatened	Schedule II
39	Campephagidae	Large Cuckooshrike	<i>Coracina javensis</i>	Least Concerned	Schedule II
40	Campephagidae	Small Minivet	<i>Pericrocotus cinnamomeus</i>	Least Concerned	Schedule I
41	Campephagidae	White-bellied Minivet	<i>Pericrocotus erythropygus</i>	Least Concerned	Schedule II
42	Charadriidae	Little Ringed Plover	<i>Charadrius dubius</i>	Least Concerned	Schedule II
43	Charadriidae	Common Ringed Plover	<i>Charadrius hiaticula</i>	Least Concerned	Schedule II
44	Charadriidae	River Lapwing	<i>Vanellus duvaucelii</i>	Near-threatened	Schedule II
45	Charadriidae	Red-wattled Lapwing	<i>Vanellus indicus</i>	Least Concerned	Schedule II
46	Ciconiidae	Asian Openbill	<i>Anastomus oscitans</i>	Least Concerned	Schedule I
47	Ciconiidae	Woolly-necked Stork	<i>Ciconia episcopus</i>	Vulnerable	Schedule I
48	Ciconiidae	Black Stork	<i>Ciconia nigra</i>	Least Concerned	Schedule II
49	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	Near-threatened	Schedule II
50	Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>	Least Concerned	Schedule II
51	Cisticolidae	Plain Prinia	<i>Prinia inornata</i>	Least Concerned	Schedule II
52	Cisticolidae	Ashy Prinia	<i>Prinia socialis</i>	Least Concerned	Schedule II
53	Cisticolidae	Jungle Prinia	<i>Prinia sylvatica</i>	Least Concerned	Schedule II
54	Columbidae	Rock Dove	<i>Columba livia</i>	Least Concerned	Schedule II
55	Columbidae	Spotted Dove	<i>Streptopelia chinensis</i>	Least Concerned	Schedule II
56	Columbidae	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Least Concerned	Schedule II
57	Columbidae	Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Least Concerned	Schedule II
58	Columbidae	Laughing Dove	<i>Streptopelia senegalensis</i>	Least Concerned	Schedule II

59	Columbidae	Red Collared Dove	<i>Streptopelia tranquebarica</i>	Least Concerned	Schedule II
60	Columbidae	Yellow-footed Green Pigeon	<i>Treron phoenicopterus</i>	Least Concerned	Schedule II
61	Coraciidae	Indian Roller	<i>Coracias benghalensis</i>	Least Concerned	Schedule II
62	Corvidae	Large-billed Crow	<i>Corvus macrorhynchos</i>	Least Concerned	Schedule II
63	Corvidae	House Crow	<i>Corvus splendens</i>	Least Concerned	Schedule II
64	Corvidae	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Least Concerned	Schedule II
65	Cuculidae	Greater Coucal	<i>Centropus sinensis</i>	Least Concerned	Schedule II
66	Cuculidae	Asian Koel	<i>Eudynamis scolopaceus</i>	Least Concerned	Schedule II
67	Cuculidae	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	Least Concerned	Schedule II
68	Dicruridae	White-bellied Drongo	<i>Dicrurus caerulescens</i>	Least Concerned	Schedule II
69	Dicruridae	Ashy Drongo	<i>Dicrurus leucophaeus</i>	Least Concerned	Schedule II
70	Dicruridae	Black Drongo	<i>Dicrurus macrocercus</i>	Least Concerned	Schedule II
71	Estrildidae	Indian Silverbill	<i>Euodice malabarica</i>	Least Concerned	Schedule II
72	Estrildidae	Chestnut Munia	<i>Lonchura malacca</i>	Least Concerned	Schedule II
73	Estrildidae	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Least Concerned	Schedule II
74	Estrildidae	White-rumped Munia	<i>Lonchura striata</i>	Least Concerned	Schedule II
75	Falconidae	Common Kestrel	<i>Falco tinnunculus</i>	Least Concerned	Schedule II
76	Glareolidae	Little Pratincole	<i>Glareola lactea</i>	Least Concerned	Schedule II
77	Jacaniidae	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Least Concerned	Schedule II
78	Jacaniidae	Bronze-winged Jacana	<i>Metopidius indicus</i>	Least Concerned	Schedule II
79	Laniidae	Brown Shrike	<i>Lanius cristatus</i>	Least Concerned	Schedule II
80	Laniidae	Great Grey Shrike	<i>Lanius excubitor</i>	Least Concerned	Schedule II
81	Laniidae	Long-tailed Shrike	<i>Lanius schach</i>	Least Concerned	Schedule II
82	Laniidae	Bay-backed Shrike	<i>Lanius vittatus</i>	Least Concerned	Schedule II

83	Laridae	Brown-headed Gull	<i>Chroicocephalus brunnicephalus</i>	Least Concerned	Schedule II
84	Laridae	Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Least Concerned	Schedule II
85	Laridae	Indian Skimmer	<i>Rynchops albicollis</i>	Endangered	Schedule I
86	Laridae	Black-bellied Tern	<i>Sterna acuticauda</i>	Endangered	Schedule I
87	Laridae	River Tern	<i>Sterna aurantia</i>	Vulnerable	Schedule I
88	Laridae	Little Tern	<i>Sternula albifrons</i>	Least Concerned	Schedule I
89	Leiothrichidae	Large Grey Babbler	<i>Argya malcolmi</i>	Least Concerned	Schedule I
90	Leiothrichidae	Jungle Babbler	<i>Turdoides striata</i>	Least Concerned	Schedule II
91	Meropidae	Green Bee-eater	<i>Merops orientalis</i>	Least Concerned	Schedule II
92	Meropidae	Blue-tailed Bee-eater	<i>Merops philippinus</i>	Least Concerned	Schedule II
93	Motacillidae	Paddyfield Pipit	<i>Anthus rufulus</i>	Least Concerned	Schedule II
94	Motacillidae	White Wagtail	<i>Motacilla alba</i>	Least Concerned	Schedule II
95	Motacillidae	Grey Wagtail	<i>Motacilla cinerea</i>	Least Concerned	Schedule II
96	Motacillidae	Citrine Wagtail	<i>Motacilla citreola</i>	Least Concerned	Schedule II
97	Motacillidae	Western Yellow Wagtail	<i>Motacilla flava</i>	Least Concerned	Schedule II
98	Motacillidae	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Least Concerned	Schedule II
99	Muscicapidae	Oriental Magpie Robin	<i>Copsychus saularis</i>	Least Concerned	Schedule II
100	Muscicapidae	Verditer Flycatcher	<i>Eumyias thalassinus</i>	Least Concerned	Schedule II
101	Muscicapidae	Bluethroat	<i>Luscinia svecica</i>	Least Concerned	Schedule II
102	Muscicapidae	Blue Rock Thrush	<i>Monticola solitarius</i>	Least Concerned	Schedule II
103	Muscicapidae	Brown Rock Chat	<i>Oenanthe fusca</i>	Least Concerned	Schedule II
104	Muscicapidae	Black Redstart	<i>Phoenicurus ochruros</i>	Least Concerned	Schedule II
105	Muscicapidae	Pied Bush Chat	<i>Saxicola caprata</i>	Least Concerned	Schedule II

106	Muscicapidae	Siberian Stonechat	<i>Saxicola maurus</i>	Least Concerned	Schedule II
107	Muscicapidae	Indian Robin	<i>Saxicoloides fulicatus</i>	Least Concerned	Schedule II
108	Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>	Least Concerned	Schedule II
109	Oriolidae	Indian Golden Oriole	<i>Oriolus kundoo</i>	Least Concerned	Schedule II
110	Oriolidae	Black-hooded Oriole	<i>Oriolus xanthornus</i>	Least Concerned	Schedule II
111	Pandionidae	Osprey	<i>Pandion haliaetus</i>	Least Concerned	Schedule I
112	Passeridae	House Sparrow	<i>Passer domesticus</i>	Least Concerned	Schedule II
113	Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	Least Concerned	Schedule II
114	Phalacrocoracidae	Great Cormorant	<i>Phalacrocorax carbo</i>	Least Concerned	Schedule II
115	Phalacrocoracidae	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Least Concerned	Schedule II
116	Phasianidae	Grey Francolin	<i>Francolinus pondicerianus</i>	Least Concerned	Schedule II
117	Phasianidae	Indian Peafowl	<i>Pavo cristatus</i>	Least Concerned	Schedule I
118	Picidae	Black-rumped Woodpecker	<i>Dinopium benghalense</i>	Least Concerned	Schedule II
119	Ploceidae	Baya Weaver	<i>Ploceus philippinus</i>	Least Concerned	Schedule II
120	Psittaculidae	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Least Concerned	Schedule II
121	Pteroclididae	Chestnut-bellied Sandgrouse	<i>Pterocles exustus</i>	Least Concerned	Schedule II
122	Pteroclididae	Painted Sandgrouse	<i>Pterocles indicus</i>	Least Concerned	Schedule II
123	Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	Least Concerned	Schedule II
124	Pycnonotidae	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Least Concerned	Schedule II
125	Rallidae	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Least Concerned	Schedule II
126	Rallidae	Eurasian Coot	<i>Fulica atra</i>	Least Concerned	Schedule II
127	Rallidae	Common Moorhen	<i>Gallinula chloropus</i>	Least Concerned	Schedule II
128	Rallidae	Grey-headed Swamphen	<i>Porphyrio porphyrio</i>	Least Concerned	Schedule II

129	Ramphastidae	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Least Concerned	Schedule II
130	Ramphastidae	Brown-headed Barbet	<i>Psilopogon zeylanicus</i>	Least Concerned	Schedule II
131	Recurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	Least Concerned	Schedule II
132	Rhipiduridae	White-browed Fantail	<i>Rhipidura aureola</i>	Least Concerned	Schedule II
133	Scolopacidae	Common Sandpiper	<i>Actitis hypoleucos</i>	Least Concerned	Schedule II
134	Scolopacidae	Green Sandpiper	<i>Tringa ochropus</i>	Least Concerned	Schedule II
135	Strigidae	Spotted Owlet	<i>Athene brama</i>	Least Concerned	Schedule II
136	Strigidae	Brown Fish Owl	<i>Ketupa zeylonensis</i>	Least Concerned	Schedule I
137	Sturnidae	Jungle Myna	<i>Acridotheres fuscus</i>	Least Concerned	Schedule II
138	Sturnidae	Bank Myna	<i>Acridotheres ginginianus</i>	Least Concerned	Schedule II
139	Sturnidae	Common Myna	<i>Acridotheres tristis</i>	Least Concerned	Schedule II
140	Sturnidae	Asian Pied Starling	<i>Gracupica contra</i>	Least Concerned	Schedule II
141	Sturnidae	Rosy Starling	<i>Pastor roseus</i>	Least Concerned	Schedule II
142	Sylviidae	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Least Concerned	Schedule II
143	Threskiornithidae	Red-naped Ibis	<i>Pseudibis papillosa</i>	Least Concerned	Schedule II
144	Threskiornithidae	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	Near-threatened	Schedule II
145	Turdidae	Orange-headed Thrush	<i>Geokichla citrina</i>	Least Concerned	Schedule II
146	Upupidae	Common Hoopoe	<i>Upupa epops</i>	Least Concerned	Schedule II
147	Vangidae	Common Woodshrike	<i>Tephrodornis pondicerianus</i>	Least Concerned	Schedule II
148	Zosteropidae	Oriental White-eye	<i>Zosterops palpebrosus</i>	Least Concerned	Schedule II

Annexure 2: Species list of Mammals, Reptiles and Amphibians documented during the present survey in the study landscape.

Class: Mammalia					
SL.no	Family	Common Name	Scientific Name	IUCN Status	Wildlife Protection Act
1	Sciuridae	Three striped palm squirrel	<i>Funambulus palmarum</i>	LC	Not listed
2	Bovidae	Nilgai	<i>Boselaphus tragocamelus</i>	LC	Schedule II
3	Bovidae	Black Buck	<i>Antilope cervicapra</i>	LC	Schedule I
4	Canidae	Golden jackal	<i>Canis aureus</i>	LC	Schedule I
5	Canidae	Desert fox	<i>Vulpes vulpes pusilla</i>	LC	Schedule I
6	Canidae	Bengal fox	<i>Vulpes bengalensis</i>	LC	Schedule II
7	Canidae	Indian Wolf	<i>Canis lupus pallipes</i>	EN	Schedule I
8	Cercopithecida	Rhesus Macaque	<i>Macaca mulatta</i>	LC	Schedule I
9	Cervidae	Sambar	<i>Rusa unicolor</i>	VU	Schedule I
10	Felidae	Jungle Cat	<i>Felis chaus</i>	LC	Schedule I
11	Felidae	Common Leopard	<i>Panthera pardus</i>	VU	Schedule I
12	Herpestidae	Indian grey mongoose	<i>Herpestes edwardsii</i>	LC	Schedule I
13	Hyaenidae	Striped hyaena	<i>Hyaena hyaena</i>	NT	Schedule I
14	Hystricidae	Indian Crested Porcupine	<i>Hystrix indica</i>	LC	Schedule I
15	Leporidae	Black Naped Hare	<i>Lepus nigricollis</i>	LC	Schedule II
16	Platanistidae	Gangetic River dolphin	<i>Platanista gangetica</i>	EN	Schedule I
17	Suidae	Indian Wild Boar	<i>Sus scrofa cistatus</i>	LC	Schedule II
18	Viverridae	Small Indian Civet	<i>Viverricula indica</i>	LC	Schedule I

Class-Reptilia					
SL.no	Family	Common Name	Scientific Name	IUCN Status	Wildlife Protection Act
1	Geoemydidae	Red Crowned roofed turtle	<i>Batagur kachuga</i>	CR	Schedule I
2	Geoemydidae	Indian roofed turtle	<i>Pangshura tecta</i>	VU	Schedule I
3	Trionychidae	Indian softshell turtle	<i>Nilssonia gangetica</i>	EN	Schedule I
4	Geoemydidae	Indian tent turtle	<i>Pangshura tentoria</i>	LC	Schedule I
5	Gavialidae	Gharial	<i>Gavialis gangeticus</i>	CR	Schedule I
6	Crocodylidae	Mugger	<i>Crocodylus palustris</i>	VC	Schedule I
7	Varanidae	Indian monitor Lizard	<i>Varanus bengalensis</i>	NT	Schedule I
8	Chamaeleonidae	Indian Chameleon	<i>Chamaeleo zeylanicus</i>	LC	Schedule I
9	Gekkonidae	Common house gecko	<i>Hemidactylus frenatus</i>	LC	Not listed
Class-Amphibians					
1	Bufoidea	Common Indian Toad	<i>Duttaphrynus melanostictus</i>	LC	Not listed
2	Dicroglossidae	Indian pond frog	<i>Euphlyctis hexadactylus</i>	LC	Schedule II
3	Dicroglossidae	Indian Bull frog	<i>Hoplobatrachus tigerinus</i>	LC	Schedule II

